

Horn Rapids Landfill 2023 Annual Environmental Monitoring Report

Prepared for
City of Richland



March 2024

ParametriX

Horn Rapids Landfill 2023 Annual Environmental Monitoring Report

Prepared for

City of Richland
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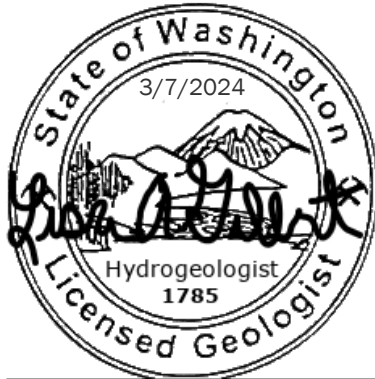
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Certification

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional hydrogeologist licensed to practice as such, is affixed below.



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CHECKLIST FOR GROUNDWATER REPORTING
Municipal Solid Waste Landfills
WAC 173-351-415

Include a signed, completed copy of this checklist with each quarterly and annual report.

Quarterly groundwater reports shall be submitted to the jurisdictional health department and Ecology within 60 days of receipt of analytical data. Annual groundwater reports shall be submitted to the jurisdictional health department and Ecology by April 1 of each year.

RCW 18.220 requires that groundwater reports are stamped by a licensed geologist or by a professional engineer with the appropriate background in groundwater.

1 st <input type="checkbox"/>	2 nd <input type="checkbox"/>	3 rd <input type="checkbox"/>	4 th <input checked="" type="checkbox"/>	YEAR: <u>2023</u>	Reference (section, subsection)	Included in this report	Location – page # or appendix #
Quarterly Groundwater Reports: 173-351-415 (2) plus the referenced section							
Groundwater monitoring data						<input checked="" type="checkbox"/>	Appendix A
Statistical results and/or trends						<input checked="" type="checkbox"/>	Page 4-2 to 4-6
Descriptive statistics					420, (1)	<input checked="" type="checkbox"/>	Appendix E
Statistical tests					420, (2)	<input checked="" type="checkbox"/>	Appendix D
Notification of statistical increase (if applicable)					420, (4)	<input checked="" type="checkbox"/>	Page 3-1
Notification of concentrations above GWQs						<input checked="" type="checkbox"/>	Tables 3-1 and 3-2
Static water level readings						<input checked="" type="checkbox"/>	Appendix G
Potentiometric surface elevation maps depicting flow direction						<input checked="" type="checkbox"/>	Appendix G
Flow rate – calculated						<input checked="" type="checkbox"/>	Page 5-1
Cation-anion balances					430, (5a)	<input checked="" type="checkbox"/>	Appendix F
Explanation of greater than 5% (or 10%) difference if needed					430, (5a)	<input checked="" type="checkbox"/>	Page 4-7 to 4-8
Trilinear diagrams					430, (5b)	<input checked="" type="checkbox"/>	Appendix F
Leachate analyses (if applicable)						<input checked="" type="checkbox"/>	Page 8-1
Data submitted in electronic format for Environmental Information Management System						<input checked="" type="checkbox"/>	Submitted
Also, the Department of Ecology requests that you include a complete copy of the lab report with each quarterly report.						<input checked="" type="checkbox"/>	Appendix B
Annual Groundwater Reports: 173-351-415 (1) YEAR: 2023							
Summary of statistical results and/or trends						<input checked="" type="checkbox"/>	
Summary of groundwater flow rate and direction for the year						<input checked="" type="checkbox"/>	
Copy of all potentiometric maps for the year						<input checked="" type="checkbox"/>	
Summary geochemical evaluation						<input checked="" type="checkbox"/>	

Lisa A. Ditt

March 2024

Horn Rapids

Signature of Report Author

Date

Landfill

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Acronyms and Abbreviations

BFHD	Benton-Franklin Health District
bgs	below ground surface
City Facility	275-acre parcel of City-owned property
City	City of Richland Public Works Department
DO	dissolved oxygen
DCA	Dichloroethane
DCE	Dichloroethene
Ecology	Washington Department of Ecology
EPA's	U.S. Environmental Protection Agency
FS	Feasibility Study
ft	feet
GWQSSs	Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200-040)
IHS	Indicator Hazardous Substances
LFG	landfill gas
MCLs	Maximum Contaminant Levels (WAC 246-290-310)
mg/L	milligrams per liter
MSW	municipal solid waste
MTCA	Model Toxics Control Act (Chapter 173-340 WAC)
New Landfill	104-acre landfill expansion
Old Landfill	46-acre historical landfill
ORP	oxidation-reduction potential
ORV	off-road vehicle
PCE	tetrachloroethene
Permit	Solid Waste Permit
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RNG	renewable natural gas
TCE	trichloroethene
TDS	total dissolved solids
TOC	total organic carbon
UTLs	Upper Tolerance Limits
VC	vinyl chloride
VOCs	volatile organic compounds

1. Introduction

This report presents the 2023 results of environmental sampling and analysis for groundwater, landfill gas (LFG), and leachate at the Horn Rapids Landfill. The 2023 quarterly groundwater sampling events were conducted in March, June, September, and December, and included the annual vadose zone inspection and leachate pond sampling. The LFG collection system was monitored monthly and the gas probes were monitored quarterly. Groundwater sampling was conducted by Parametrix personnel and gas probe monitoring was conducted by City of Richland Public Works Department (City) personnel in accordance with Operating Permit No. BFHD 19-17 MSWLF issued by the Benton-Franklin Health District (BFHD). The site layout is presented on the Facility Plan (Figure 1-1) and monitoring well and gas probe locations are shown on Figures 1-2 and 1-3. Leachate and lysimeter sampling points are shown in Figure 1-4.

The following terminology related to the Horn Rapids Landfill has been developed, as further described in Section 2:

- **City Facility:** 275-acre permitted waste site, including landfill, customer transfer station, and compost facility on a parcel dedicated to these uses.
- **Landfill:** 46-acre permitted area where municipal solid waste (MSW) was placed between the 1970's and 2020 within the City Facility. This is now referred to as the Old Landfill and does not have a bottom liner.
- **City Property:** Contiguous property owned by the City of Richland, including the City Facility (approximately 1,820 total acres), most of which is being marketed for various forms of development.
- **Expansion:** 104-acre lined expansion of the Horn Rapids Landfill located within the City Facility east of the Landfill where waste placement into Phase 1 began in 2020. This is now referred to as the New Landfill. Phase 1 of the New Landfill contains a bottom liner.

2. Background

2.1 Horn Rapids Landfill Setting

The Horn Rapids Landfill is owned and operated by the City. It is located within the city limits of Richland, Washington in a rural area bounded by Twin Bridges Road on the west, Horn Rapids Road on the north, and State Route 240 on the south.

The Horn Rapids Landfill is located within the southwest quadrant of a larger 275-acre parcel of City-owned property (City Facility) that includes the 46-acre historical landfill (Old Landfill), a support facility, a 9-acre composting facility, a customer service transfer station that includes a small household hazardous waste receiving area, and the 104-acre landfill expansion (New Landfill) permitted for disposal of MSW, which began operation in the fall of 2020.

The City also owns contiguous property (City Property) to the west, south and east of the City Facility (a total of approximately 1,820 total acres), with the exception of several small privately-owned parcels, two located along the southwest corner of the City Facility, and one in the northeast corner of the City Facility. Immediately east of the City Facility are circle-irrigated agricultural fields used to grow alfalfa hay, corn, and potatoes. The City Property immediately west of the City Facility has been developed as an off-road vehicle (ORV) park, which includes a road-racing track and a motocross track facility. Additional agricultural fields are located further west and northwest. The remaining City Property south and southeast of the City Facility is undeveloped. Figure 1-2 shows the portion of the City Property that includes the groundwater monitoring wells.

The Facility Plan (Figure 1-1) shows the City Facility boundary, the Old Landfill, the New Landfill, current fill area (Phase 1) and other City Facility features, and monitoring locations including gas probes and groundwater monitoring wells.

2.2 Landfill Description

The Old Landfill began receiving MSW in 1974. The Old Landfill historically accepted only municipal wastes and was initially developed by placing waste into a series of north-south oriented trenches in the Phase 1 western portion of the Landfill. The waste depths in the trenches ranged from 12 to 30 feet (ft).

The Old Landfill (refuse) boundary is shown on Figure 1-1. Phase 1 (the western portion) of the Old Landfill was closed in 2011. From 2005 to 2010, Phase 1 of the Old Landfill was filled and graded to the closure grading plan. During the 2011 construction season, Phase 1 closure was installed over the western portion of the Old Landfill, which included installation of an active LFG system.

MSW was accepted in Phase 2 of the Old Landfill through September 2020. Closure of the Phase 2 Old Landfill began with LFG extraction well installations in 2021, closure cover completion in July 2023, and gas extraction beginning in late July 2023. MSW is currently being placed in Phase 1 of the New Landfill in the eastern portion of the City Facility.

Leachate generated at Phase 1 of the New Landfill is being collected via a network of perforated pipes installed above the liner and transmitted to a leachate storage and evaporation pond located north of Phase 1 (see Figure 1-1). The location and details of the leachate pond and leak detection sump are shown on Figure 1-4.

2.3 Hydrogeologic Setting

Groundwater in the uppermost aquifer occurs under water table conditions in the sand, silt and gravel sediments of the middle Ringold Formation, and the aquifer thickness is approximately 80 to 110 ft (Parametrix 2017b). The water table beneath the City Facility occurs at depths of approximately 75 to 110 ft below ground surface (bgs) and elevations of approximately 385 to 388 ft NAVD88, and typically fluctuates less than a foot throughout the year.

Regionally, groundwater flow has been documented to be eastward toward the Columbia River (Shaw 2003). However, mounding effects of intermittent crop circle irrigation on the City Facility's eastern boundary, artificial recharge to the west, and crop circle irrigation to the west and northwest have caused fluctuations in the groundwater flow direction both temporally and seasonally.

Crop circles have been used to grow alfalfa hay, corn and potatoes since 1987. The source of the irrigation water is reported to be from the Columbia River. Historical groundwater measurements have indicated the flow direction at the City Facility to be locally influenced by groundwater mounding from irrigated crop circles on the City Facility's eastern boundary, deflecting the flow in the eastern portion of the City Facility seasonally toward the southeast.

Historical influences at the ORV park west of the City Facility may have also temporarily altered local flow directions by periodically flooding shallow unlined waterways for boat racing and allowing the water to seep out after each race. The ponds were constructed in 1999 and racing was discontinued in the mid 2000's. Additional sources of artificial recharge include the four septic systems at the ORV park, including a bathroom/shower facility designed for 4,000 uses per day.

Irrigation is conducted seasonally at the Tri City Kart Club, located on the ORV park property immediately west of the Landfill, and this facility also includes a bathroom/shower facility and septic system. Beginning in 2019, groundwater monitoring indicates groundwater mounding is occurring beneath the northern portion of the Landfill immediately downgradient of the Tri City Kart Club and may be related to groundwater recharge from that facility, or potentially to irrigated crop circles further to the west and northwest. The mounding appears to steepen the groundwater gradient on the northwest portion of the Landfill and shift flow in that area slightly more toward the south-southeast.

2.4 Regulatory History

The Horn Rapids Landfill was originally permitted under Washington Administrative Code (WAC) 173-301, and currently operates under the Criteria for Municipal Solid Waste Landfills, Chapter 173-351 WAC and the current Solid Waste Permit (Permit) issued by the BFHD. Groundwater monitoring has been performed since 1987 and is currently documented in quarterly and annual groundwater monitoring reports in accordance with Chapter 173-351 WAC.

Concentrations of volatile organic compounds (VOCs) were detected above the WAC 173-200-040 Groundwater Quality Criteria, including tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride (VC), in groundwater monitoring wells MW-5 and MW-6 installed in 1998 (Shannon & Wilson 1998). By letter dated February 18, 2000, the City notified BFHD and Washington Department of Ecology (Ecology) that statistically significant increases in groundwater contaminants were confirmed during monitoring activities and that the increase in concentration would be addressed through a formal corrective action process under the Model Toxics Control Act (MTCA; Chapter 173-340 WAC). Ecology sent the City a MTCA Early Notice letter on March 6, 2000, and the Horn Rapids Landfill was

placed on Ecology's Confirmed or Suspected Contaminated Sites list for groundwater contamination (Facility/Site No. 308).

In order to comply with MTCA requirements, the City chose to conduct a MTCA independent cleanup of the groundwater by performing a Remedial Investigation (RI) and Feasibility Study (FS). From 2001 through 2004, the City performed an independent, two-phased RI (Shaw Environmental Inc. 2003, 2004), and in 2004, they performed a LFG pilot study/FS (Shaw EMCON/OWT, Inc. 2005). The RI determined that LFG is the likely source of the VOCs impacting groundwater. A LFG extraction system was designed (Parametrix 2005) based on pilot study results that showed LFG extraction would effectively remove VOCs from the subsurface, and closure, which will include an LFG extraction system, is being implemented in two phases.

Between 2005 and 2010, Phase 1 (the western portion of the Old Landfill) was filled and graded to approved closure grading plans (EMCON 1999; Parametrix 2006, 2008, 2011) and was closed in 2011 (Parametrix 2011, 2012a, 2012b) as an independent remedial action in accordance with WAC 173-340. The Phase 1 closure included a final cover and gas collection system consisting of in-refuse wells, collection manifold and laterals, a condensate manhole, and a flare station. The gas collection system was activated in September 2011 to prevent subsurface LFG migration beyond the Landfill perimeter and to remove VOCs from groundwater beneath the Landfill. The collection system has operated 24 hours a day since startup. Phase 2 (the eastern portion of the Old Landfill) was filled to grade in September 2020. Closure began with LFG well installations in 2021 and 2022 and the cover installation and activation of LFG extraction was completed in late July 2023.

In 2013, Ecology requested that additional activities be conducted to comply with the assessment monitoring requirements of WAC 173-351-440. Assessment monitoring is required whenever statistical increases and concentrations above the criteria in WAC 173-200-040, Water Quality Standards for Groundwaters of the State of Washington, have been detected for one or more of the constituents listed in WAC 173-351-990 Appendix I. The following activities were completed:

- During the first quarter of 2014, in addition to the Landfill monitoring wells, samples were collected from an additional monitoring well (W-1) located on the east side of the Weidle neighborhood, south of and more than a mile from the Landfill (Parametrix 2014). Although well W-1 is located in a direction that is not downgradient of the Landfill, the sample was collected to confirm that the Landfill was not impacting drinking water wells in the Weidle neighborhood. The groundwater quality data did not indicate any impacts from the Landfill.
- Testing for WAC 173-351-990 Appendix III parameters was conducted annually in phases between 2014 and 2022. Initially, testing included one well near the active cell and one well at the City Facility boundary in the second quarter of each year. The tested wells were MW-6 and MW-9 (2014), MW-5 and MW-8 (2015), and MW-4 and MW-10 (2016). The results of the testing did not detect any Appendix III compounds other than the VOCs identified during the RI. Therefore, beginning in 2017, annual testing for the additional Appendix III parameters was conducted on a rotating schedule at one of the three wells located closest to the Landfill (MW-5, MW-6, and MW-10), or at wells MW-4, MW-8, and MW-9 located at the City Facility boundary. Testing was conducted at well MW-6 in 2017, MW-10 in 2018, MW-5 in 2019, MW-9 in 2020, MW-8 in 2021, and MW-4 in 2022.

In July 2017, the City entered into an Agreed Order (No. DE 13717) with Ecology in accordance with MTCA to complete a RI/FS. A Remedial Investigation Work Plan (Parametrix 2017d) was approved by Ecology (Ecology 2017) and Phases 1 and 2 of the Work Plan were completed in November 2017 (Parametrix 2018) and November 2018 (Parametrix 2019), respectively. Phase 1 consisted of a push probe investigation to evaluate the furthest extent of the contamination directly downgradient

from the central portion of the contaminant plume, and Phase 2 consisted of installing permanent groundwater monitoring well MW-12 at a location beyond the area of impact to be used as a sentinel well for the assessment monitoring program.

The draft RI Report was submitted to Ecology in January 2021 (Parametrix 2021a) and included quarterly groundwater and LFG monitoring data collected through Second Quarter 2020. The 2021 draft RI Report expanded upon the findings of the previous RI that showed groundwater impacts were primarily related to LFG migration. The updated RI showed the areal extent of groundwater contamination did not extend beyond 500 feet from the City Facility boundary and that nearby groundwater resources had not been impacted. The draft RI Report developed a preliminary list of Indicator Hazardous Substances (IHS) to be further evaluated in the FS under WAC 173-340-703 that consist of total arsenic, 1,1-dichloroethane (1,1-DCA), bromodichloromethane, chloroform, cis-1,2-dichloroethene (cis-1,2-DCE), PCE, TCE, and VC. The draft RI Report also indicated the likely cleanup remedy to be the planned Old Landfill Phase 2 closure and LFG removal combined with monitored natural attenuation of the groundwater contamination.

Ecology's comments on the draft RI Report (Ecology 2022) included the opinion that the extent of VOCs in groundwater is not fully delineated. This conclusion was based in part on the increasing trends in some VOCs observed over the past 5 years in wells MW-3 and MW-4 located along the eastern City Facility boundary, particularly in consideration of the more easterly flow direction observed over the past few years. The presumptive remedy for the site has remained closure of the Old Landfill Phase 2, LFG control, and natural attenuation through biodegradation. The City has agreed to develop an approach and timeframe for evaluating additional monitoring data to assess the effects of the interim remedial measures completed since the closure of the Old Landfill was completed in late July 2023 with installation of the landfill cover and activation of the LFG extraction system. Ecology has agreed with this approach for the timing of the FS. The Phase 2 closure is expected to further reduce the source of VOCs to groundwater and address the increasing trends observed in wells near the City Facility boundary.

Following the period of evaluation, the RI will be completed and a FS report will be prepared in accordance with the MTCA Agreed Order. It is anticipated that the FS will focus on the Old Landfill Phase 2 closure, LFG control, and biodegradation as the likely cleanup remedy.

3. Compliance Status Summary

The compliance status with respect to the requirements of Chapter 173-351 WAC and the Permit is described below for groundwater, LFG, and leachate monitoring.

3.1 Groundwater

Groundwater monitoring is being conducted to evaluate contaminant trends related to the known release from the Landfill being investigated as part of the MTCA RI/FS, and to confirm that contaminants are not being contributed from the Expansion in accordance with Chapter 173-351 WAC.

As summarized in Table 3-1, parameters in groundwater wells were detected during 2023 at concentrations above *Water Quality Standards for Groundwaters of the State of Washington* (GWQs, WAC 173-200-040), and *State Drinking Water Regulations* (Maximum Contaminant Levels [MCLs], WAC 246-290-310). Summaries of the 2023 groundwater monitoring data are provided in Table A-1 (WAC 173-351-990 Appendix I and II parameters) located in Appendix A.

Table 3-2 summarizes the highest 2023 concentration exceeding criteria in upgradient (MW-1, MW-11) or cross gradient (MW-2) wells, and downgradient wells along the edge of the Landfill (MW-5, M-6, and MW-10), along the City Facility boundary (MW-3, MW-4, MW-8, and MW-9), and on City Property (MW-12).

3.2 Landfill Gas

Methane concentrations are monitored in LFG probes at thirteen locations (see Figure 1-3). No methane was detected above the regulatory limit of 5 percent in 2023, except at GP-12-1, a shallow probe located in close proximity to the Old Landfill. A temporary increase in methane in GP-12-1 was observed in the Second Quarter, likely related to the placement of the cover and ensuing LFG buildup prior to the beginning of gas extraction that was initiated in late July. Subsequent quarterly methane concentrations measured in GP-12-1 have been just above 5 percent.

The extent of LFG migration has remained in close proximity to the perimeter of the Landfill and concentrations have not exceeded the 5 percent by volume regulatory action limit at the City Facility boundary.

3.3 Leachate

3.3.1 Old Landfill

Four lysimeters monitor the vadose zone directly beneath the MSW located in the northeast corner of the Old Landfill (see Figure 1-4). A permit modification was granted by BFHD (2017) and beginning in 2017, the vadose zone ports have been checked annually during the third quarter. The ports were checked during the Third Quarter of 2023, and a small amount of leachate was found in Port-4 that was sufficient to collect a sample to be tested for VOCs.

3.3.2 New Landfill

Samples from the Expansion leachate storage and evaporation pond (referred to as the Leachate Pond) have been collected annually beginning in 2022 and were analyzed for WAC 173-351-990 Appendix I and II parameters during the First Quarter 2023 event. Low concentrations of some VOCs were detected in the Leachate Pond sample.

The leak detection sumps of the Leachate Pond and Condensate Evaporation Pond are checked during quarterly groundwater monitoring events for the presence of liquid and the results documented on field data sheets.

Table 3-1. Wells with Parameters above Groundwater Quality Criteria, 2023

Parameter	GWQS		MCL	
	Upgradient or Cross Gradient	Downgradient	Upgradient or Cross Gradient	Downgradient
FIELD PARAMETERS				
Conductivity			MW-1, MW-11	MW-5, MW-6, MW-8, MW-9, MW-10
INORGANICS				
Arsenic	MW-1, MW-2, MW-11	MW-3 through MW-6, MW-8 through MW-10, MW-12		
Chromium	MW-2		MW-2	
Iron		MW-6		MW-6
Manganese		MW-5, MW-6		MW-5, MW-6
Nitrate	MW-2, MW-11	MW-8	MW-2, MW-11	MW-8
Sulfate	MW-11		MW-11	
Total Dissolved Solids (TDS)	MW-1, MW-2, MW-11	MW-5, MW-6, MW-8, MW-9, MW-10	MW-1, MW-2, MW-11	MW-5, MW-6, MW-8, MW-9, MW-10
VOCS				
1,1-Dichloroethane (1,1-DCA)		MW-4, MW-5, MW-6, MW-9, MW-10, MW-12		
Benzene	MW-11			
Bromodichloromethane		MW-8		
Chloroform		MW-3, MW-8		
Tetrachloroethene (PCE)	MW-1	MW-5, MW-6, MW-9, MW-10	MW-1	MW-5, MW-6, MW-9, MW-10
Trichloroethene (TCE)		MW-5, MW-6, MW-9, MW-10		MW-5, MW-6, MW-9, MW-10
Vinyl Chloride (VC)		MW-5, MW-6, MW-10		

MW-1 and MW-11 are upgradient from the Landfill; MW-2 is cross-gradient from the Landfill
 GWQS = Water quality standards for groundwaters of the State of Washington (WAC 173-200-040).
 MCL = Maximum Contaminant Level (WAC 246-290-310)

Table 3-2. Highest Concentrations of Parameters above Groundwater Quality Criteria, 2023

Parameter	Units	GWQS	MCL	Highest Observed Concentration Above Criteria						City Property (MW-12)
				Upgradient or Cross Gradient (MW-1, -2, -11)		Downgradient				
						Adjacent to Landfill (MW-5, -6, -10)		City Facility Boundary (MW -3, -4, -8, -9)		
				Concentration	Well	Concentration	Well	Concentration	Well	
FIELD PARAMETERS										
Conductivity	µmhos/cm	NA	700	1,852	MW-11	1,169	MW-5	1,120	MW-9	
INORGANICS										
Arsenic	mg/L	0.00005	0.01	0.0050	MW-11	0.0035	MW-5	0.0093	MW-3	0.0088
Chromium	mg/L	0.05	0.1	0.17	MW-2					
Iron	mg/L	0.30	0.30			0.67	MW-6			
Manganese	mg/L	0.05	0.05			0.55	MW-5			
Nitrate	mg/L	10	10	42	MW-11			27	MW-8	
Sulfate	mg/L	250	250	340	MW-11					
Total Dissolved Solids (TDS)	mg/L	500	500	1,400	MW-11	910	MW-10	790	MW-8	
VOCS										
1,1-Dichloroethane (1,1-DCA)	µg/L	1	NA			5.0	MW-10	5.5	MW-4	1.9
Benzene	µg/L	1	5	1.9	MW-11					
Bromodichloromethane	µg/L	0.3	80					0.82	MW-8	
Chloroform	µg/L	7	80					12	MW-8	
Tetrachloroethene (PCE)	µg/L	0.8	5	5.8	MW-1	22	MW-6	12	MW-9	
Trichloroethene (TCE)	µg/L	3	5			12	MW-6	5.0	MW-9	
Vinyl Chloride (VC)	µg/L	0.02	2			0.85	MW-6			

MW-1 and MW-11 are upgradient from the Landfill; MW-2 is cross-gradient from the Landfill
 GWQS = Water quality standards for groundwaters of the State of Washington (WAC 173-200-040).
 MCL = Maximum Contaminant Level (WAC 246-290-310)

4. Groundwater Monitoring

This report includes the following information for the 2023 groundwater monitoring, per the Permit and the quarterly and annual reporting requirements delineated in WAC 173-351-415 (1) and (2):

- Laboratory report for the Fourth Quarter 2023 (Appendix B).
- Field measurements and analytical laboratory results for the sampling period (Appendix A).
- Statistical calculations and summaries, including Sen's slope/Mann Kendall tests for trend, (Appendix D); and background groundwater quality statistical summary (Appendix E).
- Notification of results that exceed concentrations above GWQs (Tables 3-1 and 3-2).
- Cation-anion balances, trilinear diagram, and stiff diagram (Appendix F).
- Static water level measurements for each monitoring well and potentiometric surface elevation map depicting groundwater flow rate and direction (Appendix G).

In addition, the report contains the following information required by the Permit and BFHD correspondence:

- Time-series plots for all constituents tested (Appendix C).
- LFG data (Appendix H).

4.1 Sampling and Analysis

Groundwater samples were collected in 2023 from eleven monitoring wells (MW-1 through MW-6, MW-8 through MW-12) in accordance with the Quality Assurance Project Plan (QAPP; Parametrix 2017a).

Groundwater samples were collected with dedicated sampling pumps using a low-flow purging technique. Samples to be tested for dissolved metals were filtered in the field through 0.45-micron filters. A duplicate sample (MW-21) was collected from a different well during each quarterly event according to a rotation schedule.

The groundwater samples were analyzed for the constituents identified in Appendix I and Appendix II of WAC 173-351-990, and for additional natural attenuation parameters added as part of the RI (Shaw Environmental, Inc. 2003). Laboratory analyses were conducted by Eurofins Seattle in Tacoma, Washington, with the exception of the nitrate analyses that were conducted by Energy Northwest in Richland, Washington.

4.2 Groundwater Quality Results and Comparison to Criteria

The laboratory reports and data evaluation memoranda for the First, Second, and Third Quarters of 2023 were presented in previous reports (Parametrix 2023a,b,c). The laboratory report for the Fourth Quarter 2023 is provided in Appendix B. The data were evaluated with respect to the data validation criteria described in the QAPP, and a memorandum is provided in Appendix B.

Table A-1 (WAC 173-351-990 Appendix I and II parameters) in Appendix A provide a summary of the 2023 groundwater monitoring results. The groundwater results are compared to the GWQs (WAC 173-200-040) and MCLs (WAC 246-290-310).

4.3 Groundwater Data Evaluation Approach

Statistical analysis procedures for evaluation of groundwater monitoring data collected at the Horn Rapids Landfill are outlined in the QAPP (Parametrix 2017a) and are summarized in the following paragraphs. The procedures were developed in accordance with U.S. Environmental Protection Agency (EPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities -Unified Guidance* (Unified Guidance; EPA 2009) as recommended in Ecology guidance documents (Ecology 2012).

Prior to 2016, quarterly reports included comparison of the downgradient well data to Upper Tolerance Limits (UTLs) calculated based on background data for upgradient well MW-1 (Parametrix 2016). Statistically significant increases over background were identified in the monitoring wells downgradient of the Old Landfill and confirming a release. As described in Section 2.2, a remedy was partially completed in 2011 with the Old Landfill Phase 1 closure and fully completed in 2023 with the Old Landfill Phase 2 closure. As part of the RI and MTCA cleanup, data have been evaluated to assess the effectiveness of closure activities on mitigating the existing groundwater contamination. The current statistical approach follows assessment monitoring approaches outlined in the QAPP and WAC-173-351-440 and consists of evaluating trends qualitatively using time-series plots and quantitatively using Sen's slope and Mann-Kendall tests.

Corrective action in the form of final closure construction was recently completed at the Old Landfill in July 2023. Monitoring wells in close proximity to the eastern edge of the Landfill (MW-5, MW-6, and MW-10) that have shown significant impacts will continue to be monitored for evidence that VOC concentrations in the wells are continuing to decrease indicating that the LFG system is preventing VOC migration to groundwater.

Wells at the City Facility boundary (MW-3, MW-4, MW-8, and MW-9) and on further downgradient City Property (MW-12) will continue to be monitored to assess the degree of attenuation of VOCs. The City has agreed to develop an approach and timeframe for evaluating additional monitoring data to assess the effects of the interim remedial measures completed.

4.4 Time-Series Plots

Time-series plots are presented in Appendix C for constituents with concentrations exceeding groundwater quality criteria or that historically exceeded UTLs and regularly detected VOCs. The observed trends are discussed separately in the following sections for VOCs and inorganic parameters. In the case where a parameter is tested for but not detected, the "concentration" of that parameter is plotted as one-half of the detection limit and a hollow symbol is shown. The data are separated into two groups, one group with wells along the edge of the Phase 2 Closure (MW-5, MW-6, former well MW-7 (historical data), and MW-10), and a second group with wells along the City Facility boundary (MW-2, MW-3, MW-4, MW-8 and MW-9) and well MW-12 on further downgradient City Property. Upgradient wells MW-1 and MW-11 are included on both sets of plots. VOC data for leachate port samples are included with the wells along the edge of the Phase 2 Closure. Leachate Pond results are included with the wells along the City Facility boundary.

4.4.1 Volatile Organic Compounds

VOCs are an unambiguous indicator of landfill impacts since the typical landfill indicator parameters have been impacted by upgradient sources. The greatest number and highest concentrations of VOCs were detected in the monitoring wells immediately downgradient of the Old Landfill (MW-5, MW-6, and MW-10). Detected VOCs in these wells included 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE,

PCE, TCE, and VC. Overall decreasing trends have occurred in all three wells for 1,1-DCA, and in wells MW-5 and MW-6 for cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC. Cis-1,2-DCE concentrations have increased in MW-10. In well MW-9 located near the southern City Facility boundary, a similar suite of VOCs were detected; concentrations of 1,1-DCA have decreased and cis-1,2-DCE, PCE, and TCE have increased.

Along the eastern City Facility boundary, concentrations of 1,1-DCA, cis-1,2-DCE, and trichlorofluoromethane have shown an overall increase in well MW-4 but have decreased in well MW-3. TCE in well MW-4, and chloroform and bromodichloromethane in well MW-3 have increased over the past few years. Similar increases of chloroform and bromodichloromethane have also been observed in well MW-8 near the southern City Facility boundary.

PCE in concentrations above the GWQS have consistently been detected in upgradient well MW-1, and its presence is likely related to transport by LFG from the Old Landfill. VOCs were not detected in upgradient well MW-11 further north of the Old Landfill, except for benzene in the Third Quarter (0.40 µg/L) and Fourth Quarter (1.9 µg/L). The Fourth Quarter detection of benzene was above the GWQS of 1 µg/L.

In well MW-12, located downgradient south-southeast of the City Facility on City Property, 1,1-DCA, chloroform, and cis-1,2-DCE have been detected. First, Third, and Fourth Quarter concentrations of 1,1-DCA were above the GWQS. Further review of the trends will be performed following additional monitoring events.

4.4.2 Inorganic Parameters

Groundwater quality data collected from wells in the northern portion of the City Facility, in particular upgradient wells MW-1 and MW-11, former upgradient well MW-7, cross gradient well MW-2, and to some extent downgradient well MW-3, indicate that upgradient sources are contributing to area-wide background concentrations of inorganic compounds, including total dissolved solids (TDS), chloride, nitrate, and cations. Data spikes observed in these wells suggest that more than one source may have contributed pulses of contaminants over time.

Likely potential upgradient sources are those that involve application of water that could drive contaminants to the water table, such as agricultural irrigation at the crop circles, and septic systems in the adjacent ORV park. Biosolids applications in the northern portion of the City Facility have also been considered as a source but are not presently believed to have had substantial impacts since the biosolids are dry and applied in thin layers and have largely already been scraped off for other City Facility uses.

Ongoing groundwater monitoring related to the Hanford Reservation has documented occurrences of nitrate plumes in the Richland area with concentrations of greater than 10 milligrams per liter (mg/L) nitrate as N (45 mg/L Nitrate as NO₃). The sources of nitrate have been attributed to agricultural applications of fertilizer to irrigated fields (CH2M 2015). Similarly, chloride can also be leached from fertilizer applications.

In upgradient well MW-1, concentrations of some parameters (including alkalinity, calcium, chloride, magnesium, nitrate, potassium, sodium, sulfate, total organic carbon (TOC), TDS, and conductivity) began increasing in 2000 but stabilized over the past approximately 15 years.

In upgradient well MW-11, concentrations of conductivity and TDS and some inorganic parameters (including calcium, chloride, magnesium, nitrate, and sulfate) began increasing in 2013 but stabilized over the past approximately 5 years.

In cross-gradient well MW-2, located in the northeastern corner of the City Facility, conductivity and TDS and the concentrations of some inorganic parameters (nitrate, calcium, sodium, chloride, magnesium, potassium, and sulfate) were higher than observed historically beginning in the Third Quarter of 2008, although concentrations began decreasing again in 2013.

Concentrations of inorganic parameters in wells located immediately downgradient of the Landfill (MW-5, MW-6, and MW-10) were generally higher than in wells located along the southern City Facility boundary (MW-8 and MW-9). However, concentrations of some inorganic parameters have shown increasing trends in wells MW-8 and MW-9, including calcium, chloride, magnesium, nitrate, and sulfate, although have recently stabilized. Arsenic in well MW-8 has shown an increasing trend in the 2023 monitoring.

Concentrations of inorganic parameters in downgradient wells along the eastern City Facility boundary (MW-3 and MW-4) were comparatively low. In well MW-3, fluctuating trends in some parameters (including chloride, nitrate, potassium, sulfate, and TDS) have been observed; concentrations increased between 2011 and 2016, decreased again until 2019, and have since stabilized. It is not possible to determine if these trends represent natural changes in local groundwater or landfill impacts, since the upgradient wells have shown area-wide impacts by outside sources.

In well MW-12, located further downgradient on City Property, concentrations of inorganic parameters were generally between the range of wells MW-3 and MW-4.

4.5 Sen's Slope Plots and Mann-Kendall Tests

Potential trends in the groundwater data were evaluated using the Mann-Kendall test for trend and Sen's nonparametric estimator of slope (EPA 2009) with the Sanitas™ software (Sanitas Technologies 2023). These tests are well suited to environmental data because there are no distributional assumptions, and missing data (non-detects) or irregularly spaced measurement periods are permitted. The Mann-Kendall test was used to identify whether or not a trend exists, and then the Sen's slope test was used to determine how steeply the concentration levels are changing.

The nonparametric Mann-Kendall test evaluates the significance of temporal trends at the 95 percent confidence level. A negative value for the Mann Kendall S statistic implies that a majority of the differences between earlier and later values are negative, suggestive of a decreasing trend. An S value near zero indicates a roughly equal number of positive and negative differences. This would be expected if the measurements were randomly fluctuating about a constant mean with no apparent trend.

The Sen's slope test is a nonparametric procedure used to estimate the true slope of the data. The advantage of the Sen's slope test over linear regression methods is that it is not greatly affected by gross data errors or outliers and can be computed when data are missing.

Sen's slope and Mann Kendall tests were analyzed for VOCs (Appendix D) using data for the past 10 years (First Quarter 2014 through Fourth Quarter 2023) and 5 years (First Quarter 2019 through Fourth Quarter 2023). A summary of statistically significant trends in parameter concentrations for VOCs are presented in Table 4-1. Only well/parameter cases with greater than 50 percent non-detected values were included in the trend evaluations.

Table 4-1. Statistically Significant Trends in Volatile Organic Compounds Calculated Using the Sen’s Slope and Mann-Kendall Test

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-8	MW-9	MW-10	MW-11	MW-12
Past 10 Years 1Q2014-4Q2023											
1,1-DCA				↑	↓	↓		↓		↓	
1,1-DCE										↓	
1,2-DCA					↓	↓				↓	
1,2-Dichloropropane					↓	↓					
Benzene					↓	↓				↓	
Bromodichloromethane			↑								
Chloroform			↑					↑		↓	
cis-1,2-DCE				↑	↓	↓					
PCE						↓				↑	
trans-1,2-DCE					↓	↓				↑	
TCE				↑	↓	↓					
Trichlorofluoromethane				↑							
Vinyl Chloride (VC)					↓	↓					↓
Past 5 Years 1Q2019-4Q2023											
1,1-DCA						↓		↓		↓	
Benzene						↓					
Chloroform			↑					↑		↓	
cis-1,2-DCE				↑		↓				↑	
trans-1,2-DCE						↓					↑
TCE				↑							
Vinyl Chloride (VC)						↓					
Past 2 Years 1Q2022-4Q2023*											
Chloroform								↑			
TCE				↑							

↑ = Statistically significant increasing trend (positive Mann-Kendall and Sen’s slope)

↓ = Statistically significant decreasing trend (negative Mann-Kendall and Sen’s slope)

Red font indicates significant trend observed consistently for both past 5 years and past 10 years

*2-year trends were analyzed for well/parameter cases with statistically significant increasing trends over the past 5 years

4.5.1 Volatile Organic Compounds

As shown in Table 4-1, a number of VOCs in wells located adjacent to Phase 2 of the Old Landfill (MW-5, MW-6, and MW-10) showed statistically significant decreasing 10-year trends suggesting that the 2011 Phase I closure LFG extraction system is having an overall positive effect on groundwater concentrations. However, only some of these VOCs showed 5-year decreasing trends (1,1-DCA, benzene, cis-1,2-DCE, trans-1,2-DCE, and VC in MW-6; and 1,1-DCA and chloroform in MW-10), indicating that these VOC concentrations have stabilized. Additional decreasing trends are anticipated following the Old Landfill Phase 2 closure.

Wells along the Facility boundary (MW-3, MW-4, and MW-9) showed statistically significant increasing trends in some VOCs for both the past 5 and 10 years (chloroform in wells MW-3 and MW-9; cis-1,2-DCE and TCE in well MW-4). 2-year trends were analyzed for the wells and parameters that had increasing trends over the past 5 years and the only significant upward trends were TCE in well MW-4 and chloroform in well MW-9. This indicates that concentrations of some VOCs in wells located along the Facility boundary may be stabilizing.

Although wells MW-3 and MW-4 are downgradient and adjacent to the current fill area (Figure 1-2), the increasing trends are believed to be related to the Old Landfill release and not releases from the New Landfill.

Well MW-12 located on City Property beyond the Facility boundary showed a statistically significant increasing 5-year trend for cis-1,2-DCE; however the 2-year trend was not significant indicating the trend may be stabilizing. Due to the low groundwater flow rates (see Section 5), VOC detections in well MW-12 likely reflect LFG impacts occurring prior to remediation efforts had begun. Future monitoring will be utilized to observe if the increasing trend in MW-12 persists.

4.6 Background Statistics

Background statistics (i.e., mean, variance, standard deviation, coefficient of variation, and standard error) for upgradient wells MW-1 and MW-11 are presented in Appendix E in accordance with WAC 173-351-420(1).

4.7 Natural Attenuation Parameters

Analysis and measurement of additional parameters (dissolved methane, ethane, ethene, dissolved oxygen [DO], and oxidation-reduction potential [ORP]) are being performed to evaluate whether VOCs are degrading through either biological or chemical processes (Shaw Environmental, Inc. 2003). Natural attenuation of VOCs would be indicated by elevated concentrations of ethene or ethane and decreases in DO and ORP (EPA 1998).

Some of the 2023 data (Table A-1) indicate that natural attenuation is likely occurring. DO measurements were lower in downgradient wells MW-5, MW-6, and MW-10 adjacent to the Old Landfill Phase 2 closure (about 1 mg/L or less) and some ORP measurements were also lower. The lower DO and ORP observed in these wells indicate more anaerobic conditions that would be favorable to reductive dechlorination of more highly chlorinated compounds (PCE and TCE) which have shown significant decreases in concentrations over the past 10 years (see Table 4-1).

Quantitative analysis of other evidence for reductive dechlorination is inconclusive. The high nitrate concentrations contributed by an upgradient source as demonstrated at well MW-11 would tend to inhibit reductive dechlorination reactions for more highly chlorinated compounds (PCE and TCE), and the high sulfate concentrations would inhibit reductive dechlorination of lower chlorinated

compounds (DCE and VC). The low concentrations of iron and TOC throughout the Site are also unfavorable for reductive dechlorination. Methane is contributed directly by LFG and no ethane or ethene were detected in any of the wells.

Higher DO was measured in further downgradient wells (between about 4 and 9 mg/L), and ORP measurements generally followed this pattern with more positive values observed in wells with higher DO. The relatively higher DO and ORP in wells along the City Facility boundary compared to the wells along the edge of the Old Landfill Phase 2 closure indicates a more aerobic environment which could support degradation of cis-1,2-DCE and VC, and the significantly lower concentrations in VC in wells at the City Facility boundary provide evidence that degradation of VC is occurring.

Trends in other parameters that might indicate that biodegradation is occurring (EPA 1998, Jurgens et al 2009), such as increases in chloride and alkalinity, or decreases in nitrate and sulfate, are somewhat ambiguous because concentrations of these parameters have been affected by contributions from upgradient sources. However, nitrate and sulfate concentrations are lower and alkalinity is higher in wells MW-5, MW-6, and MW-10 than in upgradient well MW-11, suggesting that biodegradation may be occurring.

Dissolved methane continued to be detected in downgradient wells adjacent to the Old Landfill Phase 2 closure: MW-5 (0.093-0.21 mg/L), MW-6 (1.5-1.8 mg/L), and MW-10 (1.7-1.9 mg/L). Methane was also detected at lower concentrations (about 0.003 mg/L or less) in other upgradient, cross-gradient and downgradient wells. The occurrence of higher concentrations of dissolved methane in the wells with the highest concentrations of VOCs continues to support the hypothesis that LFG generated by the decomposition of solid waste within the Landfill is the source and transport mechanism for the VOCs impacting groundwater (Shaw Environmental, Inc. 2003).

4.8 Geochemical Evaluation

The geochemical evaluation (Appendix F) included preparing trilinear and Stiff diagrams to illustrate major ion geochemistry and calculating cation/anion balances.

4.8.1 Trilinear and Stiff Diagrams

Trilinear and Stiff diagrams are presented for 2023. The trilinear and Stiff diagrams indicate that in most of the wells the dominant anion was bicarbonate, and the dominant cation was calcium, followed by magnesium. However, the proportions of sulfate and chloride with respect to bicarbonate were higher in upgradient well MW-11 and to a lesser extent in downgradient wells MW-2 and MW-8.

In the First Quarter Leachate Pond sample, the dominant anion was bicarbonate followed by chloride and the dominant cation was sodium. Compared to the groundwater samples, the Leachate Pond sample had a higher proportion of chloride and lower proportion of sulfate, and a higher proportion of sodium plus potassium.

4.8.2 Cation/Anion Balance Calculations

Cation/anion balance calculations for 2023 are presented in Appendix F. Three wells (MW-5, MW-9, and MW-11) in the Third Quarter were outside the acceptable range with a higher ratio of cations relative to anions. One well (MW-2) in the Fourth Quarter was outside the acceptable range with a higher ratio of anions relative to cations. As stated in WAC 173-351-430-5(a), charge balance differences of greater than 5 to 10 percent (5 percent for cation/anion sums of greater than 5 millequivalents per liter) could indicate laboratory error, poor well conditions, or other ions not accounted for in natural or impacted groundwater conditions. However, no data quality issues were

identified in the data for the Third and Fourth Quarters, and balances were only slightly out of range. Charge balance differences of between 5 and 10 percent have periodically been observed in the monitoring wells. Actions taken to improve charge balance differences beginning in 2007 consisted of changing analytical laboratories and reviewing quality assurance records provided by the laboratory to monitor data quality.

5. Groundwater Flow Direction and Rate

Groundwater elevations and potentiometric surface maps for 2023 are presented in Appendix G. The groundwater flow direction continued to be toward the southeast in the northern and southern portions of the City Facility but was easterly in the central portion of the City Facility. Although the overall historical flow direction has ranged from easterly to southeasterly, flow in the central portion of the City Facility has been more easterly over the past few years.

The calculated rate of flow ranged from 0.002 to 0.05 ft/day or 1 to 17 ft/year, based on the measured groundwater gradient in the vicinity of well MW-6 (ranging from 0.00035 ft/ft to 0.00061 ft/ft), hydraulic conductivity values of 2 to 15 ft/day (Shaw Environmental, Inc. 2003; Shannon & Wilson 1998), and estimated porosities between 20 and 35 percent (Walton 1985).

6. Landfill Gas Monitoring

LFG measurements collected quarterly from thirteen LFG monitoring probes (Figure 1-3) are presented in Appendix H. Gas probes GP-1 through GP-4 and GP-7 through GP-11 are screened at two subsurface intervals, and GP-12 is screened at three separate intervals, including one deep probe just above groundwater. The data include measurements collected from three single-completion LFG probes (GP-13, GP-14, and GP-15) that were installed in June 2021 (Parametrix 2021b) to monitor Phase 1 of the New Landfill. These gas probes are completed in alluvium outside the New Landfill.

6.1 Landfill Gas Data

In 2023, all quarterly methane concentrations were less than 5 percent by volume except for GP-12. The shallowest probe at that location, GW-12-1, showed a methane concentration of 26.2 percent in June, following cover completion but just prior to initiation of the gas extraction system. More frequent monitoring was initiated, and the highest observed methane concentration was 35.8 percent on August 2. Methane concentrations in GP-12-1 subsequently decreased to 5.8 and 6.1 percent in October and December. Methane concentrations in the deepest GP-12 gas probe, GP-12-3, were at 3.9 percent in March 2023 prior to initiation of the gas extraction system. Concentrations decreased in October and December but remained detectable at 0.4 and 0.5 percent. The recent GP-12 data indicate that despite activation of the LFG control system at Phase 2 of the Old Landfill, the historical LFG plume in this area is not yet being fully controlled.

Methane was not detected in the other gas probes in the vicinity of the Old Landfill, indicating LFG appears to be controlled in this area. The extent of LFG migration remains in close proximity to the perimeter of the Old Landfill and concentrations have not exceeded the 5 percent by volume regulatory action limit at the City Facility boundary.

6.2 Historical Landfill Gas Data Trends

Trends in probes where methane has historically been observed (GP-2, GP-9, and GP-12) are shown on the time-series plot in Figure 7-1. The data indicate that despite limited spikes, overall substantial decreases were observed since the closure activities started in 2011 that included installation and operation of an active LFG control system. Methane concentrations in GP-2 and GP-12 have decreased from 35 to 45 percent by volume prior to the 2011 Old Landfill Phase 1 closure to below 5 percent, except for the concentrations at Probe GP-12-1.

Methane concentrations in GP-12-1 showed a temporary increase in the Second Quarter of 2023 but have since decreased to near 5 percent. GP-12-1 is the shallowest probe at that location, with its screen extending to a depth of 2.5 feet below the bottom of waste (approximately 62 feet above the water table). The temporary increases observed at GP-12-1 were likely related to the placement of the cover and ensuing LFG buildup prior to the beginning of gas extraction that was initiated in late July.

Methane concentrations in GP-12-3 have been significantly reduced since the Old Landfill Phase 1 closure, from typical concentrations of 15 to 25 percent, to generally less than 1 percent. This probe is notable because its screened interval extends to approximately 8 ft above the water table (56.5 ft below the top of waste). The most recent methane concentration measured at GP-12-3 in Fourth Quarter 2023 was 0.5 percent.

New gas probes GP-13, GP-14, and GP-15 that monitor Phase 1 of the New Landfill have not detected methane above background concentrations since installation in 2021.

6.3 Landfill Gas System Changes

Figure 1-3 shows the LFG controls on the Old Landfill. As discussed above, the Phase 2 Old Landfill LFG controls were activated in July 2023. The first LFG controls on the New Landfill were just recently installed in the First Quarter of 2024 and consist of three horizontal (east-west oriented) perforated pipe trenches installed into the waste. A renewable natural gas (RNG) plant has been constructed adjacent to the Condensate Evaporation Pond near the center of the City Facility (see Figure 1-1). The RNG plant was activated in December 2023 (Pine Creek 2023). Typical gas control system operation routes all LFG to the RNG plant with the City's flare as a backup control measure. In the event of a shutdown of the RNG plant an automated control valve routes gas to the flare until normal operation of the RNG is restored. Future gas generation is expected to exceed the capacity of the RNG plant, and upon reaching this threshold the automatic control valve will modulate flow to both the RNG plant and the City flare to create sufficient capacity to maintain control of the LFG.

7. Leachate Monitoring

7.1 Old Landfill Vadose Zone Monitoring

Leachate is collected annually during the third quarter from four lysimeters that monitor the vadose zone directly beneath the MSW located in the northeast corner of the Old Landfill. Drains from each lysimeter are connected to a common sampling vault where discrete samples of leachate are collected from four sampling ports. The approximate location of the lysimeters and sampling vault are identified in Figure 1-4. Samples from the four vadose monitoring ports are to be analyzed for leachate parameters listed in Appendix I and II of WAC 173-351-990.

The leachate ports of the Old Landfill were checked in the Third Quarter 2023, and a small amount of leachate was found in Port 4 that was sufficient to collect a sample to be tested for VOCs. The sample collected from Port 4 contained measured concentrations of 4-methyl-2-pentanone, carbon disulfide, cis-1,2-DCE, toluene, and VC. Reporting limits were elevated with respect to groundwater data.

7.2 New Landfill Leachate Pond

Leachate from the New Landfill is migrated from trenches in the lined cell into a lined leachate pond. The leachate pond is sampled annually during the first quarter. The annual sampling of the New Landfill Phase 1 leachate storage and evaporation pond (referred to as the Leachate Pond) was conducted during the First Quarter 2023 event (Parametrix 2023a). The leachate samples were analyzed for the constituents identified in Appendix I and Appendix II of WAC 173-351-990, and for additional natural attenuation parameters added as part of the RI (Shaw Environmental, Inc. 2003). Laboratory analyses were conducted by Eurofins Seattle in Tacoma, Washington, with the exception of the nitrate analysis that was conducted by Energy Northwest in Richland, Washington.

The Leachate Pond sample had relatively higher concentrations of some parameters compared to groundwater including conductivity, TDS, chloride, cations (calcium, magnesium, potassium, and sodium), TOC, and bicarbonate. The only VOCs detected in the Leachate Pond sample were low concentrations of 1,2-DCA, acetone, chloromethane and toluene. The detected concentration of 1,2-DCA was in a similar range as the groundwater samples but the other VOCs were not detected in the groundwater samples.

The leak detection sumps of the Leachate Pond and the Condensate Evaporation Pond (see location on Figure 1-1) were checked during quarterly groundwater monitoring events for the presence of liquid and the results documented on field data sheets (see Appendix I).

8. Conclusions and Recommendations

8.1 Conclusions

Since 2011, the Old Landfill Phase 1 LFG collection system and cover effectively removed much of the gas within close proximity of the Old Landfill as demonstrated by the overall decreases in methane concentrations observed at multilevel gas probes GP-2 and GP-12, including GP-12-3, screened immediately above the water table. The decreasing trends in VOCs observed in wells adjacent to the Old Landfill indicate that removing or greatly reducing the LFG source has been effective in reducing impacts to groundwater beneath the Landfill. With completion of the Old Landfill Phase 2 closure in July 2023, the source of VOCs to groundwater are expected to be further reduced. Methane has not been detected above background in new gas probes GP-13, GP-14, and GP-15 that monitor Phase 1 of the New Landfill.

Evaluation of natural attenuation parameters such as DO and ORP measurements indicate that conditions in groundwater near the Old Landfill source may be consistent with attenuation of PCE and TCE, and more aerobic conditions further downgradient may be consistent with degradation of cis-1,2-DCE and VC. However, quantitative analysis of other evidence is inconclusive. The high concentrations of nitrate and sulfate contributed by an upgradient source may inhibit reductive dechlorination. Trends in other parameters that might indicate that biodegradation is occurring, such as increases in chloride and alkalinity, or decreases in nitrate and sulfate, are somewhat ambiguous due to the influences from upgradient sources (i.e. crop fertilization), and methane is also contributed directly by LFG.

Since area wide background concentrations of inorganic indicator parameters are present, VOCs are the primary unambiguous compounds of concern reflecting landfill impacts. VOCs continued to be detected in groundwater at concentrations above groundwater quality criteria. The groundwater monitoring wells located in close proximity to the waste along the eastern edge of the Old Landfill (MW-5, MW-6, and MW-10) show the highest number and concentrations of VOCs. Further downgradient well MW-9, located along the southern City Facility boundary approximately 800 feet from the Old Landfill, also has been impacted by a similar suite of VOCs in lower concentrations. The other three further downgradient monitoring wells along the City Facility boundary, MW-3, MW-4, and MW-8, contain a slightly different distribution of VOCs and in lower concentrations. Low levels of VOCs have also been detected in well MW-12 further downgradient on City Property. Overall VOC concentrations appear consistent with the findings of the 2021 draft RI Report with exceedances of groundwater quality criteria generally limited to within 500 feet of the City Facility boundary.

Trend analyses indicate that the concentrations of VOCs have shown significant decreases in some groundwater wells during the past 10 years, likely as a result of the 2011 Old Landfill Phase 1 closure. These include 1,1-DCA in wells MW-5, MW-6, MW-9, and MW-10; 1,2-DCA in wells MW-5, MW-6 and MW-10, 1,2-dichloropropane in wells MW-5 and MW-6; benzene in wells MW-5, MW-6, and MW-10; chloroform in well MW-10; chlorinated ethenes in well MW-5 (cis-1,2-DCE, trans-1,2-DCE, TCE and VC), well MW-6 (cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, and VC), and well MW-10 (1,1-DCE and VC).

Increasing trends in some VOCs have been observed over both the past 5 and 10 years in wells located along the Facility boundary (chloroform in wells MW-3 and MW-9, and cis-1,2-DCE and TCE in well MW-4). However, 1,1-DCA and trichlorofluoromethane in well MW-4 no longer showed significant increasing trends over the past 5 years. Wells and parameters showing increasing trends over the past 5 years (chloroform in well MW-3; cis-1,2-DCE and TCE in well MW-4; chloroform in MW-9, and cis-1,2-DCE in wells MW-10) were analyzed for 2-year trends and only TCE in well MW-4 and chloroform in MW-9 were significant. These data indicate that some of the VOC concentrations in wells located along the Facility boundary may be stabilizing. An increasing 5-year trend for cis-1,2-DCE was observed in MW-12 located

further downgradient on City Property, but the trend in the 2-year data was not significant, indicating the concentrations may be stabilizing. Due to the low groundwater flow rates (see Section 5), VOC detections in well MW-12 likely reflect LFG impacts occurring prior to remediation efforts and it will take time to observe the effects of remediation efforts in MW-12.

The Old Landfill Phase 2 LFG extraction system was recently activated in July 2023, and continued LFG extraction in the coming years is anticipated to further decrease the concentrations of VOCs reaching the water table and subsequently decrease the concentrations within the dissolved phase plume. However, gas probe data from GP-12 adjacent to the Old Landfill Phase 2 continues to show gas migration beyond the control of the Phase 2 LFG extraction system. This indicates the LFG may still be contributing a source of VOCs until full LFG control is established.

The increasing VOC trends observed are attributed to historical LFG releases from the unlined portions of the Old Landfill and are not considered to be related to the current active fill area in the New Landfill Phase 1 that is lined.

No Appendix III parameters other than VOCs have been detected in groundwater wells, and leachate generation has been shown to be minimal by insignificant quantities of liquids present in lysimeters.

Although the overall historical flow direction has ranged from easterly to southeasterly, flow in the central portion of the City Facility has been more easterly over the past few years.

8.2 Recommendations

Ongoing quarterly groundwater and LFG monitoring will continue to evaluate whether the Old Landfill closure is actively mitigating the LFG source that has impacted groundwater. The New Landfill Phase 1 active fill area is a lined cell and no groundwater impacts are anticipated and no LFG impacts have been identified. On-going groundwater monitoring will assess whether decreasing trends in VOCs are continuing to occur in downgradient wells, reflecting attenuation of existing contamination related to historical releases from the Old Landfill. To this end, the statistical evaluation for groundwater data will continue to consist of evaluating groundwater time series plots, updating groundwater trend analyses, and updating plots of methane measurements in the LFG probes.

The draft RI Report has been submitted to and reviewed by Ecology, and Ecology comments were addressed. Ecology's comments on the draft RI Report (Ecology 2022) included the opinion that the extent of VOCs in groundwater is not fully delineated. This conclusion was based in part on the increasing trends in some VOCs observed over the past 5 years in wells MW-3 and MW-4 located along the eastern City Facility boundary, particularly in consideration of the more easterly flow direction observed over the past few years. The City has agreed to develop an approach and timeframe for evaluating additional monitoring data to assess the effects of the interim remedial measures completed.

Following the completion of the final RI Report, a FS report will be prepared in accordance with the MTCA Agreed Order that focuses on the Old Landfill Phase 2 closure and LFG control as the likely cleanup remedy. The Old Landfill Phase 2 closure was completed in July 2023 with installation of the landfill cover and activation of the LFG extraction system. The closure is expected to reduce the source of VOCs to groundwater and address the increasing trends observed in wells near the City Facility boundary.

As discussed in a letter submitted to BFCHD (Parametrix 2022) testing for the WAC 173-351-990 Appendix III assessment monitoring parameters was discontinued in 2023 since none of the additional parameters have been detected other than VOCs which are listed as detection monitoring constituents in WAC 173-351 Appendix I. Therefore, the Site has met the criteria "concentrations of all Appendix III constituents are at or below background values for two consecutive events" per WAC 173-351-440(5).

9. References

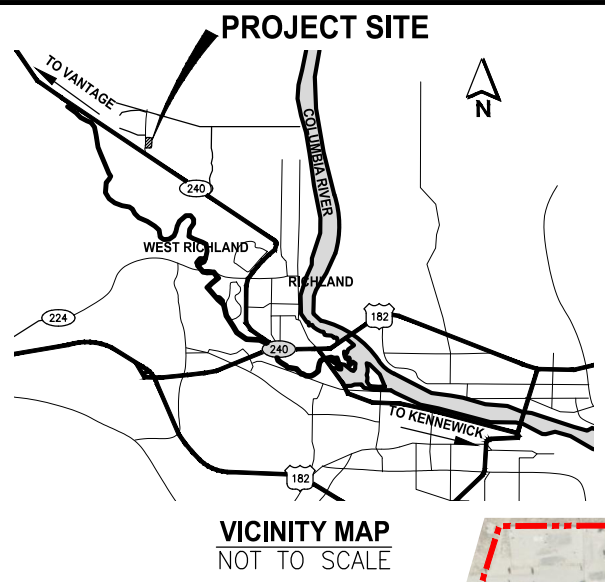
- Benton-Franklin Health District (BFHD). 2017. Solid Waste Landfill Permit Modification Request, Horn Rapids Landfill. Letter to Pete Rogalsky, Public Works Director, City of Richland. January 25, 2017.
- CH2M 2015. Hanford Groundwater Monitoring Report for 2014. Prepared for Department of Energy. DOE/RL-2015-07. July 2015.
- Ecology (Washington State Department of Ecology) 2012. Guidance for Groundwater Monitoring at Landfills and Other Facilities Regulated Under Chapters 173-304, 173-306, 173-350, and 173-351 WAC. Publication No. 12-07-072.
- Ecology. 2017. Approval of Remedial Investigation Work Plan for Richland Horn Rapids Landfill. Letter from Patricia Shanley to Pete Rogalsky, City of Richland. April 28, 2017.
- Ecology. 2022. Ecology Comments on the Horn Rapids Landfill Remedial Investigation Report. Letter from Luke LeMond to Mark Chidester, City of Richland. August 2, 2022.
- EMCON. 1999. Closure and Post-Closure Plan, Horn Rapids Landfill, Richland, Washington. Prepared for City of Richland. March 26, 1999.
- EPA (U.S. Environmental Protection Agency). 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water. EPA/600/R-98/128. September 1998.
- EPA 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance.
- Jurgens, Bryant C., McMahon, Peter B., Chapelle, Francis H., and Eberts, Sandra M., 2009. *An Excel Workbook for Identifying Redox Processes in Ground Water*. U.S. Geological Survey Open File Report 2009-1004.
- Parametrix. 2006. Horn Rapids Landfill Closure and Post-Closure Plan Addendum. Prepared for City of Richland Public Works by Parametrix, Seattle, WA. October 17, 2006.
- Parametrix. 2008. Revised Landfill Closure Plan, Horn Rapids Landfill. Prepared for City of Richland Public Works Department by Parametrix, Seattle, WA. December 2008.
- Parametrix. 2011. Horn Rapids Landfill Contract Documents and Specifications, Phase 1 Closure Project Contract SB 11-01PW. Prepared for City of Richland Public Works Department by Parametrix, Seattle, WA. March 2011.
- Parametrix. 2012a. Horn Rapids Landfill Phase 1 Closure Construction Quality Assurance Report. Prepared for City of Richland Public Works Department by Parametrix, Seattle, WA. March 2012.
- Parametrix. 2012b. Horn Rapids Landfill, Landfill Gas Collection System Operation and Maintenance Manual. Prepared for City of Richland Public Works Department by Parametrix, Seattle, WA. May 2012.
- Parametrix, Inc. 2016. Horn Rapids Landfill Environmental Monitoring Report, Calendar Year 2015. Prepared for City of Richland. March 2016.
- Parametrix, Inc. 2017a. Horn Rapids Landfill Quality Assurance Project Plan. Prepared for City of Richland. January 2017.

- Parametrix, Inc. 2017b. Horn Rapids Landfill Hydrogeologic Report. Prepared for City of Richland. January 2017.
- Parametrix, Inc. 2017c. Horn Rapids Landfill Operations Plan. Prepared for City of Richland. January 2017.
- Parametrix, Inc. 2017d. Horn Rapids Landfill Remedial Investigation Work Plan. Prepared for City of Richland. April 2017.
- Parametrix, Inc. 2018. Horn Rapids Landfill Remedial Investigation Phase I Push Probe Investigation. Prepared for City of Richland. February 2018.
- Parametrix, Inc. 2019. Horn Rapids Landfill Technical Memorandum Installation of Well MW-12. Prepared for City of Richland. February 2019.
- Parametrix, Inc. 2021a. Horn Rapids Landfill Draft Remedial Investigation Report. Prepared for City of Richland. January 2021.
- Parametrix, Inc. 2021b. Installation of Gas Probes GP-13 through GP-15, Horn Rapids Landfill. Technical Memorandum prepared for City of Richland. August 2021.
- Parametrix, Inc. 2022. Horn Rapids Landfill - Recommendation to Discontinue Testing of WAC 173-351 Appendix III Parameters. Letter to Mr. James Coleman, Benton-Franklin County Health District. October 19.
- Parametrix, Inc. 2023a. Horn Rapids Landfill First Quarter 2023 Environmental Monitoring Report. Prepared for City of Richland. May 2023.
- Parametrix, Inc. 2023b. Horn Rapids Landfill Second Quarter 2023 Environmental Monitoring Report. Prepared for City of Richland. August 2023.
- Parametrix, Inc. 2023c. Horn Rapids Landfill Third Quarter 2023 Environmental Monitoring Report. Prepared for City of Richland. December 2023.
- Pine Creek. 2023. Horn Rapids Landfill Renewable Natural Gas – Landfill Gas to Fuel, available online at <https://pinecreekrng.com/projects/horn-rapids/>
- Sanitas Technologies (formerly NIC and Intelligent Decision Technologies/IDT). 2023. Sanitas™ Version 10.0.15. Shawnee, Kansas.
- Shannon & Wilson. 1998. Results of Hydrogeologic Service for the Richland Landfill, Richland, Washington.
- Shaw Environmental, Inc. 2003. Phase I Remedial Investigation Summary Report. Horn Rapids Landfill, Richland, Washington. Prepared for City of Richland Department of Public Works. June 16, 2003.
- Shaw Environmental, Inc. 2004. Phase 2 Remedial Investigation Summary Report. Horn Rapids Landfill, Richland, Washington. Prepared for City of Richland Department of Public Works. April 2, 2004.
- Shaw EMCON/OWT, Inc. 2005. Results of Pilot-Scale LFG Extraction Test (Draft), Horn Rapids Landfill, Richland, Washington. Prepared for Mr. Steve McNutt Horn Rapids Landfill, April 8, 2005.
- Walton, W.C. 1985. Practical Aspects of Groundwater Modeling.

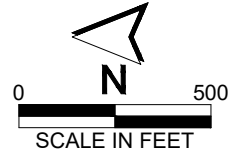
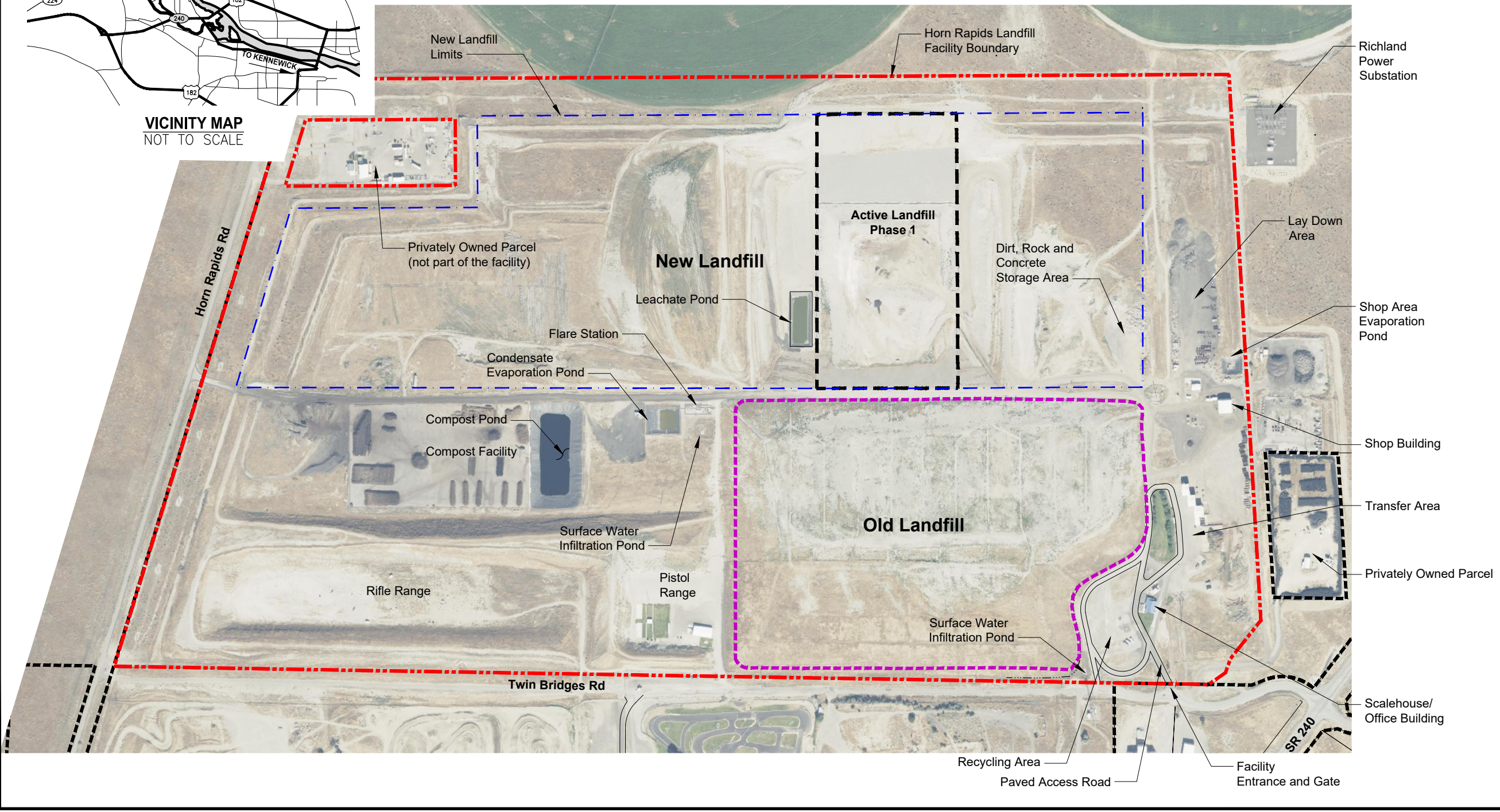
Figures



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- LEGEND:**
- - - - - Facility Boundary
 - City of Richland Property Line
 - Active Phase
 - Old Landfill Boundary
 - New Landfill Boundary

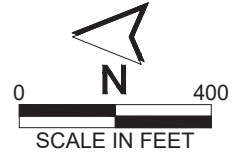


**Figure 1-1
Horn Rapids Landfill
Facility Plan**








FILE: HRL_OPSP1ANF1-3 GW WELLS LAYOUT: F1-3 PATH: \\parametrix.com\yma\PSO\Projects\Cities\3820-City of Richland\555-3820-004\Phase 13 2023\Horn Rapids Ops Plan PLOTTED BY: NelerTF DATE: Friday, July 21, 2023 7:44



Parametrix DATE: July 21, 2023 FILE: HRL_OPSP1ANF1-3 GW WELLS



Legend:

-  Existing Groundwater Monitoring Well
-  Decommissioned Groundwater Monitoring Well
-  Facility Boundary
-  City of Richland Property Line
-  Active Phase
-  Old Landfill Boundary
-  New Landfill Boundary

**Figure 1-2
Groundwater Monitoring Well
Locations
Horn Rapids Landfill**

FILE: HRL OPSPLANF1-4 LFG LAYOUT: F1-5 PATH: \\parametrix.com\pmx\PSO\Projects\Clients\3820-city of Richland\555-3820-004 HornRapid201EM\995svcs\CADD\555-3820-004\Phase 13 2023\Horn Rapids Ops Plan PLOTTED BY: NeelTJ DATE: Friday, July 21, 2023 7:57:32



LEGEND:

- Existing Gas Probe
- Decommissioned Gas Probe
- LFG Gas Extraction Wells
- LFG Control System
- Facility Boundary
- City of Richland Property Line
- Old Landfill Boundary
- New Landfill Boundary
- Active Phase

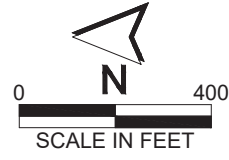
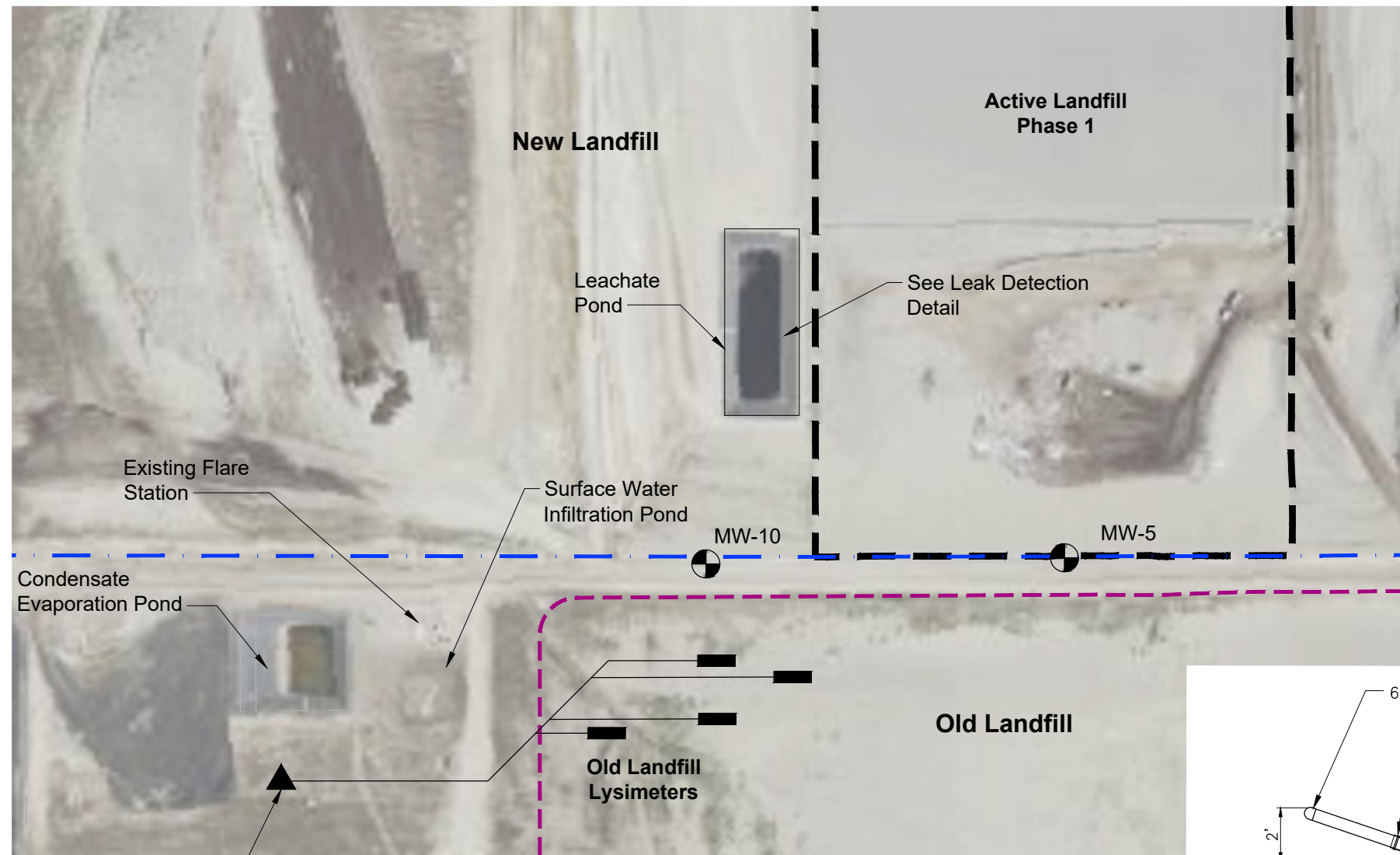


Figure 1-3
Gas Probe and
Extraction Well Locations
Horn Rapids Landfill

FILE: HRL_OPSPLANF1-6 LEACHATE LAYOUT: F1-6 DATE: July 20, 2023 FILE: HRL_OPSPLANF1-6 LEACHATE



- LEGEND:**
- Existing Groundwater Monitoring Well
 - Lysimeter Port
 - Lysimeter
 - Active Phase
 - Old Landfill Boundary
 - New Landfill Boundary

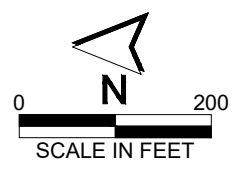
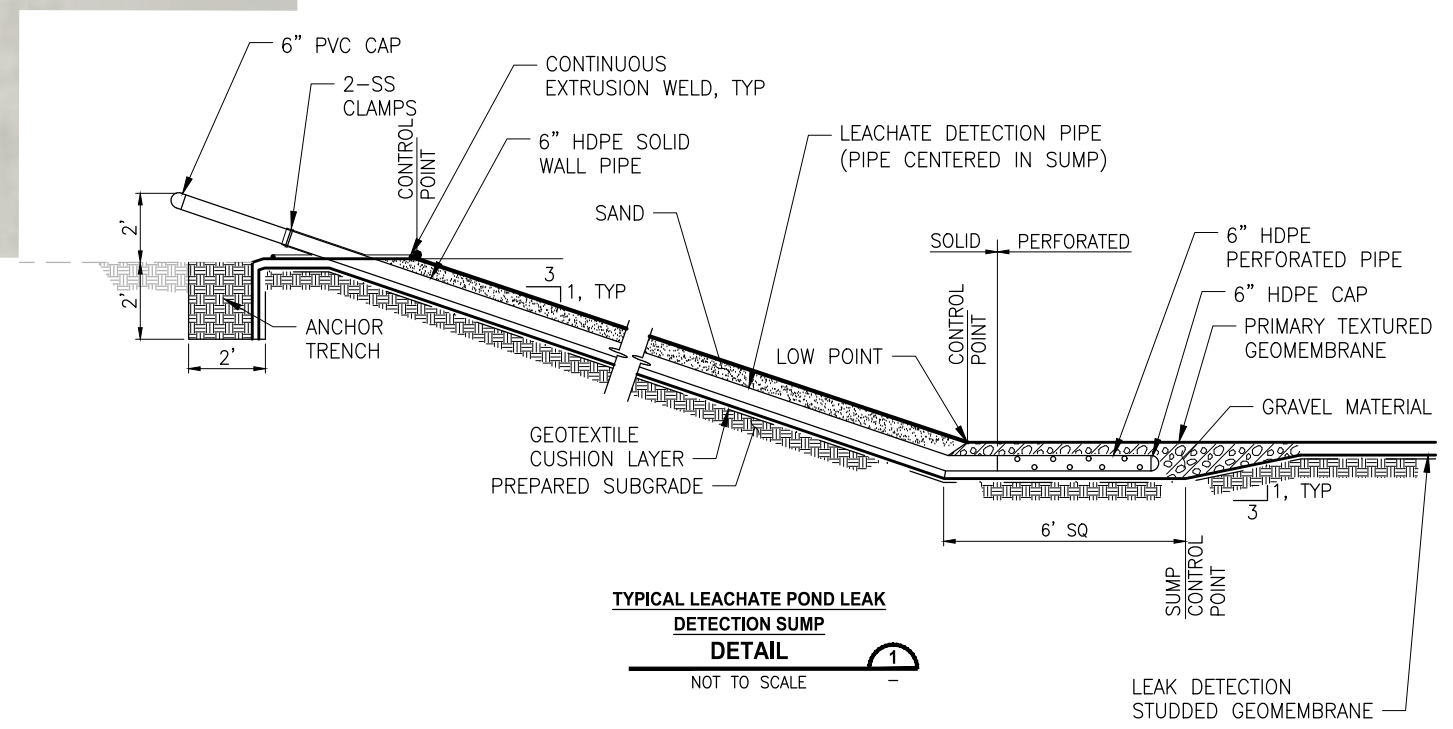
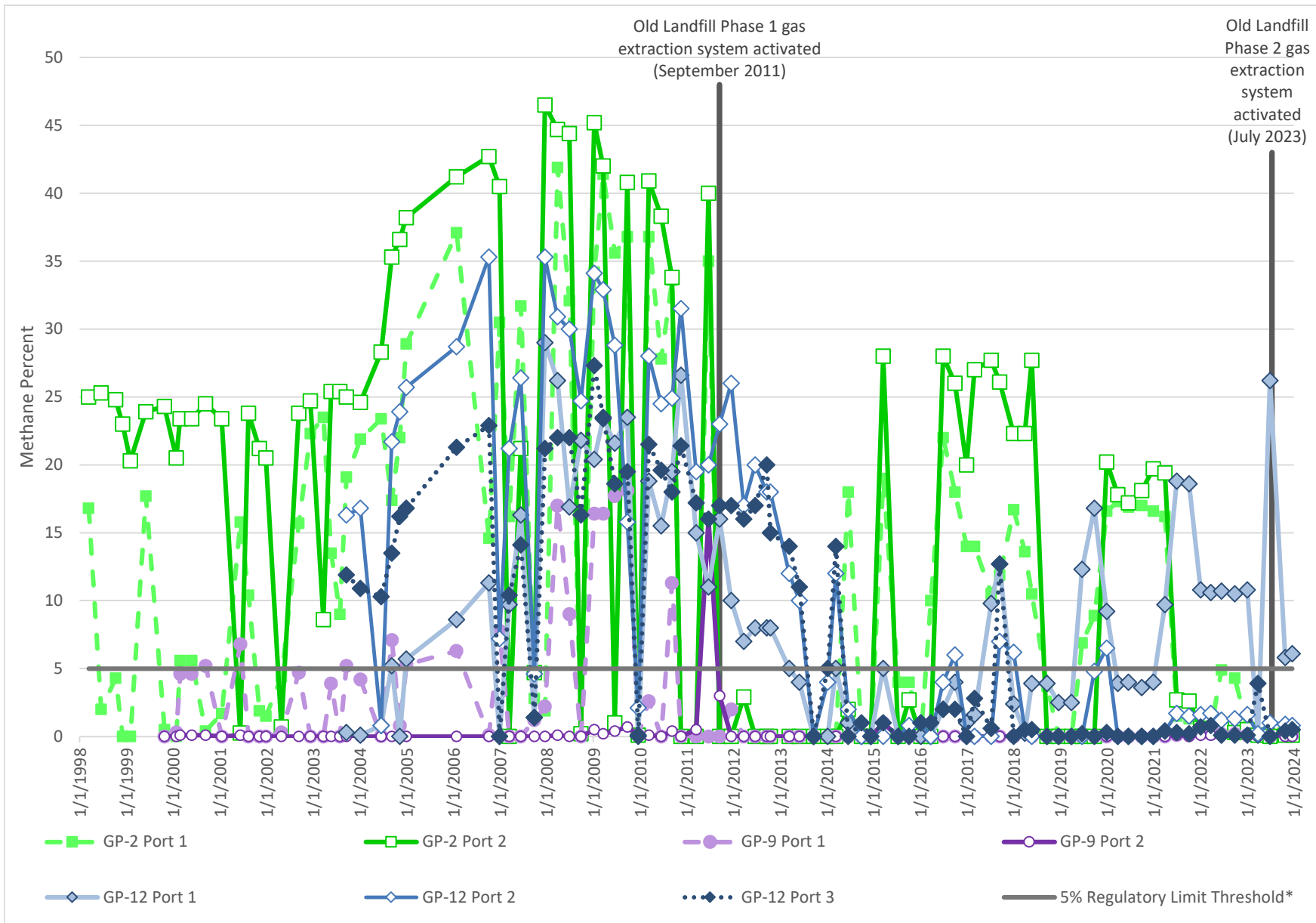


Figure 1-4
Leachate Management Details
Horn Rapids Landfill



*WAC 173-351 (Threshold for reference only, applies at City Facility Boundary)

Figure 7-1
Methane in Landfill Gas Probes,
Horn Rapids Landfill

Appendix A

Groundwater Quality Data Summary Table

Table A-1. Groundwater Quality Data Summary

Units	GWQS	MCL	MW-1	MW-1	MW-21	MW-1	MW-1	MW-2	MW-2	MW-2	MW-2	MW-3	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4
			3/22/2023	6/14/2023	(MW-1 Dup) 6/14/2023	9/26/2023	12/6/2023	3/22/2023	6/13/2023	9/26/2023	12/6/2023	3/23/2023	6/14/2023	9/26/2023	12/6/2023	3/23/2023	6/14/2023	9/26/2023
pH	units	6.5-8.5	7.12	7.24	NA	7.34	7.23	7.67	7.55	7.87	7.70	7.85	7.96	8.04	7.93	7.58	7.69	7.72
Conductivity	µmhos/cm	700 **	782	705	NA	532	594	522.7	494.5	396.1	484	337.7	317.7	251.2	276.2	672	605	489.9
Temperature	C°		20.2	21.3	NA	21.5	20.2	20.2	25.3	20.4	18.1	19.8	22.0	20.1	17.5	20.1	21.1	20.1
Redox	mv		118.9	66.3	NA	75.8	60.9	107.2	51.7	41.9	22.7	107.9	58.9	37.8	33.6	96.1	57.0	46.9
Dissolved Oxygen	mg/L		5.38	5.75	NA	6.18	6.38	6.34	6.60	6.88	7.18	9.25	8.86	8.93	8.83	3.62	4.10	4.01
Nitrate-Nitrogen	mg/L	10 *	7.4	7.4	7.5	6.8	6.3	11	13	14	15	3.7	3.4	3.8	3.2	7.8	7.8	9.2
Calcium, Dissolved	mg/L		110	97	100	110	91	66	62	69	70	40	38	43	38	92	86	100
Sodium, Dissolved	mg/L		21	21	20	24	21	12	13	14	14	11	11	13	12	14	15	18
Bicarbonate Alkalinity	mg/L as CaCO3		290	250	260	300	290	120	120	120	150	96	86	100	92	260	240	260
Chloride	mg/L	250 **	25	14	14	23	22	23	26	27	29	15	17	16	15	16	8.7	17
Magnesium, Dissolved	mg/L		20	19	20	22	19	13	13	15	16	7.2	7.2	8.6	8.0	18	18	23
Potassium, Dissolved	mg/L		8.6	7.2	7.5	8.2	7.3	6.6	5.6	6.2	6.2	6.0	5.2	5.7	5.6	7.8	6.7	8.0
Sulfate	mg/L	250 **	50	51	50	48	48	54	61	62	70	31	34	34	32	33	35	36
Total Alkalinity	mg/L as CaCO3		290	250	260	300	290	120	120	120	150	96	86	100	92	260	240	260
Iron, Dissolved	mg/L	0.30 **	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Manganese, Dissolved	mg/L	0.05 **	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ammonia-Nitrogen	mg/L as N		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Organic Carbon	mg/L		1.1	1.2	1.0	<1.0	1.1	<1.0	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	500 **	550	500 J	650 J	480	450	540	330	370	420	260	240	260	220	400	400	490
Total Suspended Solids	mg/L		<0.40	<0.40	<0.40	<2.0	<2.0	1.2	<2.0	<2.0	<2.0	<0.40	<0.40	<2.0	2.0	4.0	<0.40	<2.0
Antimony, Total	mg/L		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Arsenic, Total	mg/L	0.00005 ***	0.0040	0.0042	0.0041	0.0041	0.0039	0.0040	0.0046	0.0039	0.0039	0.0092	0.0093	0.0089	0.0087	0.0040	0.0041	0.0040
Barium, Total	mg/L	1 *	0.052	0.049	0.051	0.047	0.047	0.032	0.035	0.034	0.038	0.017	0.019	0.018	0.017	0.052	0.052	0.053
Beryllium, Total	mg/L		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Cadmium, Total	mg/L	0.01 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Chromium, Total	mg/L	0.05 *	0.0051	0.0039	0.0040	0.0046	0.0035	0.083	0.13	0.068	0.17	0.0022	0.0084	0.0034	0.0051	0.0022	0.0027	0.0021
Cobalt, Total	mg/L		0.016	0.0084	0.0084	0.011	0.0064	0.00057	0.0013	0.00064	0.00089	<0.00040	<0.00040	<0.00040	0.00050	0.0067	0.011	0.0044
Copper, Total	mg/L	1 **	0.0063	<0.0020	0.0022	0.0057	<0.0020	0.0036	0.0045	<0.0020	0.0060	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Lead, Total	mg/L	0.05 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Nickel, Total	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.014	0.015	0.0063	0.018	<0.0030	0.0046	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Selenium, Total	mg/L	0.01 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Silver, Total	mg/L	0.05 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Thallium, Total	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vanadium, Total	mg/L		0.0091	0.0095	0.0093	0.0092	0.0093	0.012	0.014	0.012	0.014	0.016	0.016	0.016	0.016	0.012	0.012	0.011
Zinc, Total	mg/L	5 **	0.065	0.019	0.012	0.038	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
1,1,1,2-Tetrachloroethane	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,1,1-Trichloroethane	µg/L	200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2,2-Tetrachloroethane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	1 ***	<0.20	<0.20	<0.20	<0.20	<0.20	0.23	0.22	0.21	0.20	<0.20	<0.20	<0.20	<0.20	5.1	5.5	5.3
1,1-Dichloroethene	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.29	<0.20	0.20
1,2,3-Trichloropropane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dibromo-3-Chloropropane	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-Dibromoethane	µg/L	0.001 ***	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,2-Dichloroethane	µg/L	0.5 ***	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	0.6 ***	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	µg/L	4 ***	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Butanone	µg/L		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Hexanone	µg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

Table A-1. Groundwater Quality Data Summary

Units	GWQS	MCL	MW-4 12/6/2023	MW-21 (MW-5 Dup)					MW-6				MW-8			MW-9 3/23/2023		
				MW-5 3/23/2023	MW-5 3/23/2023	MW-5 6/13/2023	MW-5 9/25/2023	MW-5 12/5/2023	MW-6 3/23/2023	MW-6 6/14/2023	MW-6 9/25/2023	MW-6 12/5/2023	MW-8 3/23/2023	MW-8 6/14/2023	MW-8 9/26/2023		MW-8 Dup) 9/26/2023	
pH	units	6.5-8.5	7.59	6.71	NA	6.73	6.85	7.00	6.62	6.69	6.72	6.54	7.74	7.74	7.88	NA	7.72	6.93
Conductivity	µmhos/cm	700 **	568	1169	NA	1083	859	966	1117	1019	810	920	900	989	490.3	NA	460.9	1120
Temperature	C°		19.9	23.4	NA	25.4	24.7	24.1	23.9	23.8	26.6	23.6	21.0	23.4	23.3	NA	20.9	22.5
Redox	mv		32.5	80.5	NA	-77.0	-37.0	-16.1	44.2	-137.9	-142.9	-152.0	85.1	35.9	41.2	NA	42.5	66.0
Dissolved Oxygen	mg/L		4.34	0.41	NA	0.76	0.96	0.91	0.52	1.04	0.93	1.02	7.81	8.50	7.33	NA	6.23	2.29
Nitrate-Nitrogen	mg/L	10 * 10 *	9.5	1.7	1.7	1.5	1.8	1.8	0.065	<0.05	0.065	<0.05	20	27	14	14	11	7.5
Calcium, Dissolved	mg/L		90	160	170	160	190	160	160	150	180	160	100	120	89	85	64	140
Sodium, Dissolved	mg/L		15	21	22	22	27	22	21	21	25	21	25	31	25	25	19	22
Bicarbonate Alkalinity	mg/L as CaCO3		260	470	460	480	510	490	510	470	530	560	130	130	140	140	150	350
Chloride	mg/L	250 ** 250 **	17	45	45	42	48	48	22	7.1	23	24	90	130	58	59	32	52
Magnesium, Dissolved	mg/L		20	36	38	37	48	40	37	36	46	40	20	25	19	18	14	29
Potassium, Dissolved	mg/L		7.1	12	12	11	13	11	13	11	13	11	8.6	9.4	8.5	8.1	6.8	9.9
Sulfate	mg/L	250 ** 250 **	37	69	69	71	75	74	50	51	51	51	73	97	59	60	48	71
Total Alkalinity	mg/L as CaCO3		260	470	460	480	510	490	510	470	530	560	130	130	140	140	150	350
Iron, Dissolved	mg/L	0.30 ** 0.30 **	<0.10	<0.10	<0.10	<0.10	0.14	0.11	0.33	0.34	0.54	0.67	<0.10	<0.10	<0.10	<0.10	0.10	<0.10
Manganese, Dissolved	mg/L	0.05 ** 0.05 **	<0.020	0.39	0.40	0.41	0.55	0.39	0.092	0.098	0.16	0.19	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ammonia-Nitrogen	mg/L as N		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.44	0.54	0.45	0.48	<0.10	<0.10	<0.10	NA	<0.10	<0.10
Total Organic Carbon	mg/L		<1.0	2.2	2.2	3.8	2.8	2.6	1.3	1.4	2.2	1.4	1.2	1.7	1.1	NA	<1.0	1.4
Total Dissolved Solids	mg/L	500 ** 500 **	420	860	800	730	880	720	740	690	700	660	790	670	450	460	360	760
Total Suspended Solids	mg/L		2.0	2.6	2.4	<2.0	<2.0	<2.0	2.4	<0.40	<2.0	<2.0	0.60	<0.40	<2.0	<2.0	5.0	0.40
Antimony, Total	mg/L	6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Arsenic, Total	mg/L	0.00005 *** 0.01 *	0.0038	0.0031	0.0032	0.0031	0.0035	0.0031	0.0012	0.0011	0.0012	0.0014	0.0082	0.0076	0.0084	0.0085	0.0089	0.0018
Barium, Total	mg/L	1 * 2 *	0.054	0.10	0.10	0.10	0.11	0.11	0.11	0.10	0.11	0.10	0.067	0.095	0.051	0.054	0.045	0.081
Beryllium, Total	mg/L	0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Cadmium, Total	mg/L	0.01 * 0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Chromium, Total	mg/L	0.05 * 0.1 *	0.0029	<0.00080	<0.00080	0.0041	0.0011	0.0011	0.0033	0.0021	0.0050	0.0019	0.0035	0.0072	0.0046	0.0044	0.018	0.0027
Cobalt, Total	mg/L		0.012	0.00051	0.00055	0.00090	0.00067	0.00057	0.0020	0.00090	0.0030	0.00093	<0.00040	<0.00040	<0.00040	<0.00040	0.00077	<0.00040
Copper, Total	mg/L	1 **	0.0027	0.0020	0.0020	0.0075	0.0021	0.0043	<0.0020	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Lead, Total	mg/L	0.05 *	<0.00040	<0.00040	<0.00040	0.00054	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Nickel, Total	mg/L	0.1 *	<0.0030	0.0034	0.0035	0.0045	0.0041	0.0040	<0.0030	<0.0030	0.0038	<0.0030	<0.0030	0.0041	0.0085	0.0075	0.014	<0.0030
Selenium, Total	mg/L	0.01 * 0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Silver, Total	mg/L	0.05 * 0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Thallium, Total	mg/L	0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vanadium, Total	mg/L		0.012	0.0079	0.0078	0.0082	0.0084	0.0081	0.0054	0.0048	0.0048	0.0046	0.015	0.014	0.016	0.016	0.018	0.0075
Zinc, Total	mg/L	5 ** 5 **	<0.0070	0.017	0.018	0.033	0.021	0.024	0.0072	0.011	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
1,1,1,2-Tetrachloroethane	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,1,1-Trichloroethane	µg/L	200 * 200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2,2-Tetrachloroethane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	µg/L	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	1 ***	5.0	3.1	3.2	3.3	3.5	3.2	2.1	2.1	2.1	2.2	<0.20	<0.20	0.41 J	0.40 J	0.64	1.8
1,1-Dichloroethene	µg/L	7 *	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	0.24	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2,3-Trichloropropane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dibromo-3-Chloropropane	µg/L	0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-Dibromoethane	µg/L	0.001 *** 0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,2-Dichloroethane	µg/L	0.5 *** 5 *	<0.20	0.37	0.41	0.42	0.45	0.32	0.32	0.28	0.34	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	0.6 *** 5 *	0.23	0.24	0.23	0.25	0.26	0.25	0.24	0.26	0.26	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	µg/L	4 *** 75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Butanone	µg/L		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Hexanone	µg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

Table A-1. Groundwater Quality Data Summary

Units	GWQS	MCL	MW-9	MW-9	MW-9	MW-21 (MW-9 Dup)	MW-10	MW-10	MW-10	MW-10
			6/14/2023	9/26/2023	12/5/2023	12/5/2023	3/22/2023	6/13/2023	9/26/2023	12/5/2023
pH	units	6.5-8.5	7.04	7.04	6.96	NA	6.62	6.69	6.79	6.96
Conductivity	µmhos/cm		995	750	849	NA	1288	1165	879	1017
Temperature	C°		23.5	22.4	20.5	NA	24.9	27.2	26.0	23.1
Redox	mv		53.6	65.8	-5.8	NA	101.0	29.1	55.7	47.4
Dissolved Oxygen	mg/L		4.00	2.88	3.14	NA	0.24	0.53	0.56	0.82
Nitrate-Nitrogen	mg/L	10 *	8.4	8.1	7.8	7.9	4.8	5.0	5.8	5.3
Calcium, Dissolved	mg/L		150	160	140	140	190	190	200	180
Sodium, Dissolved	mg/L		27	28	23	23	20	21	24	20
Bicarbonate Alkalinity	mg/L as CaCO3		340	370	370	380	530	540	530	560
Chloride	mg/L	250 **	52	54	53	53	29	8.8	29	29
Magnesium, Dissolved	mg/L		32	38	32	32	39	39	46	40
Potassium, Dissolved	mg/L		9.4	10	9.0	9.1	13	11	13	11
Sulfate	mg/L	250 **	85	77	76	76	81	84	77	81
Total Alkalinity	mg/L as CaCO3		340	370	370	380	530	540	530	560
Iron, Dissolved	mg/L	0.30 **	<0.10	0.13	<0.10	<0.10	0.12	<0.10	0.15	0.12
Manganese, Dissolved	mg/L	0.05 **	<0.020	<0.020	<0.020	<0.020	0.044	0.039	0.041	0.040
Ammonia-Nitrogen	mg/L as N		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Organic Carbon	mg/L		1.5	1.3	1.5	1.5	4.2	1.4	1.5	2.4
Total Dissolved Solids	mg/L	500 **	660	710	660	620	910	800	800	770
Total Suspended Solids	mg/L		<0.40	<2.0	2.0	2.0	<0.40	<2.0	<2.0	2.0
Antimony, Total	mg/L			6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Arsenic, Total	mg/L	0.00005 ***		0.01 *	0.0019	0.0018	0.0017	0.0017	0.0014	0.0014
Barium, Total	mg/L	1 *		2 *	0.089	0.078	0.078	0.078	0.11	0.11
Beryllium, Total	mg/L			0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Cadmium, Total	mg/L	0.01 *		0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Chromium, Total	mg/L	0.05 *		0.1 *	0.0035	0.0027	0.0023	0.0023	0.0011	< 0.0008
Cobalt, Total	mg/L				< 0.0004	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Copper, Total	mg/L	1 **			< 0.0020	<0.0020	<0.0020	<0.0020	< 0.0020	<0.0020
Lead, Total	mg/L	0.05 *			<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Nickel, Total	mg/L			0.1 *	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Selenium, Total	mg/L	0.01 *		0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
Silver, Total	mg/L	0.05 *		0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Thallium, Total	mg/L			0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	< 0.001	<0.0010
Vanadium, Total	mg/L				0.0072	0.0071	0.0074	0.0074	0.0068	0.0072
Zinc, Total	mg/L	5 **		5 **	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
1,1,1,2-Tetrachloroethane	µg/L				<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,1,1-Trichloroethane	µg/L	200 *		200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2,2-Tetrachloroethane	µg/L				<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	µg/L			5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	1 ***			1.5	1.9	1.8	1.9	4.7	5.0
1,1-Dichloroethene	µg/L			7 *	<0.20	<0.20	<0.20	<0.20	0.20	<0.20
1,2,3-Trichloropropane	µg/L				<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dibromo-3-Chloropropane	µg/L			0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-Dibromoethane	µg/L	0.001 ***		0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L			600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,2-Dichloroethane	µg/L	0.5 ***		5 *	<0.20	<0.20	<0.20	<0.20	0.42	0.44
1,2-Dichloropropane	µg/L	0.6 ***		5 *	<0.20	<0.20	<0.20	<0.20	0.46	0.35
1,4-Dichlorobenzene	µg/L	4 ***		75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Butanone	µg/L				<10	<10	<10	<10	<10	<10
2-Hexanone	µg/L				<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

Table A-1. Groundwater Quality Data Summary

	Units	GWQS	MCL	MW-11 3/22/2023	MW-11 6/13/2023	MW-11 9/25/2023	MW-11 12/5/2023	MW-12 3/23/2023	MW-12 6/14/2023	MW-12 9/26/2023	MW-12 12/6/2023	Trip Blank 3/23/2022	Trip Blank 6/14/2023	Trip Blank 9/26/2023	Trip Blank 12/6/2023	Leachate Pond 3/22/2023	Leachate Port #4 9/26/2023
pH	units	6.5-8.5		7.41	7.42	7.46	7.51	7.72	7.86	7.89	7.75	NA	NA	NA	NA	8.36	NA
Conductivity	µmhos/cm		700 **	1852	1487	1256	1530	481.1	400.9	352.2	440	NA	NA	NA	NA	3402	NA
Temperature	C°			20.5	22.5	21.4	20.5	21.8	23.6	17.5	20.7	NA	NA	NA	NA	10.5	NA
Redox	mv			90.9	34.5	33.8	35.8	103.4	54.7	37.8	20.7	NA	NA	NA	NA	91.2	NA
Dissolved Oxygen	mg/L			8.37	8.33	8.63	8.69	4.85	7.53	5.87	6.12	NA	NA	NA	NA	1.97	NA
Nitrate-Nitrogen	mg/L	10 *	10 *	39	38	42	40	5.8	5.7	5.6	6.0	NA	NA	NA	NA	<0.05	NA
Calcium, Dissolved	mg/L			270	230	270	260	60	50	60	66	NA	NA	NA	NA	130	NA
Sodium, Dissolved	mg/L			19	19	22	20	18	19	22	20	NA	NA	NA	NA	300	NA
Bicarbonate Alkalinity	mg/L as CaCO3			160	170	170	160	160	130	170	190	NA	NA	NA	NA	940	NA
Chloride	mg/L	250 **	250 **	230	170	200	220	14	13	14	16	NA	NA	NA	NA	550	NA
Magnesium, Dissolved	mg/L			52	43	57	57	11	9.7	12	13	NA	NA	NA	NA	100	NA
Potassium, Dissolved	mg/L			13	11	13	12	7.9	7.1	7.9	7.6	NA	NA	NA	NA	150	NA
Sulfate	mg/L	250 **	250 **	320	260	300	340	34	35	36	37	NA	NA	NA	NA	21	NA
Total Alkalinity	mg/L as CaCO3			160	170	170	160	160	130	170	190	NA	NA	NA	NA	940	NA
Iron, Dissolved	mg/L	0.30 **	0.30 **	0.13	<0.10	0.20	0.16	<0.10	<0.10	<0.10	<0.10	NA	NA	NA	NA	2.0	NA
Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	NA	NA	NA	1.3	NA
Ammonia-Nitrogen	mg/L as N			<0.10	<0.10	0.14	<0.10	<0.10	<0.10	0.11	<0.10	NA	NA	NA	NA	26	NA
Total Organic Carbon	mg/L			6.4	4.6	5.3	6.5	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	86	NA
Total Dissolved Solids	mg/L	500 **	500 **	1400	1100	1200 H	1300	470	280	320	340	NA	NA	NA	NA	2100	NA
Total Suspended Solids	mg/L			<0.40	<2.0	<2.0	2.0	12	2.8	3.6	13	NA	NA	NA	NA	13	NA
Antimony, Total	mg/L		6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	NA	NA	NA	NA	0.0017	NA
Arsenic, Total	mg/L	0.00005 ***	0.01 *	0.0044	0.0050	0.0047	0.0045	0.0070	0.0088	0.0077	0.0063	NA	NA	NA	NA	0.012	NA
Barium, Total	mg/L	1 *	2 *	0.099	0.089	0.091	0.096	0.056	0.048	0.052	0.060	NA	NA	NA	NA	0.31	NA
Beryllium, Total	mg/L		0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	<0.00040	NA
Cadmium, Total	mg/L	0.01 *	0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	<0.00040	NA
Chromium, Total	mg/L	0.05 *	0.1 *	0.0037	0.0054	0.0052	0.0044	0.015	0.013	0.014	0.018	NA	NA	NA	NA	0.0046	NA
Cobalt, Total	mg/L			<0.00040	0.0027	0.00068	0.00040	0.00082	0.0013	0.00079	0.0010	NA	NA	NA	NA	0.0052	NA
Copper, Total	mg/L	1 **		<0.0020	<0.0020	<0.0020	<0.0020	0.0038	0.0026	0.0033	0.0039	NA	NA	NA	NA	<0.0020	NA
Lead, Total	mg/L	0.05 *		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	<0.00040	NA
Nickel, Total	mg/L		0.1 *	<0.0030	<0.0030	<0.0030	<0.0030	0.0062	0.0057	0.0060	0.0087	NA	NA	NA	NA	0.031	NA
Selenium, Total	mg/L	0.01 *	0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	NA	NA	NA	NA	<0.0080	NA
Silver, Total	mg/L	0.05 *	0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00055	<0.00040	<0.00040	NA	NA	NA	NA	<0.00040	NA
Thallium, Total	mg/L		0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	NA	NA	NA	<0.0010	NA
Vanadium, Total	mg/L			0.010	0.011	0.010	0.010	0.014	0.015	0.015	0.015	NA	NA	NA	NA	0.0066	NA
Zinc, Total	mg/L	5 **	5 **	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	NA	NA	NA	NA	<0.0070	NA
1,1,1,2-Tetrachloroethane	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<6.0
1,1,1-Trichloroethane	µg/L	200 *	200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,1,2,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,1,2-Trichloroethane	µg/L		5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	<0.20	<0.20	1.1	0.56	1.1	1.9	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,1-Dichloroethene	µg/L		7 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,2,3-Trichloropropane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<40
1,2-Dibromoethane	µg/L	0.001 ***	0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<2.0
1,2-Dichlorobenzene	µg/L		600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<6.0
1,2-Dichloroethane	µg/L	0.5 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	<4.0
1,2-Dichloropropane	µg/L	0.6 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
1,4-Dichlorobenzene	µg/L	4 ***	75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<6.0
2-Butanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<200
2-Hexanone	µg/L			<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<60

Table A-1. Groundwater Quality Data Summary

	Units	GWQS	MCL	MW-1	MW-1	MW-21	MW-1	MW-1	MW-2	MW-2	MW-2	MW-2	MW-3	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4
				3/22/2023	6/14/2023	(MW-1 Dup) 6/14/2023	9/26/2023	12/6/2023	3/22/2023	6/13/2023	9/26/2023	12/6/2023	3/23/2023	6/14/2023	9/26/2023	12/6/2023	3/23/2023	6/14/2023	9/26/2023
4-Methyl-2-pentanone	µg/L			<10	< 10	< 10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acetone	µg/L			<10	< 10	< 10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acrylonitrile	µg/L	0.07 ***		<10	< 10	< 10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	µg/L	1 ***	5 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromochloromethane	µg/L			<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	0.3 ***	80 * THM	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	0.25	0.24	<0.20	<0.20	<0.20
Bromoform	µg/L	5 ***	80 * THM	<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Disulfide	µg/L			<0.30	< 0.30	< 0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.3 ***	5 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	µg/L		100 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	µg/L	7 ***	80 * THM	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	6.9	7.0	7.1	7.3	0.35	0.35	0.37
Chloromethane	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	µg/L		70 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	6.1	5.7	6.4
cis-1,3-Dichloropropene	µg/L			<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L		80 * THM	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromomethane	µg/L			<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L		700 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Iodomethane	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5 ***	5 *	<5.0	< 5.0	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	µg/L		100 *	<1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	µg/L	0.8 ***	5 *	5.0	4.7	4.6	4.6	5.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	0.59	0.62
Toluene	µg/L		1000 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	< 0.20	<0.20
trans-1,2-Dichloroethene	µg/L		100 *	<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	< 0.20	<0.20
trans-1,3-Dichloropropene	µg/L			<0.20	< 0.20	< 0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	< 0.20	<0.20
trans-1,4-Dichloro-2-butene	µg/L			<2.0	< 2.0	< 2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	< 2.0	<2.0
Trichloroethene	µg/L	3 ***	5 *	0.31	0.26	0.24	0.32	0.44	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.76	0.74	0.85
Trichlorofluoromethane	µg/L			<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.77	0.86
Vinyl Acetate	µg/L			<2.0	< 2.0	< 2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vinyl Chloride	µg/L	0.02 ***	2 *	<0.10	< 0.10	< 0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Xylenes	µg/L		10000 * XYL	<0.50	< 0.50	< 0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethane	µg/L			<1.1	< 1.1	< 1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Ethene	µg/L			<1.0	< 1	< 1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methane	µg/L			0.91	< 0.58	< 0.58	0.62	<0.58	<0.58	0.59	0.60	<0.58	0.61	<0.58	0.64	<0.58	<0.58	<0.58	0.59

Table A-1. Groundwater Quality Data Summary

Units	GWQS	MCL	MW-4	MW-21 (MW-5 Dup)			MW-5	MW-5	MW-5	MW-6	MW-6	MW-6	MW-6	MW-8	MW-8	MW-8	MW-21 (MW-8 Dup)	MW-8	MW-9
			12/6/2023	3/23/2023	3/23/2023	6/13/2023	9/25/2023	12/5/2023	3/23/2023	6/14/2023	9/25/2023	12/5/2023	3/23/2023	6/14/2023	9/26/2023	9/26/2023	12/6/2023	3/23/2023	
4-Methyl-2-pentanone	µg/L		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acetone	µg/L		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acrylonitrile	µg/L	0.07 ***	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	µg/L	1 ***	5 *	<0.20	<0.20	0.21	<0.20	0.20	0.20	0.28	0.25	0.27	0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromochloromethane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	0.3 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.39	0.35	0.76	0.73	0.82	<0.20
Bromoform	µg/L	5 ***	80 * THM	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Disulfide	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.3 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.24	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	µg/L	7 ***	80 * THM	0.33	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	6.6	5.8	11 J	11 J	12	2.6
Chloromethane	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	µg/L		70 *	5.8	19	20	18	21	20	41	36	38	42	<0.20	<0.20	0.25 J	0.25 J	0.44	10
cis-1,3-Dichloropropene	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromomethane	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Iodomethane	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	µg/L	0.8 ***	5 *	0.64	11	12	10	11	11	20	17	14	22	<0.50	<0.50	<0.50	<0.50	<0.50	12
Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
trans-1,2-Dichloroethene	µg/L		100 *	<0.20	0.36	0.35	0.31	0.39	0.29	1.1	0.94	0.98	1.1	<0.20	<0.20	<0.20	<0.20	<0.20	0.36
trans-1,3-Dichloropropene	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
trans-1,4-Dichloro-2-butene	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Trichloroethene	µg/L	3 ***	5 *	0.86	4.6	4.7	4.0	5.0	4.8	10	8.7	8.8	12	<0.20	<0.20	<0.20	<0.20	<0.20	4.6
Trichlorofluoromethane	µg/L		0.92	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Acetate	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vinyl Chloride	µg/L	0.02 ***	2 *	<0.10	0.63	0.65	0.70	0.81	0.65	0.85	0.80	0.68	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethane	µg/L		<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Ethene	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methane	µg/L		<0.58	160	170	130	210	93	1700	1800	1500	1800	0.60	1.2	0.82	0.60	<0.58	3.0	

Table A-1. Groundwater Quality Data Summary

	Units	GWQS	MCL	MW-9 6/14/2023	MW-9 9/26/2023	MW-9 12/5/2023	MW-21 (MW-9 Dup) 12/5/2023	MW-10 3/22/2023	MW-10 6/13/2023	MW-10 9/26/2023	MW-10 12/5/2023
4-Methyl-2-pentanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10
Acetone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10
Acrylonitrile	µg/L	0.07 ***		<10	<10	<10	<10	<10	<10	<10	<10
Benzene	µg/L	1 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	0.3 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/L	5 ***	80 * THM	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Disulfide	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.3 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	µg/L	7 ***	80 * THM	1.6	2.6	2.7	2.7	0.44	0.47	0.44	0.40
Chloromethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	µg/L		70 *	7.3	11	11	10	17	17	18	15
cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Iodomethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	µg/L	0.8 ***	5 *	11	11	12	11	5.2	6.0	5.0	4.7
Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
trans-1,2-Dichloroethene	µg/L		100 *	0.37	0.40	0.34	0.35	0.20	0.23	0.23	0.20
trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
trans-1,4-Dichloro-2-butene	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Trichloroethene	µg/L	3 ***	5 *	3.4	5.0	4.9	4.8	3.3	3.2	3.3	3.0
Trichlorofluoromethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Acetate	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vinyl Chloride	µg/L	0.02 ***	2 *	<0.10	<0.10	<0.10	<0.10	0.21	0.24	0.21	0.15
Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethane	µg/L			<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Ethene	µg/L			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methane	µg/L			1.4	2.6	1.9	1.8	1800	1700	1900	1700

Table A-1. Groundwater Quality Data Summary

	Units	GWQS	MCL	MW-11 3/22/2023	MW-11 6/13/2023	MW-11 9/25/2023	MW-11 12/5/2023	MW-12 3/23/2023	MW-12 6/14/2023	MW-12 9/26/2023	MW-12 12/6/2023	Trip Blank 3/23/2022	Trip Blank 6/14/2023	Trip Blank 9/26/2023	Trip Blank 12/6/2023	Leachate Pond 3/22/2023	Leachate Port #4 9/26/2023
4-Methyl-2-pentanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	3000
Acetone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	20	<200
Acrylonitrile	µg/L	0.07 ***		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<200
Benzene	µg/L	1 ***	5 *	<0.20	<0.20	0.40	1.9	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Bromodichloromethane	µg/L	0.3 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Bromoform	µg/L	5 ***	80 * THM	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Bromomethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Carbon Disulfide	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	19
Carbon Tetrachloride	µg/L	0.3 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Chloroethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Chloroform	µg/L	7 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	0.29	<0.20	0.27	0.46	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Chloromethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	<10
cis-1,2-Dichloroethene	µg/L		70 *	<0.20	<0.20	<0.20	<0.20	0.89	0.39	0.91	1.8	<0.20	<0.20	<0.20	<0.20	<0.20	20
cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Iodomethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<100
m,p-Xylene	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
o-Xylene	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20
Tetrachloroethene	µg/L	0.8 ***	5 *	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.31	6.3
trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
trans-1,4-Dichloro-2-butene	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<40
Trichloroethene	µg/L	3 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<4.0
Trichlorofluoromethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Vinyl Acetate	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<40
Vinyl Chloride	µg/L	0.02 ***	2 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	2.2
Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
Ethane	µg/L			<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	NA
Ethene	µg/L			<1.0	<1.0	2.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA
Methane	µg/L			0.99	0.58	2.0	0.58	0.68	0.62	0.75	<0.58	<0.58	<0.58	0.6	<0.58	1200	NA

Notes: GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC 173-200)
 MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-290)
 * = Primary
 ** = Secondary
 *** = Carcinogen
 *THM = Primary MCL for the sum of all trihalomethanes
 *XYL = Primary MCL for the sum of all xylenes
 J = Estimated value
Bold = Does not meet GWQS or MCL
 NA = Not analyzed

Appendix B

Laboratory Data Report
and Data Review
Memorandum

QC Results

<u>QCBatch ID</u>	<u>QC ID</u>	<u>Parameter</u>	<u>% Recovery / RPD</u>	<u>Control Limits</u>
LB212	240444-04: DUP 1	Nitrate (as N)	1.1976	0 - 15
	240444-04: MS 1	Nitrate (as N)	103.47	80 - 120
	LCS 1	Nitrate (as N)	100.8	90 - 110
	MB 1	Nitrate (as N)	0.0	- 0.023
	MRL 1	Nitrate (as N)	90.4	70 - 130

Approved:



10-Jan-24



Report of Analysis

For: Parametrix
719 2nd Ave. Suite 200
Seattle, WA 98104
Attn: Lisa Gilbert

Cust Sample #: MW-1 **Lab Sample ID:** 240454-01
Site: Parametrix **Collection Date:** 12/6/2023 11:25 AM

Analyte	Method	Sample Result	RL	Analyst	QC Batch	Analyzed
Nitrate (as N)	EPA 300.0	6.3 mg/L	0.05	tkroupa	LB213	12/7/2023 8:43 AM

Cust Sample #: MW-2 **Lab Sample ID:** 240454-02
Site: Parametrix **Collection Date:** 12/6/2023 12:44 PM

Analyte	Method	Sample Result	RL	Analyst	QC Batch	Analyzed
Nitrate (as N)	EPA 300.0	15 mg/L	0.05	tkroupa	LB213	12/7/2023 11:39 AM

Cust Sample #: MW-3 **Lab Sample ID:** 240454-03
Site: Parametrix **Collection Date:** 12/6/2023 10:28 AM

Analyte	Method	Sample Result	RL	Analyst	QC Batch	Analyzed
Nitrate (as N)	EPA 300.0	3.2 mg/L	0.05	tkroupa	LB213	12/7/2023 8:14 AM

Cust Sample #: MW-4 **Lab Sample ID:** 240454-04
Site: Parametrix **Collection Date:** 12/6/2023 9:40 AM

Analyte	Method	Sample Result	RL	Analyst	QC Batch	Analyzed
Nitrate (as N)	EPA 300.0	9.5 mg/L	0.05	tkroupa	LB213	12/7/2023 7:44 AM

Cust Sample #: MW-8 **Lab Sample ID:** 240454-05
Site: Parametrix **Collection Date:** 12/6/2023 8:45 AM

Analyte	Method	Sample Result	RL	Analyst	QC Batch	Analyzed
Nitrate (as N)	EPA 300.0	11 mg/L	0.05	tkroupa	LB213	12/7/2023 7:15 AM

Cust Sample #: MW-12 **Lab Sample ID:** 240454-06
Site: Parametrix **Collection Date:** 12/6/2023 1:35 PM

Analyte	Method	Sample Result	RL	Analyst	QC Batch	Analyzed
Nitrate (as N)	EPA 300.0	6.0 mg/L	0.05	tkroupa	LB213	12/7/2023 9:42 AM

QC Results

<u>QC Batch ID</u>	<u>QC ID</u>	<u>Parameter</u>	<u>% Recovery / RPD</u>	<u>Control Limits</u>
LB213	240446-07: DUP 1	Nitrate (as N)	2.6316	0 - 15
	240446-07: MS 1	Nitrate (as N)	97.33	80 - 120
	LCS 1	Nitrate (as N)	98.67	90 - 110
	MB 1	Nitrate (as N)	0.0	- 0.023
	MRL 1	Nitrate (as N)	94.4	70 - 130

Approved:



10-Jan-24

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Lisa Gilbert
Parametrix, Inc.
719 2nd Avenue
Suite 200
Seattle, Washington 98104

Generated 12/19/2023 2:45:37 PM

JOB DESCRIPTION

Horn Rapids Landfill

JOB NUMBER

580-134634-1

Eurofins Seattle

Job Notes

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Case Narrative

Client: Parametrix, Inc.
Project: Horn Rapids Landfill

Job ID: 580-134634-1

Job ID: 580-134634-1

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Job Narrative 580-134634-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 12/7/2023 11:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.3°C, 0.7°C and 0.9°C

GC/MS VOA

Method 8260D_LL: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-445937 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

Method 2540C: Only one duplicate is provided due to contamination of second duplicate prior to second weight.
MW-1 (580-134634-1), MW-2 (580-134634-2), MW-3 (580-134634-3), MW-4 (580-134634-4), MW-5 (580-134634-5), MW-6 (580-134634-6), MW-8 (580-134634-7), MW-9 (580-134634-8), MW-10 (580-134634-9), MW-11 (580-134634-10), MW-12 (580-134634-11) and MW-21 (580-134634-12)

Method 350.1: The continuing calibration verification (CCV) associated with the laboratory control sample (LCS) and method blank (MB) recovered above the upper control limit for ammonia. The MB is a non-detect and when the 2% bias from the CCV is added to the LCS recovery, it still falls within acceptance limits. Therefore, the QC are being reported as qualified data. The associated samples are impacted: (CCV 280-637563/81), (LCS 280-637563/88) and (MB 280-637563/89)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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Definitions/Glossary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-1

Lab Sample ID: 580-134634-1

Date Collected: 12/06/23 11:25

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/13/23 04:35	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/13/23 04:35	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/13/23 04:35	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/13/23 04:35	1
1,1-Dichloroethane	ND		0.20		ug/L			12/13/23 04:35	1
1,1-Dichloroethene	ND		0.20		ug/L			12/13/23 04:35	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/13/23 04:35	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/13/23 04:35	1
1,2-Dibromoethane	ND		0.10		ug/L			12/13/23 04:35	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/13/23 04:35	1
1,2-Dichloroethane	ND		0.20		ug/L			12/13/23 04:35	1
1,2-Dichloropropane	ND		0.20		ug/L			12/13/23 04:35	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/13/23 04:35	1
2-Butanone	ND		10		ug/L			12/13/23 04:35	1
2-Hexanone	ND		3.0		ug/L			12/13/23 04:35	1
4-Methyl-2-pentanone	ND		10		ug/L			12/13/23 04:35	1
Acetone	ND		10		ug/L			12/13/23 04:35	1
Acrylonitrile	ND		10		ug/L			12/13/23 04:35	1
Benzene	ND		0.20		ug/L			12/13/23 04:35	1
Bromochloromethane	ND		0.20		ug/L			12/13/23 04:35	1
Bromodichloromethane	ND		0.20		ug/L			12/13/23 04:35	1
Bromoform	ND		0.50		ug/L			12/13/23 04:35	1
Bromomethane	ND		0.50		ug/L			12/13/23 04:35	1
Carbon disulfide	ND		0.30		ug/L			12/13/23 04:35	1
Carbon tetrachloride	ND		0.20		ug/L			12/13/23 04:35	1
Chlorobenzene	ND		0.20		ug/L			12/13/23 04:35	1
Chloroethane	ND		0.50		ug/L			12/13/23 04:35	1
Chloroform	ND		0.20		ug/L			12/13/23 04:35	1
Chloromethane	ND		0.50		ug/L			12/13/23 04:35	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 04:35	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 04:35	1
Dibromochloromethane	ND		0.20		ug/L			12/13/23 04:35	1
Dibromomethane	ND		0.20		ug/L			12/13/23 04:35	1
Ethylbenzene	ND		0.20		ug/L			12/13/23 04:35	1
Iodomethane	ND		0.50		ug/L			12/13/23 04:35	1
Methylene Chloride	ND		5.0		ug/L			12/13/23 04:35	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/13/23 04:35	1
o-Xylene	ND		0.50		ug/L			12/13/23 04:35	1
Styrene	ND		1.0		ug/L			12/13/23 04:35	1
Tetrachloroethene	5.8		0.50		ug/L			12/13/23 04:35	1
Toluene	ND		0.20		ug/L			12/13/23 04:35	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 04:35	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 04:35	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/13/23 04:35	1
Trichloroethene	0.44		0.20		ug/L			12/13/23 04:35	1
Trichlorofluoromethane	ND		0.50		ug/L			12/13/23 04:35	1
Vinyl acetate	ND		2.0		ug/L			12/13/23 04:35	1
Vinyl chloride	ND		0.10		ug/L			12/13/23 04:35	1
Xylenes, Total	ND		0.50		ug/L			12/13/23 04:35	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-1

Lab Sample ID: 580-134634-1

Date Collected: 12/06/23 11:25

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		80 - 120		12/13/23 04:35	1
4-Bromofluorobenzene (Surr)	102		80 - 120		12/13/23 04:35	1
Dibromofluoromethane (Surr)	104		80 - 120		12/13/23 04:35	1
Toluene-d8 (Surr)	102		80 - 120		12/13/23 04:35	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 17:50	1
Ethylene	ND		1.0		ug/L			12/15/23 17:50	1
Methane	ND		0.58		ug/L			12/15/23 17:50	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	91		0.50		mg/L		12/11/23 15:16	12/12/23 16:25	1
Magnesium	19		0.50		mg/L		12/11/23 15:16	12/12/23 16:25	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 16:25	1
Potassium	7.3		3.3		mg/L		12/11/23 15:16	12/12/23 16:25	1
Sodium	21		0.50		mg/L		12/11/23 15:16	12/12/23 16:25	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0039		0.0010		mg/L		12/13/23 16:15	12/15/23 14:33	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 14:33	1
Barium	0.047		0.0012		mg/L		12/13/23 16:15	12/15/23 14:33	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:33	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:33	1
Chromium	0.0035		0.00080		mg/L		12/13/23 16:15	12/15/23 14:33	1
Cobalt	0.0064		0.00040		mg/L		12/13/23 16:15	12/15/23 14:33	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 14:33	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:33	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 14:33	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 14:33	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:33	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 14:33	1
Vanadium	0.0093		0.0040		mg/L		12/13/23 16:15	12/15/23 14:33	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 14:33	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 13:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	22		1.5		mg/L			12/11/23 11:32	1
Sulfate (EPA 300.0)	48		1.5		mg/L			12/11/23 11:32	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 14:36	1
TOC Result 1 (SM 5310B)	1.1		1.0		mg/L			12/14/23 10:03	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	290		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	290		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-1

Lab Sample ID: 580-134634-1

Date Collected: 12/06/23 11:25

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	450		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-2

Lab Sample ID: 580-134634-2

Date Collected: 12/06/23 12:44

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/13/23 04:59	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/13/23 04:59	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/13/23 04:59	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/13/23 04:59	1
1,1-Dichloroethane	ND		0.20		ug/L			12/13/23 04:59	1
1,1-Dichloroethene	ND		0.20		ug/L			12/13/23 04:59	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/13/23 04:59	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/13/23 04:59	1
1,2-Dibromoethane	ND		0.10		ug/L			12/13/23 04:59	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/13/23 04:59	1
1,2-Dichloroethane	ND		0.20		ug/L			12/13/23 04:59	1
1,2-Dichloropropane	ND		0.20		ug/L			12/13/23 04:59	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/13/23 04:59	1
2-Butanone	ND		10		ug/L			12/13/23 04:59	1
2-Hexanone	ND		3.0		ug/L			12/13/23 04:59	1
4-Methyl-2-pentanone	ND		10		ug/L			12/13/23 04:59	1
Acetone	ND		10		ug/L			12/13/23 04:59	1
Acrylonitrile	ND		10		ug/L			12/13/23 04:59	1
Benzene	ND		0.20		ug/L			12/13/23 04:59	1
Bromochloromethane	ND		0.20		ug/L			12/13/23 04:59	1
Bromodichloromethane	ND		0.20		ug/L			12/13/23 04:59	1
Bromoform	ND		0.50		ug/L			12/13/23 04:59	1
Bromomethane	ND		0.50		ug/L			12/13/23 04:59	1
Carbon disulfide	ND		0.30		ug/L			12/13/23 04:59	1
Carbon tetrachloride	ND		0.20		ug/L			12/13/23 04:59	1
Chlorobenzene	ND		0.20		ug/L			12/13/23 04:59	1
Chloroethane	ND		0.50		ug/L			12/13/23 04:59	1
Chloroform	ND		0.20		ug/L			12/13/23 04:59	1
Chloromethane	ND		0.50		ug/L			12/13/23 04:59	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 04:59	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 04:59	1
Dibromochloromethane	ND		0.20		ug/L			12/13/23 04:59	1
Dibromomethane	ND		0.20		ug/L			12/13/23 04:59	1
Ethylbenzene	ND		0.20		ug/L			12/13/23 04:59	1
Iodomethane	ND		0.50		ug/L			12/13/23 04:59	1
Methylene Chloride	ND		5.0		ug/L			12/13/23 04:59	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/13/23 04:59	1
o-Xylene	ND		0.50		ug/L			12/13/23 04:59	1
Styrene	ND		1.0		ug/L			12/13/23 04:59	1
Tetrachloroethene	ND		0.50		ug/L			12/13/23 04:59	1
Toluene	ND		0.20		ug/L			12/13/23 04:59	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 04:59	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 04:59	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/13/23 04:59	1
Trichloroethene	ND		0.20		ug/L			12/13/23 04:59	1
Trichlorofluoromethane	ND		0.50		ug/L			12/13/23 04:59	1
Vinyl acetate	ND		2.0		ug/L			12/13/23 04:59	1
Vinyl chloride	ND		0.10		ug/L			12/13/23 04:59	1
Xylenes, Total	ND		0.50		ug/L			12/13/23 04:59	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-2
Date Collected: 12/06/23 12:44
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-2
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		80 - 120		12/13/23 04:59	1
4-Bromofluorobenzene (Surr)	103		80 - 120		12/13/23 04:59	1
Dibromofluoromethane (Surr)	103		80 - 120		12/13/23 04:59	1
Toluene-d8 (Surr)	101		80 - 120		12/13/23 04:59	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 18:02	1
Ethylene	ND		1.0		ug/L			12/15/23 18:02	1
Methane	ND		0.58		ug/L			12/15/23 18:02	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	70		0.50		mg/L		12/11/23 15:16	12/12/23 16:52	1
Magnesium	16		0.50		mg/L		12/11/23 15:16	12/12/23 16:52	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 16:52	1
Potassium	6.2		3.3		mg/L		12/11/23 15:16	12/12/23 16:52	1
Sodium	14		0.50		mg/L		12/11/23 15:16	12/12/23 16:52	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0039		0.0010		mg/L		12/13/23 16:15	12/15/23 15:08	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:08	1
Barium	0.038		0.0012		mg/L		12/13/23 16:15	12/15/23 15:08	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:08	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:08	1
Chromium	0.17		0.00080		mg/L		12/13/23 16:15	12/15/23 15:08	1
Cobalt	0.00089		0.00040		mg/L		12/13/23 16:15	12/15/23 15:08	1
Copper	0.0060		0.0020		mg/L		12/13/23 16:15	12/15/23 15:08	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:08	1
Nickel	0.018		0.0030		mg/L		12/13/23 16:15	12/15/23 15:08	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:08	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:08	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:08	1
Vanadium	0.014		0.0040		mg/L		12/13/23 16:15	12/15/23 15:08	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:08	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 14:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	29		1.5		mg/L			12/11/23 12:54	1
Sulfate (EPA 300.0)	70		1.5		mg/L			12/11/23 12:54	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 14:44	1
TOC Result 1 (SM 5310B)	ND		1.0		mg/L			12/14/23 10:17	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	150		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	150		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-2

Lab Sample ID: 580-134634-2

Date Collected: 12/06/23 12:44

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	420		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-3

Lab Sample ID: 580-134634-3

Date Collected: 12/06/23 10:28

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/13/23 05:23	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/13/23 05:23	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/13/23 05:23	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/13/23 05:23	1
1,1-Dichloroethane	ND		0.20		ug/L			12/13/23 05:23	1
1,1-Dichloroethene	ND		0.20		ug/L			12/13/23 05:23	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/13/23 05:23	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/13/23 05:23	1
1,2-Dibromoethane	ND		0.10		ug/L			12/13/23 05:23	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/13/23 05:23	1
1,2-Dichloroethane	ND		0.20		ug/L			12/13/23 05:23	1
1,2-Dichloropropane	ND		0.20		ug/L			12/13/23 05:23	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/13/23 05:23	1
2-Butanone	ND		10		ug/L			12/13/23 05:23	1
2-Hexanone	ND		3.0		ug/L			12/13/23 05:23	1
4-Methyl-2-pentanone	ND		10		ug/L			12/13/23 05:23	1
Acetone	ND		10		ug/L			12/13/23 05:23	1
Acrylonitrile	ND		10		ug/L			12/13/23 05:23	1
Benzene	ND		0.20		ug/L			12/13/23 05:23	1
Bromochloromethane	ND		0.20		ug/L			12/13/23 05:23	1
Bromodichloromethane	0.24		0.20		ug/L			12/13/23 05:23	1
Bromoform	ND		0.50		ug/L			12/13/23 05:23	1
Bromomethane	ND		0.50		ug/L			12/13/23 05:23	1
Carbon disulfide	ND		0.30		ug/L			12/13/23 05:23	1
Carbon tetrachloride	ND		0.20		ug/L			12/13/23 05:23	1
Chlorobenzene	ND		0.20		ug/L			12/13/23 05:23	1
Chloroethane	ND		0.50		ug/L			12/13/23 05:23	1
Chloroform	7.3		0.20		ug/L			12/13/23 05:23	1
Chloromethane	ND		0.50		ug/L			12/13/23 05:23	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 05:23	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 05:23	1
Dibromochloromethane	ND		0.20		ug/L			12/13/23 05:23	1
Dibromomethane	ND		0.20		ug/L			12/13/23 05:23	1
Ethylbenzene	ND		0.20		ug/L			12/13/23 05:23	1
Iodomethane	ND		0.50		ug/L			12/13/23 05:23	1
Methylene Chloride	ND		5.0		ug/L			12/13/23 05:23	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/13/23 05:23	1
o-Xylene	ND		0.50		ug/L			12/13/23 05:23	1
Styrene	ND		1.0		ug/L			12/13/23 05:23	1
Tetrachloroethene	ND		0.50		ug/L			12/13/23 05:23	1
Toluene	ND		0.20		ug/L			12/13/23 05:23	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 05:23	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 05:23	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/13/23 05:23	1
Trichloroethene	ND		0.20		ug/L			12/13/23 05:23	1
Trichlorofluoromethane	ND		0.50		ug/L			12/13/23 05:23	1
Vinyl acetate	ND		2.0		ug/L			12/13/23 05:23	1
Vinyl chloride	ND		0.10		ug/L			12/13/23 05:23	1
Xylenes, Total	ND		0.50		ug/L			12/13/23 05:23	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-3
Date Collected: 12/06/23 10:28
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-3
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		80 - 120		12/13/23 05:23	1
4-Bromofluorobenzene (Surr)	101		80 - 120		12/13/23 05:23	1
Dibromofluoromethane (Surr)	105		80 - 120		12/13/23 05:23	1
Toluene-d8 (Surr)	102		80 - 120		12/13/23 05:23	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 18:15	1
Ethylene	ND		1.0		ug/L			12/15/23 18:15	1
Methane	ND		0.58		ug/L			12/15/23 18:15	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	38		0.50		mg/L		12/11/23 15:16	12/12/23 17:02	1
Magnesium	8.0		0.50		mg/L		12/11/23 15:16	12/12/23 17:02	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:02	1
Potassium	5.6		3.3		mg/L		12/11/23 15:16	12/12/23 17:02	1
Sodium	12		0.50		mg/L		12/11/23 15:16	12/12/23 17:02	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0087		0.0010		mg/L		12/13/23 16:15	12/15/23 15:16	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:16	1
Barium	0.017		0.0012		mg/L		12/13/23 16:15	12/15/23 15:16	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:16	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:16	1
Chromium	0.0051		0.00080		mg/L		12/13/23 16:15	12/15/23 15:16	1
Cobalt	0.00050		0.00040		mg/L		12/13/23 16:15	12/15/23 15:16	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:16	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:16	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:16	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:16	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:16	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:16	1
Vanadium	0.016		0.0040		mg/L		12/13/23 16:15	12/15/23 15:16	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:16	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 14:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	15		1.5		mg/L			12/11/23 13:06	1
Sulfate (EPA 300.0)	32		1.5		mg/L			12/11/23 13:06	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 14:47	1
TOC Result 1 (SM 5310B)	ND		1.0		mg/L			12/14/23 11:02	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	92		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	92		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-3

Lab Sample ID: 580-134634-3

Date Collected: 12/06/23 10:28

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	220		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-4

Lab Sample ID: 580-134634-4

Date Collected: 12/06/23 09:40

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/13/23 05:47	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/13/23 05:47	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/13/23 05:47	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/13/23 05:47	1
1,1-Dichloroethane	5.0		0.20		ug/L			12/13/23 05:47	1
1,1-Dichloroethene	ND		0.20		ug/L			12/13/23 05:47	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/13/23 05:47	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/13/23 05:47	1
1,2-Dibromoethane	ND		0.10		ug/L			12/13/23 05:47	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/13/23 05:47	1
1,2-Dichloroethane	ND		0.20		ug/L			12/13/23 05:47	1
1,2-Dichloropropane	0.23		0.20		ug/L			12/13/23 05:47	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/13/23 05:47	1
2-Butanone	ND		10		ug/L			12/13/23 05:47	1
2-Hexanone	ND		3.0		ug/L			12/13/23 05:47	1
4-Methyl-2-pentanone	ND		10		ug/L			12/13/23 05:47	1
Acetone	ND		10		ug/L			12/13/23 05:47	1
Acrylonitrile	ND		10		ug/L			12/13/23 05:47	1
Benzene	ND		0.20		ug/L			12/13/23 05:47	1
Bromochloromethane	ND		0.20		ug/L			12/13/23 05:47	1
Bromodichloromethane	ND		0.20		ug/L			12/13/23 05:47	1
Bromoform	ND		0.50		ug/L			12/13/23 05:47	1
Bromomethane	ND		0.50		ug/L			12/13/23 05:47	1
Carbon disulfide	ND		0.30		ug/L			12/13/23 05:47	1
Carbon tetrachloride	ND		0.20		ug/L			12/13/23 05:47	1
Chlorobenzene	ND		0.20		ug/L			12/13/23 05:47	1
Chloroethane	ND		0.50		ug/L			12/13/23 05:47	1
Chloroform	0.33		0.20		ug/L			12/13/23 05:47	1
Chloromethane	ND		0.50		ug/L			12/13/23 05:47	1
cis-1,2-Dichloroethene	5.8		0.20		ug/L			12/13/23 05:47	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 05:47	1
Dibromochloromethane	ND		0.20		ug/L			12/13/23 05:47	1
Dibromomethane	ND		0.20		ug/L			12/13/23 05:47	1
Ethylbenzene	ND		0.20		ug/L			12/13/23 05:47	1
Iodomethane	ND		0.50		ug/L			12/13/23 05:47	1
Methylene Chloride	ND		5.0		ug/L			12/13/23 05:47	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/13/23 05:47	1
o-Xylene	ND		0.50		ug/L			12/13/23 05:47	1
Styrene	ND		1.0		ug/L			12/13/23 05:47	1
Tetrachloroethene	0.64		0.50		ug/L			12/13/23 05:47	1
Toluene	ND		0.20		ug/L			12/13/23 05:47	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 05:47	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 05:47	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/13/23 05:47	1
Trichloroethene	0.86		0.20		ug/L			12/13/23 05:47	1
Trichlorofluoromethane	0.92		0.50		ug/L			12/13/23 05:47	1
Vinyl acetate	ND		2.0		ug/L			12/13/23 05:47	1
Vinyl chloride	ND		0.10		ug/L			12/13/23 05:47	1
Xylenes, Total	ND		0.50		ug/L			12/13/23 05:47	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-4
Date Collected: 12/06/23 09:40
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-4
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		80 - 120		12/13/23 05:47	1
4-Bromofluorobenzene (Surr)	101		80 - 120		12/13/23 05:47	1
Dibromofluoromethane (Surr)	99		80 - 120		12/13/23 05:47	1
Toluene-d8 (Surr)	99		80 - 120		12/13/23 05:47	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 18:28	1
Ethylene	ND		1.0		ug/L			12/15/23 18:28	1
Methane	ND		0.58		ug/L			12/15/23 18:28	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	90		0.50		mg/L		12/11/23 15:16	12/12/23 17:05	1
Magnesium	20		0.50		mg/L		12/11/23 15:16	12/12/23 17:05	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:05	1
Potassium	7.1		3.3		mg/L		12/11/23 15:16	12/12/23 17:05	1
Sodium	15		0.50		mg/L		12/11/23 15:16	12/12/23 17:05	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0038		0.0010		mg/L		12/13/23 16:15	12/15/23 15:19	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:19	1
Barium	0.054		0.0012		mg/L		12/13/23 16:15	12/15/23 15:19	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:19	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:19	1
Chromium	0.0029		0.00080		mg/L		12/13/23 16:15	12/15/23 15:19	1
Cobalt	0.012		0.00040		mg/L		12/13/23 16:15	12/15/23 15:19	1
Copper	0.0027		0.0020		mg/L		12/13/23 16:15	12/15/23 15:19	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:19	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:19	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:19	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:19	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:19	1
Vanadium	0.012		0.0040		mg/L		12/13/23 16:15	12/15/23 15:19	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:19	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 14:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	17		1.5		mg/L			12/11/23 13:18	1
Sulfate (EPA 300.0)	37		1.5		mg/L			12/11/23 13:18	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 14:49	1
TOC Result 1 (SM 5310B)	ND		1.0		mg/L			12/14/23 11:16	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	260		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	260		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-4

Lab Sample ID: 580-134634-4

Date Collected: 12/06/23 09:40

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	420		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-5

Lab Sample ID: 580-134634-5

Date Collected: 12/05/23 11:45

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 04:18	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 04:18	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 04:18	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 04:18	1
1,1-Dichloroethane	3.2		0.20		ug/L			12/12/23 04:18	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 04:18	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 04:18	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 04:18	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 04:18	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 04:18	1
1,2-Dichloroethane	0.32		0.20		ug/L			12/12/23 04:18	1
1,2-Dichloropropane	0.25		0.20		ug/L			12/12/23 04:18	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 04:18	1
2-Butanone	ND		10		ug/L			12/12/23 04:18	1
2-Hexanone	ND		3.0		ug/L			12/12/23 04:18	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 04:18	1
Acetone	ND		10		ug/L			12/12/23 04:18	1
Acrylonitrile	ND		10		ug/L			12/12/23 04:18	1
Benzene	0.20		0.20		ug/L			12/12/23 04:18	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 04:18	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 04:18	1
Bromoform	ND		0.50		ug/L			12/12/23 04:18	1
Bromomethane	ND		0.50		ug/L			12/12/23 04:18	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 04:18	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 04:18	1
Chlorobenzene	ND		0.20		ug/L			12/12/23 04:18	1
Chloroethane	ND		0.50		ug/L			12/12/23 04:18	1
Chloroform	ND		0.20		ug/L			12/12/23 04:18	1
Chloromethane	ND		0.50		ug/L			12/12/23 04:18	1
cis-1,2-Dichloroethene	20		0.20		ug/L			12/12/23 04:18	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 04:18	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 04:18	1
Dibromomethane	ND		0.20		ug/L			12/12/23 04:18	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 04:18	1
Iodomethane	ND	F1	0.50		ug/L			12/12/23 04:18	1
Methylene Chloride	ND		5.0		ug/L			12/12/23 04:18	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 04:18	1
o-Xylene	ND		0.50		ug/L			12/12/23 04:18	1
Styrene	ND		1.0		ug/L			12/12/23 04:18	1
Tetrachloroethene	11		0.50		ug/L			12/12/23 04:18	1
Toluene	ND		0.20		ug/L			12/12/23 04:18	1
trans-1,2-Dichloroethene	0.29		0.20		ug/L			12/12/23 04:18	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 04:18	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 04:18	1
Trichloroethene	4.8		0.20		ug/L			12/12/23 04:18	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 04:18	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 04:18	1
Vinyl chloride	0.65		0.10		ug/L			12/12/23 04:18	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 04:18	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-5
Date Collected: 12/05/23 11:45
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-5
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		80 - 120		12/12/23 04:18	1
4-Bromofluorobenzene (Surr)	104		80 - 120		12/12/23 04:18	1
Dibromofluoromethane (Surr)	101		80 - 120		12/12/23 04:18	1
Toluene-d8 (Surr)	97		80 - 120		12/12/23 04:18	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/13/23 17:10	1
Ethylene	ND		1.0		ug/L			12/13/23 17:10	1
Methane	93		0.58		ug/L			12/13/23 17:10	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	160		0.50		mg/L		12/11/23 15:16	12/12/23 17:09	1
Magnesium	40		0.50		mg/L		12/11/23 15:16	12/12/23 17:09	1
Manganese	0.39		0.020		mg/L		12/11/23 15:16	12/12/23 17:09	1
Potassium	11		3.3		mg/L		12/11/23 15:16	12/12/23 17:09	1
Sodium	22		0.50		mg/L		12/11/23 15:16	12/12/23 17:09	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0031		0.0010		mg/L		12/13/23 16:15	12/15/23 15:22	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:22	1
Barium	0.11		0.0012		mg/L		12/13/23 16:15	12/15/23 15:22	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:22	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:22	1
Chromium	0.0011		0.00080		mg/L		12/13/23 16:15	12/15/23 15:22	1
Cobalt	0.00057		0.00040		mg/L		12/13/23 16:15	12/15/23 15:22	1
Copper	0.0043		0.0020		mg/L		12/13/23 16:15	12/15/23 15:22	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:22	1
Nickel	0.0040		0.0030		mg/L		12/13/23 16:15	12/15/23 15:22	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:22	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:22	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:22	1
Vanadium	0.0081		0.0040		mg/L		12/13/23 16:15	12/15/23 15:22	1
Zinc	0.024		0.0070		mg/L		12/13/23 16:15	12/15/23 15:22	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.11		0.10		mg/L		12/11/23 15:16	12/13/23 14:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	48		1.5		mg/L			12/11/23 13:30	1
Sulfate (EPA 300.0)	74		1.5		mg/L			12/11/23 13:30	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 14:52	1
TOC Result 1 (SM 5310B)	2.6		1.0		mg/L			12/14/23 13:06	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	490		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	490		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-5

Lab Sample ID: 580-134634-5

Date Collected: 12/05/23 11:45

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	720		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-6

Lab Sample ID: 580-134634-6

Date Collected: 12/05/23 12:50

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 02:37	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 02:37	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 02:37	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 02:37	1
1,1-Dichloroethane	2.2		0.20		ug/L			12/12/23 02:37	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 02:37	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 02:37	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 02:37	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 02:37	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 02:37	1
1,2-Dichloroethane	0.25		0.20		ug/L			12/12/23 02:37	1
1,2-Dichloropropane	0.25		0.20		ug/L			12/12/23 02:37	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 02:37	1
2-Butanone	ND		10		ug/L			12/12/23 02:37	1
2-Hexanone	ND		3.0		ug/L			12/12/23 02:37	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 02:37	1
Acetone	ND		10		ug/L			12/12/23 02:37	1
Acrylonitrile	ND		10		ug/L			12/12/23 02:37	1
Benzene	0.30		0.20		ug/L			12/12/23 02:37	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 02:37	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 02:37	1
Bromoform	ND		0.50		ug/L			12/12/23 02:37	1
Bromomethane	ND		0.50		ug/L			12/12/23 02:37	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 02:37	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 02:37	1
Chlorobenzene	0.24		0.20		ug/L			12/12/23 02:37	1
Chloroethane	ND		0.50		ug/L			12/12/23 02:37	1
Chloroform	ND		0.20		ug/L			12/12/23 02:37	1
Chloromethane	ND		0.50		ug/L			12/12/23 02:37	1
cis-1,2-Dichloroethene	42		0.20		ug/L			12/12/23 02:37	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 02:37	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 02:37	1
Dibromomethane	ND		0.20		ug/L			12/12/23 02:37	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 02:37	1
Iodomethane	ND		0.50		ug/L			12/12/23 02:37	1
Methylene Chloride	ND		5.0		ug/L			12/12/23 02:37	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 02:37	1
o-Xylene	ND		0.50		ug/L			12/12/23 02:37	1
Styrene	ND		1.0		ug/L			12/12/23 02:37	1
Tetrachloroethene	22		0.50		ug/L			12/12/23 02:37	1
Toluene	ND		0.20		ug/L			12/12/23 02:37	1
trans-1,2-Dichloroethene	1.1		0.20		ug/L			12/12/23 02:37	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 02:37	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 02:37	1
Trichloroethene	12		0.20		ug/L			12/12/23 02:37	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 02:37	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 02:37	1
Vinyl chloride	ND		0.10		ug/L			12/12/23 02:37	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 02:37	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-6
Date Collected: 12/05/23 12:50
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-6
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		80 - 120		12/12/23 02:37	1
4-Bromofluorobenzene (Surr)	105		80 - 120		12/12/23 02:37	1
Dibromofluoromethane (Surr)	100		80 - 120		12/12/23 02:37	1
Toluene-d8 (Surr)	95		80 - 120		12/12/23 02:37	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/13/23 17:23	1
Ethylene	ND		1.0		ug/L			12/13/23 17:23	1
Methane (TCD)	1800		390		ug/L			12/13/23 17:23	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	160		0.50		mg/L		12/11/23 15:16	12/12/23 17:12	1
Magnesium	40		0.50		mg/L		12/11/23 15:16	12/12/23 17:12	1
Manganese	0.19		0.020		mg/L		12/11/23 15:16	12/12/23 17:12	1
Potassium	11		3.3		mg/L		12/11/23 15:16	12/12/23 17:12	1
Sodium	21		0.50		mg/L		12/11/23 15:16	12/12/23 17:12	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0014		0.0010		mg/L		12/13/23 16:15	12/15/23 15:25	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:25	1
Barium	0.10		0.0012		mg/L		12/13/23 16:15	12/15/23 15:25	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:25	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:25	1
Chromium	0.0019		0.00080		mg/L		12/13/23 16:15	12/15/23 15:25	1
Cobalt	0.00093		0.00040		mg/L		12/13/23 16:15	12/15/23 15:25	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:25	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:25	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:25	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:25	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:25	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:25	1
Vanadium	0.0046		0.0040		mg/L		12/13/23 16:15	12/15/23 15:25	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:25	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.67		0.10		mg/L		12/11/23 15:16	12/13/23 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	24		1.5		mg/L			12/11/23 13:41	1
Sulfate (EPA 300.0)	51		1.5		mg/L			12/11/23 13:41	1
Ammonia as N (EPA 350.1)	0.48		0.10		mg/L			12/15/23 14:54	1
TOC Result 1 (SM 5310B)	1.4		1.0		mg/L			12/14/23 13:22	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	560		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	560		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-6

Lab Sample ID: 580-134634-6

Date Collected: 12/05/23 12:50

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	660		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-8

Lab Sample ID: 580-134634-7

Date Collected: 12/06/23 08:45

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/13/23 06:11	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/13/23 06:11	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/13/23 06:11	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/13/23 06:11	1
1,1-Dichloroethane	0.64		0.20		ug/L			12/13/23 06:11	1
1,1-Dichloroethene	ND		0.20		ug/L			12/13/23 06:11	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/13/23 06:11	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/13/23 06:11	1
1,2-Dibromoethane	ND		0.10		ug/L			12/13/23 06:11	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/13/23 06:11	1
1,2-Dichloroethane	ND		0.20		ug/L			12/13/23 06:11	1
1,2-Dichloropropane	ND		0.20		ug/L			12/13/23 06:11	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/13/23 06:11	1
2-Butanone	ND		10		ug/L			12/13/23 06:11	1
2-Hexanone	ND		3.0		ug/L			12/13/23 06:11	1
4-Methyl-2-pentanone	ND		10		ug/L			12/13/23 06:11	1
Acetone	ND		10		ug/L			12/13/23 06:11	1
Acrylonitrile	ND		10		ug/L			12/13/23 06:11	1
Benzene	ND		0.20		ug/L			12/13/23 06:11	1
Bromochloromethane	ND		0.20		ug/L			12/13/23 06:11	1
Bromodichloromethane	0.82		0.20		ug/L			12/13/23 06:11	1
Bromoform	ND		0.50		ug/L			12/13/23 06:11	1
Bromomethane	ND		0.50		ug/L			12/13/23 06:11	1
Carbon disulfide	ND		0.30		ug/L			12/13/23 06:11	1
Carbon tetrachloride	ND		0.20		ug/L			12/13/23 06:11	1
Chlorobenzene	ND		0.20		ug/L			12/13/23 06:11	1
Chloroethane	ND		0.50		ug/L			12/13/23 06:11	1
Chloroform	12		0.20		ug/L			12/13/23 06:11	1
Chloromethane	ND		0.50		ug/L			12/13/23 06:11	1
cis-1,2-Dichloroethene	0.44		0.20		ug/L			12/13/23 06:11	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 06:11	1
Dibromochloromethane	ND		0.20		ug/L			12/13/23 06:11	1
Dibromomethane	ND		0.20		ug/L			12/13/23 06:11	1
Ethylbenzene	ND		0.20		ug/L			12/13/23 06:11	1
Iodomethane	ND		0.50		ug/L			12/13/23 06:11	1
Methylene Chloride	ND		5.0		ug/L			12/13/23 06:11	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/13/23 06:11	1
o-Xylene	ND		0.50		ug/L			12/13/23 06:11	1
Styrene	ND		1.0		ug/L			12/13/23 06:11	1
Tetrachloroethene	ND		0.50		ug/L			12/13/23 06:11	1
Toluene	ND		0.20		ug/L			12/13/23 06:11	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 06:11	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 06:11	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/13/23 06:11	1
Trichloroethene	ND		0.20		ug/L			12/13/23 06:11	1
Trichlorofluoromethane	ND		0.50		ug/L			12/13/23 06:11	1
Vinyl acetate	ND		2.0		ug/L			12/13/23 06:11	1
Vinyl chloride	ND		0.10		ug/L			12/13/23 06:11	1
Xylenes, Total	ND		0.50		ug/L			12/13/23 06:11	1

Eurofins Seattle

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-8

Lab Sample ID: 580-134634-7

Date Collected: 12/06/23 08:45

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		80 - 120		12/13/23 06:11	1
4-Bromofluorobenzene (Surr)	101		80 - 120		12/13/23 06:11	1
Dibromofluoromethane (Surr)	98		80 - 120		12/13/23 06:11	1
Toluene-d8 (Surr)	101		80 - 120		12/13/23 06:11	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 18:41	1
Ethylene	ND		1.0		ug/L			12/15/23 18:41	1
Methane	ND		0.58		ug/L			12/15/23 18:41	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	64		0.50		mg/L		12/11/23 15:16	12/12/23 17:16	1
Magnesium	14		0.50		mg/L		12/11/23 15:16	12/12/23 17:16	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:16	1
Potassium	6.8		3.3		mg/L		12/11/23 15:16	12/12/23 17:16	1
Sodium	19		0.50		mg/L		12/11/23 15:16	12/12/23 17:16	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0089		0.0010		mg/L		12/13/23 16:15	12/15/23 15:27	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:27	1
Barium	0.045		0.0012		mg/L		12/13/23 16:15	12/15/23 15:27	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:27	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:27	1
Chromium	0.018		0.00080		mg/L		12/13/23 16:15	12/15/23 15:27	1
Cobalt	0.00077		0.00040		mg/L		12/13/23 16:15	12/15/23 15:27	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:27	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:27	1
Nickel	0.014		0.0030		mg/L		12/13/23 16:15	12/15/23 15:27	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:27	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:27	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:27	1
Vanadium	0.018		0.0040		mg/L		12/13/23 16:15	12/15/23 15:27	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:27	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.10		0.10		mg/L		12/11/23 15:16	12/13/23 14:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	32		1.5		mg/L			12/11/23 13:53	1
Sulfate (EPA 300.0)	48		1.5		mg/L			12/11/23 13:53	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 15:11	1
TOC Result 1 (SM 5310B)	ND		1.0		mg/L			12/14/23 14:05	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	150		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	150		7.0		mg/L			12/09/23 18:04	1

Eurofins Seattle

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-8

Lab Sample ID: 580-134634-7

Date Collected: 12/06/23 08:45

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	360		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	5.0		2.0		mg/L			12/08/23 21:39	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-9

Lab Sample ID: 580-134634-8

Date Collected: 12/05/23 14:28

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 02:57	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 02:57	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 02:57	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 02:57	1
1,1-Dichloroethane	1.8		0.20		ug/L			12/12/23 02:57	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 02:57	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 02:57	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 02:57	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 02:57	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 02:57	1
1,2-Dichloroethane	ND		0.20		ug/L			12/12/23 02:57	1
1,2-Dichloropropane	ND		0.20		ug/L			12/12/23 02:57	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 02:57	1
2-Butanone	ND		10		ug/L			12/12/23 02:57	1
2-Hexanone	ND		3.0		ug/L			12/12/23 02:57	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 02:57	1
Acetone	ND		10		ug/L			12/12/23 02:57	1
Acrylonitrile	ND		10		ug/L			12/12/23 02:57	1
Benzene	ND		0.20		ug/L			12/12/23 02:57	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 02:57	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 02:57	1
Bromoform	ND		0.50		ug/L			12/12/23 02:57	1
Bromomethane	ND		0.50		ug/L			12/12/23 02:57	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 02:57	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 02:57	1
Chlorobenzene	ND		0.20		ug/L			12/12/23 02:57	1
Chloroethane	ND		0.50		ug/L			12/12/23 02:57	1
Chloroform	2.7		0.20		ug/L			12/12/23 02:57	1
Chloromethane	ND		0.50		ug/L			12/12/23 02:57	1
cis-1,2-Dichloroethene	11		0.20		ug/L			12/12/23 02:57	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 02:57	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 02:57	1
Dibromomethane	ND		0.20		ug/L			12/12/23 02:57	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 02:57	1
Iodomethane	ND		0.50		ug/L			12/12/23 02:57	1
Methylene Chloride	ND		5.0		ug/L			12/12/23 02:57	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 02:57	1
o-Xylene	ND		0.50		ug/L			12/12/23 02:57	1
Styrene	ND		1.0		ug/L			12/12/23 02:57	1
Tetrachloroethene	12		0.50		ug/L			12/12/23 02:57	1
Toluene	ND		0.20		ug/L			12/12/23 02:57	1
trans-1,2-Dichloroethene	0.34		0.20		ug/L			12/12/23 02:57	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 02:57	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 02:57	1
Trichloroethene	4.9		0.20		ug/L			12/12/23 02:57	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 02:57	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 02:57	1
Vinyl chloride	ND		0.10		ug/L			12/12/23 02:57	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 02:57	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-9

Lab Sample ID: 580-134634-8

Date Collected: 12/05/23 14:28

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		80 - 120		12/12/23 02:57	1
4-Bromofluorobenzene (Surr)	105		80 - 120		12/12/23 02:57	1
Dibromofluoromethane (Surr)	101		80 - 120		12/12/23 02:57	1
Toluene-d8 (Surr)	96		80 - 120		12/12/23 02:57	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 18:54	1
Ethylene	ND		1.0		ug/L			12/15/23 18:54	1
Methane	1.9		0.58		ug/L			12/15/23 18:54	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	140		0.50		mg/L		12/11/23 15:16	12/12/23 17:19	1
Magnesium	32		0.50		mg/L		12/11/23 15:16	12/12/23 17:19	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:19	1
Potassium	9.0		3.3		mg/L		12/11/23 15:16	12/12/23 17:19	1
Sodium	23		0.50		mg/L		12/11/23 15:16	12/12/23 17:19	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0017		0.0010		mg/L		12/13/23 16:15	12/15/23 15:30	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:30	1
Barium	0.078		0.0012		mg/L		12/13/23 16:15	12/15/23 15:30	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:30	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:30	1
Chromium	0.0023		0.00080		mg/L		12/13/23 16:15	12/15/23 15:30	1
Cobalt	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:30	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:30	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:30	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:30	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:30	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:30	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:30	1
Vanadium	0.0074		0.0040		mg/L		12/13/23 16:15	12/15/23 15:30	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:30	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 14:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	53		1.5		mg/L			12/11/23 14:05	1
Sulfate (EPA 300.0)	76		1.5		mg/L			12/11/23 14:05	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 15:14	1
TOC Result 1 (SM 5310B)	1.5		1.0		mg/L			12/14/23 14:20	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	370		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	370		7.0		mg/L			12/09/23 18:04	1

Eurofins Seattle

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-9

Lab Sample ID: 580-134634-8

Date Collected: 12/05/23 14:28

Matrix: Water

Date Received: 12/07/23 11:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	660		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-10

Lab Sample ID: 580-134634-9

Date Collected: 12/05/23 10:45

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 03:17	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 03:17	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 03:17	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 03:17	1
1,1-Dichloroethane	4.3		0.20		ug/L			12/12/23 03:17	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 03:17	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 03:17	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 03:17	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 03:17	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 03:17	1
1,2-Dichloroethane	0.35		0.20		ug/L			12/12/23 03:17	1
1,2-Dichloropropane	ND		0.20		ug/L			12/12/23 03:17	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 03:17	1
2-Butanone	ND		10		ug/L			12/12/23 03:17	1
2-Hexanone	ND		3.0		ug/L			12/12/23 03:17	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 03:17	1
Acetone	ND		10		ug/L			12/12/23 03:17	1
Acrylonitrile	ND		10		ug/L			12/12/23 03:17	1
Benzene	ND		0.20		ug/L			12/12/23 03:17	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 03:17	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 03:17	1
Bromoform	ND		0.50		ug/L			12/12/23 03:17	1
Bromomethane	ND		0.50		ug/L			12/12/23 03:17	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 03:17	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 03:17	1
Chlorobenzene	ND		0.20		ug/L			12/12/23 03:17	1
Chloroethane	ND		0.50		ug/L			12/12/23 03:17	1
Chloroform	0.40		0.20		ug/L			12/12/23 03:17	1
Chloromethane	ND		0.50		ug/L			12/12/23 03:17	1
cis-1,2-Dichloroethene	15		0.20		ug/L			12/12/23 03:17	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 03:17	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 03:17	1
Dibromomethane	ND		0.20		ug/L			12/12/23 03:17	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 03:17	1
Iodomethane	ND		0.50		ug/L			12/12/23 03:17	1
Methylene Chloride	ND		5.0		ug/L			12/12/23 03:17	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 03:17	1
o-Xylene	ND		0.50		ug/L			12/12/23 03:17	1
Styrene	ND		1.0		ug/L			12/12/23 03:17	1
Tetrachloroethene	4.7		0.50		ug/L			12/12/23 03:17	1
Toluene	ND		0.20		ug/L			12/12/23 03:17	1
trans-1,2-Dichloroethene	0.20		0.20		ug/L			12/12/23 03:17	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 03:17	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 03:17	1
Trichloroethene	3.0		0.20		ug/L			12/12/23 03:17	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 03:17	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 03:17	1
Vinyl chloride	0.15		0.10		ug/L			12/12/23 03:17	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 03:17	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-10

Lab Sample ID: 580-134634-9

Date Collected: 12/05/23 10:45

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		80 - 120		12/12/23 03:17	1
4-Bromofluorobenzene (Surr)	104		80 - 120		12/12/23 03:17	1
Dibromofluoromethane (Surr)	101		80 - 120		12/12/23 03:17	1
Toluene-d8 (Surr)	96		80 - 120		12/12/23 03:17	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 19:07	1
Ethylene	ND		1.0		ug/L			12/15/23 19:07	1
Methane (TCD)	1700		390		ug/L			12/15/23 19:07	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	180		0.50		mg/L		12/11/23 15:16	12/12/23 17:31	1
Magnesium	40		0.50		mg/L		12/11/23 15:16	12/12/23 17:31	1
Manganese	0.040		0.020		mg/L		12/11/23 15:16	12/12/23 17:31	1
Potassium	11		3.3		mg/L		12/11/23 15:16	12/12/23 17:31	1
Sodium	20		0.50		mg/L		12/11/23 15:16	12/12/23 17:31	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010		mg/L		12/13/23 16:15	12/15/23 15:33	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:33	1
Barium	0.10		0.0012		mg/L		12/13/23 16:15	12/15/23 15:33	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:33	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:33	1
Chromium	0.0011		0.00080		mg/L		12/13/23 16:15	12/15/23 15:33	1
Cobalt	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:33	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:33	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:33	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:33	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:33	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:33	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:33	1
Vanadium	0.0070		0.0040		mg/L		12/13/23 16:15	12/15/23 15:33	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:33	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.12		0.10		mg/L		12/11/23 15:16	12/13/23 14:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	29		1.5		mg/L			12/11/23 14:16	1
Sulfate (EPA 300.0)	81		1.5		mg/L			12/11/23 14:16	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 15:17	1
TOC Result 1 (SM 5310B)	2.4		1.0		mg/L			12/14/23 14:36	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	560		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	560		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-10
Date Collected: 12/05/23 10:45
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-9
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	770		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-11

Lab Sample ID: 580-134634-10

Date Collected: 12/05/23 09:40

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 03:37	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 03:37	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 03:37	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 03:37	1
1,1-Dichloroethane	ND		0.20		ug/L			12/12/23 03:37	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 03:37	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 03:37	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 03:37	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 03:37	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 03:37	1
1,2-Dichloroethane	ND		0.20		ug/L			12/12/23 03:37	1
1,2-Dichloropropane	ND		0.20		ug/L			12/12/23 03:37	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 03:37	1
2-Butanone	ND		10		ug/L			12/12/23 03:37	1
2-Hexanone	ND		3.0		ug/L			12/12/23 03:37	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 03:37	1
Acetone	ND		10		ug/L			12/12/23 03:37	1
Acrylonitrile	ND		10		ug/L			12/12/23 03:37	1
Benzene	1.9		0.20		ug/L			12/12/23 03:37	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 03:37	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 03:37	1
Bromoform	ND		0.50		ug/L			12/12/23 03:37	1
Bromomethane	ND		0.50		ug/L			12/12/23 03:37	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 03:37	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 03:37	1
Chlorobenzene	ND		0.20		ug/L			12/12/23 03:37	1
Chloroethane	ND		0.50		ug/L			12/12/23 03:37	1
Chloroform	ND		0.20		ug/L			12/12/23 03:37	1
Chloromethane	ND		0.50		ug/L			12/12/23 03:37	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/12/23 03:37	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 03:37	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 03:37	1
Dibromomethane	ND		0.20		ug/L			12/12/23 03:37	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 03:37	1
Iodomethane	ND		0.50		ug/L			12/12/23 03:37	1
Methylene Chloride	ND		5.0		ug/L			12/12/23 03:37	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 03:37	1
o-Xylene	ND		0.50		ug/L			12/12/23 03:37	1
Styrene	ND		1.0		ug/L			12/12/23 03:37	1
Tetrachloroethene	ND		0.50		ug/L			12/12/23 03:37	1
Toluene	ND		0.20		ug/L			12/12/23 03:37	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/12/23 03:37	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 03:37	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 03:37	1
Trichloroethene	ND		0.20		ug/L			12/12/23 03:37	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 03:37	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 03:37	1
Vinyl chloride	ND		0.10		ug/L			12/12/23 03:37	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 03:37	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-11

Lab Sample ID: 580-134634-10

Date Collected: 12/05/23 09:40

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		80 - 120		12/12/23 03:37	1
4-Bromofluorobenzene (Surr)	104		80 - 120		12/12/23 03:37	1
Dibromofluoromethane (Surr)	101		80 - 120		12/12/23 03:37	1
Toluene-d8 (Surr)	97		80 - 120		12/12/23 03:37	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 19:20	1
Ethylene	ND		1.0		ug/L			12/15/23 19:20	1
Methane	ND		0.58		ug/L			12/15/23 19:20	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	260		0.50		mg/L		12/11/23 15:16	12/12/23 17:34	1
Magnesium	57		0.50		mg/L		12/11/23 15:16	12/12/23 17:34	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:34	1
Potassium	12		3.3		mg/L		12/11/23 15:16	12/12/23 17:34	1
Sodium	20		0.50		mg/L		12/11/23 15:16	12/12/23 17:34	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0045		0.0010		mg/L		12/13/23 16:15	12/15/23 15:49	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:49	1
Barium	0.096		0.0012		mg/L		12/13/23 16:15	12/15/23 15:49	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:49	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:49	1
Chromium	0.0044		0.00080		mg/L		12/13/23 16:15	12/15/23 15:49	1
Cobalt	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:49	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:49	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:49	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:49	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:49	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:49	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:49	1
Vanadium	0.010		0.0040		mg/L		12/13/23 16:15	12/15/23 15:49	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:49	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.16		0.10		mg/L		12/11/23 15:16	12/13/23 14:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	220		15		mg/L			12/11/23 14:40	10
Sulfate (EPA 300.0)	340		15		mg/L			12/11/23 14:40	10
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 15:20	1
TOC Result 1 (SM 5310B)	6.5		1.0		mg/L			12/14/23 14:50	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	160		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	160		7.0		mg/L			12/09/23 18:04	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-11
Date Collected: 12/05/23 09:40
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-10
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1300		100		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-12

Lab Sample ID: 580-134634-11

Date Collected: 12/06/23 13:35

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/13/23 06:35	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/13/23 06:35	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/13/23 06:35	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/13/23 06:35	1
1,1-Dichloroethane	1.9		0.20		ug/L			12/13/23 06:35	1
1,1-Dichloroethene	ND		0.20		ug/L			12/13/23 06:35	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/13/23 06:35	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/13/23 06:35	1
1,2-Dibromoethane	ND		0.10		ug/L			12/13/23 06:35	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/13/23 06:35	1
1,2-Dichloroethane	ND		0.20		ug/L			12/13/23 06:35	1
1,2-Dichloropropane	ND		0.20		ug/L			12/13/23 06:35	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/13/23 06:35	1
2-Butanone	ND		10		ug/L			12/13/23 06:35	1
2-Hexanone	ND		3.0		ug/L			12/13/23 06:35	1
4-Methyl-2-pentanone	ND		10		ug/L			12/13/23 06:35	1
Acetone	ND		10		ug/L			12/13/23 06:35	1
Acrylonitrile	ND		10		ug/L			12/13/23 06:35	1
Benzene	ND		0.20		ug/L			12/13/23 06:35	1
Bromochloromethane	ND		0.20		ug/L			12/13/23 06:35	1
Bromodichloromethane	ND		0.20		ug/L			12/13/23 06:35	1
Bromoform	ND		0.50		ug/L			12/13/23 06:35	1
Bromomethane	ND		0.50		ug/L			12/13/23 06:35	1
Carbon disulfide	ND		0.30		ug/L			12/13/23 06:35	1
Carbon tetrachloride	ND		0.20		ug/L			12/13/23 06:35	1
Chlorobenzene	ND		0.20		ug/L			12/13/23 06:35	1
Chloroethane	ND		0.50		ug/L			12/13/23 06:35	1
Chloroform	0.46		0.20		ug/L			12/13/23 06:35	1
Chloromethane	ND		0.50		ug/L			12/13/23 06:35	1
cis-1,2-Dichloroethene	1.8		0.20		ug/L			12/13/23 06:35	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 06:35	1
Dibromochloromethane	ND		0.20		ug/L			12/13/23 06:35	1
Dibromomethane	ND		0.20		ug/L			12/13/23 06:35	1
Ethylbenzene	ND		0.20		ug/L			12/13/23 06:35	1
Iodomethane	ND		0.50		ug/L			12/13/23 06:35	1
Methylene Chloride	ND		5.0		ug/L			12/13/23 06:35	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/13/23 06:35	1
o-Xylene	ND		0.50		ug/L			12/13/23 06:35	1
Styrene	ND		1.0		ug/L			12/13/23 06:35	1
Tetrachloroethene	ND		0.50		ug/L			12/13/23 06:35	1
Toluene	ND		0.20		ug/L			12/13/23 06:35	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/13/23 06:35	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/13/23 06:35	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/13/23 06:35	1
Trichloroethene	ND		0.20		ug/L			12/13/23 06:35	1
Trichlorofluoromethane	ND		0.50		ug/L			12/13/23 06:35	1
Vinyl acetate	ND		2.0		ug/L			12/13/23 06:35	1
Vinyl chloride	ND		0.10		ug/L			12/13/23 06:35	1
Xylenes, Total	ND		0.50		ug/L			12/13/23 06:35	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-12

Lab Sample ID: 580-134634-11

Date Collected: 12/06/23 13:35

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		80 - 120		12/13/23 06:35	1
4-Bromofluorobenzene (Surr)	101		80 - 120		12/13/23 06:35	1
Dibromofluoromethane (Surr)	103		80 - 120		12/13/23 06:35	1
Toluene-d8 (Surr)	101		80 - 120		12/13/23 06:35	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 19:33	1
Ethylene	ND		1.0		ug/L			12/15/23 19:33	1
Methane	ND		0.58		ug/L			12/15/23 19:33	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	66		0.50		mg/L		12/11/23 15:16	12/12/23 17:38	1
Magnesium	13		0.50		mg/L		12/11/23 15:16	12/12/23 17:38	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:38	1
Potassium	7.6		3.3		mg/L		12/11/23 15:16	12/12/23 17:38	1
Sodium	20		0.50		mg/L		12/11/23 15:16	12/12/23 17:38	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0063		0.0010		mg/L		12/13/23 16:15	12/15/23 15:52	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:52	1
Barium	0.060		0.0012		mg/L		12/13/23 16:15	12/15/23 15:52	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:52	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:52	1
Chromium	0.018		0.00080		mg/L		12/13/23 16:15	12/15/23 15:52	1
Cobalt	0.0010		0.00040		mg/L		12/13/23 16:15	12/15/23 15:52	1
Copper	0.0039		0.0020		mg/L		12/13/23 16:15	12/15/23 15:52	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:52	1
Nickel	0.0087		0.0030		mg/L		12/13/23 16:15	12/15/23 15:52	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:52	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:52	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:52	1
Vanadium	0.015		0.0040		mg/L		12/13/23 16:15	12/15/23 15:52	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:52	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 14:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	16		1.5		mg/L			12/11/23 15:15	1
Sulfate (EPA 300.0)	37		1.5		mg/L			12/11/23 15:15	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 15:23	1
TOC Result 1 (SM 5310B)	ND		1.0		mg/L			12/14/23 15:05	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	190		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	190		7.0		mg/L			12/09/23 18:04	1

Eurofins Seattle

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-12
Date Collected: 12/06/23 13:35
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-11
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	340		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	13		2.0		mg/L			12/08/23 21:39	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-21

Lab Sample ID: 580-134634-12

Date Collected: 12/05/23 07:00

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 03:58	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 03:58	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 03:58	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 03:58	1
1,1-Dichloroethane	1.9		0.20		ug/L			12/12/23 03:58	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 03:58	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 03:58	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 03:58	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 03:58	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 03:58	1
1,2-Dichloroethane	ND		0.20		ug/L			12/12/23 03:58	1
1,2-Dichloropropane	ND		0.20		ug/L			12/12/23 03:58	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 03:58	1
2-Butanone	ND		10		ug/L			12/12/23 03:58	1
2-Hexanone	ND		3.0		ug/L			12/12/23 03:58	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 03:58	1
Acetone	ND		10		ug/L			12/12/23 03:58	1
Acrylonitrile	ND		10		ug/L			12/12/23 03:58	1
Benzene	ND		0.20		ug/L			12/12/23 03:58	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 03:58	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 03:58	1
Bromoform	ND		0.50		ug/L			12/12/23 03:58	1
Bromomethane	ND		0.50		ug/L			12/12/23 03:58	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 03:58	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 03:58	1
Chlorobenzene	ND		0.20		ug/L			12/12/23 03:58	1
Chloroethane	ND		0.50		ug/L			12/12/23 03:58	1
Chloroform	2.7		0.20		ug/L			12/12/23 03:58	1
Chloromethane	ND		0.50		ug/L			12/12/23 03:58	1
cis-1,2-Dichloroethene	10		0.20		ug/L			12/12/23 03:58	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 03:58	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 03:58	1
Dibromomethane	ND		0.20		ug/L			12/12/23 03:58	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 03:58	1
Iodomethane	ND		0.50		ug/L			12/12/23 03:58	1
Methylene Chloride	ND		5.0		ug/L			12/12/23 03:58	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 03:58	1
o-Xylene	ND		0.50		ug/L			12/12/23 03:58	1
Styrene	ND		1.0		ug/L			12/12/23 03:58	1
Tetrachloroethene	11		0.50		ug/L			12/12/23 03:58	1
Toluene	ND		0.20		ug/L			12/12/23 03:58	1
trans-1,2-Dichloroethene	0.35		0.20		ug/L			12/12/23 03:58	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 03:58	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 03:58	1
Trichloroethene	4.8		0.20		ug/L			12/12/23 03:58	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 03:58	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 03:58	1
Vinyl chloride	ND		0.10		ug/L			12/12/23 03:58	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 03:58	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-21

Lab Sample ID: 580-134634-12

Date Collected: 12/05/23 07:00

Matrix: Water

Date Received: 12/07/23 11:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		80 - 120		12/12/23 03:58	1
4-Bromofluorobenzene (Surr)	105		80 - 120		12/12/23 03:58	1
Dibromofluoromethane (Surr)	100		80 - 120		12/12/23 03:58	1
Toluene-d8 (Surr)	96		80 - 120		12/12/23 03:58	1

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 19:46	1
Ethylene	ND		1.0		ug/L			12/15/23 19:46	1
Methane	1.8		0.58		ug/L			12/15/23 19:46	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	140		0.50		mg/L		12/11/23 15:16	12/12/23 17:41	1
Magnesium	32		0.50		mg/L		12/11/23 15:16	12/12/23 17:41	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 17:41	1
Potassium	9.1		3.3		mg/L		12/11/23 15:16	12/12/23 17:41	1
Sodium	23		0.50		mg/L		12/11/23 15:16	12/12/23 17:41	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0017		0.0010		mg/L		12/13/23 16:15	12/15/23 15:55	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 15:55	1
Barium	0.078		0.0012		mg/L		12/13/23 16:15	12/15/23 15:55	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:55	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:55	1
Chromium	0.0023		0.00080		mg/L		12/13/23 16:15	12/15/23 15:55	1
Cobalt	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:55	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 15:55	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:55	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 15:55	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 15:55	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 15:55	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 15:55	1
Vanadium	0.0074		0.0040		mg/L		12/13/23 16:15	12/15/23 15:55	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 15:55	1

Method: EPA 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 15:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (EPA 300.0)	53		1.5		mg/L			12/11/23 15:27	1
Sulfate (EPA 300.0)	76		1.5		mg/L			12/11/23 15:27	1
Ammonia as N (EPA 350.1)	ND		0.10		mg/L			12/15/23 15:32	1
TOC Result 1 (SM 5310B)	1.5		1.0		mg/L			12/14/23 15:19	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity (SM 2320B)	380		7.0		mg/L			12/09/23 18:04	1
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	380		7.0		mg/L			12/09/23 18:04	1

Eurofins Seattle

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-21
Date Collected: 12/05/23 07:00
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-12
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	620		50		mg/L			12/08/23 17:35	1
Total Suspended Solids (SM 2540D)	ND		2.0		mg/L			12/08/23 21:39	1

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Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-134634-13

Date Collected: 12/05/23 00:01

Matrix: Water

Date Received: 12/07/23 11:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/11/23 22:54	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/11/23 22:54	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/11/23 22:54	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/11/23 22:54	1
1,1-Dichloroethane	ND		0.20		ug/L			12/11/23 22:54	1
1,1-Dichloroethene	ND		0.20		ug/L			12/11/23 22:54	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/11/23 22:54	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/11/23 22:54	1
1,2-Dibromoethane	ND		0.10		ug/L			12/11/23 22:54	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/11/23 22:54	1
1,2-Dichloroethane	ND		0.20		ug/L			12/11/23 22:54	1
1,2-Dichloropropane	ND		0.20		ug/L			12/11/23 22:54	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/11/23 22:54	1
2-Butanone	ND		10		ug/L			12/11/23 22:54	1
2-Hexanone	ND		3.0		ug/L			12/11/23 22:54	1
4-Methyl-2-pentanone	ND		10		ug/L			12/11/23 22:54	1
Acetone	ND		10		ug/L			12/11/23 22:54	1
Acrylonitrile	ND		10		ug/L			12/11/23 22:54	1
Benzene	ND		0.20		ug/L			12/11/23 22:54	1
Bromochloromethane	ND		0.20		ug/L			12/11/23 22:54	1
Bromodichloromethane	ND		0.20		ug/L			12/11/23 22:54	1
Bromoform	ND		0.50		ug/L			12/11/23 22:54	1
Bromomethane	ND		0.50		ug/L			12/11/23 22:54	1
Carbon disulfide	ND		0.30		ug/L			12/11/23 22:54	1
Carbon tetrachloride	ND		0.20		ug/L			12/11/23 22:54	1
Chlorobenzene	ND		0.20		ug/L			12/11/23 22:54	1
Chloroethane	ND		0.50		ug/L			12/11/23 22:54	1
Chloroform	ND		0.20		ug/L			12/11/23 22:54	1
Chloromethane	ND		0.50		ug/L			12/11/23 22:54	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/11/23 22:54	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/11/23 22:54	1
Dibromochloromethane	ND		0.20		ug/L			12/11/23 22:54	1
Dibromomethane	ND		0.20		ug/L			12/11/23 22:54	1
Ethylbenzene	ND		0.20		ug/L			12/11/23 22:54	1
Iodomethane	ND		0.50		ug/L			12/11/23 22:54	1
Methylene Chloride	ND		5.0		ug/L			12/11/23 22:54	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/11/23 22:54	1
o-Xylene	ND		0.50		ug/L			12/11/23 22:54	1
Styrene	ND		1.0		ug/L			12/11/23 22:54	1
Tetrachloroethene	ND		0.50		ug/L			12/11/23 22:54	1
Toluene	ND		0.20		ug/L			12/11/23 22:54	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/11/23 22:54	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/11/23 22:54	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/11/23 22:54	1
Trichloroethene	ND		0.20		ug/L			12/11/23 22:54	1
Trichlorofluoromethane	ND		0.50		ug/L			12/11/23 22:54	1
Vinyl acetate	ND		2.0		ug/L			12/11/23 22:54	1
Vinyl chloride	ND		0.10		ug/L			12/11/23 22:54	1
Xylenes, Total	ND		0.50		ug/L			12/11/23 22:54	1

Client Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-134634-13

Date Collected: 12/05/23 00:01

Matrix: Water

Date Received: 12/07/23 11:30

<u>Surrogate</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
1,2-Dichloroethane-d4 (Surr)	98		80 - 120		12/11/23 22:54	1
4-Bromofluorobenzene (Surr)	102		80 - 120		12/11/23 22:54	1
Dibromofluoromethane (Surr)	100		80 - 120		12/11/23 22:54	1
Toluene-d8 (Surr)	97		80 - 120		12/11/23 22:54	1

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-445937/7
Matrix: Water
Analysis Batch: 445937

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/11/23 22:34	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/11/23 22:34	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/11/23 22:34	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/11/23 22:34	1
1,1-Dichloroethane	ND		0.20		ug/L			12/11/23 22:34	1
1,1-Dichloroethene	ND		0.20		ug/L			12/11/23 22:34	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/11/23 22:34	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/11/23 22:34	1
1,2-Dibromoethane	ND		0.10		ug/L			12/11/23 22:34	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/11/23 22:34	1
1,2-Dichloroethane	ND		0.20		ug/L			12/11/23 22:34	1
1,2-Dichloropropane	ND		0.20		ug/L			12/11/23 22:34	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/11/23 22:34	1
2-Butanone	ND		10		ug/L			12/11/23 22:34	1
2-Hexanone	ND		3.0		ug/L			12/11/23 22:34	1
4-Methyl-2-pentanone	ND		10		ug/L			12/11/23 22:34	1
Acetone	ND		10		ug/L			12/11/23 22:34	1
Acrylonitrile	ND		10		ug/L			12/11/23 22:34	1
Benzene	ND		0.20		ug/L			12/11/23 22:34	1
Bromochloromethane	ND		0.20		ug/L			12/11/23 22:34	1
Bromodichloromethane	ND		0.20		ug/L			12/11/23 22:34	1
Bromoform	ND		0.50		ug/L			12/11/23 22:34	1
Bromomethane	ND		0.50		ug/L			12/11/23 22:34	1
Carbon disulfide	ND		0.30		ug/L			12/11/23 22:34	1
Carbon tetrachloride	ND		0.20		ug/L			12/11/23 22:34	1
Chlorobenzene	ND		0.20		ug/L			12/11/23 22:34	1
Chloroethane	ND		0.50		ug/L			12/11/23 22:34	1
Chloroform	ND		0.20		ug/L			12/11/23 22:34	1
Chloromethane	ND		0.50		ug/L			12/11/23 22:34	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/11/23 22:34	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/11/23 22:34	1
Dibromochloromethane	ND		0.20		ug/L			12/11/23 22:34	1
Dibromomethane	ND		0.20		ug/L			12/11/23 22:34	1
Ethylbenzene	ND		0.20		ug/L			12/11/23 22:34	1
Iodomethane	ND		0.50		ug/L			12/11/23 22:34	1
Methylene Chloride	ND		5.0		ug/L			12/11/23 22:34	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/11/23 22:34	1
o-Xylene	ND		0.50		ug/L			12/11/23 22:34	1
Styrene	ND		1.0		ug/L			12/11/23 22:34	1
Tetrachloroethene	ND		0.50		ug/L			12/11/23 22:34	1
Toluene	ND		0.20		ug/L			12/11/23 22:34	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/11/23 22:34	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/11/23 22:34	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/11/23 22:34	1
Trichloroethene	ND		0.20		ug/L			12/11/23 22:34	1
Trichlorofluoromethane	ND		0.50		ug/L			12/11/23 22:34	1
Vinyl acetate	ND		2.0		ug/L			12/11/23 22:34	1
Vinyl chloride	ND		0.10		ug/L			12/11/23 22:34	1

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-445937/7
Matrix: Water
Analysis Batch: 445937

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		0.50		ug/L			12/11/23 22:34	1
Surrogate									
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		80 - 120					12/11/23 22:34	1
4-Bromofluorobenzene (Surr)	103		80 - 120					12/11/23 22:34	1
Dibromofluoromethane (Surr)	101		80 - 120					12/11/23 22:34	1
Toluene-d8 (Surr)	97		80 - 120					12/11/23 22:34	1

Lab Sample ID: LCS 580-445937/4
Matrix: Water
Analysis Batch: 445937

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1,2-Tetrachloroethane	5.00	5.01		ug/L		100	69 - 127
1,1,1-Trichloroethane	5.00	4.64		ug/L		93	70 - 121
1,1,2,2-Tetrachloroethane	5.00	4.87		ug/L		97	67 - 136
1,1,2-Trichloroethane	5.00	5.15		ug/L		103	73 - 127
1,1-Dichloroethane	5.00	4.55		ug/L		91	74 - 120
1,1-Dichloroethene	5.00	4.51		ug/L		90	60 - 129
1,2,3-Trichloropropane	5.00	4.87		ug/L		97	67 - 135
1,2-Dibromo-3-Chloropropane	5.00	4.40		ug/L		88	55 - 135
1,2-Dibromoethane	5.00	4.94		ug/L		99	61 - 143
1,2-Dichlorobenzene	5.00	4.52		ug/L		90	72 - 129
1,2-Dichloroethane	5.00	4.83		ug/L		97	74 - 127
1,2-Dichloropropane	5.00	4.95		ug/L		99	69 - 130
1,4-Dichlorobenzene	5.00	4.37		ug/L		87	71 - 129
2-Butanone	25.0	28.1		ug/L		112	37 - 150
2-Hexanone	25.0	27.0		ug/L		108	56 - 150
4-Methyl-2-pentanone	25.0	25.8		ug/L		103	63 - 137
Acetone	25.0	28.6		ug/L		115	49 - 150
Acrylonitrile	50.0	54.0		ug/L		108	50 - 145
Benzene	5.00	4.57		ug/L		91	80 - 120
Bromochloromethane	5.00	4.97		ug/L		99	79 - 121
Bromodichloromethane	5.00	4.93		ug/L		99	74 - 131
Bromoform	5.00	4.87		ug/L		97	48 - 127
Bromomethane	5.00	4.32		ug/L		86	51 - 148
Carbon disulfide	5.00	3.99		ug/L		80	54 - 142
Carbon tetrachloride	5.00	4.64		ug/L		93	66 - 130
Chlorobenzene	5.00	4.67		ug/L		93	74 - 123
Chloroethane	5.00	5.05		ug/L		101	54 - 140
Chloroform	5.00	4.91		ug/L		98	75 - 120
Chloromethane	5.00	4.34		ug/L		87	32 - 150
cis-1,2-Dichloroethene	5.00	4.96		ug/L		99	72 - 120
cis-1,3-Dichloropropene	5.00	4.43		ug/L		89	77 - 131
Dibromochloromethane	5.00	5.05		ug/L		101	62 - 141
Dibromomethane	5.00	5.46		ug/L		109	65 - 141
Ethylbenzene	5.00	4.38		ug/L		88	80 - 124
Iodomethane	5.00	3.55		ug/L		71	60 - 128

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 580-445937/4
Matrix: Water
Analysis Batch: 445937

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methylene Chloride	5.00	4.53	J	ug/L		91	40 - 142
m-Xylene & p-Xylene	5.00	4.38		ug/L		88	75 - 124
o-Xylene	5.00	4.39		ug/L		88	71 - 124
Styrene	5.00	4.56		ug/L		91	74 - 127
Tetrachloroethene	5.00	3.85		ug/L		77	75 - 124
Toluene	5.00	4.33		ug/L		87	80 - 126
trans-1,2-Dichloroethene	5.00	4.46		ug/L		89	69 - 121
trans-1,3-Dichloropropene	5.00	4.70		ug/L		94	71 - 138
trans-1,4-Dichloro-2-butene	5.00	4.49		ug/L		90	20 - 150
Trichloroethene	5.00	4.83		ug/L		97	72 - 120
Trichlorofluoromethane	5.00	4.97		ug/L		99	60 - 132
Vinyl acetate	12.5	11.4		ug/L		92	38 - 150
Vinyl chloride	5.00	4.80		ug/L		96	41 - 150
Xylenes, Total	10.0	8.77		ug/L		88	73 - 123

Surrogate	LCS %Recovery	LCS Qualifier	LCS Limits
1,2-Dichloroethane-d4 (Surr)	100		80 - 120
4-Bromofluorobenzene (Surr)	104		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120
Toluene-d8 (Surr)	96		80 - 120

Lab Sample ID: LCSD 580-445937/5
Matrix: Water
Analysis Batch: 445937

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	5.00	5.46		ug/L		109	69 - 127	9	22
1,1,1-Trichloroethane	5.00	5.13		ug/L		103	70 - 121	10	24
1,1,1,2,2-Tetrachloroethane	5.00	5.29		ug/L		106	67 - 136	8	24
1,1,2-Trichloroethane	5.00	5.55		ug/L		111	73 - 127	8	22
1,1-Dichloroethane	5.00	5.06		ug/L		101	74 - 120	11	26
1,1-Dichloroethene	5.00	5.08		ug/L		102	60 - 129	12	29
1,2,3-Trichloropropane	5.00	5.49		ug/L		110	67 - 135	12	25
1,2-Dibromo-3-Chloropropane	5.00	4.90		ug/L		98	55 - 135	11	29
1,2-Dibromoethane	5.00	5.28		ug/L		106	61 - 143	7	22
1,2-Dichlorobenzene	5.00	5.03		ug/L		101	72 - 129	11	22
1,2-Dichloroethane	5.00	5.28		ug/L		106	74 - 127	9	21
1,2-Dichloropropane	5.00	5.37		ug/L		107	69 - 130	8	22
1,4-Dichlorobenzene	5.00	4.81		ug/L		96	71 - 129	10	22
2-Butanone	25.0	32.3		ug/L		129	37 - 150	14	35
2-Hexanone	25.0	29.4		ug/L		118	56 - 150	8	29
4-Methyl-2-pentanone	25.0	28.0		ug/L		112	63 - 137	8	26
Acetone	25.0	30.8		ug/L		123	49 - 150	7	24
Acrylonitrile	50.0	58.5		ug/L		117	50 - 145	8	33
Benzene	5.00	4.94		ug/L		99	80 - 120	8	22
Bromochloromethane	5.00	5.47		ug/L		109	79 - 121	10	20
Bromodichloromethane	5.00	5.46		ug/L		109	74 - 131	10	21
Bromoform	5.00	5.48		ug/L		110	48 - 127	12	23

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-445937/5
Matrix: Water
Analysis Batch: 445937

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Bromomethane	5.00	4.86		ug/L		97	51 - 148	12	35
Carbon disulfide	5.00	4.41		ug/L		88	54 - 142	10	34
Carbon tetrachloride	5.00	4.96		ug/L		99	66 - 130	7	24
Chlorobenzene	5.00	5.16		ug/L		103	74 - 123	10	21
Chloroethane	5.00	5.35		ug/L		107	54 - 140	6	33
Chloroform	5.00	5.27		ug/L		105	75 - 120	7	21
Chloromethane	5.00	4.88		ug/L		98	32 - 150	12	33
cis-1,2-Dichloroethene	5.00	5.44		ug/L		109	72 - 120	9	22
cis-1,3-Dichloropropene	5.00	4.77		ug/L		95	77 - 131	7	24
Dibromochloromethane	5.00	5.52		ug/L		110	62 - 141	9	22
Dibromomethane	5.00	5.93		ug/L		119	65 - 141	8	22
Ethylbenzene	5.00	4.86		ug/L		97	80 - 124	10	22
Iodomethane	5.00	4.04		ug/L		81	60 - 128	13	39
Methylene Chloride	5.00	4.90	J	ug/L		98	40 - 142	8	25
m-Xylene & p-Xylene	5.00	4.82		ug/L		96	75 - 124	10	22
o-Xylene	5.00	4.80		ug/L		96	71 - 124	9	23
Styrene	5.00	5.08		ug/L		102	74 - 127	11	22
Tetrachloroethene	5.00	4.39		ug/L		88	75 - 124	13	20
Toluene	5.00	4.75		ug/L		95	80 - 126	9	20
trans-1,2-Dichloroethene	5.00	4.69		ug/L		94	69 - 121	5	27
trans-1,3-Dichloropropene	5.00	5.32		ug/L		106	71 - 138	12	26
trans-1,4-Dichloro-2-butene	5.00	4.69		ug/L		94	20 - 150	4	35
Trichloroethene	5.00	5.16		ug/L		103	72 - 120	7	22
Trichlorofluoromethane	5.00	5.68		ug/L		114	60 - 132	13	32
Vinyl acetate	12.5	14.2		ug/L		114	38 - 150	22	35
Vinyl chloride	5.00	5.31		ug/L		106	41 - 150	10	32
Xylenes, Total	10.0	9.62		ug/L		96	73 - 123	9	20

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	100		80 - 120
4-Bromofluorobenzene (Surr)	103		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120
Toluene-d8 (Surr)	96		80 - 120

Lab Sample ID: 580-134634-5 MS
Matrix: Water
Analysis Batch: 445937

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1,2-Tetrachloroethane	ND		5.00	4.94		ug/L		99	69 - 127
1,1,1-Trichloroethane	ND		5.00	5.11		ug/L		102	70 - 121
1,1,2,2-Tetrachloroethane	ND		5.00	4.63		ug/L		93	67 - 136
1,1,2-Trichloroethane	ND		5.00	4.91		ug/L		98	73 - 127
1,1-Dichloroethane	3.2		5.00	8.19		ug/L		100	74 - 120
1,1-Dichloroethene	ND		5.00	5.19		ug/L		103	60 - 129
1,2,3-Trichloropropane	ND		5.00	4.47		ug/L		89	67 - 135
1,2-Dibromo-3-Chloropropane	ND		5.00	3.89		ug/L		78	55 - 135
1,2-Dibromoethane	ND		5.00	4.44		ug/L		89	61 - 143

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-134634-5 MS

Matrix: Water

Analysis Batch: 445937

Client Sample ID: MW-5

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier	Added	Result	Qualifier				
1,2-Dichlorobenzene	ND		5.00	4.61		ug/L		92	72 - 129
1,2-Dichloroethane	0.32		5.00	5.30		ug/L		100	74 - 127
1,2-Dichloropropane	0.25		5.00	5.30		ug/L		101	69 - 130
1,4-Dichlorobenzene	ND		5.00	4.40		ug/L		88	71 - 129
2-Butanone	ND		25.0	27.0		ug/L		108	37 - 150
2-Hexanone	ND		25.0	21.2		ug/L		85	56 - 150
4-Methyl-2-pentanone	ND		25.0	22.9		ug/L		92	63 - 137
Acetone	ND		25.0	21.6		ug/L		86	49 - 150
Acrylonitrile	ND		50.0	50.0		ug/L		100	50 - 145
Benzene	0.20		5.00	5.13		ug/L		99	80 - 120
Bromochloromethane	ND		5.00	5.02		ug/L		100	79 - 121
Bromodichloromethane	ND		5.00	5.00		ug/L		100	74 - 131
Bromoform	ND		5.00	4.54		ug/L		91	48 - 127
Bromomethane	ND		5.00	3.59		ug/L		72	51 - 148
Carbon disulfide	ND		5.00	4.53		ug/L		91	54 - 142
Carbon tetrachloride	ND		5.00	5.13		ug/L		103	66 - 130
Chlorobenzene	ND		5.00	4.93		ug/L		97	74 - 123
Chloroethane	ND		5.00	5.81		ug/L		116	54 - 140
Chloroform	ND		5.00	5.15		ug/L		103	75 - 120
Chloromethane	ND		5.00	4.99		ug/L		100	32 - 150
cis-1,2-Dichloroethene	20		5.00	24.8		ug/L		105	72 - 120
cis-1,3-Dichloropropene	ND		5.00	4.17		ug/L		83	77 - 131
Dibromochloromethane	ND		5.00	4.83		ug/L		97	62 - 141
Dibromomethane	ND		5.00	5.16		ug/L		103	65 - 141
Ethylbenzene	ND		5.00	4.62		ug/L		92	80 - 124
Iodomethane	ND	F1	5.00	2.71	F1	ug/L		54	60 - 128
Methylene Chloride	ND		5.00	5.15		ug/L		103	40 - 142
m-Xylene & p-Xylene	ND		5.00	4.44		ug/L		89	75 - 124
o-Xylene	ND		5.00	4.55		ug/L		91	71 - 124
Styrene	ND		5.00	4.63		ug/L		93	74 - 127
Tetrachloroethene	11		5.00	14.9		ug/L		82	75 - 124
Toluene	ND		5.00	4.54		ug/L		91	80 - 126
trans-1,2-Dichloroethene	0.29		5.00	5.35		ug/L		101	69 - 121
trans-1,3-Dichloropropene	ND		5.00	4.41		ug/L		88	71 - 138
trans-1,4-Dichloro-2-butene	ND		5.00	3.86		ug/L		77	20 - 150
Trichloroethene	4.8		5.00	9.98		ug/L		104	72 - 120
Trichlorofluoromethane	ND		5.00	5.94		ug/L		119	60 - 132
Vinyl acetate	ND		12.5	10.7		ug/L		86	38 - 150
Vinyl chloride	0.65		5.00	6.12		ug/L		109	41 - 150
Xylenes, Total	ND		10.0	8.99		ug/L		90	73 - 123
	MS MS								
Surrogate	%Recovery	Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	100		80 - 120						
4-Bromofluorobenzene (Surr)	103		80 - 120						
Dibromofluoromethane (Surr)	101		80 - 120						
Toluene-d8 (Surr)	96		80 - 120						

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-134634-5 MSD
Matrix: Water
Analysis Batch: 445937

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		Limit
1,1,1,2-Tetrachloroethane	ND		5.00	4.91		ug/L		98	69 - 127	1	22
1,1,1-Trichloroethane	ND		5.00	5.10		ug/L		102	70 - 121	0	24
1,1,2,2-Tetrachloroethane	ND		5.00	4.60		ug/L		92	67 - 136	1	24
1,1,2-Trichloroethane	ND		5.00	4.68		ug/L		94	73 - 127	5	22
1,1-Dichloroethane	3.2		5.00	8.16		ug/L		100	74 - 120	0	26
1,1-Dichloroethene	ND		5.00	5.24		ug/L		104	60 - 129	1	29
1,2,3-Trichloropropane	ND		5.00	4.76		ug/L		95	67 - 135	6	25
1,2-Dibromo-3-Chloropropane	ND		5.00	4.14		ug/L		83	55 - 135	6	29
1,2-Dibromoethane	ND		5.00	4.38		ug/L		88	61 - 143	1	22
1,2-Dichlorobenzene	ND		5.00	4.61		ug/L		92	72 - 129	0	22
1,2-Dichloroethane	0.32		5.00	5.38		ug/L		101	74 - 127	2	21
1,2-Dichloropropane	0.25		5.00	5.40		ug/L		103	69 - 130	2	22
1,4-Dichlorobenzene	ND		5.00	4.46		ug/L		89	71 - 129	1	22
2-Butanone	ND		25.0	27.2		ug/L		109	37 - 150	1	35
2-Hexanone	ND		25.0	21.8		ug/L		87	56 - 150	2	29
4-Methyl-2-pentanone	ND		25.0	22.1		ug/L		88	63 - 137	4	26
Acetone	ND		25.0	19.3		ug/L		77	49 - 150	11	24
Acrylonitrile	ND		50.0	48.6		ug/L		97	50 - 145	3	33
Benzene	0.20		5.00	5.08		ug/L		98	80 - 120	1	22
Bromochloromethane	ND		5.00	4.97		ug/L		99	79 - 121	1	20
Bromodichloromethane	ND		5.00	5.00		ug/L		100	74 - 131	0	21
Bromoform	ND		5.00	4.49		ug/L		90	48 - 127	1	23
Bromomethane	ND		5.00	3.81		ug/L		76	51 - 148	6	35
Carbon disulfide	ND		5.00	4.53		ug/L		91	54 - 142	0	34
Carbon tetrachloride	ND		5.00	5.12		ug/L		102	66 - 130	0	24
Chlorobenzene	ND		5.00	4.83		ug/L		95	74 - 123	2	21
Chloroethane	ND		5.00	5.83		ug/L		117	54 - 140	0	33
Chloroform	ND		5.00	5.08		ug/L		102	75 - 120	1	21
Chloromethane	ND		5.00	4.88		ug/L		98	32 - 150	2	33
cis-1,2-Dichloroethene	20		5.00	25.0		ug/L		110	72 - 120	1	22
cis-1,3-Dichloropropene	ND		5.00	4.22		ug/L		84	77 - 131	1	24
Dibromochloromethane	ND		5.00	4.79		ug/L		96	62 - 141	1	22
Dibromomethane	ND		5.00	5.22		ug/L		104	65 - 141	1	22
Ethylbenzene	ND		5.00	4.58		ug/L		92	80 - 124	1	22
Iodomethane	ND	F1	5.00	3.42		ug/L		68	60 - 128	23	39
Methylene Chloride	ND		5.00	5.07		ug/L		101	40 - 142	2	25
m-Xylene & p-Xylene	ND		5.00	4.61		ug/L		92	75 - 124	4	22
o-Xylene	ND		5.00	4.48		ug/L		90	71 - 124	1	23
Styrene	ND		5.00	4.65		ug/L		93	74 - 127	0	22
Tetrachloroethene	11		5.00	15.0		ug/L		84	75 - 124	1	20
Toluene	ND		5.00	4.55		ug/L		91	80 - 126	0	20
trans-1,2-Dichloroethene	0.29		5.00	5.18		ug/L		98	69 - 121	3	27
trans-1,3-Dichloropropene	ND		5.00	4.40		ug/L		88	71 - 138	0	26
trans-1,4-Dichloro-2-butene	ND		5.00	3.89		ug/L		78	20 - 150	1	35
Trichloroethene	4.8		5.00	9.96		ug/L		104	72 - 120	0	22
Trichlorofluoromethane	ND		5.00	5.95		ug/L		119	60 - 132	0	32
Vinyl acetate	ND		12.5	11.0		ug/L		88	38 - 150	3	35
Vinyl chloride	0.65		5.00	6.17		ug/L		110	41 - 150	1	32

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-134634-5 MSD
Matrix: Water
Analysis Batch: 445937

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Xylenes, Total	ND		10.0	9.09		ug/L		91	73 - 123	1	20
MSD MSD											
Surrogate	%Recovery	Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	97		80 - 120								
4-Bromofluorobenzene (Surr)	103		80 - 120								
Dibromofluoromethane (Surr)	102		80 - 120								
Toluene-d8 (Surr)	96		80 - 120								

Lab Sample ID: MB 580-446015/7
Matrix: Water
Analysis Batch: 446015

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/12/23 23:46	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/12/23 23:46	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/12/23 23:46	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/12/23 23:46	1
1,1-Dichloroethane	ND		0.20		ug/L			12/12/23 23:46	1
1,1-Dichloroethene	ND		0.20		ug/L			12/12/23 23:46	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/12/23 23:46	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/12/23 23:46	1
1,2-Dibromoethane	ND		0.10		ug/L			12/12/23 23:46	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/12/23 23:46	1
1,2-Dichloroethane	ND		0.20		ug/L			12/12/23 23:46	1
1,2-Dichloropropane	ND		0.20		ug/L			12/12/23 23:46	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/12/23 23:46	1
2-Butanone	ND		10		ug/L			12/12/23 23:46	1
2-Hexanone	ND		3.0		ug/L			12/12/23 23:46	1
4-Methyl-2-pentanone	ND		10		ug/L			12/12/23 23:46	1
Acetone	ND		10		ug/L			12/12/23 23:46	1
Acrylonitrile	ND		10		ug/L			12/12/23 23:46	1
Benzene	ND		0.20		ug/L			12/12/23 23:46	1
Bromochloromethane	ND		0.20		ug/L			12/12/23 23:46	1
Bromodichloromethane	ND		0.20		ug/L			12/12/23 23:46	1
Bromoform	ND		0.50		ug/L			12/12/23 23:46	1
Bromomethane	ND		0.50		ug/L			12/12/23 23:46	1
Carbon disulfide	ND		0.30		ug/L			12/12/23 23:46	1
Carbon tetrachloride	ND		0.20		ug/L			12/12/23 23:46	1
Chlorobenzene	ND		0.20		ug/L			12/12/23 23:46	1
Chloroethane	ND		0.50		ug/L			12/12/23 23:46	1
Chloroform	ND		0.20		ug/L			12/12/23 23:46	1
Chloromethane	ND		0.50		ug/L			12/12/23 23:46	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/12/23 23:46	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 23:46	1
Dibromochloromethane	ND		0.20		ug/L			12/12/23 23:46	1
Dibromomethane	ND		0.20		ug/L			12/12/23 23:46	1
Ethylbenzene	ND		0.20		ug/L			12/12/23 23:46	1
Iodomethane	ND		0.50		ug/L			12/12/23 23:46	1

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-446015/7
Matrix: Water
Analysis Batch: 446015

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	ND		5.0		ug/L			12/12/23 23:46	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/12/23 23:46	1
o-Xylene	ND		0.50		ug/L			12/12/23 23:46	1
Styrene	ND		1.0		ug/L			12/12/23 23:46	1
Tetrachloroethene	ND		0.50		ug/L			12/12/23 23:46	1
Toluene	ND		0.20		ug/L			12/12/23 23:46	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/12/23 23:46	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/12/23 23:46	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/12/23 23:46	1
Trichloroethene	ND		0.20		ug/L			12/12/23 23:46	1
Trichlorofluoromethane	ND		0.50		ug/L			12/12/23 23:46	1
Vinyl acetate	ND		2.0		ug/L			12/12/23 23:46	1
Vinyl chloride	ND		0.10		ug/L			12/12/23 23:46	1
Xylenes, Total	ND		0.50		ug/L			12/12/23 23:46	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		80 - 120		12/12/23 23:46	1
4-Bromofluorobenzene (Surr)	102		80 - 120		12/12/23 23:46	1
Dibromofluoromethane (Surr)	101		80 - 120		12/12/23 23:46	1
Toluene-d8 (Surr)	100		80 - 120		12/12/23 23:46	1

Lab Sample ID: LCS 580-446015/4
Matrix: Water
Analysis Batch: 446015

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1,2-Tetrachloroethane	5.00	5.18		ug/L		104	69 - 127
1,1,1-Trichloroethane	5.00	4.94		ug/L		99	70 - 121
1,1,2,2-Tetrachloroethane	5.00	5.15		ug/L		103	67 - 136
1,1,2-Trichloroethane	5.00	5.14		ug/L		103	73 - 127
1,1-Dichloroethane	5.00	5.06		ug/L		101	74 - 120
1,1-Dichloroethene	5.00	4.87		ug/L		97	60 - 129
1,2,3-Trichloropropane	5.00	5.09		ug/L		102	67 - 135
1,2-Dibromo-3-Chloropropane	5.00	5.15		ug/L		103	55 - 135
1,2-Dibromoethane	5.00	4.78		ug/L		96	61 - 143
1,2-Dichlorobenzene	5.00	5.02		ug/L		100	72 - 129
1,2-Dichloroethane	5.00	4.36		ug/L		87	74 - 127
1,2-Dichloropropane	5.00	4.44		ug/L		89	69 - 130
1,4-Dichlorobenzene	5.00	4.80		ug/L		96	71 - 129
2-Butanone	25.0	26.9		ug/L		108	37 - 150
2-Hexanone	25.0	27.1		ug/L		108	56 - 150
4-Methyl-2-pentanone	25.0	27.3		ug/L		109	63 - 137
Acetone	25.0	28.4		ug/L		114	49 - 150
Acrylonitrile	50.0	50.7		ug/L		101	50 - 145
Benzene	5.00	4.52		ug/L		90	80 - 120
Bromochloromethane	5.00	4.77		ug/L		95	79 - 121
Bromodichloromethane	5.00	4.91		ug/L		98	74 - 131
Bromoform	5.00	4.75		ug/L		95	48 - 127

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 580-446015/4
Matrix: Water
Analysis Batch: 446015

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromomethane	5.00	5.30		ug/L		106	51 - 148
Carbon disulfide	5.00	4.29		ug/L		86	54 - 142
Carbon tetrachloride	5.00	4.71		ug/L		94	66 - 130
Chlorobenzene	5.00	4.79		ug/L		96	74 - 123
Chloroethane	5.00	5.57		ug/L		111	54 - 140
Chloroform	5.00	5.18		ug/L		104	75 - 120
Chloromethane	5.00	5.47		ug/L		109	32 - 150
cis-1,2-Dichloroethene	5.00	4.98		ug/L		100	72 - 120
cis-1,3-Dichloropropene	5.00	4.38		ug/L		88	77 - 131
Dibromochloromethane	5.00	5.08		ug/L		102	62 - 141
Dibromomethane	5.00	5.06		ug/L		101	65 - 141
Ethylbenzene	5.00	4.75		ug/L		95	80 - 124
Iodomethane	5.00	4.93		ug/L		99	60 - 128
Methylene Chloride	5.00	4.94	J	ug/L		99	40 - 142
m-Xylene & p-Xylene	5.00	4.71		ug/L		94	75 - 124
o-Xylene	5.00	4.81		ug/L		96	71 - 124
Styrene	5.00	4.90		ug/L		98	74 - 127
Tetrachloroethene	5.00	4.36		ug/L		87	75 - 124
Toluene	5.00	4.50		ug/L		90	80 - 126
trans-1,2-Dichloroethene	5.00	4.81		ug/L		96	69 - 121
trans-1,3-Dichloropropene	5.00	4.64		ug/L		93	71 - 138
trans-1,4-Dichloro-2-butene	5.00	3.33		ug/L		67	20 - 150
Trichloroethene	5.00	4.51		ug/L		90	72 - 120
Trichlorofluoromethane	5.00	5.68		ug/L		114	60 - 132
Vinyl acetate	12.5	11.7		ug/L		94	38 - 150
Vinyl chloride	5.00	5.42		ug/L		108	41 - 150
Xylenes, Total	10.0	9.52		ug/L		95	73 - 123

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		80 - 120
4-Bromofluorobenzene (Surr)	105		80 - 120
Dibromofluoromethane (Surr)	104		80 - 120
Toluene-d8 (Surr)	101		80 - 120

Lab Sample ID: LCSD 580-446015/5
Matrix: Water
Analysis Batch: 446015

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	5.00	5.21		ug/L		104	69 - 127	0	22
1,1,1-Trichloroethane	5.00	4.98		ug/L		100	70 - 121	1	24
1,1,1,2,2-Tetrachloroethane	5.00	5.32		ug/L		106	67 - 136	3	24
1,1,2-Trichloroethane	5.00	5.25		ug/L		105	73 - 127	2	22
1,1-Dichloroethane	5.00	4.93		ug/L		99	74 - 120	3	26
1,1-Dichloroethene	5.00	4.74		ug/L		95	60 - 129	3	29
1,2,3-Trichloropropane	5.00	5.34		ug/L		107	67 - 135	5	25
1,2-Dibromo-3-Chloropropane	5.00	4.94		ug/L		99	55 - 135	4	29
1,2-Dibromoethane	5.00	4.94		ug/L		99	61 - 143	3	22

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-446015/5
Matrix: Water
Analysis Batch: 446015

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,2-Dichlorobenzene	5.00	5.04		ug/L		101	72 - 129	0	22
1,2-Dichloroethane	5.00	4.78		ug/L		96	74 - 127	9	21
1,2-Dichloropropane	5.00	4.69		ug/L		94	69 - 130	6	22
1,4-Dichlorobenzene	5.00	4.87		ug/L		97	71 - 129	2	22
2-Butanone	25.0	25.8		ug/L		103	37 - 150	4	35
2-Hexanone	25.0	29.1		ug/L		117	56 - 150	7	29
4-Methyl-2-pentanone	25.0	26.6		ug/L		107	63 - 137	2	26
Acetone	25.0	24.3		ug/L		97	49 - 150	16	24
Acrylonitrile	50.0	46.7		ug/L		93	50 - 145	8	33
Benzene	5.00	4.64		ug/L		93	80 - 120	3	22
Bromochloromethane	5.00	4.82		ug/L		96	79 - 121	1	20
Bromodichloromethane	5.00	5.19		ug/L		104	74 - 131	6	21
Bromoform	5.00	4.83		ug/L		97	48 - 127	2	23
Bromomethane	5.00	5.29		ug/L		106	51 - 148	0	35
Carbon disulfide	5.00	4.29		ug/L		86	54 - 142	0	34
Carbon tetrachloride	5.00	4.70		ug/L		94	66 - 130	0	24
Chlorobenzene	5.00	4.92		ug/L		98	74 - 123	3	21
Chloroethane	5.00	5.77		ug/L		115	54 - 140	4	33
Chloroform	5.00	5.07		ug/L		101	75 - 120	2	21
Chloromethane	5.00	5.50		ug/L		110	32 - 150	0	33
cis-1,2-Dichloroethene	5.00	4.94		ug/L		99	72 - 120	1	22
cis-1,3-Dichloropropene	5.00	4.75		ug/L		95	77 - 131	8	24
Dibromochloromethane	5.00	5.29		ug/L		106	62 - 141	4	22
Dibromomethane	5.00	5.23		ug/L		105	65 - 141	3	22
Ethylbenzene	5.00	4.72		ug/L		94	80 - 124	0	22
Iodomethane	5.00	4.84		ug/L		97	60 - 128	2	39
Methylene Chloride	5.00	4.77	J	ug/L		95	40 - 142	4	25
m-Xylene & p-Xylene	5.00	4.72		ug/L		94	75 - 124	0	22
o-Xylene	5.00	4.68		ug/L		94	71 - 124	3	23
Styrene	5.00	4.98		ug/L		100	74 - 127	2	22
Tetrachloroethene	5.00	4.51		ug/L		90	75 - 124	4	20
Toluene	5.00	4.59		ug/L		92	80 - 126	2	20
trans-1,2-Dichloroethene	5.00	4.64		ug/L		93	69 - 121	4	27
trans-1,3-Dichloropropene	5.00	4.98		ug/L		100	71 - 138	7	26
trans-1,4-Dichloro-2-butene	5.00	4.01		ug/L		80	20 - 150	18	35
Trichloroethene	5.00	4.57		ug/L		91	72 - 120	1	22
Trichlorofluoromethane	5.00	5.65		ug/L		113	60 - 132	1	32
Vinyl acetate	12.5	11.3		ug/L		90	38 - 150	3	35
Vinyl chloride	5.00	5.68		ug/L		114	41 - 150	5	32
Xylenes, Total	10.0	9.40		ug/L		94	73 - 123	1	20

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	101		80 - 120
4-Bromofluorobenzene (Surr)	101		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120
Toluene-d8 (Surr)	101		80 - 120

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 680-813205/9
Matrix: Water
Analysis Batch: 813205

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/13/23 16:39	1
Ethylene	ND		1.0		ug/L			12/13/23 16:39	1
Methane	ND		0.58		ug/L			12/13/23 16:39	1

Lab Sample ID: LCS 680-813205/1003
Matrix: Water
Analysis Batch: 813205

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane (TCD)	1920	2170		ug/L		113	75 - 125

Lab Sample ID: LCS 680-813205/6
Matrix: Water
Analysis Batch: 813205

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ethane	361	361		ug/L		100	75 - 125
Ethylene	337	327		ug/L		97	75 - 125
Methane	192	187		ug/L		97	75 - 125

Lab Sample ID: LCSD 680-813205/4
Matrix: Water
Analysis Batch: 813205

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane (TCD)	1920	2070		ug/L		108	75 - 125	5	30

Lab Sample ID: LCSD 680-813205/7
Matrix: Water
Analysis Batch: 813205

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ethane	361	358		ug/L		99	75 - 125	1	30
Ethylene	337	324		ug/L		96	75 - 125	1	30
Methane	192	187		ug/L		97	75 - 125	0	30

Lab Sample ID: MB 680-813744/9
Matrix: Water
Analysis Batch: 813744

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/15/23 16:20	1
Ethylene	ND		1.0		ug/L			12/15/23 16:20	1
Methane	ND		0.58		ug/L			12/15/23 16:20	1

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 680-813744/3
Matrix: Water
Analysis Batch: 813744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane (TCD)	1920	2140		ug/L		111	75 - 125

Lab Sample ID: LCS 680-813744/6
Matrix: Water
Analysis Batch: 813744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ethane	361	350		ug/L		97	75 - 125
Ethylene	337	319		ug/L		95	75 - 125
Methane	192	183		ug/L		95	75 - 125

Lab Sample ID: LCSD 680-813744/4
Matrix: Water
Analysis Batch: 813744

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane (TCD)	1920	1990		ug/L		104	75 - 125	7	30

Lab Sample ID: LCSD 680-813744/7
Matrix: Water
Analysis Batch: 813744

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ethane	361	395		ug/L		109	75 - 125	12	30
Ethylene	337	360		ug/L		107	75 - 125	12	30
Methane	192	203		ug/L		105	75 - 125	11	30

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 580-445921/26-A
Matrix: Water
Analysis Batch: 446120

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 445921

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		12/11/23 15:16	12/12/23 16:15	1
Magnesium	ND		0.50		mg/L		12/11/23 15:16	12/12/23 16:15	1
Manganese	ND		0.020		mg/L		12/11/23 15:16	12/12/23 16:15	1
Potassium	ND		3.3		mg/L		12/11/23 15:16	12/12/23 16:15	1
Sodium	ND		0.50		mg/L		12/11/23 15:16	12/12/23 16:15	1

Lab Sample ID: LCS 580-445921/27-A
Matrix: Water
Analysis Batch: 446120

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 445921

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	20.0	19.6		mg/L		98	85 - 115
Magnesium	20.0	20.8		mg/L		104	85 - 115
Manganese	1.00	0.976		mg/L		98	85 - 115
Potassium	20.0	19.5		mg/L		97	85 - 115
Sodium	20.0	19.5		mg/L		97	85 - 115

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: LCSD 580-445921/28-A
Matrix: Water
Analysis Batch: 446120

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 445921

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Calcium	20.0	19.4		mg/L		97	85 - 115	1	20
Magnesium	20.0	20.8		mg/L		104	85 - 115	0	20
Manganese	1.00	0.969		mg/L		97	85 - 115	1	20
Potassium	20.0	19.5		mg/L		97	85 - 115	0	20
Sodium	20.0	19.5		mg/L		97	85 - 115	0	20

Lab Sample ID: 580-134634-1 MS
Matrix: Water
Analysis Batch: 446120

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Calcium	91		20.0	115	4	mg/L		118	70 - 130		
Magnesium	19		20.0	40.2		mg/L		104	70 - 130		
Manganese	ND		1.00	0.984		mg/L		98	70 - 130		
Potassium	7.3		20.0	27.1		mg/L		99	70 - 130		
Sodium	21		20.0	41.0		mg/L		101	70 - 130		

Lab Sample ID: 580-134634-1 MSD
Matrix: Water
Analysis Batch: 446120

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Calcium	91		20.0	110	4	mg/L		91	70 - 130	5	20
Magnesium	19		20.0	38.5		mg/L		96	70 - 130	4	20
Manganese	ND		1.00	0.930		mg/L		93	70 - 130	6	20
Potassium	7.3		20.0	26.0		mg/L		93	70 - 130	4	20
Sodium	21		20.0	39.2		mg/L		92	70 - 130	5	20

Lab Sample ID: 580-134634-2 MS
Matrix: Water
Analysis Batch: 446120

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Calcium	70		20.0	88.0		mg/L		89	70 - 130		
Magnesium	16		20.0	35.6		mg/L		99	70 - 130		
Manganese	ND		1.00	0.944		mg/L		94	70 - 130		
Potassium	6.2		20.0	25.4		mg/L		96	70 - 130		
Sodium	14		20.0	33.1		mg/L		96	70 - 130		

Lab Sample ID: 580-134634-2 MSD
Matrix: Water
Analysis Batch: 446120

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Calcium	70		20.0	88.6		mg/L		92	70 - 130	1	20
Magnesium	16		20.0	36.7		mg/L		105	70 - 130	3	20
Manganese	ND		1.00	0.944		mg/L		94	70 - 130	0	20
Potassium	6.2		20.0	26.0		mg/L		99	70 - 130	2	20
Sodium	14		20.0	34.0		mg/L		100	70 - 130	3	20

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 580-134634-1 DU
Matrix: Water
Analysis Batch: 446120

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Calcium	91		94.0		mg/L		3	20
Magnesium	19		19.5		mg/L		0.4	20
Manganese	ND		ND		mg/L		NC	20
Potassium	7.3		7.27		mg/L		0.4	20
Sodium	21		21.0		mg/L		0.7	20

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 580-445921/26-A
Matrix: Water
Analysis Batch: 446165

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 445921

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	ND		0.10		mg/L		12/11/23 15:16	12/13/23 13:31	1

Lab Sample ID: LCS 580-445921/27-A
Matrix: Water
Analysis Batch: 446165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 445921

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Iron	20.0	21.4		mg/L		107	85 - 115

Lab Sample ID: LCSD 580-445921/28-A
Matrix: Water
Analysis Batch: 446165

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 445921

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec Limits	RPD	Limit
		Result	Qualifier						
Iron	20.0	21.4		mg/L		107	85 - 115	0	20

Lab Sample ID: MB 580-446177/26-A
Matrix: Water
Analysis Batch: 446435

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 446177

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 14:27	1
Antimony	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 14:27	1
Barium	ND		0.0012		mg/L		12/13/23 16:15	12/15/23 14:27	1
Beryllium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:27	1
Cadmium	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:27	1
Chromium	ND		0.00080		mg/L		12/13/23 16:15	12/15/23 14:27	1
Cobalt	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:27	1
Copper	ND		0.0020		mg/L		12/13/23 16:15	12/15/23 14:27	1
Lead	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:27	1
Nickel	ND		0.0030		mg/L		12/13/23 16:15	12/15/23 14:27	1
Selenium	ND		0.0080		mg/L		12/13/23 16:15	12/15/23 14:27	1
Silver	ND		0.00040		mg/L		12/13/23 16:15	12/15/23 14:27	1
Thallium	ND		0.0010		mg/L		12/13/23 16:15	12/15/23 14:27	1
Vanadium	ND		0.0040		mg/L		12/13/23 16:15	12/15/23 14:27	1
Zinc	ND		0.0070		mg/L		12/13/23 16:15	12/15/23 14:27	1

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-446177/27-A
Matrix: Water
Analysis Batch: 446435

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	0.982		mg/L		98	85 - 115
Antimony	1.00	1.01		mg/L		101	85 - 115
Barium	1.00	0.992		mg/L		99	85 - 115
Beryllium	1.00	0.976		mg/L		98	85 - 115
Cadmium	1.00	0.981		mg/L		98	85 - 115
Chromium	1.00	1.04		mg/L		104	85 - 115
Cobalt	1.00	0.998		mg/L		100	85 - 115
Copper	1.00	1.02		mg/L		102	85 - 115
Lead	1.00	0.986		mg/L		99	85 - 115
Nickel	1.00	1.02		mg/L		102	85 - 115
Selenium	1.00	0.969		mg/L		97	85 - 115
Silver	1.00	0.999		mg/L		100	85 - 115
Thallium	1.00	0.942		mg/L		94	85 - 115
Vanadium	1.00	1.04		mg/L		104	85 - 115
Zinc	1.00	1.05		mg/L		105	85 - 115

Lab Sample ID: LCSD 580-446177/28-A
Matrix: Water
Analysis Batch: 446435

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	0.965		mg/L		97	85 - 115	2	20
Antimony	1.00	1.00		mg/L		100	85 - 115	0	20
Barium	1.00	0.989		mg/L		99	85 - 115	0	20
Beryllium	1.00	0.961		mg/L		96	85 - 115	1	20
Cadmium	1.00	0.993		mg/L		99	85 - 115	1	20
Chromium	1.00	1.05		mg/L		105	85 - 115	1	20
Cobalt	1.00	1.00		mg/L		100	85 - 115	0	20
Copper	1.00	1.01		mg/L		101	85 - 115	1	20
Lead	1.00	0.983		mg/L		98	85 - 115	0	20
Nickel	1.00	1.00		mg/L		100	85 - 115	1	20
Selenium	1.00	1.01		mg/L		101	85 - 115	4	20
Silver	1.00	1.00		mg/L		100	85 - 115	0	20
Thallium	1.00	0.926		mg/L		93	85 - 115	2	20
Vanadium	1.00	1.05		mg/L		105	85 - 115	1	20
Zinc	1.00	1.00		mg/L		100	85 - 115	4	20

Lab Sample ID: 580-134634-1 MS
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.0039		1.00	0.998		mg/L		99	70 - 130
Antimony	ND		1.00	1.05		mg/L		105	70 - 130
Barium	0.047		1.00	1.07		mg/L		102	70 - 130
Beryllium	ND		1.00	0.975		mg/L		98	70 - 130
Cadmium	ND		1.00	1.01		mg/L		101	70 - 130
Chromium	0.0035		1.00	1.10		mg/L		109	70 - 130
Cobalt	0.0064		1.00	1.01		mg/L		101	70 - 130

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-134634-1 MS
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Copper	ND		1.00	1.02		mg/L		102	70 - 130
Lead	ND		1.00	1.01		mg/L		101	70 - 130
Nickel	ND		1.00	1.01		mg/L		101	70 - 130
Selenium	ND		1.00	1.06		mg/L		106	70 - 130
Silver	ND		1.00	1.03		mg/L		103	70 - 130
Thallium	ND		1.00	0.947		mg/L		95	70 - 130
Vanadium	0.0093		1.00	1.11		mg/L		110	70 - 130
Zinc	ND		1.00	1.05		mg/L		104	70 - 130

Lab Sample ID: 580-134634-1 MSD
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Arsenic	0.0039		1.00	0.990		mg/L		99	70 - 130	1	20
Antimony	ND		1.00	1.05		mg/L		105	70 - 130	0	20
Barium	0.047		1.00	1.08		mg/L		104	70 - 130	1	20
Beryllium	ND		1.00	0.976		mg/L		98	70 - 130	0	20
Cadmium	ND		1.00	1.03		mg/L		103	70 - 130	2	20
Chromium	0.0035		1.00	1.07		mg/L		107	70 - 130	2	20
Cobalt	0.0064		1.00	1.00		mg/L		100	70 - 130	1	20
Copper	ND		1.00	1.01		mg/L		101	70 - 130	1	20
Lead	ND		1.00	1.02		mg/L		102	70 - 130	1	20
Nickel	ND		1.00	0.999		mg/L		100	70 - 130	1	20
Selenium	ND		1.00	1.06		mg/L		106	70 - 130	0	20
Silver	ND		1.00	1.04		mg/L		104	70 - 130	1	20
Thallium	ND		1.00	0.937		mg/L		94	70 - 130	1	20
Vanadium	0.0093		1.00	1.09		mg/L		108	70 - 130	2	20
Zinc	ND		1.00	1.01		mg/L		101	70 - 130	3	20

Lab Sample ID: 580-134634-2 MS
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-2
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.0039		1.00	0.964		mg/L		96	70 - 130
Antimony	ND		1.00	1.01		mg/L		101	70 - 130
Barium	0.038		1.00	1.03		mg/L		100	70 - 130
Beryllium	ND		1.00	0.950		mg/L		95	70 - 130
Cadmium	ND		1.00	1.00		mg/L		100	70 - 130
Chromium	0.17		1.00	1.28		mg/L		111	70 - 130
Cobalt	0.00089		1.00	0.980		mg/L		98	70 - 130
Copper	0.0060		1.00	1.00		mg/L		99	70 - 130
Lead	ND		1.00	0.981		mg/L		98	70 - 130
Nickel	0.018		1.00	1.01		mg/L		99	70 - 130
Selenium	ND		1.00	1.08		mg/L		107	70 - 130
Silver	ND		1.00	1.01		mg/L		101	70 - 130
Thallium	ND		1.00	0.933		mg/L		93	70 - 130
Vanadium	0.014		1.00	1.12		mg/L		110	70 - 130

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QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-134634-2 MS
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-2
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Zinc	ND		1.00	1.01		mg/L		100	70 - 130

Lab Sample ID: 580-134634-2 MSD
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-2
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	0.0039		1.00	0.974		mg/L		97	70 - 130	1	20
Antimony	ND		1.00	0.999		mg/L		100	70 - 130	1	20
Barium	0.038		1.00	1.02		mg/L		99	70 - 130	1	20
Beryllium	ND		1.00	0.949		mg/L		95	70 - 130	0	20
Cadmium	ND		1.00	0.994		mg/L		99	70 - 130	1	20
Chromium	0.17		1.00	1.24		mg/L		107	70 - 130	3	20
Cobalt	0.00089		1.00	0.985		mg/L		98	70 - 130	1	20
Copper	0.0060		1.00	1.01		mg/L		100	70 - 130	1	20
Lead	ND		1.00	0.991		mg/L		99	70 - 130	1	20
Nickel	0.018		1.00	1.01		mg/L		99	70 - 130	0	20
Selenium	ND		1.00	1.04		mg/L		104	70 - 130	3	20
Silver	ND		1.00	1.00		mg/L		100	70 - 130	0	20
Thallium	ND		1.00	0.923		mg/L		92	70 - 130	1	20
Vanadium	0.014		1.00	1.08		mg/L		107	70 - 130	3	20
Zinc	ND		1.00	1.02		mg/L		101	70 - 130	1	20

Lab Sample ID: 580-134634-1 DU
Matrix: Water
Analysis Batch: 446435

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 446177

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	0.0039		0.00402		mg/L		4	20
Antimony	ND		ND		mg/L		NC	20
Barium	0.047		0.0479		mg/L		1	20
Beryllium	ND		ND		mg/L		NC	20
Cadmium	ND		ND		mg/L		NC	20
Chromium	0.0035		0.00344		mg/L		2	20
Cobalt	0.0064		0.00647		mg/L		1	20
Copper	ND		ND		mg/L		NC	20
Lead	ND		ND		mg/L		NC	20
Nickel	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20
Silver	ND		ND		mg/L		NC	20
Thallium	ND		ND		mg/L		NC	20
Vanadium	0.0093		0.00946		mg/L		2	20
Zinc	ND		ND		mg/L		NC	20

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-134634-1 MS
Matrix: Water
Analysis Batch: 446165

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	ND		20.0	23.1		mg/L		115	70 - 130

Lab Sample ID: 580-134634-1 MSD
Matrix: Water
Analysis Batch: 446165

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	ND		20.0	22.0		mg/L		110	70 - 130	5	20

Lab Sample ID: 580-134634-2 MS
Matrix: Water
Analysis Batch: 446165

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	ND		20.0	22.2		mg/L		111	70 - 130

Lab Sample ID: 580-134634-2 MSD
Matrix: Water
Analysis Batch: 446165

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	ND		20.0	22.4		mg/L		112	70 - 130	1	20

Lab Sample ID: 580-134634-1 DU
Matrix: Water
Analysis Batch: 446165

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 445921

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	ND		ND		mg/L		NC	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-445916/3
Matrix: Water
Analysis Batch: 445916

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			12/11/23 09:35	1
Sulfate	ND		1.5		mg/L			12/11/23 09:35	1

Lab Sample ID: LCS 580-445916/4
Matrix: Water
Analysis Batch: 445916

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	53.2		mg/L		106	90 - 110
Sulfate	50.0	52.2		mg/L		104	90 - 110

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 580-445916/5
Matrix: Water
Analysis Batch: 445916

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	53.1		mg/L		106	90 - 110	0	15
Sulfate	50.0	52.2		mg/L		104	90 - 110	0	15

Lab Sample ID: 580-134634-1 MS
Matrix: Water
Analysis Batch: 445916

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	22		50.0	73.5		mg/L		103	90 - 110
Sulfate	48		50.0	96.3		mg/L		97	90 - 110

Lab Sample ID: 580-134634-1 MSD
Matrix: Water
Analysis Batch: 445916

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	22		50.0	73.5		mg/L		103	90 - 110	0	15
Sulfate	48		50.0	96.2		mg/L		96	90 - 110	0	15

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 280-637563/147
Matrix: Water
Analysis Batch: 637563

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND		0.10		mg/L			12/15/23 16:30	1

Lab Sample ID: MB 280-637563/89
Matrix: Water
Analysis Batch: 637563

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	ND	^+	0.10		mg/L			12/15/23 13:53	1

Lab Sample ID: LCS 280-637563/146
Matrix: Water
Analysis Batch: 637563

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	2.50	2.75		mg/L		110	90 - 110

Lab Sample ID: LCS 280-637563/88
Matrix: Water
Analysis Batch: 637563

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	2.50	2.68	^+	mg/L		107	90 - 110

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: 580-134634-1 MS
Matrix: Water
Analysis Batch: 637563

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	ND		1.00	1.07		mg/L		107	90 - 110

Lab Sample ID: 580-134634-1 MSD
Matrix: Water
Analysis Batch: 637563

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia as N	ND		1.00	1.07		mg/L		107	90 - 110	0	10

Lab Sample ID: 580-134634-11 MS
Matrix: Water
Analysis Batch: 637563

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	ND		1.00	1.09		mg/L		109	90 - 110

Lab Sample ID: 580-134634-11 MSD
Matrix: Water
Analysis Batch: 637563

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia as N	ND		1.00	1.10		mg/L		110	90 - 110	1	10

Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-445856/2
Matrix: Water
Analysis Batch: 445856

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Alkalinity	100	95.9		mg/L		96	85 - 115

Lab Sample ID: 580-134634-1 DU
Matrix: Water
Analysis Batch: 445856

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	290		285		mg/L		1	17
Bicarbonate Alkalinity as CaCO3	290		285		mg/L		1	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 580-445823/1
Matrix: Water
Analysis Batch: 445823

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		50		mg/L			12/08/23 17:35	1

Eurofins Seattle

QC Sample Results

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 580-445823/2
Matrix: Water
Analysis Batch: 445823

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1020	1020		mg/L		99	80 - 120

Lab Sample ID: 580-134634-10 DU
Matrix: Water
Analysis Batch: 445823

Client Sample ID: MW-11
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	1300		1320		mg/L		5	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 580-445852/1
Matrix: Water
Analysis Batch: 445852

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		2.0		mg/L			12/08/23 21:39	1

Lab Sample ID: LCS 580-445852/2
Matrix: Water
Analysis Batch: 445852

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	500	408		mg/L		82	80 - 120

Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 280-637453/35
Matrix: Water
Analysis Batch: 637453

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		1.0		mg/L			12/14/23 03:27	1

Lab Sample ID: LCS 280-637453/34
Matrix: Water
Analysis Batch: 637453

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
TOC Result 1	25.0	27.9		mg/L		112	88 - 112

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-1

Lab Sample ID: 580-134634-1

Date Collected: 12/06/23 11:25

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	446015	JBT	EET SEA	12/13/23 04:35
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 17:50
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 16:25
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 13:36
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 14:33
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 11:32
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 14:36
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 10:03

Client Sample ID: MW-2

Lab Sample ID: 580-134634-2

Date Collected: 12/06/23 12:44

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	446015	JBT	EET SEA	12/13/23 04:59
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 18:02
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 16:52
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:14
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:08
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 12:54
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 14:44
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 10:17

Client Sample ID: MW-3

Lab Sample ID: 580-134634-3

Date Collected: 12/06/23 10:28

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	446015	JBT	EET SEA	12/13/23 05:23
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 18:15

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-3

Lab Sample ID: 580-134634-3

Date Collected: 12/06/23 10:28

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:02
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:22
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:16
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 13:06
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 14:47
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 11:02

Client Sample ID: MW-4

Lab Sample ID: 580-134634-4

Date Collected: 12/06/23 09:40

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	446015	JBT	EET SEA	12/13/23 05:47
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 18:28
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:05
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:25
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:19
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 13:18
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 14:49
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 11:16

Client Sample ID: MW-5

Lab Sample ID: 580-134634-5

Date Collected: 12/05/23 11:45

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/12/23 04:18
Total/NA	Analysis	RSK-175		1	813205	OK	EET SAV	12/13/23 17:10
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:09

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-5

Lab Sample ID: 580-134634-5

Date Collected: 12/05/23 11:45

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:28
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:22
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 13:30
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 14:52
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 13:06

Client Sample ID: MW-6

Lab Sample ID: 580-134634-6

Date Collected: 12/05/23 12:50

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/12/23 02:37
Total/NA	Analysis	RSK-175		1	813205	OK	EET SAV	12/13/23 17:23
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:12
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:30
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:25
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 13:41
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 14:54
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 13:22

Client Sample ID: MW-8

Lab Sample ID: 580-134634-7

Date Collected: 12/06/23 08:45

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	446015	JBT	EET SEA	12/13/23 06:11
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 18:41
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:16
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:33

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-8

Date Collected: 12/06/23 08:45

Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:27
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 13:53
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 15:11
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 14:05

Client Sample ID: MW-9

Date Collected: 12/05/23 14:28

Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/12/23 02:57
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 18:54
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:19
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:36
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:30
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 14:05
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 15:14
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 14:20

Client Sample ID: MW-10

Date Collected: 12/05/23 10:45

Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/12/23 03:17
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 19:07
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:31
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:39
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:33
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 14:16

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-10

Lab Sample ID: 580-134634-9

Date Collected: 12/05/23 10:45

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 15:17
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 14:36

Client Sample ID: MW-11

Lab Sample ID: 580-134634-10

Date Collected: 12/05/23 09:40

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/12/23 03:37
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 19:20
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:34
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:55
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:49
Total/NA	Analysis	300.0		10	445916	CA	EET SEA	12/11/23 14:40
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 15:20
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 14:50

Client Sample ID: MW-12

Lab Sample ID: 580-134634-11

Date Collected: 12/06/23 13:35

Matrix: Water

Date Received: 12/07/23 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	446015	JBT	EET SEA	12/13/23 06:35
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 19:33
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:38
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 14:58
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:52
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 15:15
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 15:23
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Client Sample ID: MW-12
Date Collected: 12/06/23 13:35
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 15:05

Client Sample ID: MW-21
Date Collected: 12/05/23 07:00
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/12/23 03:58
Total/NA	Analysis	RSK-175		1	813744	DBM	EET SAV	12/15/23 19:46
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.7 Rev 4.4		1	446120	JLS	EET SEA	12/12/23 17:41
Dissolved	Prep	200.8			445921	AUA	EET SEA	12/11/23 15:16
Dissolved	Analysis	200.8		1	446165	FCW	EET SEA	12/13/23 15:01
Total/NA	Prep	200.8			446177	TMH	EET SEA	12/13/23 16:15
Total/NA	Analysis	200.8		1	446435	FCW	EET SEA	12/15/23 15:55
Total/NA	Analysis	300.0		1	445916	CA	EET SEA	12/11/23 15:27
Total/NA	Analysis	350.1		1	637563	MMP	EET DEN	12/15/23 15:32
Total/NA	Analysis	SM 2320B		1	445856	FCG	EET SEA	12/09/23 18:04
Total/NA	Analysis	SM 2540C		1	445823	CSS	EET SEA	12/08/23 17:35
Total/NA	Analysis	SM 2540D		1	445852	CSS	EET SEA	12/08/23 21:39
Total/NA	Analysis	SM 5310B		1	637453	ABW	EET DEN	12/14/23 15:19

Client Sample ID: Trip Blank
Date Collected: 12/05/23 00:01
Date Received: 12/07/23 11:30

Lab Sample ID: 580-134634-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	445937	SR	EET SEA	12/11/23 22:54

Laboratory References:

- EET DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100
- EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
- EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date												
Oregon	NELAP	4167	07-07-24												
<p>The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.</p> <table border="1"> <thead> <tr> <th>Analysis Method</th> <th>Prep Method</th> <th>Matrix</th> <th>Analyte</th> </tr> </thead> <tbody> <tr> <td>SM 2320B</td> <td></td> <td>Water</td> <td>Bicarbonate Alkalinity as CaCO3</td> </tr> <tr> <td>Washington</td> <td>State</td> <td>C788</td> <td>07-13-24</td> </tr> </tbody> </table>				Analysis Method	Prep Method	Matrix	Analyte	SM 2320B		Water	Bicarbonate Alkalinity as CaCO3	Washington	State	C788	07-13-24
Analysis Method	Prep Method	Matrix	Analyte												
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3												
Washington	State	C788	07-13-24												

Laboratory: Eurofins Denver

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C583	08-03-24

Laboratory: Eurofins Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-24
ANAB	Dept. of Defense ELAP	L2463	09-22-24
Arkansas (DW)	State	GA00006	06-30-24
Arkansas DEQ	State	19-015-0	02-01-24
California	State	2939	06-30-24
Florida	NELAP	E87052	06-30-24
Georgia	State	E87052	06-30-24
Georgia (DW)	State	803	06-30-24
Guam	State	19-007R	04-17-24
Hawaii	State	<cert No.>	06-30-24
Illinois	NELAP	200022	11-30-24
Indiana	State	C-GA-02	06-30-24
Iowa	State	353	07-01-25
Kentucky (UST)	State	NA	06-30-24
Louisiana	NELAP	30690	06-30-24
Louisiana (All)	NELAP	30690	06-30-24
Louisiana (DW)	State	LA009	12-31-23
Maine	State	GA00006	09-25-24
Maryland	State	250	12-31-23
Massachusetts	State	M-GA006	06-30-24
Michigan	State	9925	06-30-24
Mississippi	State	<cert No.>	06-30-24
Nebraska	State	NE-OS-7-04	06-30-24
New Jersey	NELAP	GA769	06-30-24
New Mexico	State	GA00006	06-30-24
North Carolina (DW)	State	13701	07-31-24
North Carolina (WW/SW)	State	269	12-31-23
Pennsylvania	NELAP	68-00474	06-30-24
Puerto Rico	State	GA00006	01-01-25
South Carolina	State	98001	06-30-24
Tennessee	State	TN02961	06-30-24
Texas	NELAP	T1047004185	11-30-24

Accreditation/Certification Summary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Laboratory: Eurofins Savannah (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Texas	TCEQ Water Supply	T104704185	06-30-24
USDA	US Federal Programs	P330-18-00313	09-03-24
Virginia	NELAP	460161	06-14-24
Wyoming	State	8TMS-L	06-30-24



Sample Summary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-134634-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-134634-1	MW-1	Water	12/06/23 11:25	12/07/23 11:30
580-134634-2	MW-2	Water	12/06/23 12:44	12/07/23 11:30
580-134634-3	MW-3	Water	12/06/23 10:28	12/07/23 11:30
580-134634-4	MW-4	Water	12/06/23 09:40	12/07/23 11:30
580-134634-5	MW-5	Water	12/05/23 11:45	12/07/23 11:30
580-134634-6	MW-6	Water	12/05/23 12:50	12/07/23 11:30
580-134634-7	MW-8	Water	12/06/23 08:45	12/07/23 11:30
580-134634-8	MW-9	Water	12/05/23 14:28	12/07/23 11:30
580-134634-9	MW-10	Water	12/05/23 10:45	12/07/23 11:30
580-134634-10	MW-11	Water	12/05/23 09:40	12/07/23 11:30
580-134634-11	MW-12	Water	12/06/23 13:35	12/07/23 11:30
580-134634-12	MW-21	Water	12/05/23 07:00	12/07/23 11:30
580-134634-13	Trip Blank	Water	12/05/23 00:01	12/07/23 11:30



Regulatory Program: DW NPDES RCRA Other: WAC 173- TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Lisa Gilbert					COC No:									
Parametrix, Inc.		Tel/Fax: (206) 394-3667					_____ of _____ COCs									
719 Second Avenue, Suite 200		Analysis Turnaround Time					Sampler:									
Seattle, WA 98104		<input type="checkbox"/> CALENDAR DAYS <input checked="" type="checkbox"/> WORKING DAYS					For Lab Use Only:									
(206) 394-3700		TAT if different from Below _____					Walk-in Client: _____									
Project Name: Horn Rapids Landfill		<input checked="" type="checkbox"/> 2 weeks					Lab Sampling: _____									
Site: Richland, WA		<input type="checkbox"/> 1 week					Job / SDG No.: _____									
P O # 555-3820-004 (13.01)		<input type="checkbox"/> 2 days														
		<input type="checkbox"/> 1 day														
Sample Identification	Sample Date	Sample Time	Sample Type (C/Comp-G/Grab)	Matrix	# of Cont.	Perform MS/MSD (Y/N)	VOCs (8260D) APPENDIX I	Alk, Bicarb, Cl, Sulfate	TDS, TSS	TOC	Ammonia	Diss. Metals (WAC173-351App1)	Total Metals (WAC173-351App1)	Methane, Ethane, Ethene	Sample Specific Notes:	
MW-1	12/6/23	1125	G	water	12	N	X	X	X	X	X	X	X	X		
MW-2	12/6/23	1244		water	12	N	X	X	X	X	X	X	X	X	Dissolved metals are field filtered	
MW-3	12/6/23	1028		water	12	N	X	X	X	X	X	X	X	X		
MW-4	12/6/23	0940		water	12	N	X	X	X	X	X	X	X	X		
MW-5	12/5/23	1145		water	18	N	X	X	X	X	X	X	X	X	MS/MSD VOCs only	
MW-6	12/5/23	1250		water	12	N	X	X	X	X	X	X	X	X		
MW-8	12/6/23	0845		water	12	N	X	X	X	X	X	X	X	X		
MW-9	12/5/23	1428		water	12	N	X	X	X	X	X	X	X	X		
MW-10	12/5/23	1045		water	12	N	X	X	X	X	X	X	X	X		
MW-11	12/5/23	0940		water	12	N	X	X	X	X	X	X	X	X		
MW-12	12/6/23	1335		water	12	N	X	X	X	X	X	X	X	X		
MW-21	12/5/23	0700		water	12	N	X	X	X	X	X	X	X	X		
Trip Blank	—	—		water	4	N	X									



580-134634 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification: _____ Sample Disposal (A fee may be assessed if samples are retained) _____

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposed for _____ Months

Special Instructions/QC Requirements & Comments: Dissolved metals are field filtered

Custody Seals Intact: Yes No Custody Seal No.: _____ Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Tr

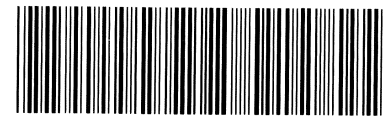
Relinquished by: <i>Darby Scanlon</i>	Parametrix, Inc	Date/Time: 12/7/11:30AM	Received by: <i>[Signature]</i>	Date/Time: 12/7/23 1130
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:

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Tacoma, WA 98424
phone 253.922.2310 fax 253.922.5047

Regulatory Program: DW NPDES RCRA Other: **WAC 173- TestAmerica Laboratories, Inc.**

Client Contact		Project Manager: Lisa Gilbert		COC No: _____										
Parametrix, Inc.		Tel/Fax: (206) 394-3667		_____ of _____ COCs										
719 Second Avenue, Suite 200		Analysis Turnaround Time		Sampler: _____										
Seattle, WA 98104		<input type="checkbox"/> CALENDAR DAYS <input checked="" type="checkbox"/> WORKING DAYS		For Lab Use Only:										
(206) 394-3700		TAT if different from Below _____		Walk-in Client: _____										
Project Name: Horn Rapids Landfill		<input checked="" type="checkbox"/> 2 weeks		Lab Sampling: _____										
Site: Richland, WA		<input type="checkbox"/> 1 week		Job / SDG No.: _____										
P O # 555-3820-004 (13.01)		<input type="checkbox"/> 2 days		_____										
		<input type="checkbox"/> 1 day		Sample Specific Notes: _____										
Sample Identification	Sample Date	Sample Time	Sample Type (C/Comp-G/Grab)	Matrix	# of Cont.	Perform MS / MSD (Y / N)	VOCs (8280D) APPENDIX I	Alk, Bicarb, Cl, Sulfate	TDS, TSS	TOC	Ammonia	Diss. Metals (WAC173-351App1)	Total Metals (WAC173-351App1)	Methane, Ethane, Ethene
MW-1	12/6/23	1125	G	water	12	N	X	X	X	X	X	X	X	X
MW-2	12/6/23	1244		water	12	N	X	X	X	X	X	X	X	Dissolved metals are field filtered
MW-3	12/6/23	1028		water	12	N	X	X	X	X	X	X	X	
MW-4	12/6/23	0940		water	12	N	X	X	X	X	X	X	X	
MW-5	12/5/23	1145		water	18	N	X	X	X	X	X	X	X	MS/MSD VOCs only
MW-6	12/5/23	1250		water	12	N	X	X	X	X	X	X	X	
MW-8	12/6/23	0845		water	12	N	X	X	X	X	X	X	X	
MW-9	12/5/23	1428		water	12	N	X	X	X	X	X	X	X	
MW-10	12/5/23	1045		water	12	N	X	X	X	X	X	X	X	
MW-11	12/5/23	0940		water	12	N	X	X	X	X	X	X	X	
MW-12	12/6/23	1335		water	12	N	X	X	X	X	X	X	X	
MW-21	12/5/23	0700		water	12	N	X	X	X	X	X	X	X	
Trip Blank	—	—	✓	water	4	N	X						X	



580-134634 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. **Sample Disposal (A fee may be assessed if samples are retained)**

Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposed for _____ Months

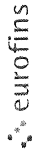
Special Instructions/QC Requirements & Comments: Dissolved metals are field filtered 0.9, 0.7, 0.3

Custody Seals Intact: Yes No Custody Seal No.: _____ Cooler Temp. (°C): Obs'd: _____ Cor'd: _____ Tr

Relinquished by: <i>[Signature]</i>	Parametrix, Inc	Date/Time: 12/7/11:30AM	Received by: <i>[Signature]</i>	Date/Time: 12/7/23 1130
Relinquished by: <i>[Signature]</i>	Company: <i>[Signature]</i>	Date/Time: 12/8/23	Received by: <i>[Signature]</i>	Date/Time: 12/8/23 0930 EETN
Relinquished by: _____	Company: _____	Date/Time: _____	Received in Laboratory by: _____	Date/Time: _____

12/12/2023

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler:	Lab PM:	Grant, Katie	Carrier Tracking No(s):	580-128063.1			
Client Contact:		Phone:	E-Mail:	Katie.Grant@et.eurofins.com	State of Origin:	Washington			
Shipping/Receiving		Company:		TestAmerica Laboratories, Inc.	Job #:	580-134634-1			
Address:		Due Date Requested:	Preservation Codes:						
4955 Yarrow Street,		12/18/2023	M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SSO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)						
City:	Anvada	TAT Requested (days):	Analysis Requested						
State, Zip:	CO, 80002	PO #:							
Phone:	303-736-0100(Tel) 303-431-7171(Fax)	WO #:							
Email:		Project #:	58013566						
Project Name:	Horn Rapids Landfill	SSOW#:							
Site:									
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform M/MSD (Yes or No)	SMS310B/(MOD) Local Method	Total Number of containers	Special Instructions/Note:
MW-1 (580-134634-1)	12/6/23	11:25 Pacific	Water	Water	X	X	X	2	
MW-2 (580-134634-2)	12/6/23	12:44 Pacific	Water	Water	X	X	X	2	
MW-3 (580-134634-3)	12/6/23	10:28 Pacific	Water	Water	X	X	X	2	
MW-4 (580-134634-4)	12/6/23	09:40 Pacific	Water	Water	X	X	X	2	
MW-5 (580-134634-5)	12/5/23	11:45 Pacific	Water	Water	X	X	X	2	
MW-6 (580-134634-6)	12/5/23	12:50 Pacific	Water	Water	X	X	X	2	
MW-8 (580-134634-7)	12/6/23	08:45 Pacific	Water	Water	X	X	X	2	
MW-9 (580-134634-8)	12/5/23	14:28 Pacific	Water	Water	X	X	X	2	
MW-10 (580-134634-9)	12/5/23	10:45 Pacific	Water	Water	X	X	X	2	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northwest, LLC.</p>									
Possible Hazard Identification									
Unconfirmed									
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2									
Empty Kit Relinquished by: _____ Date: _____ Time: _____ Method of Shipment: _____									
Relinquished by: <i>[Signature]</i> Date/Time: 12/7/23 14:23 Company: EET									
Relinquished by: _____ Date/Time: _____ Company: _____									
Relinquished by: _____ Date/Time: _____ Company: _____									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temperature(s) °C and Other Remarks: 1.9 Oct. 2									



Login Sample Receipt Checklist

Client: Parametrix, Inc.

Job Number: 580-134634-1

Login Number: 134634

List Number: 1

Creator: O'Connell, Jason I

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Login Sample Receipt Checklist

Client: Parametrix, Inc.

Job Number: 580-134634-1

Login Number: 134634

List Number: 3

Creator: Held, Wesley

List Source: Eurofins Denver

List Creation: 12/08/23 03:58 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Login Sample Receipt Checklist

Client: Parametrix, Inc.

Job Number: 580-134634-1

Login Number: 134634

List Number: 2

Creator: Harley, Tynisha

List Source: Eurofins Savannah

List Creation: 12/08/23 01:40 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Project: Horn Rapids Landfill Fourth Quarter 2023: 555-3820-004
Date Completed: 1/8/2023
Sample Numbers: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
Eurofins 580-134634-1
ENW 240445, 240454 Nitrate
MS/MSD collected at MW-5, duplicate at MW-9
Sample Date: December 5 and 6, 2023
QA/QC Completed By: Sally Nguyen

Holding Times: All within limits

Chain vs Data: None

Blanks: (List any compounds detected)

MB
None

Trip
None

Lab Comments:

Sample Receipt

The samples were received on 12/7/2023 11:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.3°C, 0.7°C and 0.9°C

VOCs (8260D)

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-445937 were outside control limits for one or more analytes: Iodomethane. Percent recovery was low (54% outside limits of 60-128). Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits. The iodomethane data for MW-5 were qualified "J" as estimated.

RSK-175

No analytical or quality issues were noted.

Metals (200.8)

MS, MSD: The laboratory flagged calcium "4" due to the analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable. No data were qualified.

General Chemistry

Method 2540C: Only one duplicate is provided due to contamination of second duplicate prior to second weight. No data were qualified due to first duplicate being within control limits.

Method 350.1: The continuing calibration verification (CCV) associated with the laboratory control sample (LCS) and method blank (MB) recovered above the upper control limit for ammonia. The MB is a non-detect and when the 2% bias from the CCV is added to the LCS recovery, it still falls within acceptance limits. Therefore, the QC are being reported as qualified data. The associated samples are impacted: (CCV 280-637563/81), (LCS 280-637563/88) and (MB 280-637563/89). None of the data were qualified.

Parametrix Qualifiers

VOCs with F1 qualifiers (percent recovery below limits in MS/MSD) were qualified J for MW-5 (Iodomethane).

QA/QC completed by: Sally Nguyen

1/8/2024

Sample number: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
Eurofins 580-134634-1
ENW 240445, 240454 Nitrate

Sample Date: December 5 and 6, 2023

Parameter	sample MW-9	duplicate MW-21	avg	diff	rpd	=/ < 25%	RL	w/in RL?
Metals total (mg/L)								
Arsenic	0.0017	0.0017	0.0017	0	0	y	0.0010	
Antimony	<0.00080	<0.00080	#DIV/0!	#VALUE!	#VALUE!		0.00080	y
Barium	0.078	0.078	0.078	0	0	y	0.0012	
Beryllium	<0.00040	<0.00040	#DIV/0!	#VALUE!	#VALUE!		0.00040	y
Cadmium	<0.00040	<0.00040	#DIV/0!	#VALUE!	#VALUE!		0.00040	y
Chromium	0.0023	0.0023	0.0023	0	0	y	0.00080	
Cobalt	<0.00040	<0.00040	#DIV/0!	#VALUE!	#VALUE!		0.00040	y
Copper	<0.0020	<0.0020	#DIV/0!	#VALUE!	#VALUE!		0.0020	y
Lead	<0.00040	<0.00040	#DIV/0!	#VALUE!	#VALUE!		0.00040	y
Nickel	<0.0030	<0.0030	#DIV/0!	#VALUE!	#VALUE!		0.0030	y
Selenium	<0.0080	<0.0080	#DIV/0!	#VALUE!	#VALUE!		0.0080	y
Silver	<0.00040	<0.00040	#DIV/0!	#VALUE!	#VALUE!		0.00040	y
Thallium	<0.0010	<0.0010	#DIV/0!	#VALUE!	#VALUE!		0.0010	y
Vanadium	0.0074	0.0074	0.0074	0	0	y	0.0040	
Zinc	<0.0070	<0.0070	#DIV/0!	#VALUE!	#VALUE!		0.0070	y
Metals dissolved (mg/L)								
Calcium	140	140	140	0	0	y	0.50	
Magnesium	32	32	32	0	0	y	0.50	
Manganese	<0.020	<0.020	#DIV/0!	#VALUE!	#VALUE!		0.020	y
Potassium	9.0	9.1	9.05	-0.1	1	y	3.3	
Sodium	<23	23	23	0	0	y	0.50	
Iron	<0.10	<0.10	#DIV/0!	#VALUE!	#VALUE!		0.10	y
RSK (ug/L)								
ethane	<1.1	<1.1	#DIV/0!	#VALUE!	#VALUE!		1.1	y
ethene	<1.0	<1.0	#DIV/0!	#VALUE!	#VALUE!		1.0	y
methane	1.9	1.8	1.85	0.1	5	y	0.58	
Conventionals (mg/L)								
chloride	53	53	53	0	0	y	1.5	
sulfate	76	76	76	0	0	y	1.5	
Ammonia	<0.10	<0.10	#DIV/0!	#VALUE!	#VALUE!		0.10	y
TOC	1.5	1.5	1.5	0	0	y	1.0	
Alkalinity	370	380	375	-10	3	y	7.0	
Bicarbonate	370	380	375	-10	3	y	7.0	
TDS	660	620	640	40	6	y	50	
TSS	<2.0	<2.0	#DIV/0!	#VALUE!	#VALUE!		2.0	y
nitrate	7.8	7.9	7.85	-0.1	1	y	0.05	
VOCs (ug/L)								
1,1-dichloroethane	1.8	1.9	1.85	-0.1	5	y	0.20	
1,1-dichloroethene	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
1,2-dichloroethane	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
1,2-dichloropropane	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
acetone	<10	<10	#DIV/0!	#VALUE!	#VALUE!		10	y
benzene	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
bromodichloromethane	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
chloroform	2.7	2.7	2.7	0	0	y	0.20	
cis-1,2-dichloroethene	11	10	10.5	1	10	y	0.20	
tetrachloroethene	12	11	11.5	1	9	y	0.20	
trans-1,2-dichloroethene	0.34	0.35	0.345	-0.01	3	y	0.20	
trichloroethene	4.9	4.8	4.85	0.1	2	y	0.20	
trichlorofluoromethane	<0.50	<0.50	#DIV/0!	#VALUE!	#VALUE!		0.50	y
vinyl chloride	<0.10	<0.10	#DIV/0!	#VALUE!	#VALUE!		0.20	y

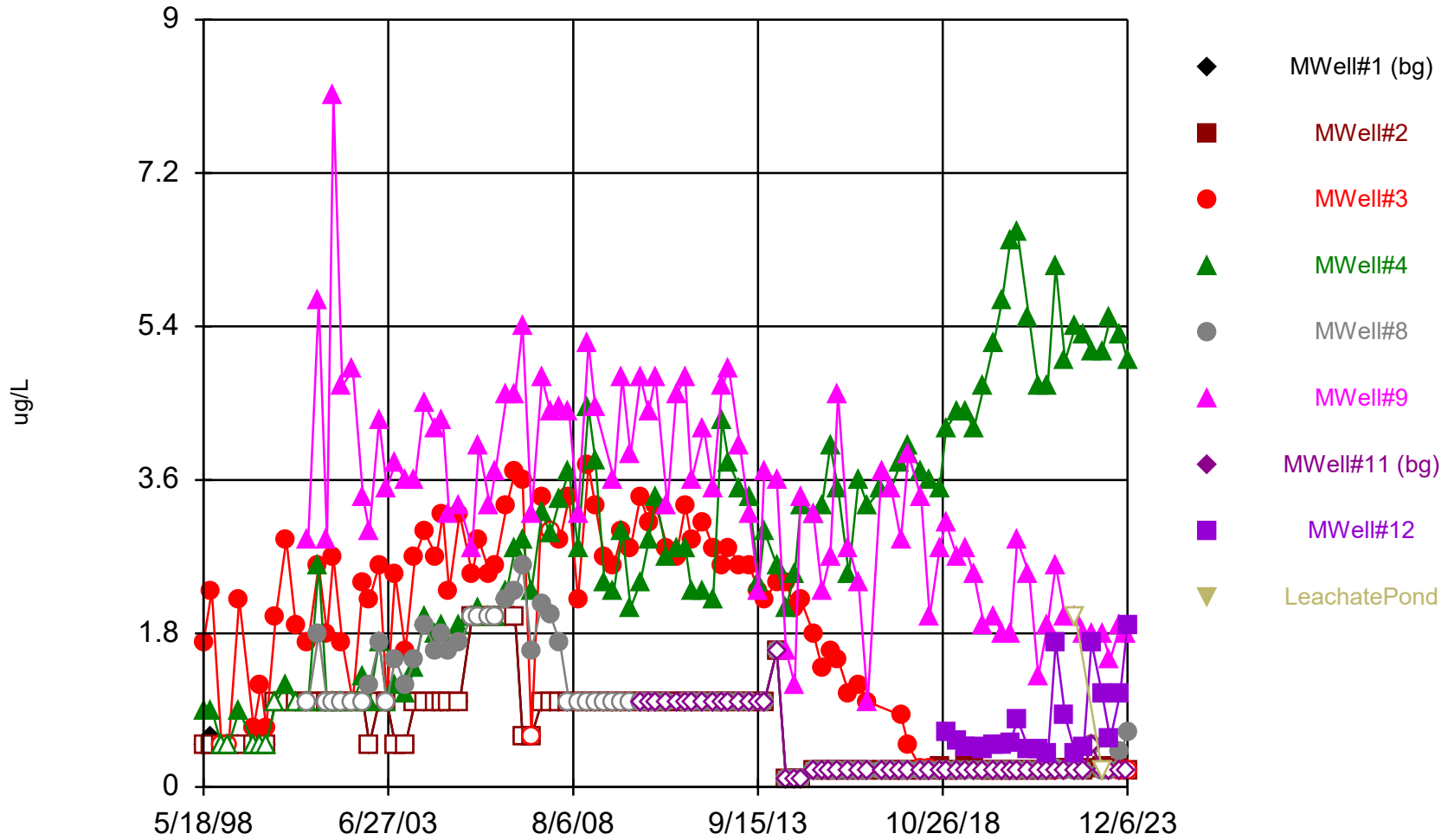
Horn Rapids Data Validation Checklist
Holding Times

Analyte	Holding Time	prep/analysis	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-8	MW-9	MW-10	MW-11	MW-12	MW-21	TB
date sampled			12/6/2023	12/6/2023	12/6/2023	12/6/2023	12/5/2023	12/5/2023	12/6/2023	12/5/2023	12/5/2023	12/5/2023	12/6/2023	12/5/2023	12/6/2023
time sampled			1125	1244	1028	940	1145	1250	845	1428	1045	940	1335	700	--
VOCs	14 days (pres)	11-Dec													√
		12-Dec					√	√		√	√	√		√	
		13-Dec	√	√	√	√			√				√		
MEE	14 days (pres)	13-Dec					√	√							
		15-Dec	√	√	√	√			√	√	√	√	√	√	
Metals 200.7 D	6 months	11-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Metals 200.8 T	6 months	13-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Iron 200.8 D	6 months	11-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Chloride	28 days	11-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Sulfate	28 days	11-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Ammonia	28 days	15-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
TOC	28 days	14-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Alkalinity	14 days	9-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Bicarbonate	14 days	9-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
TDS	7 days	8-Dec	√	√	√	√			√	√	√		√	√	
TSS	7 days	8-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Nitrate as N	48 hr	6-Dec					1821	1226		1723	1456	1653		1328	
		7-Dec	843	1139	814	744			715				942		

Appendix C

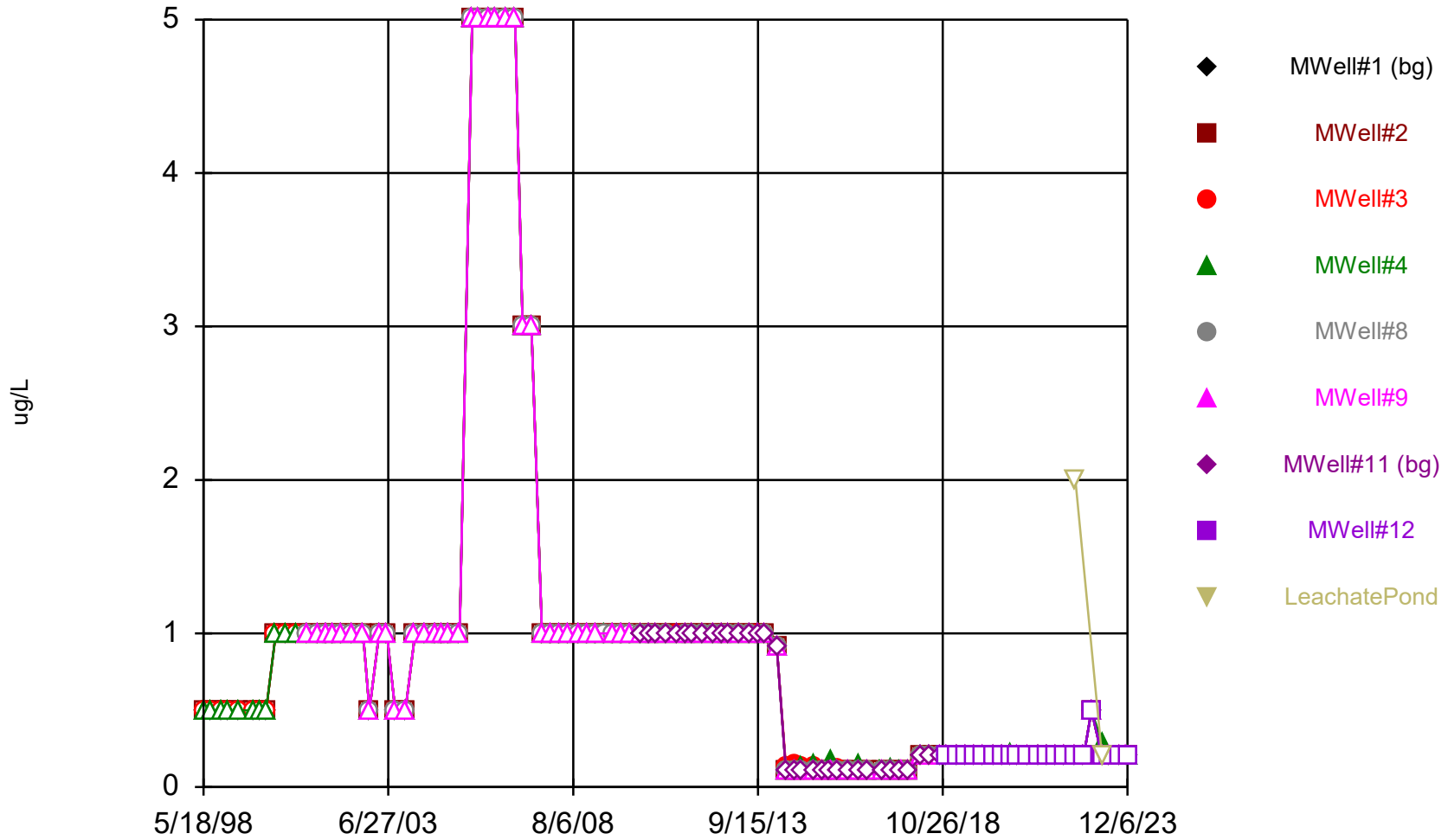
Time-Series Plots

Time Series



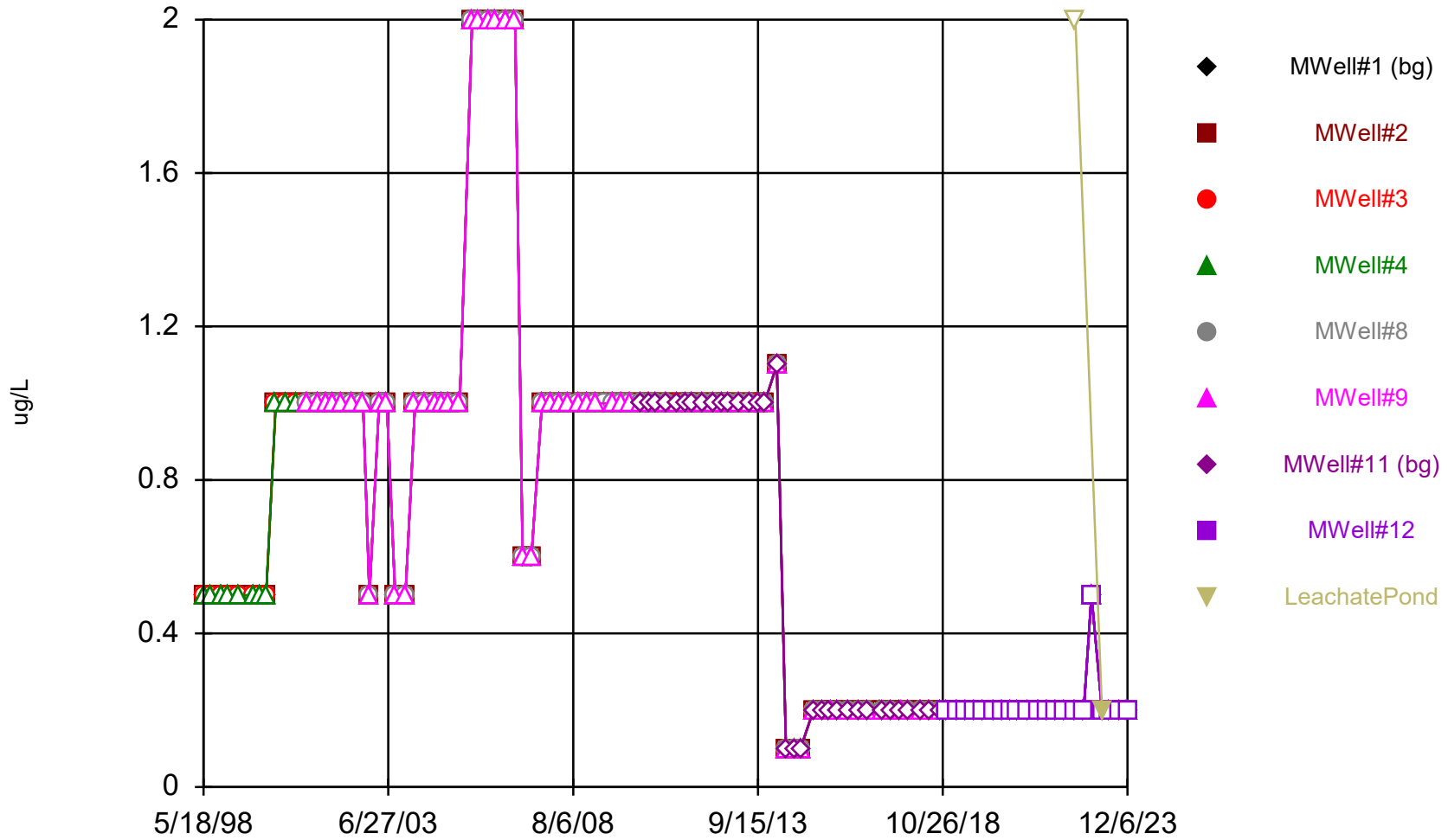
Constituent: 1,1-Dichloroethane Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



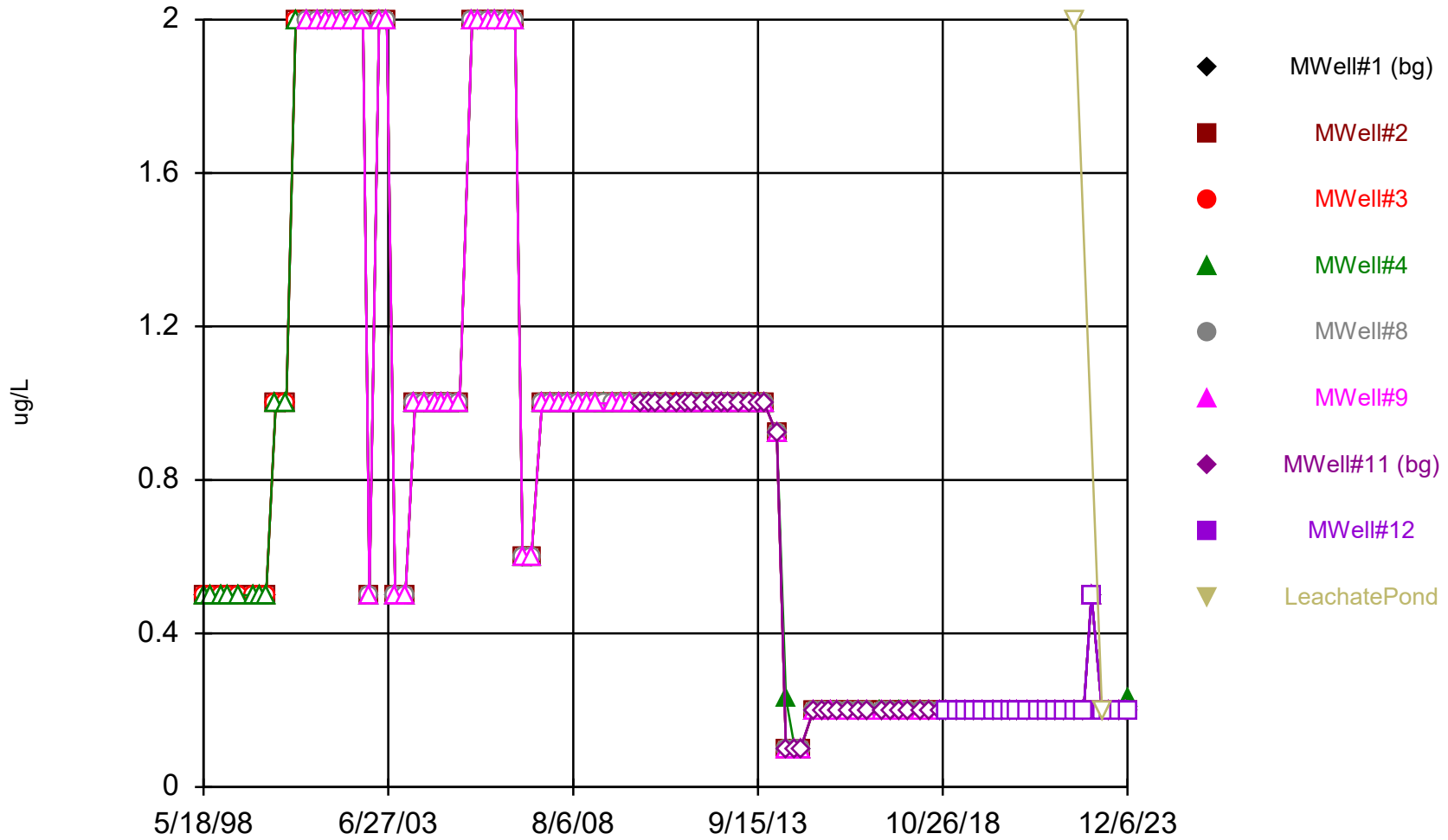
Constituent: 1,1-Dichloroethene Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



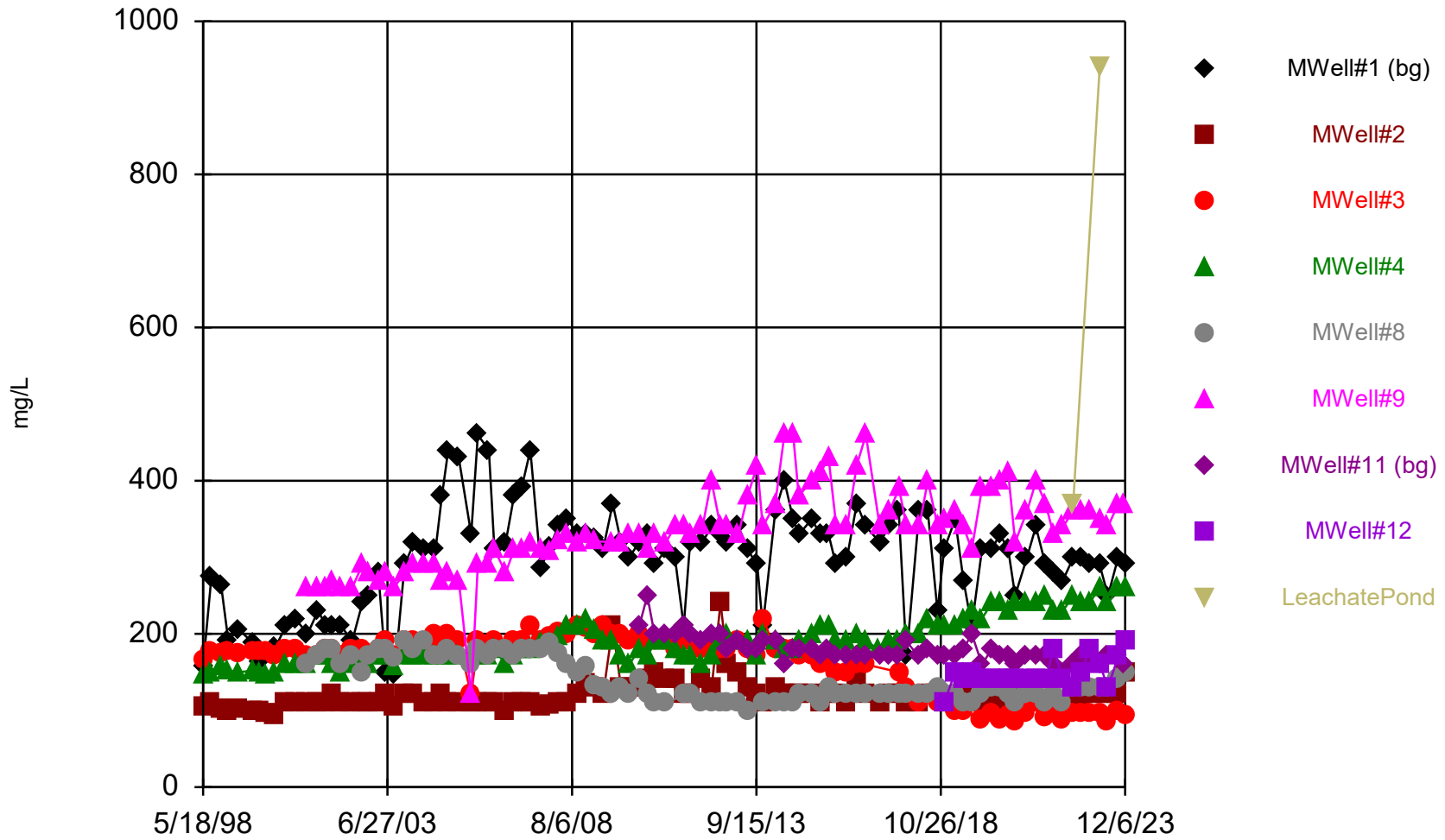
Constituent: 1,2-Dichloroethane Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: 1,2-Dichloropropane Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

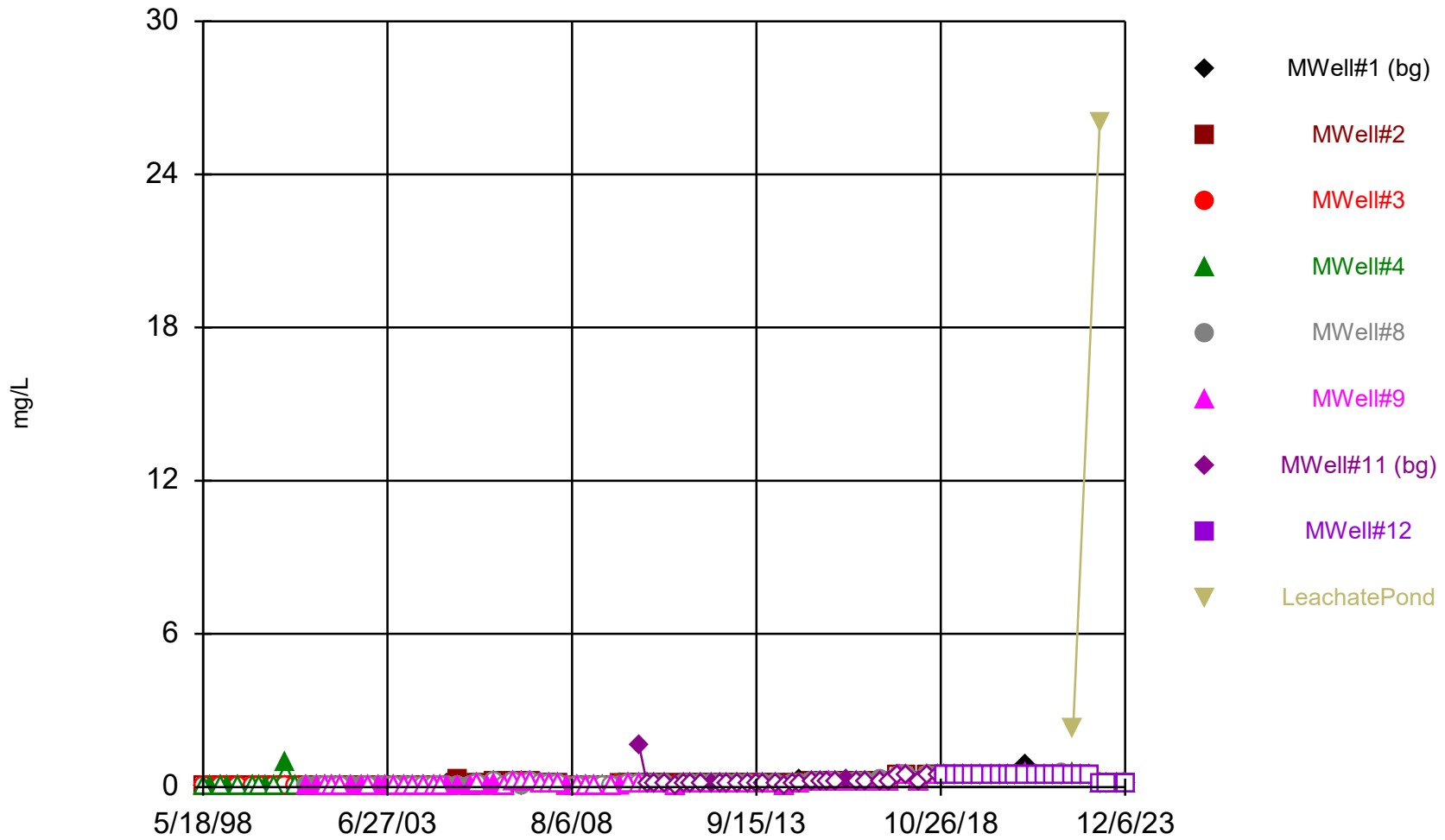
Time Series



Constituent: Alkalinity Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1

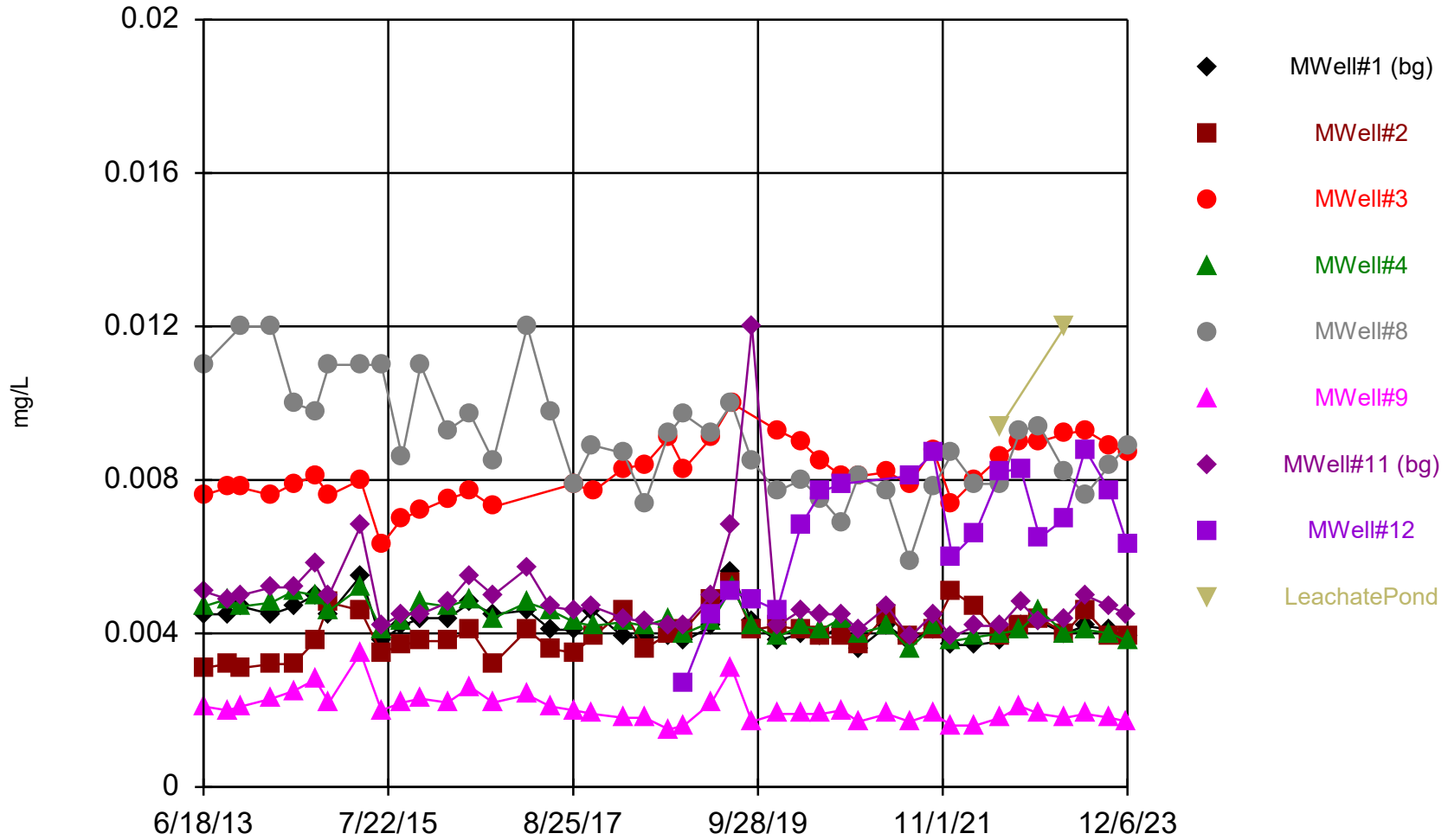
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Ammonia Nitrogen Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

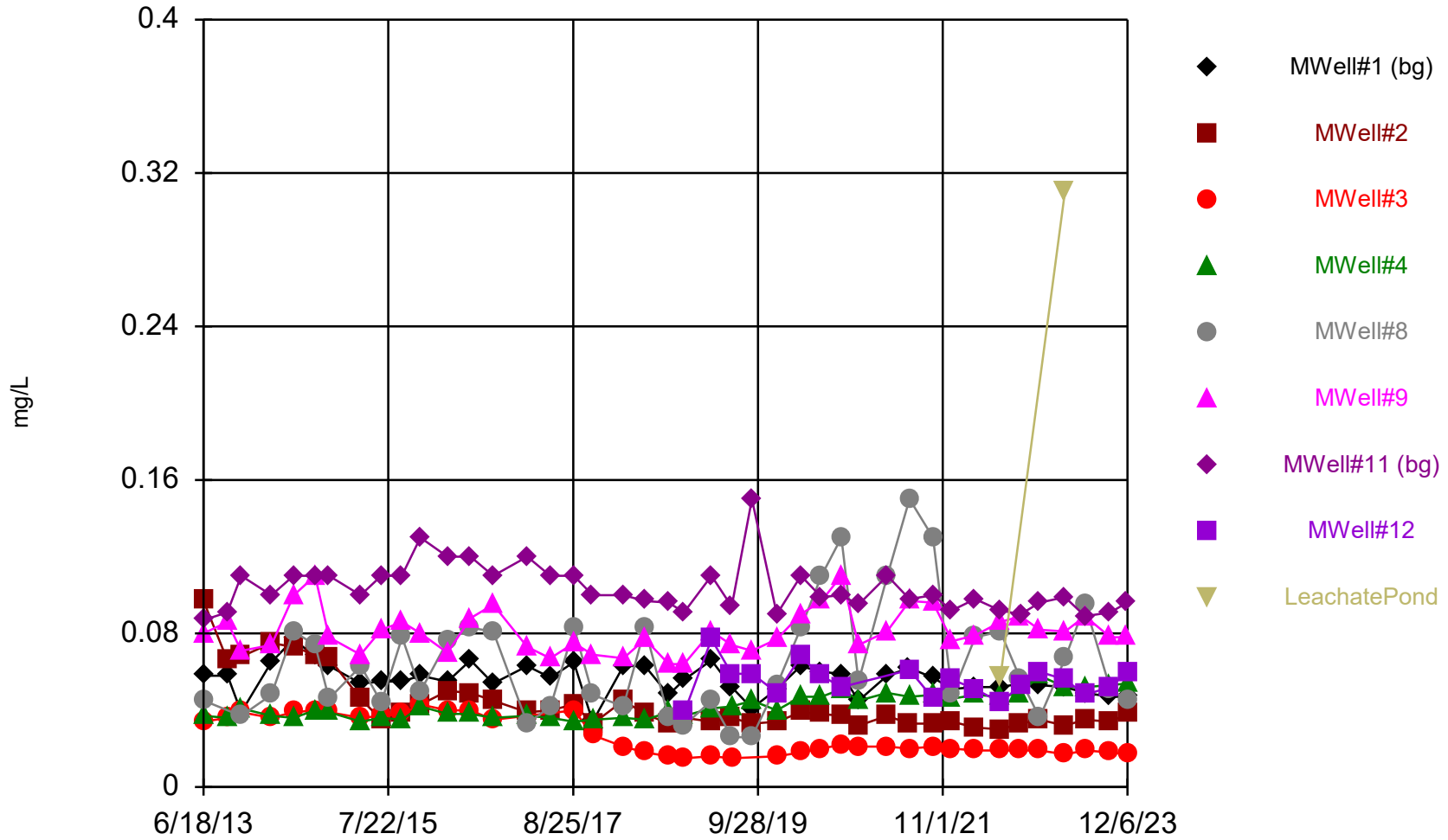
Time Series



Constituent: Arsenic, Total Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1

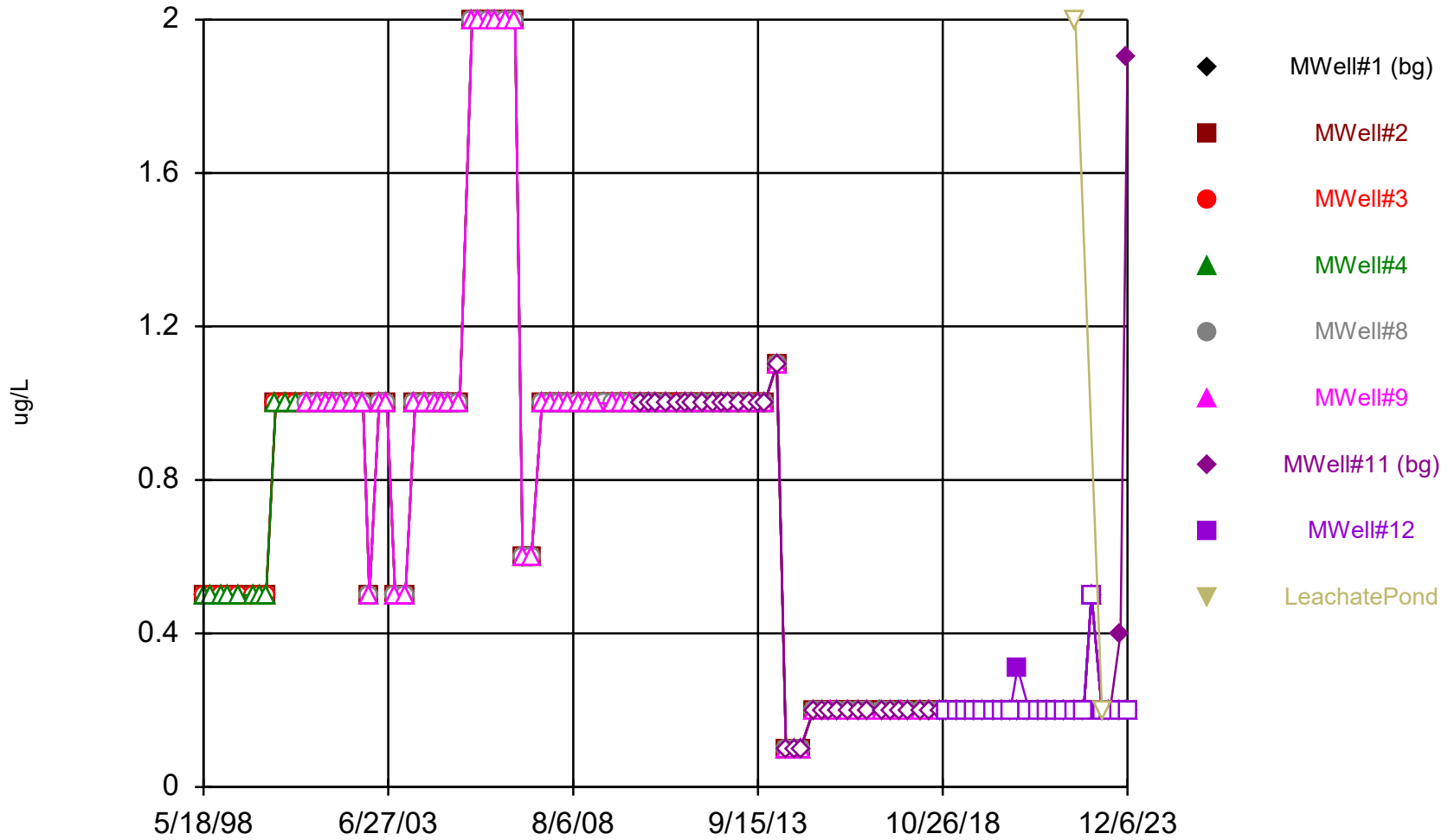
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



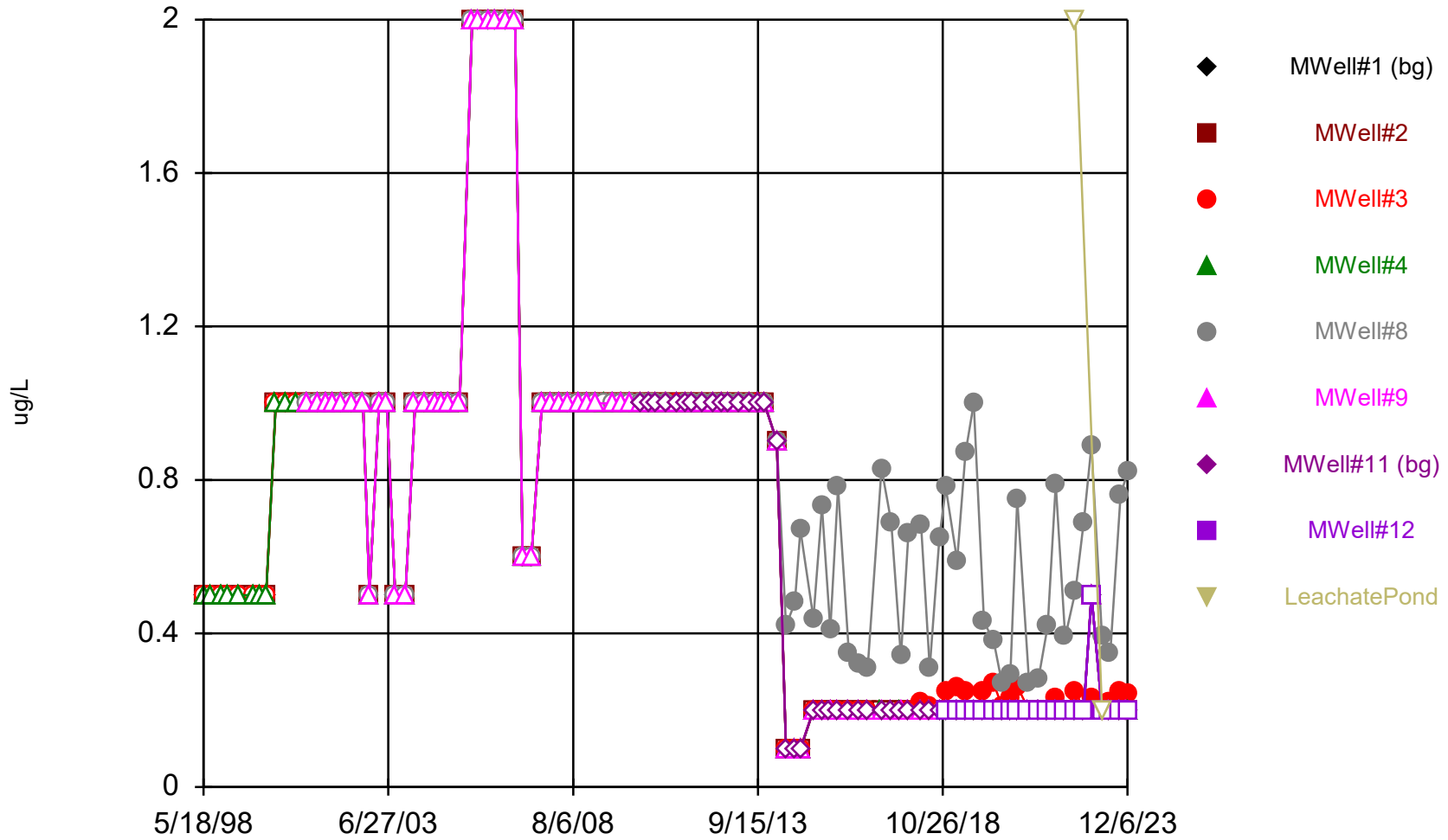
Constituent: Barium, Total Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



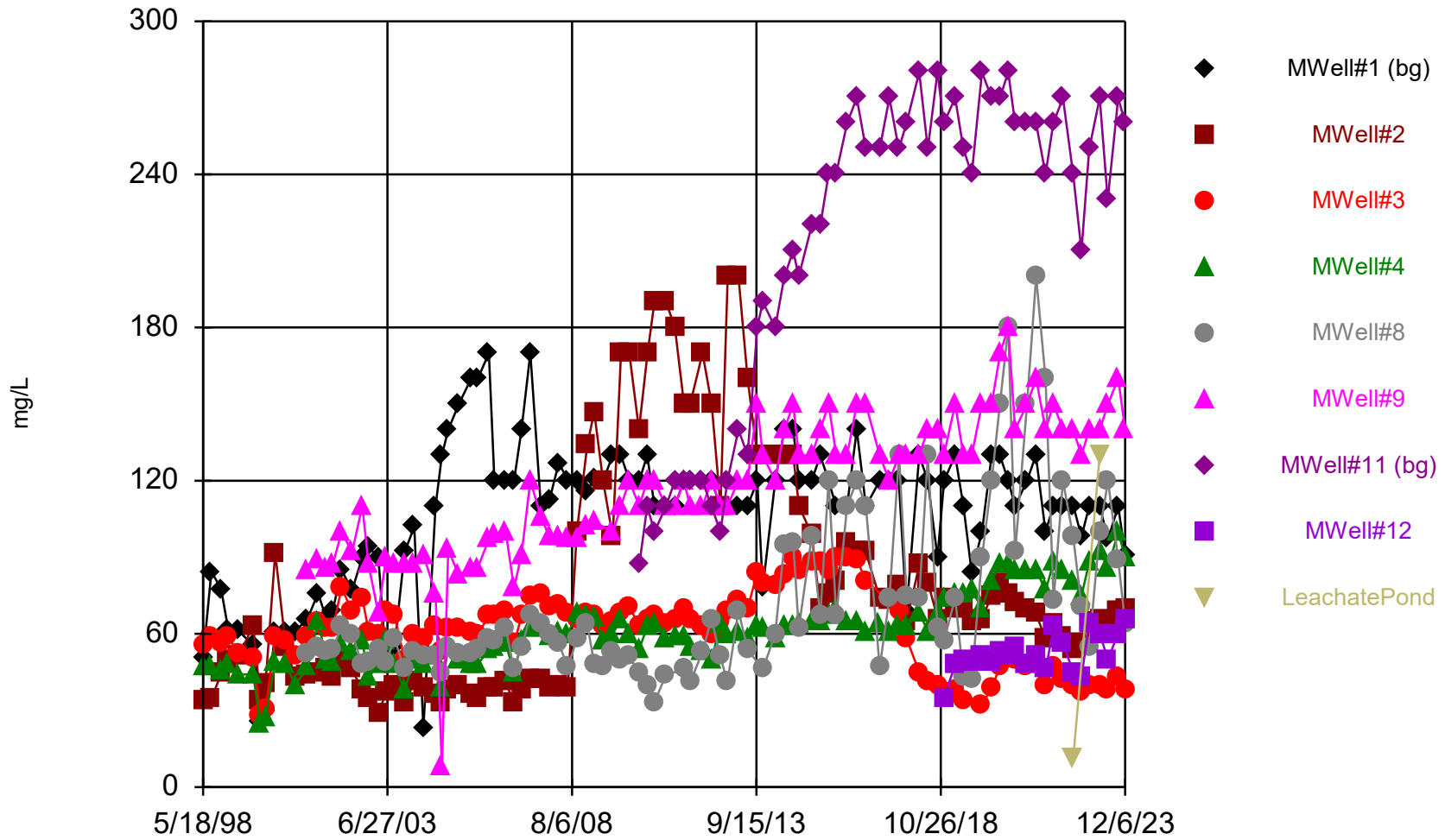
Constituent: Benzene Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



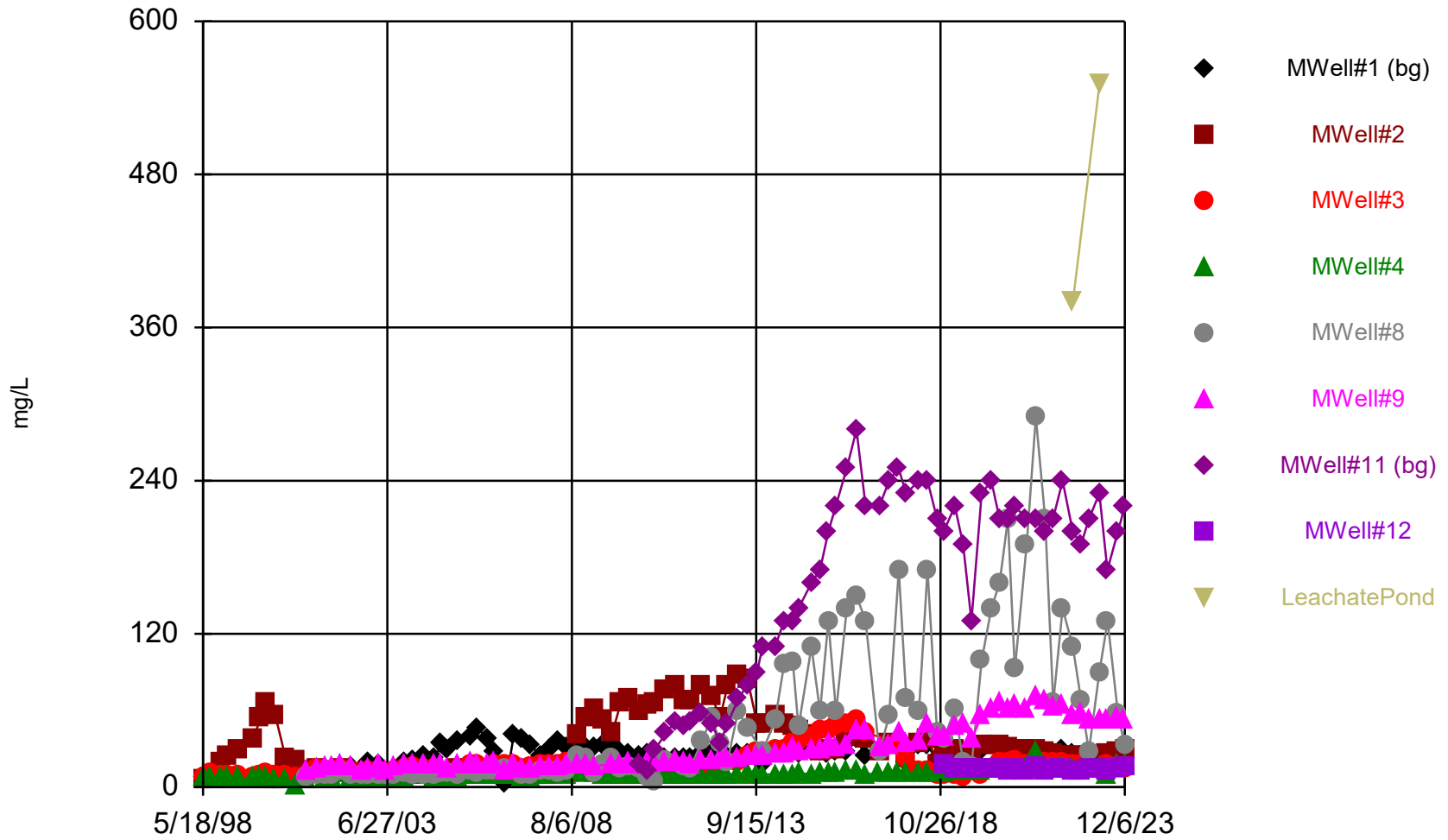
Constituent: Bromodichloromethane Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



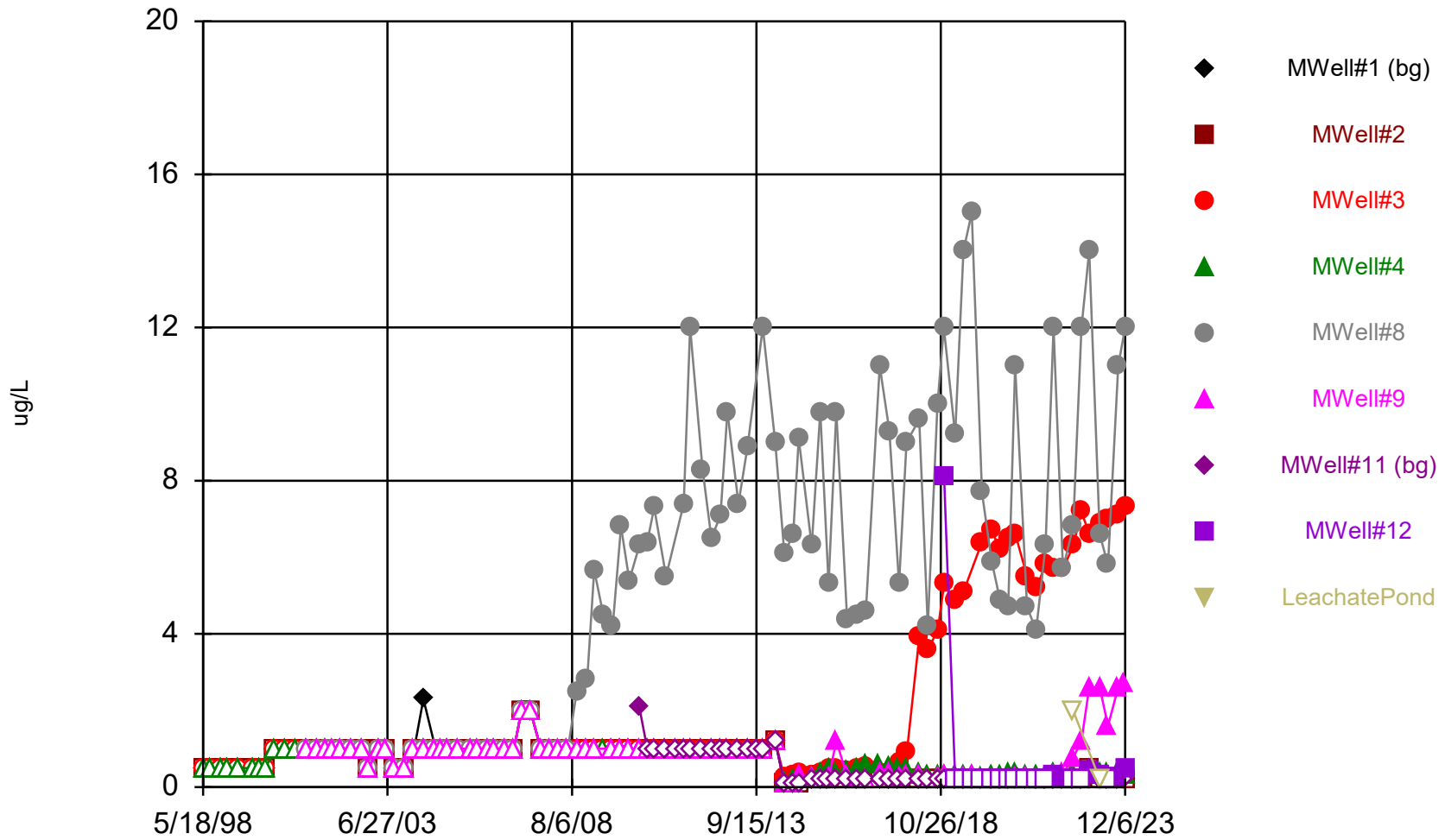
Constituent: Calcium, Dissolved Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



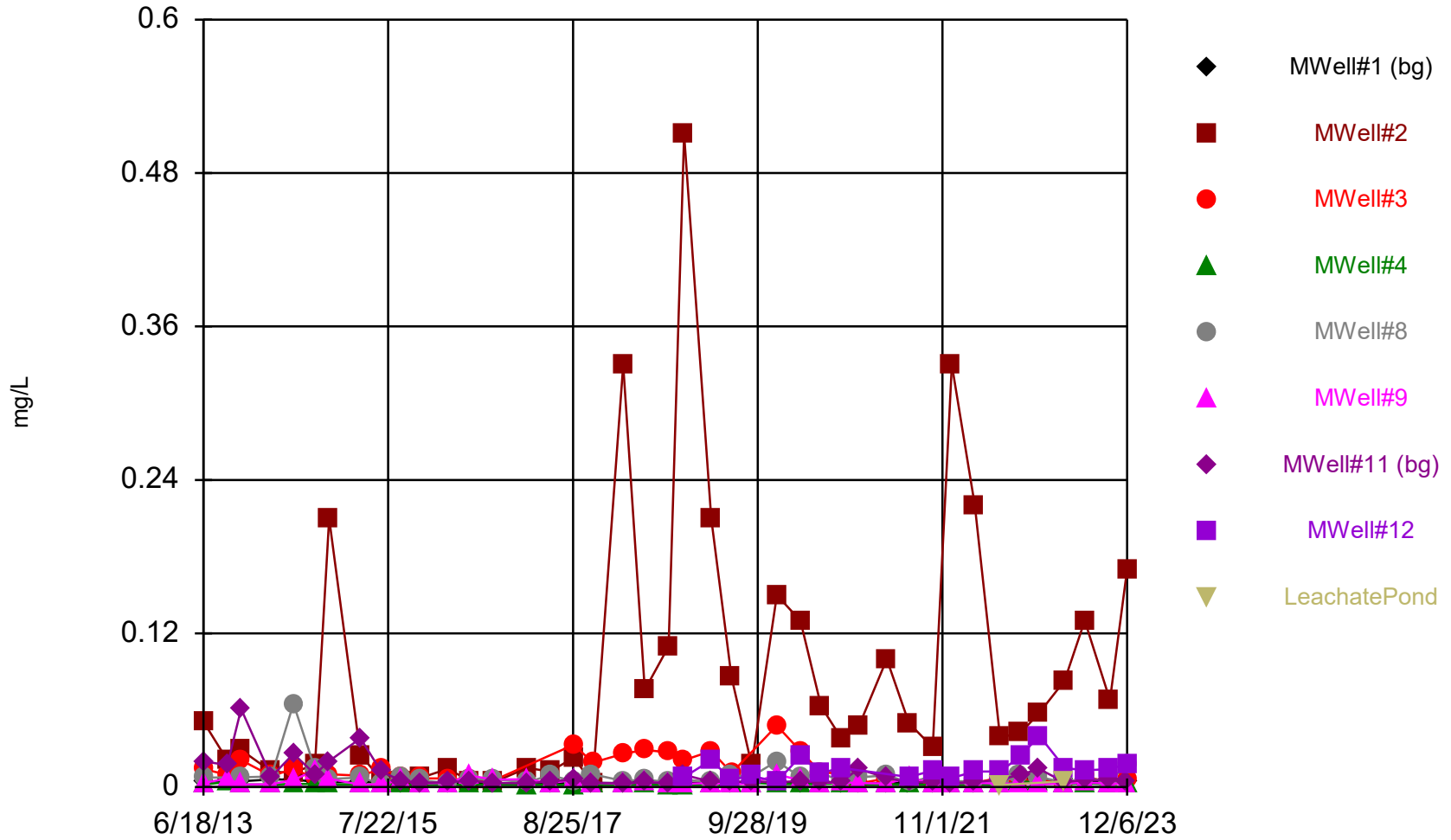
Constituent: Chloride Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Chloroform Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

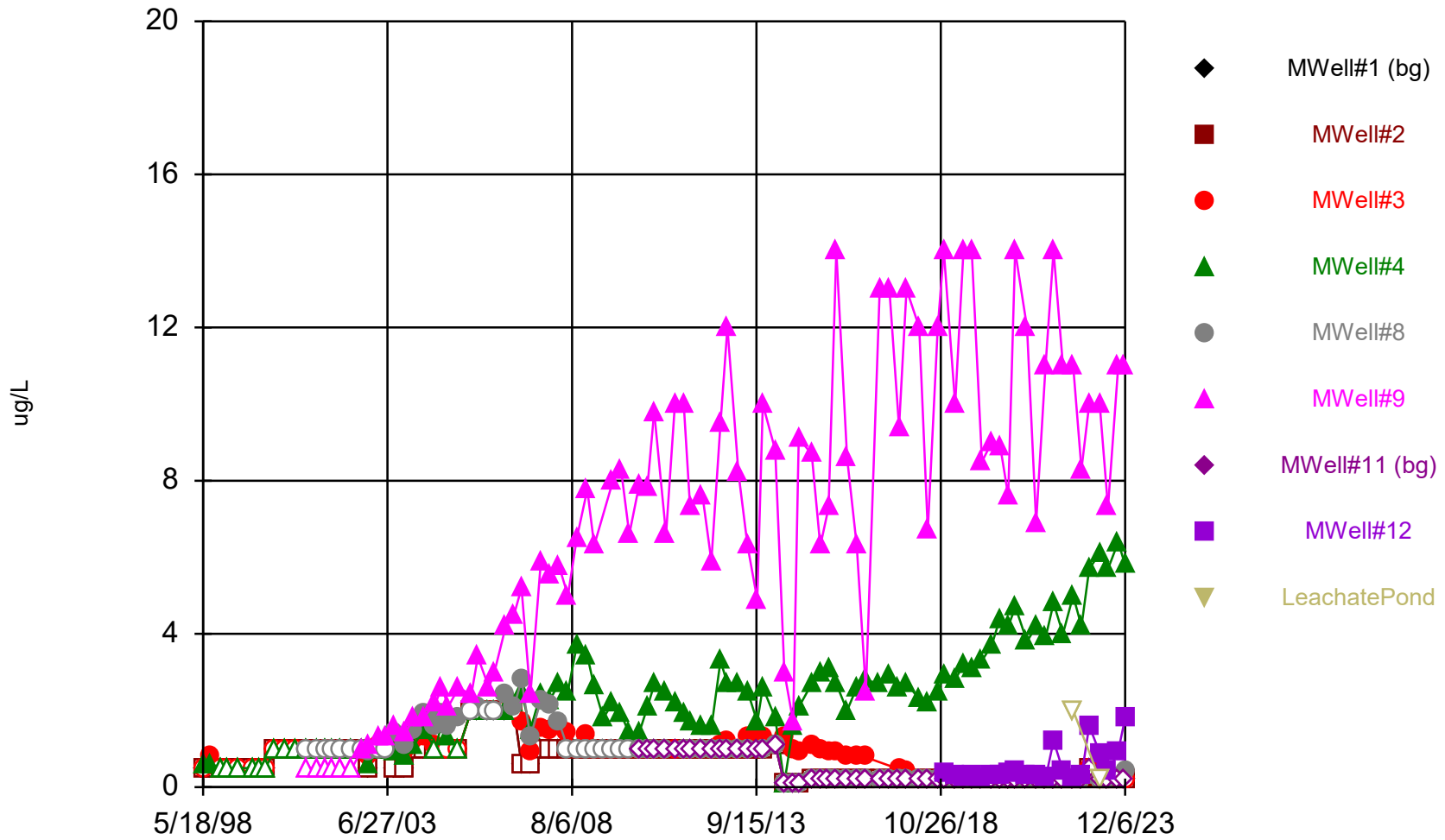
Time Series



Constituent: Chromium, Total Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1

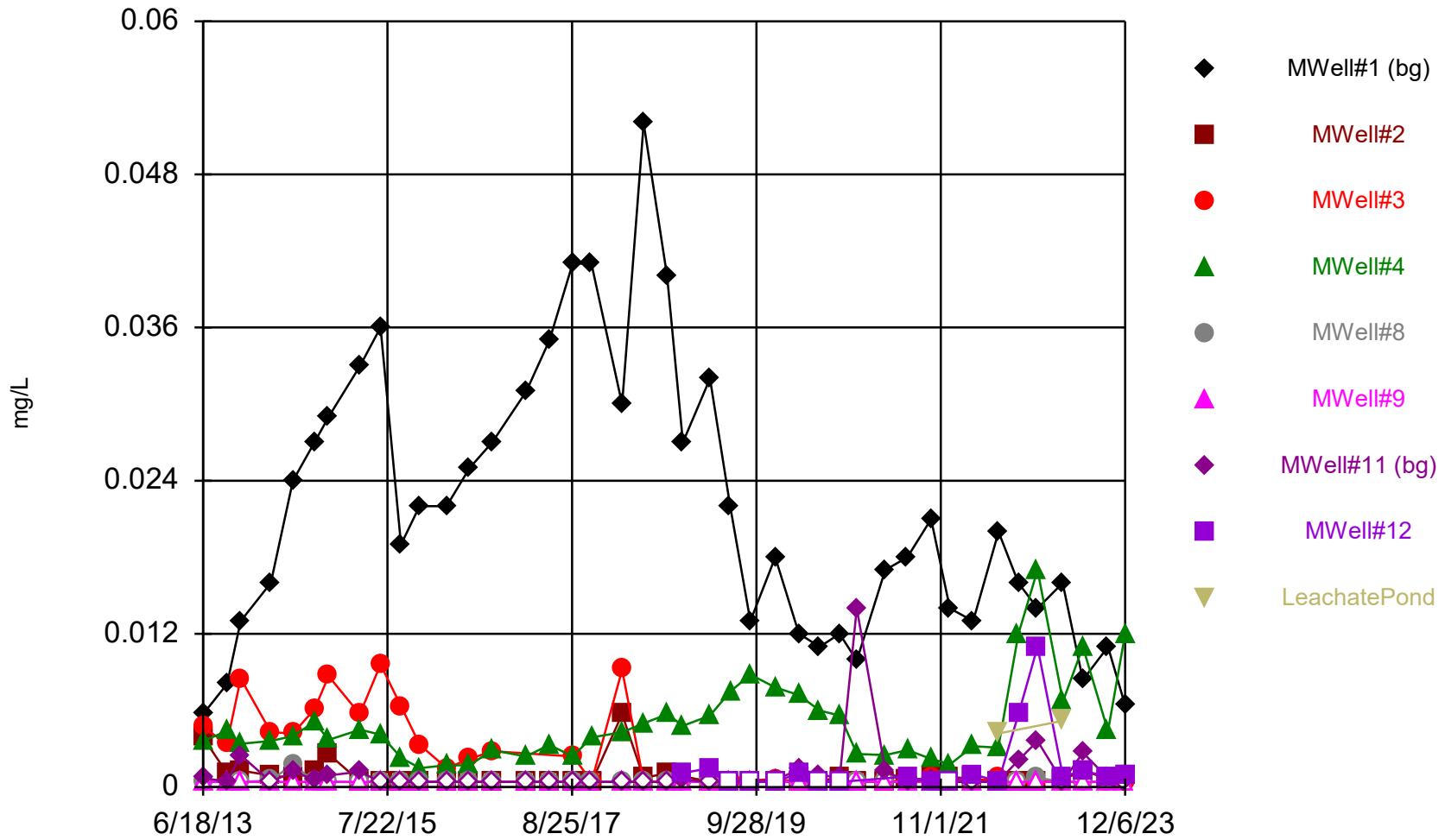
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



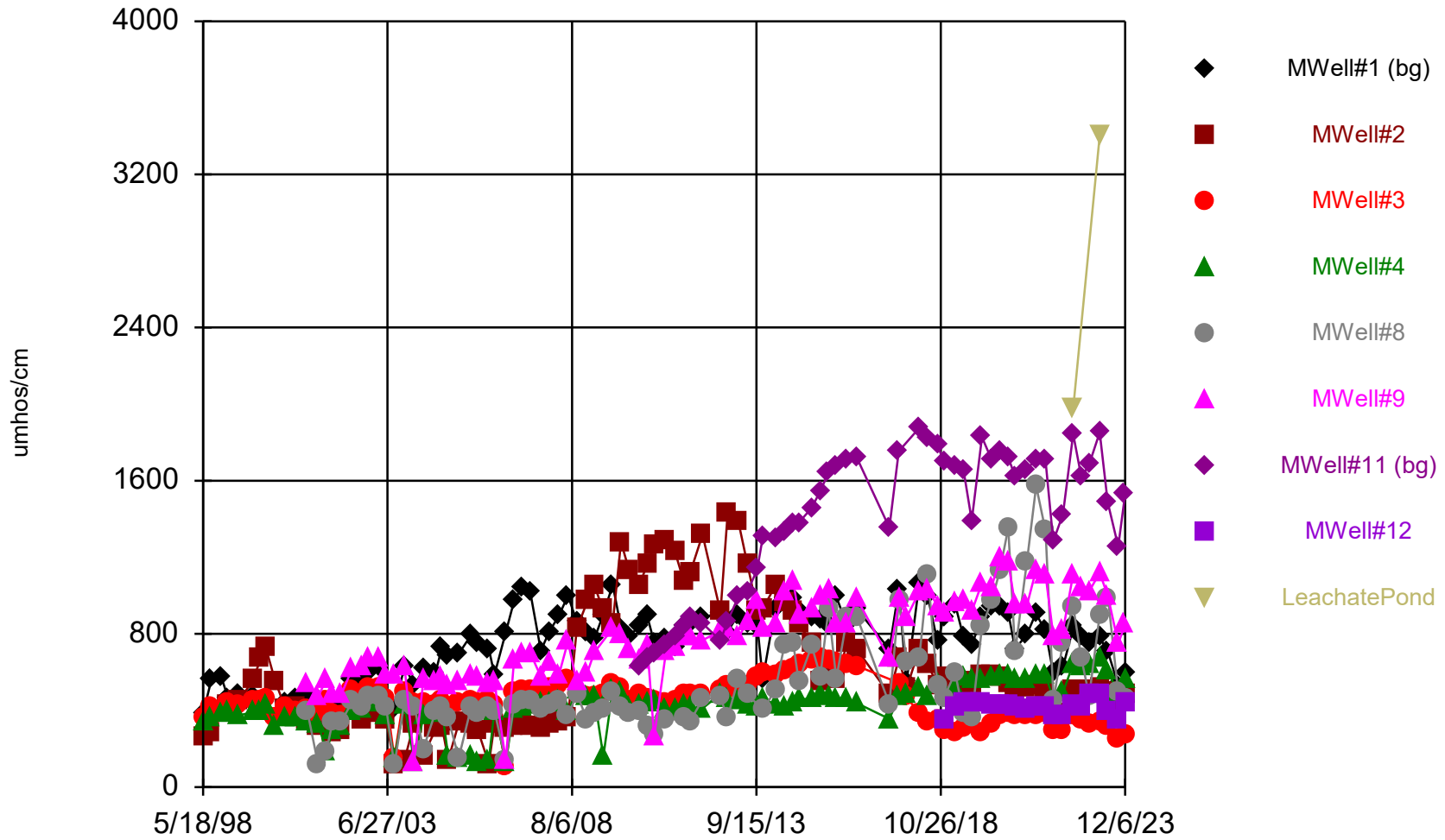
Constituent: cis-1,2-Dichloroethene Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Cobalt, Total Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

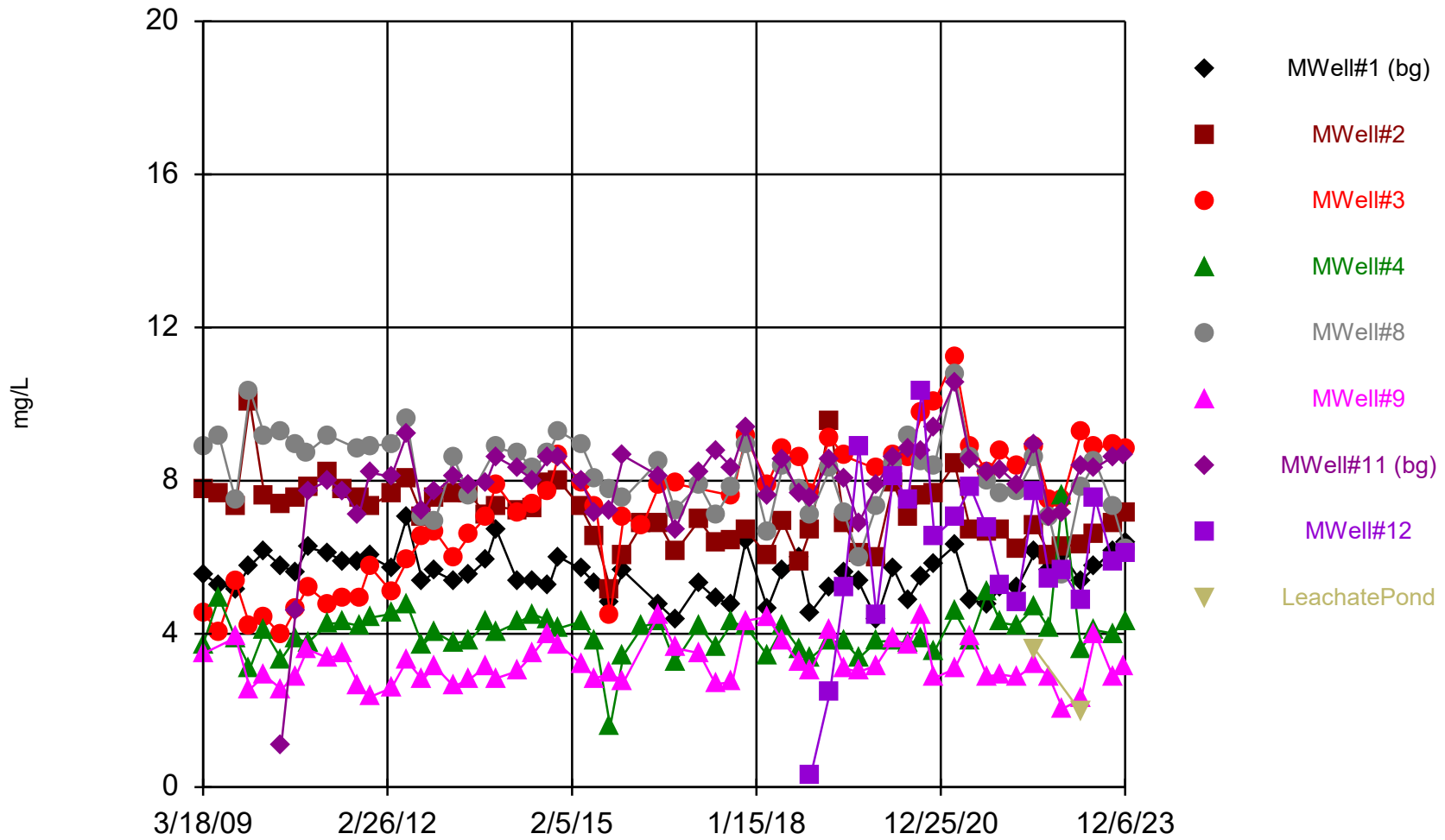
Time Series



Constituent: Conductivity Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1

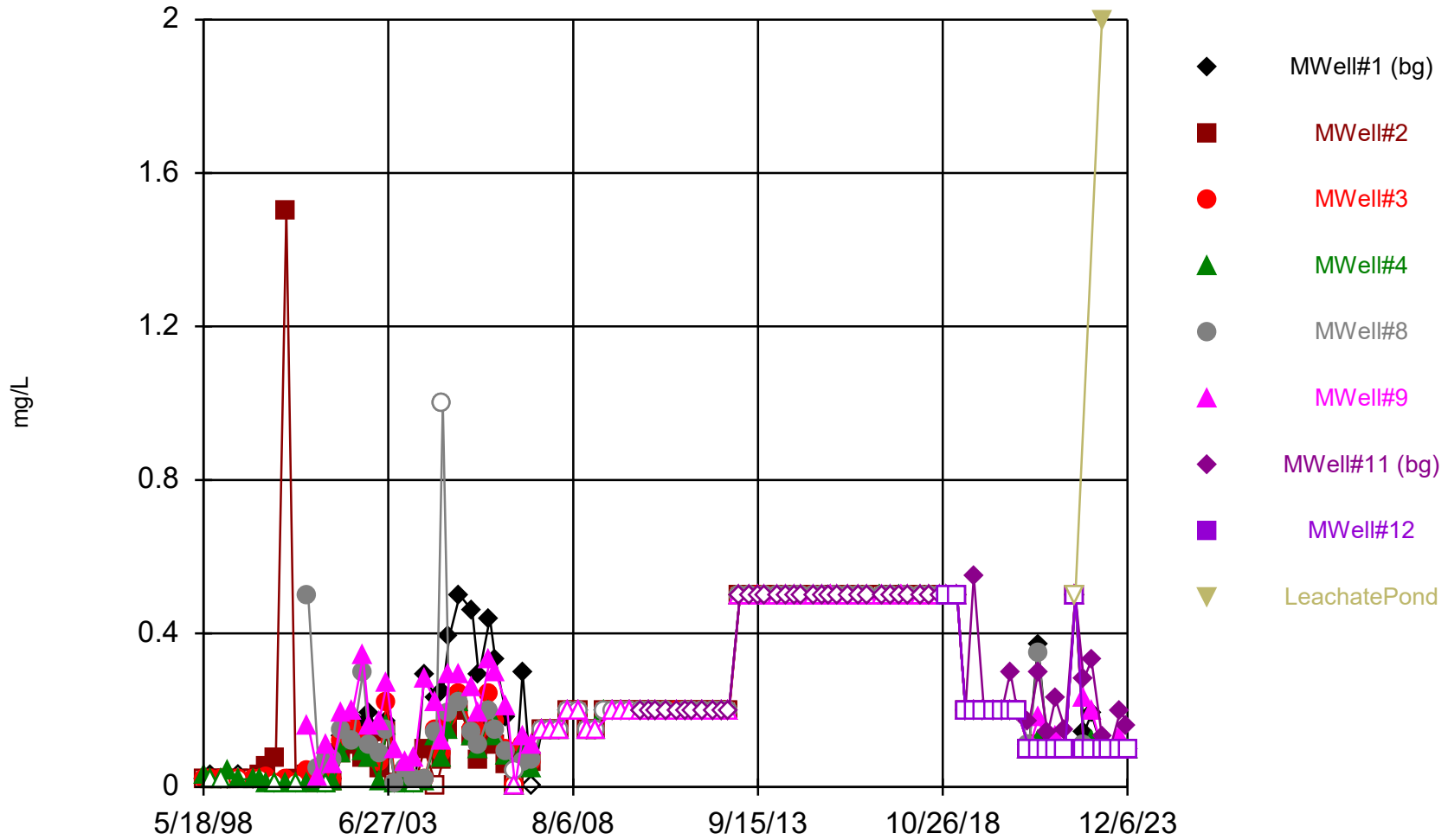
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



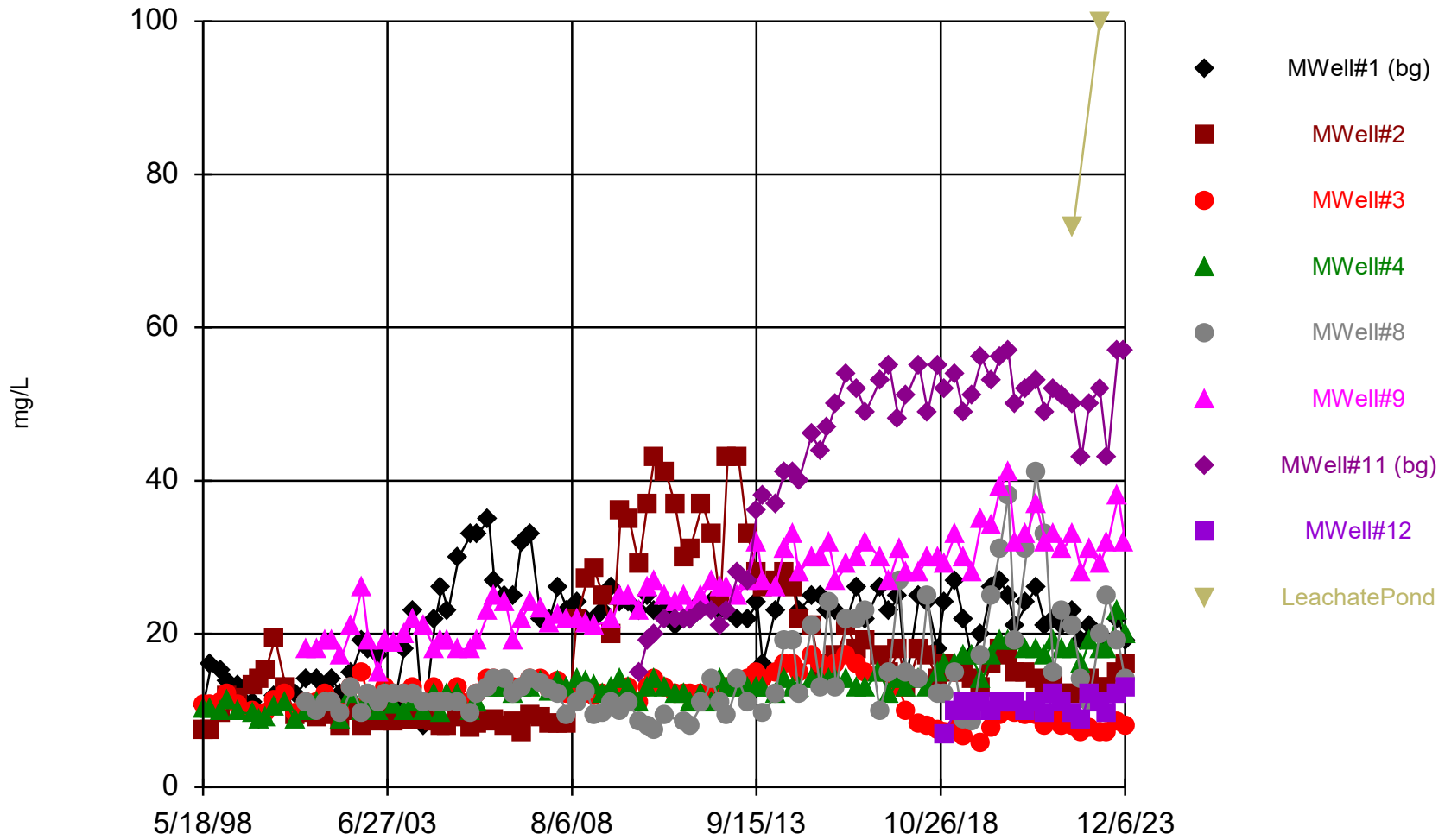
Constituent: Dissolved Oxygen Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



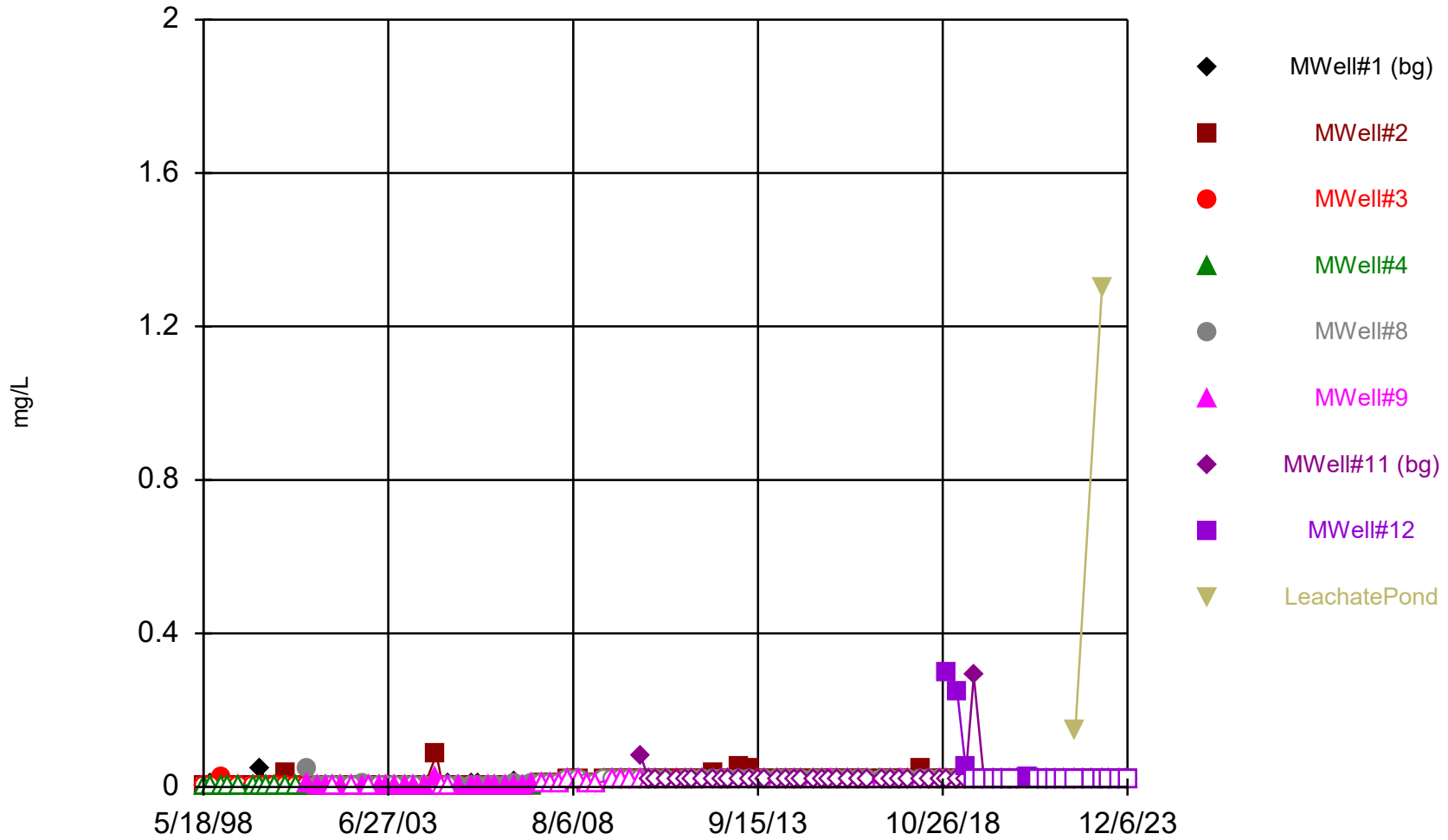
Constituent: Iron, Dissolved Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



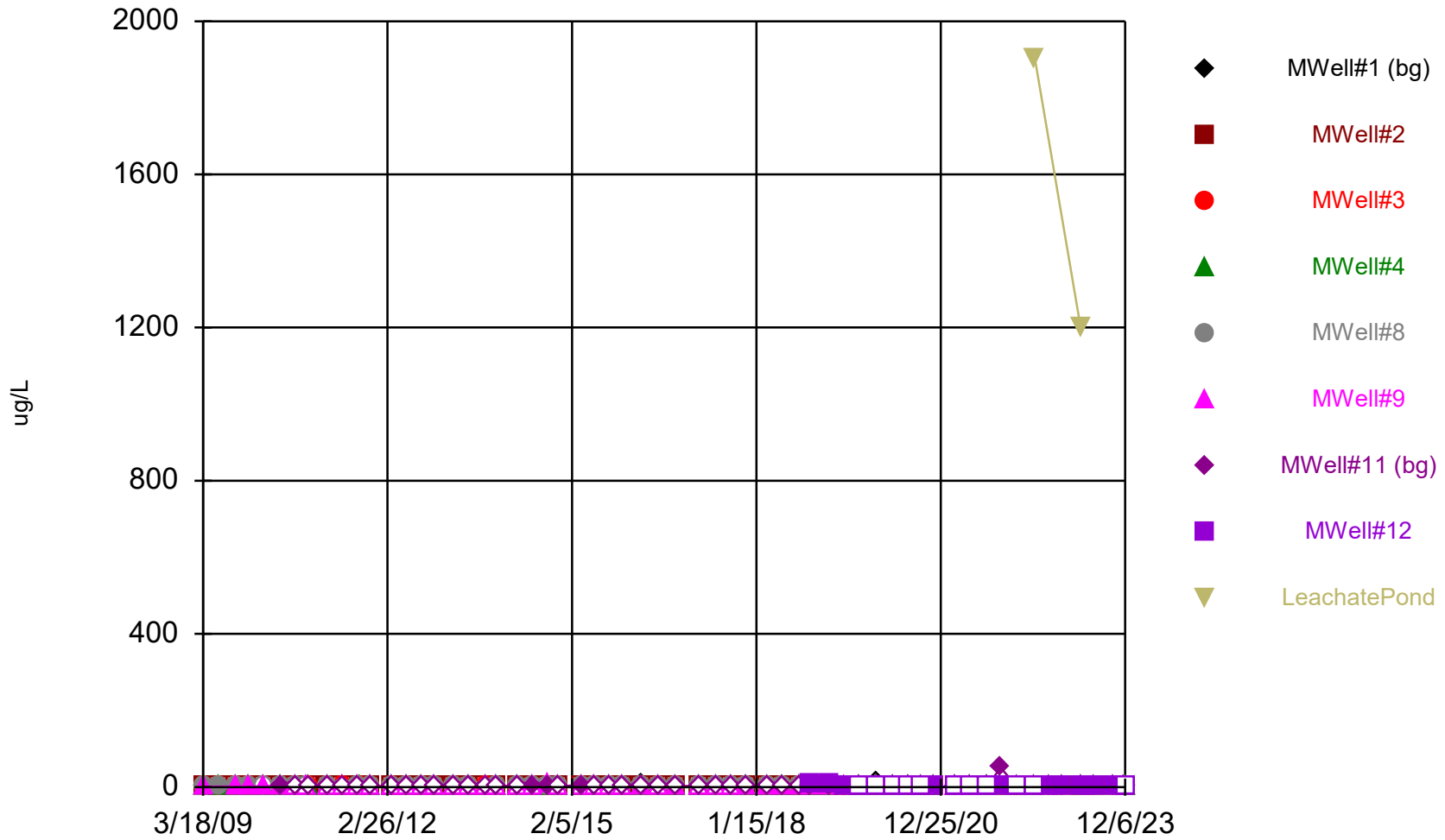
Constituent: Magnesium, Dissolved Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



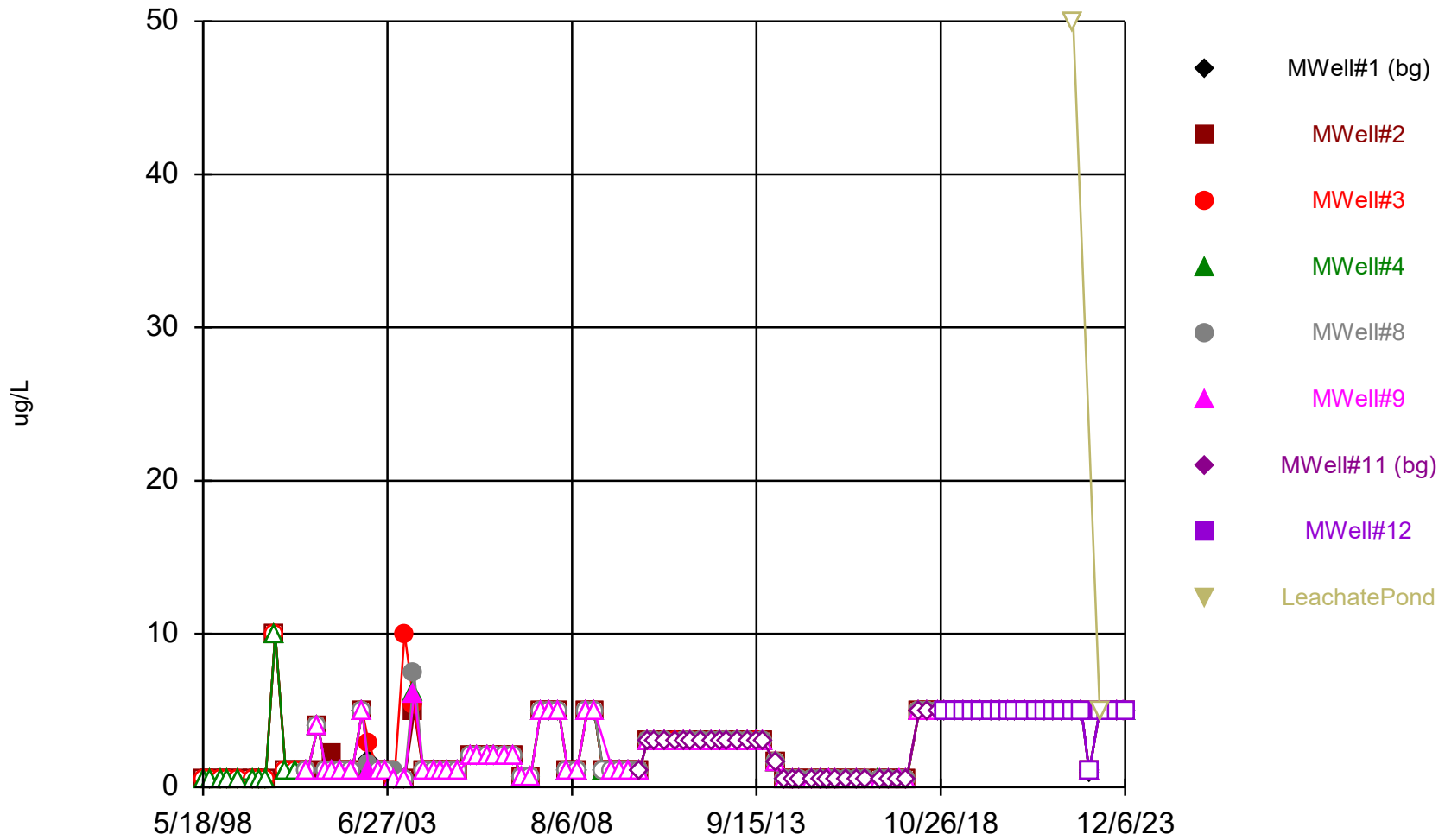
Constituent: Manganese, Dissolved Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



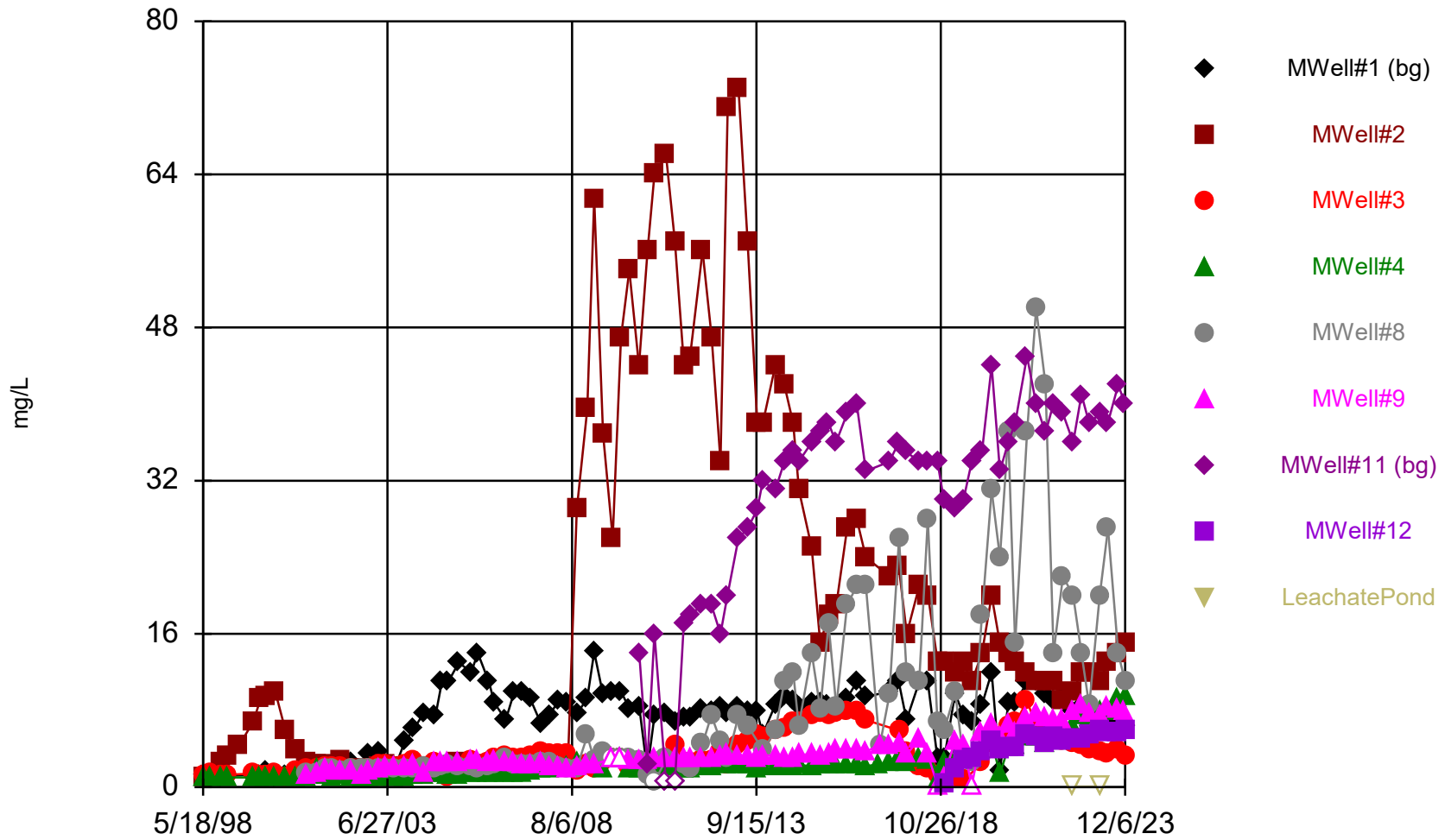
Constituent: Methane Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Methylene Chloride Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

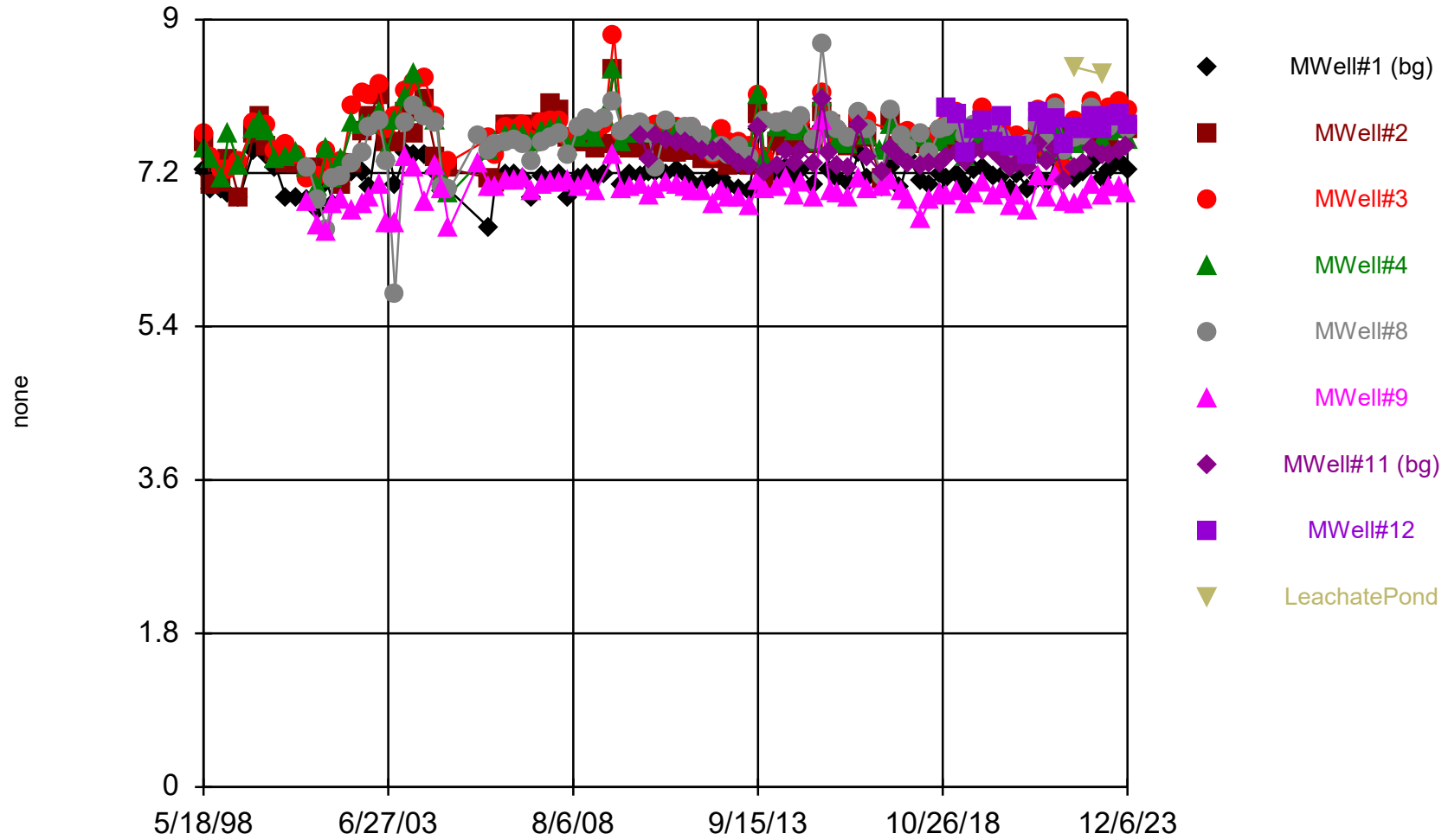
Time Series



Constituent: Nitrate Nitrogen Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1

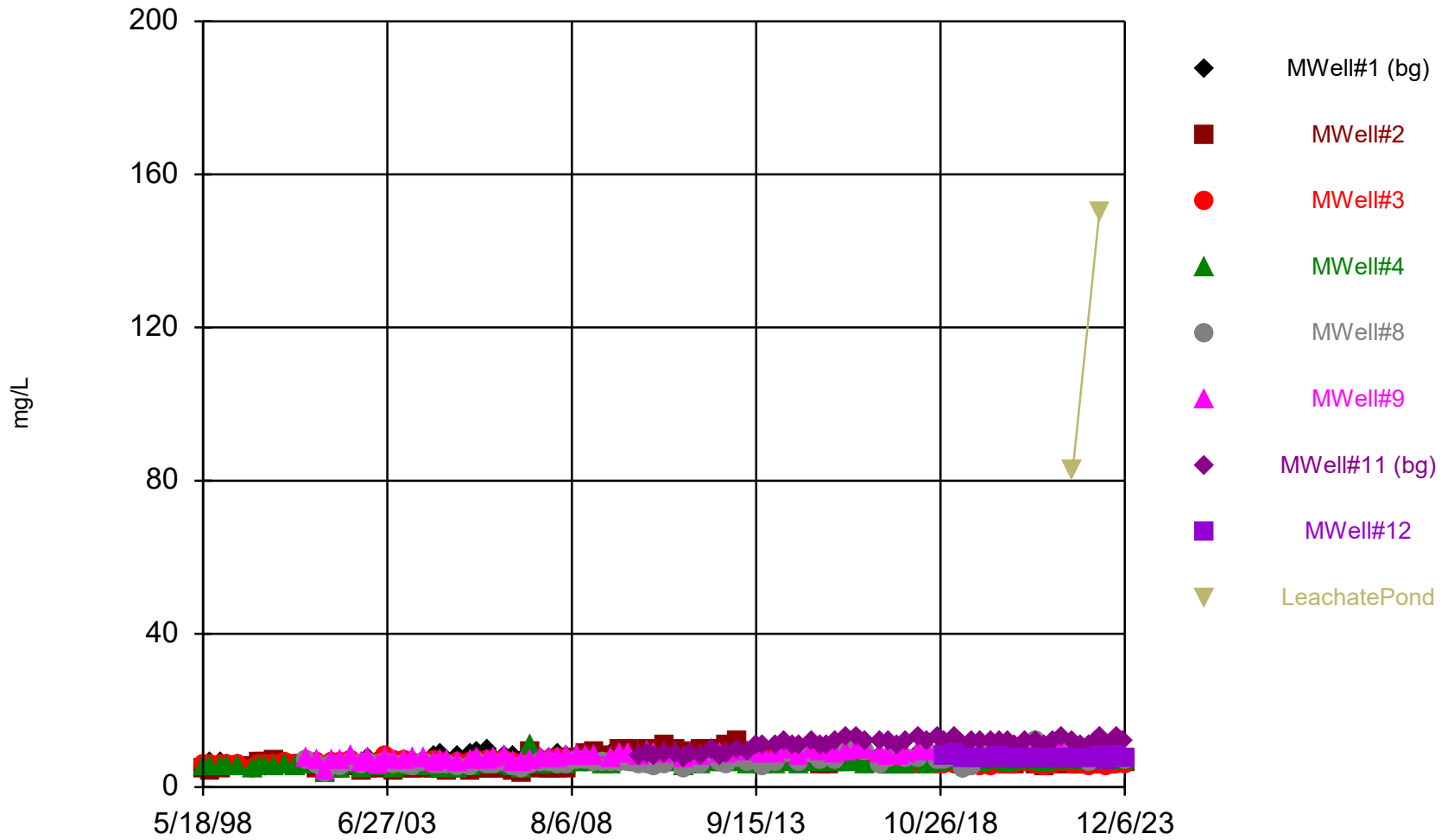
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



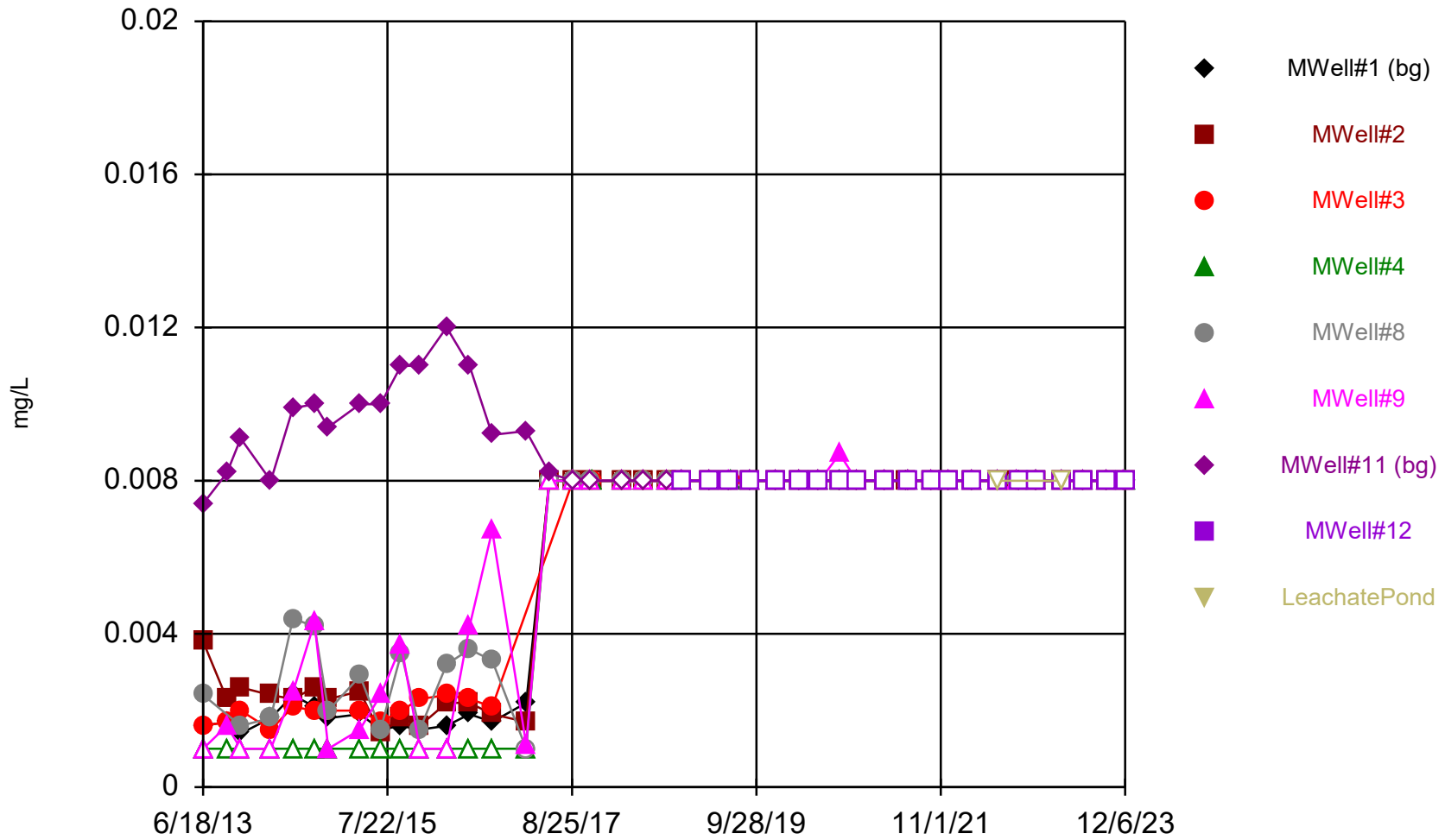
Constituent: pH Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Potassium, Dissolved Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

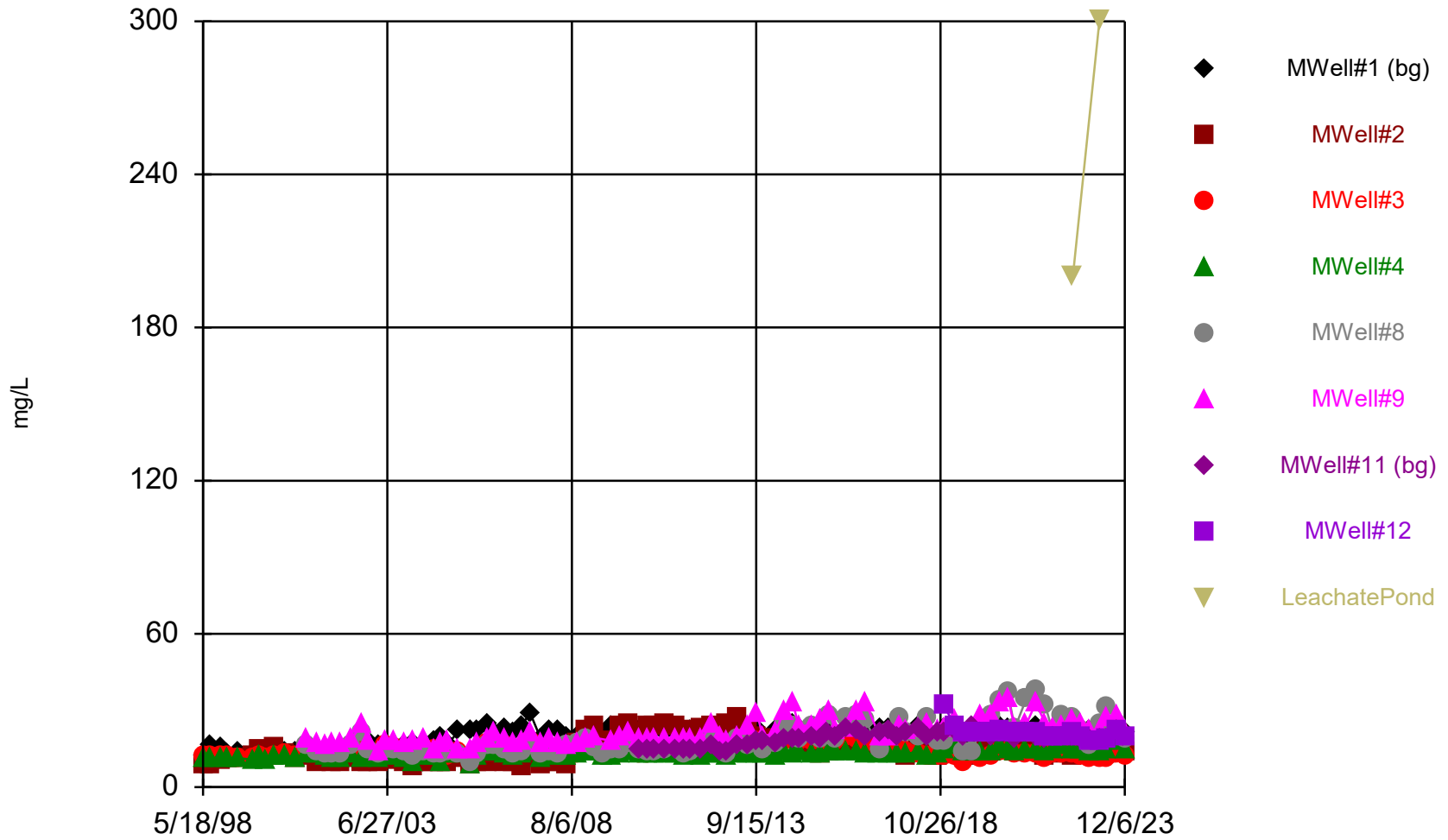
Time Series



Constituent: Selenium, Total Analysis Run 3/7/2024 10:55 AM View: HRLF_TSP Set1

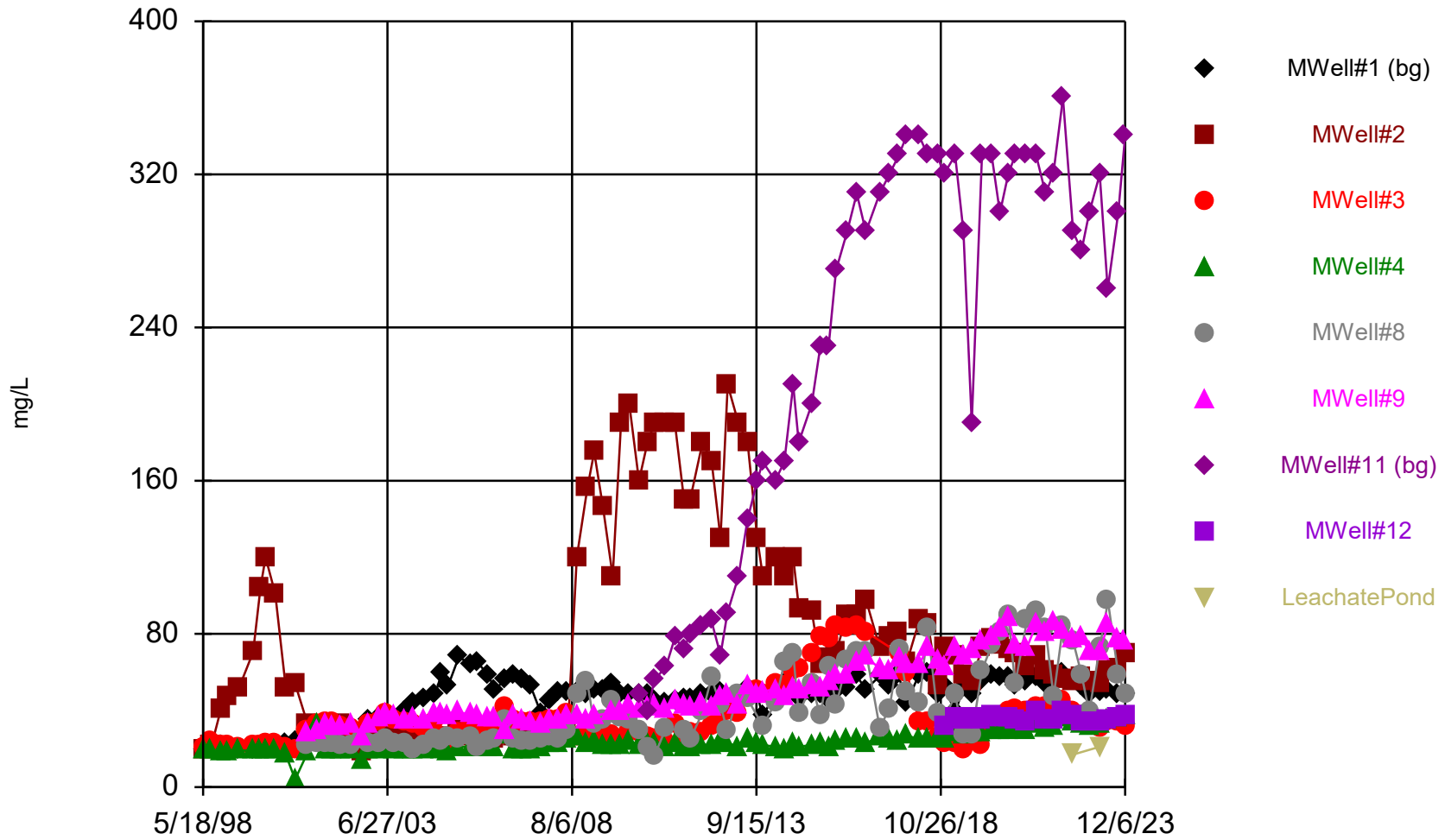
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Sodium, Dissolved Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

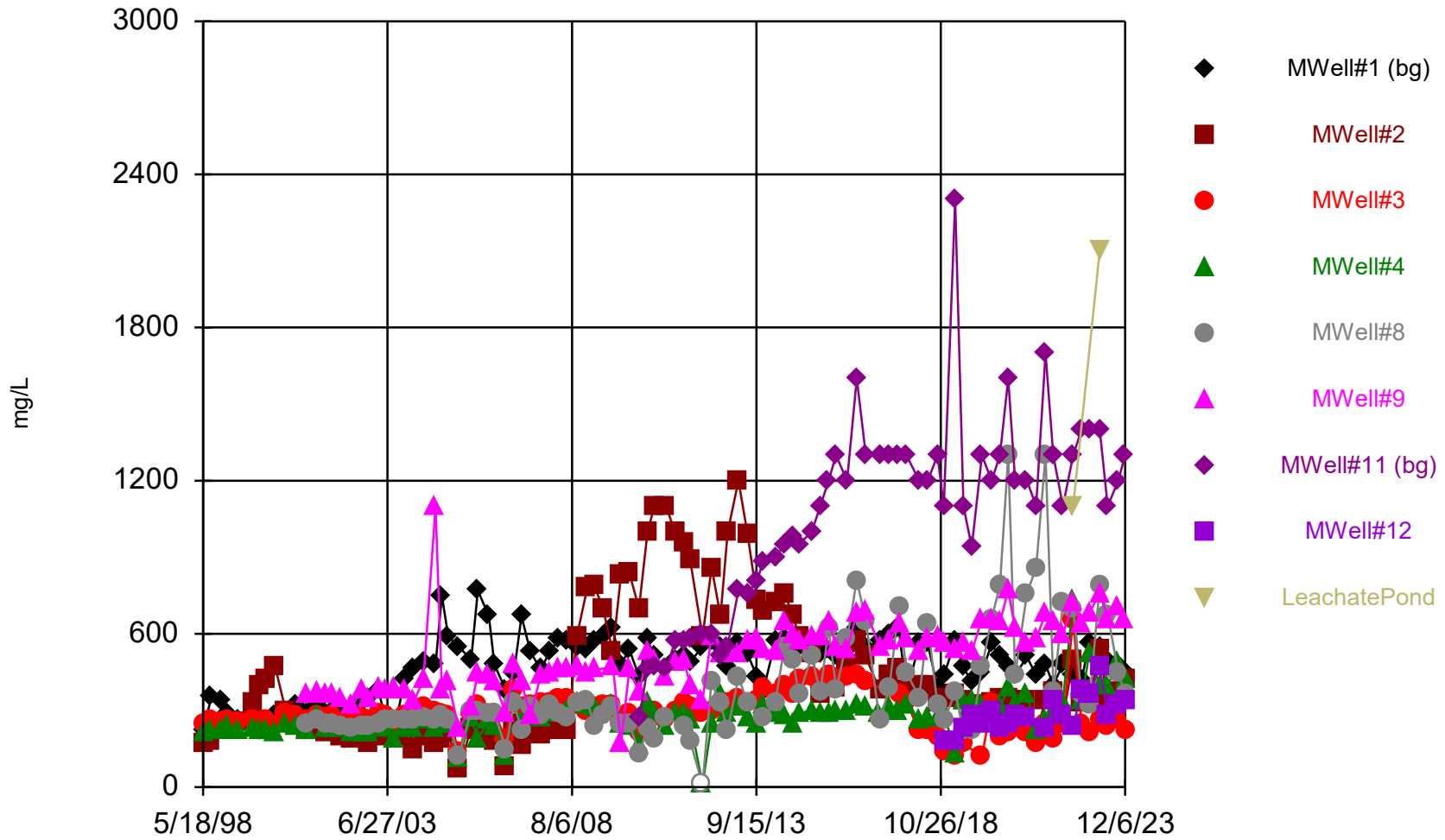
Time Series



Constituent: Sulfate Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1

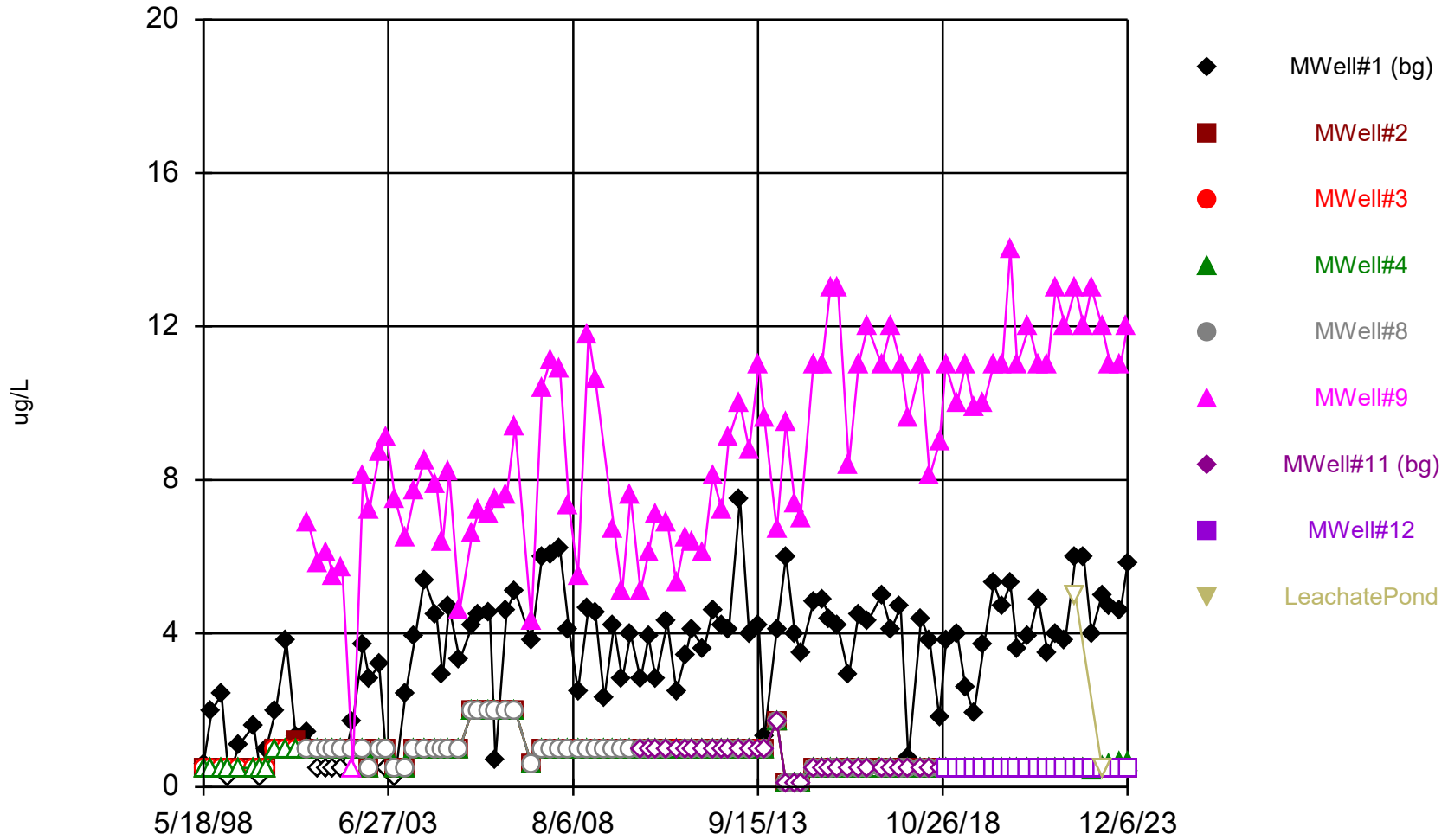
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



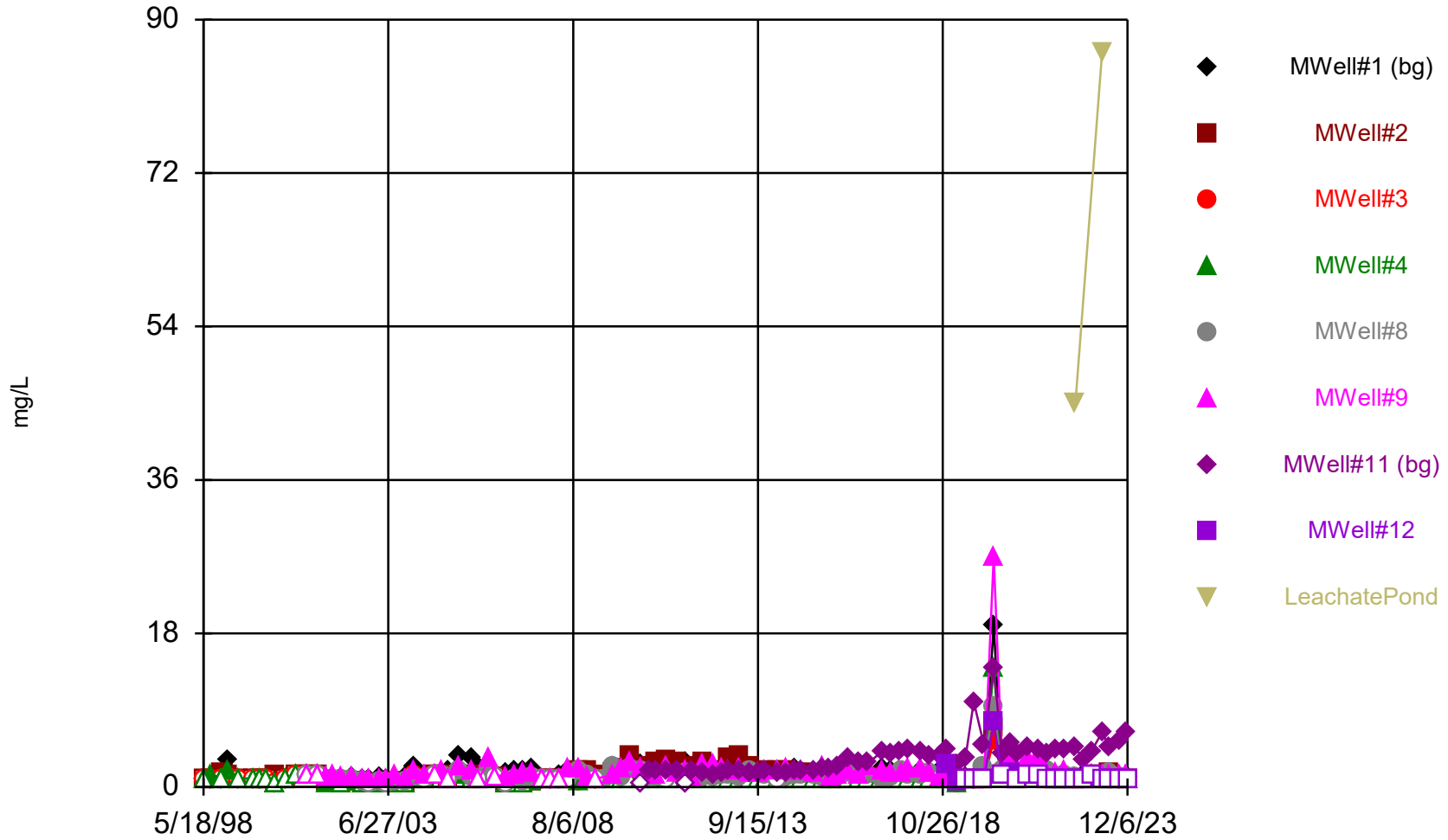
Constituent: TDS Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



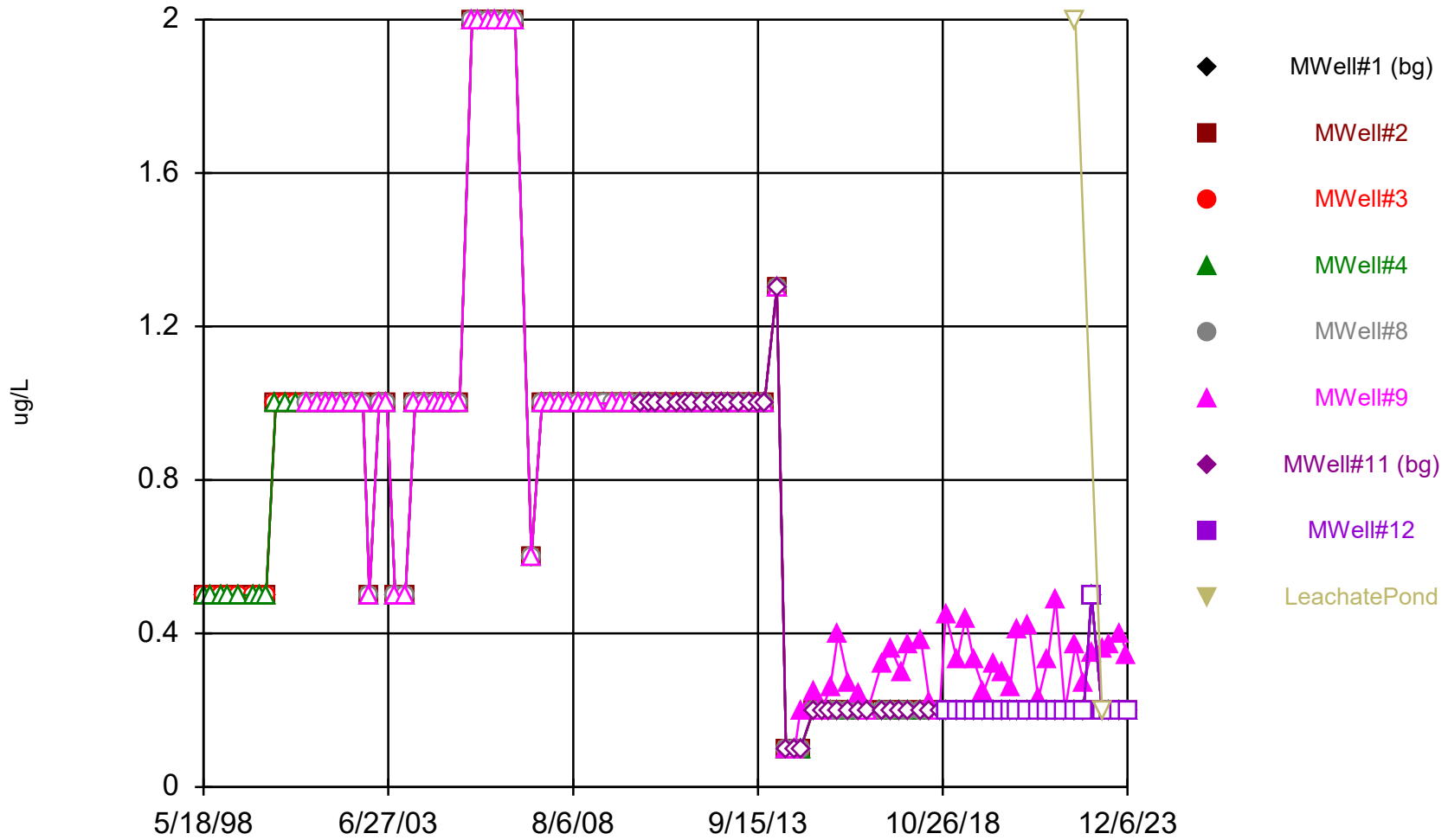
Constituent: Tetrachloroethene Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



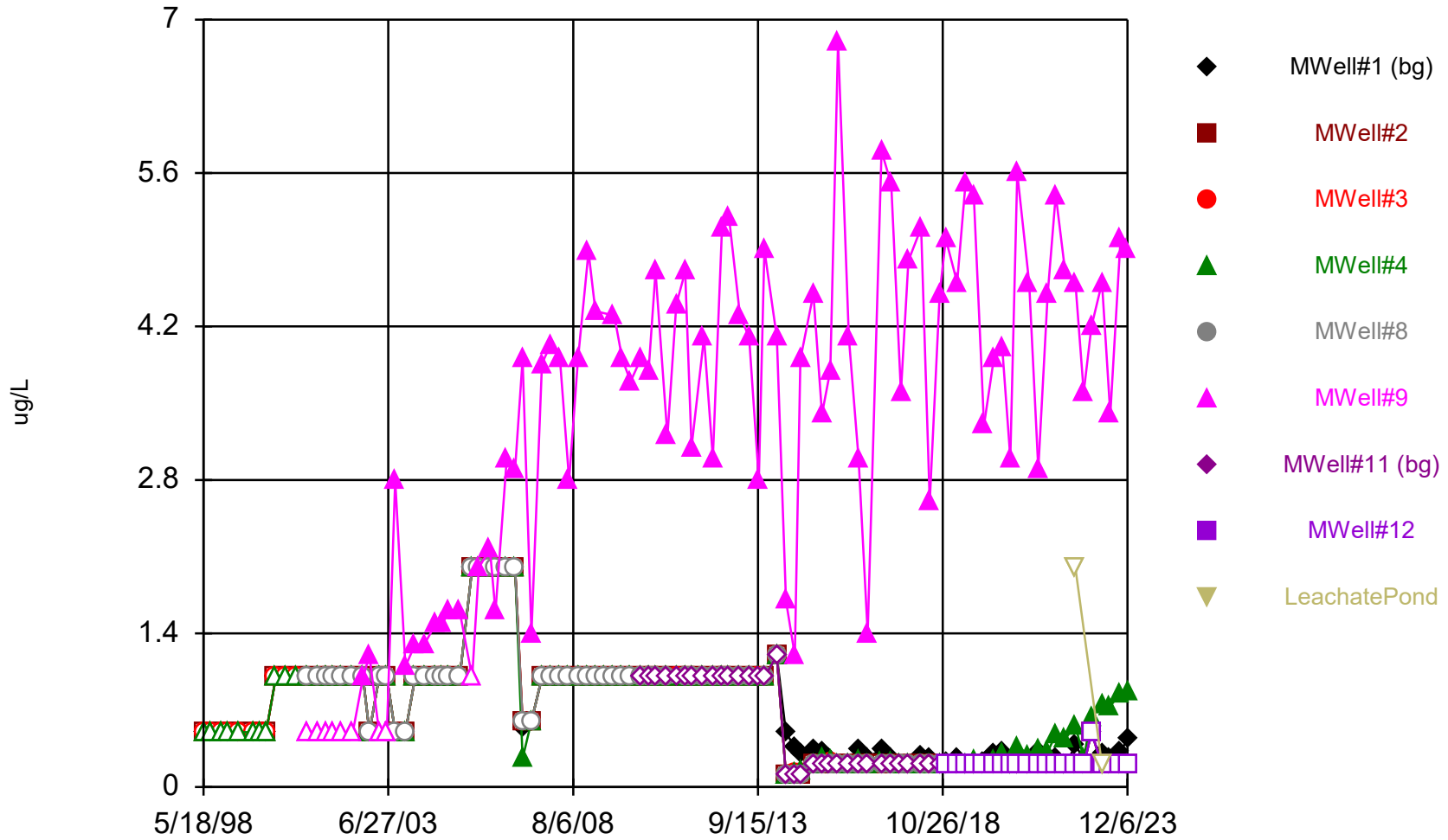
Constituent: TOC Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: trans-1,2-Dichloroethene Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

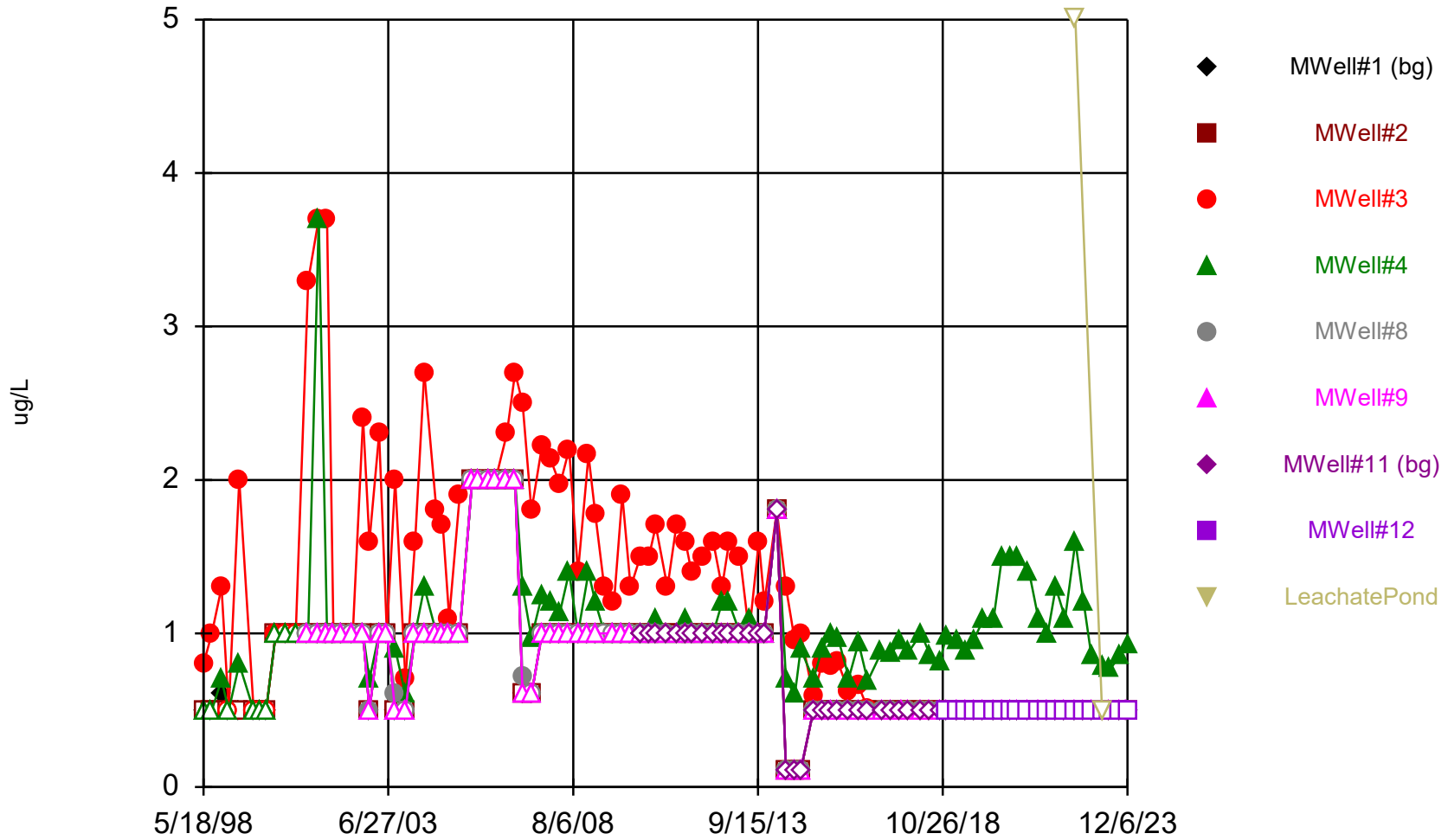
Time Series



Constituent: Trichloroethene Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1

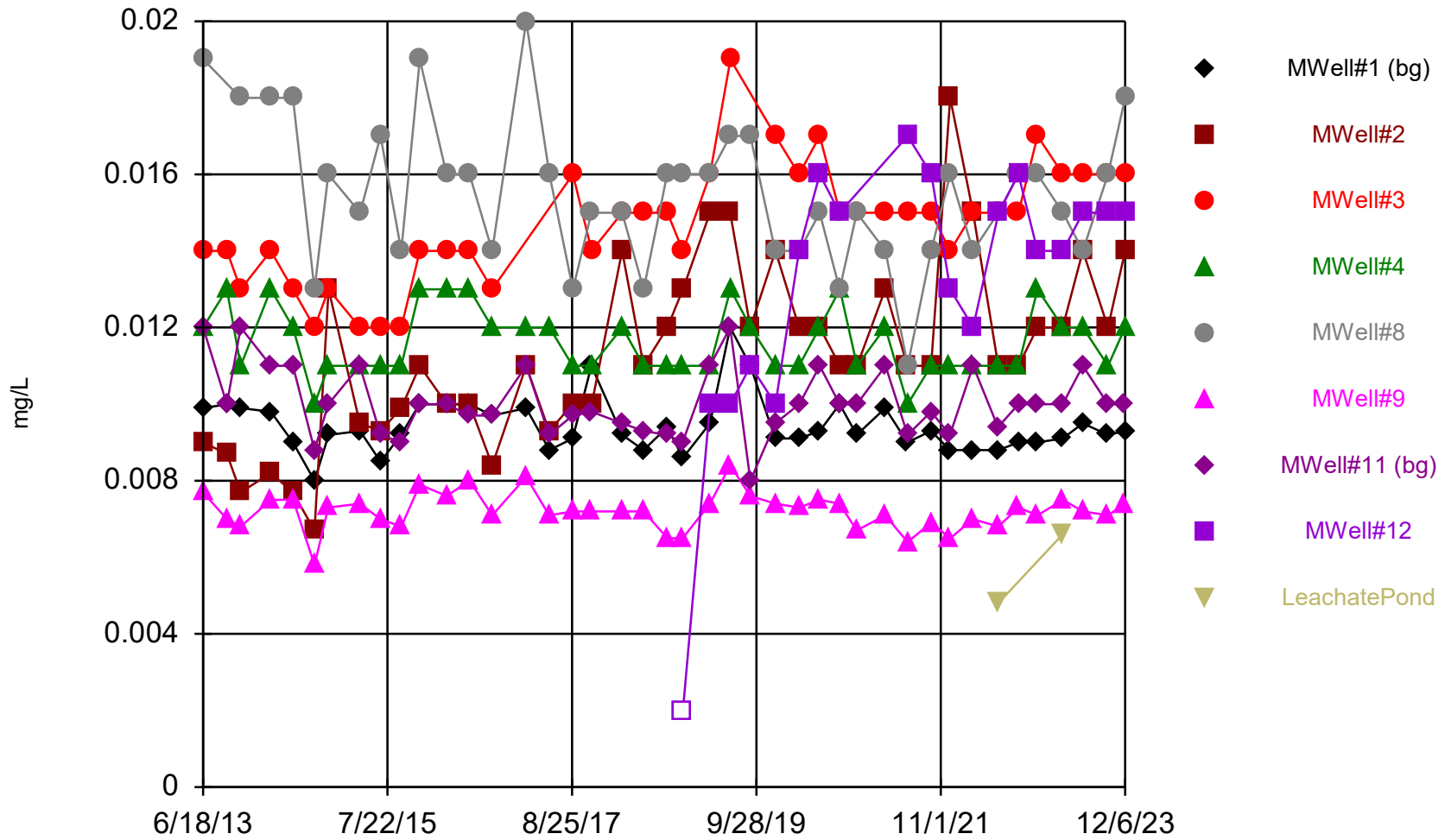
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



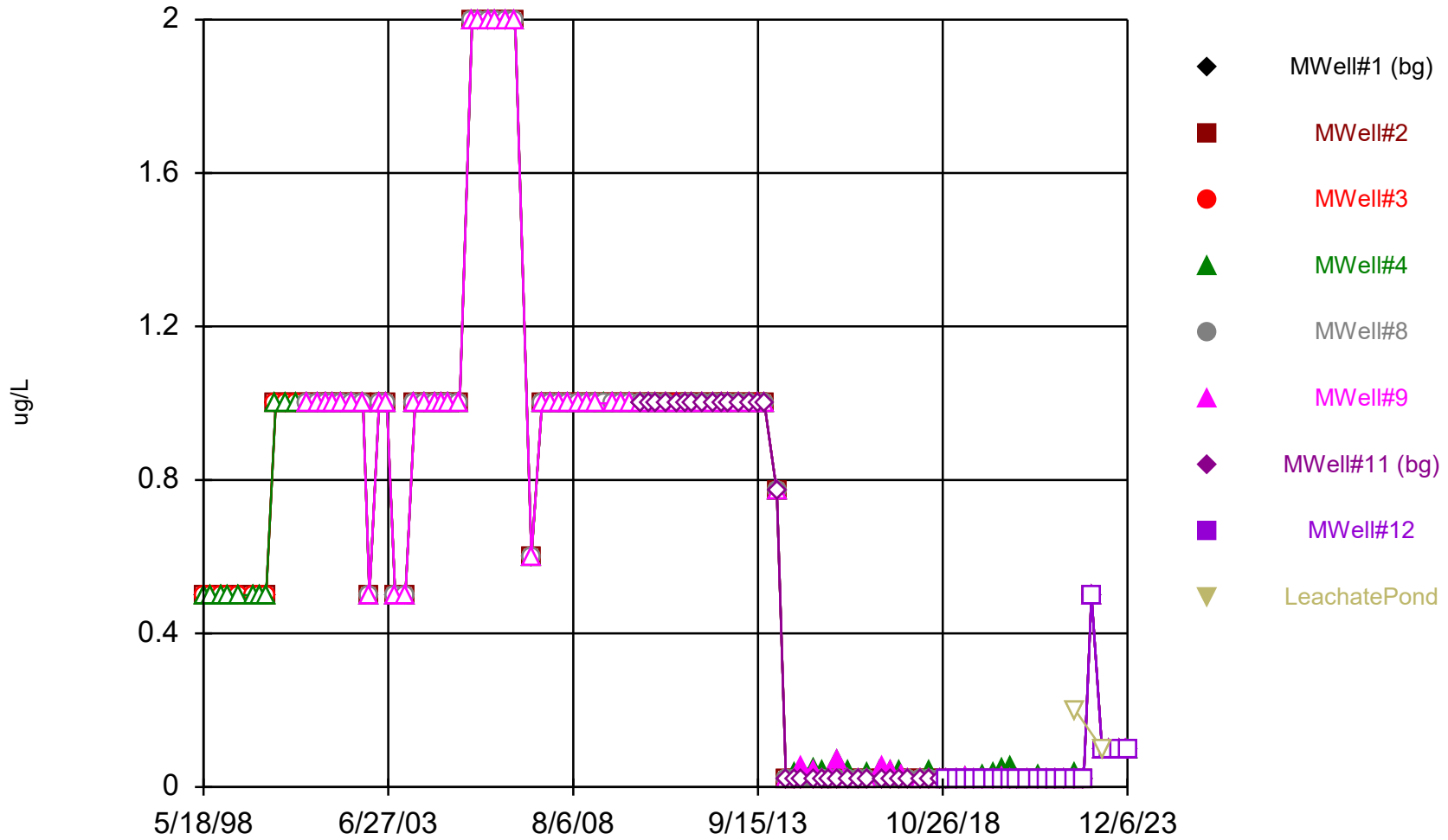
Constituent: Trichlorofluoromethane Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Vanadium, Total Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

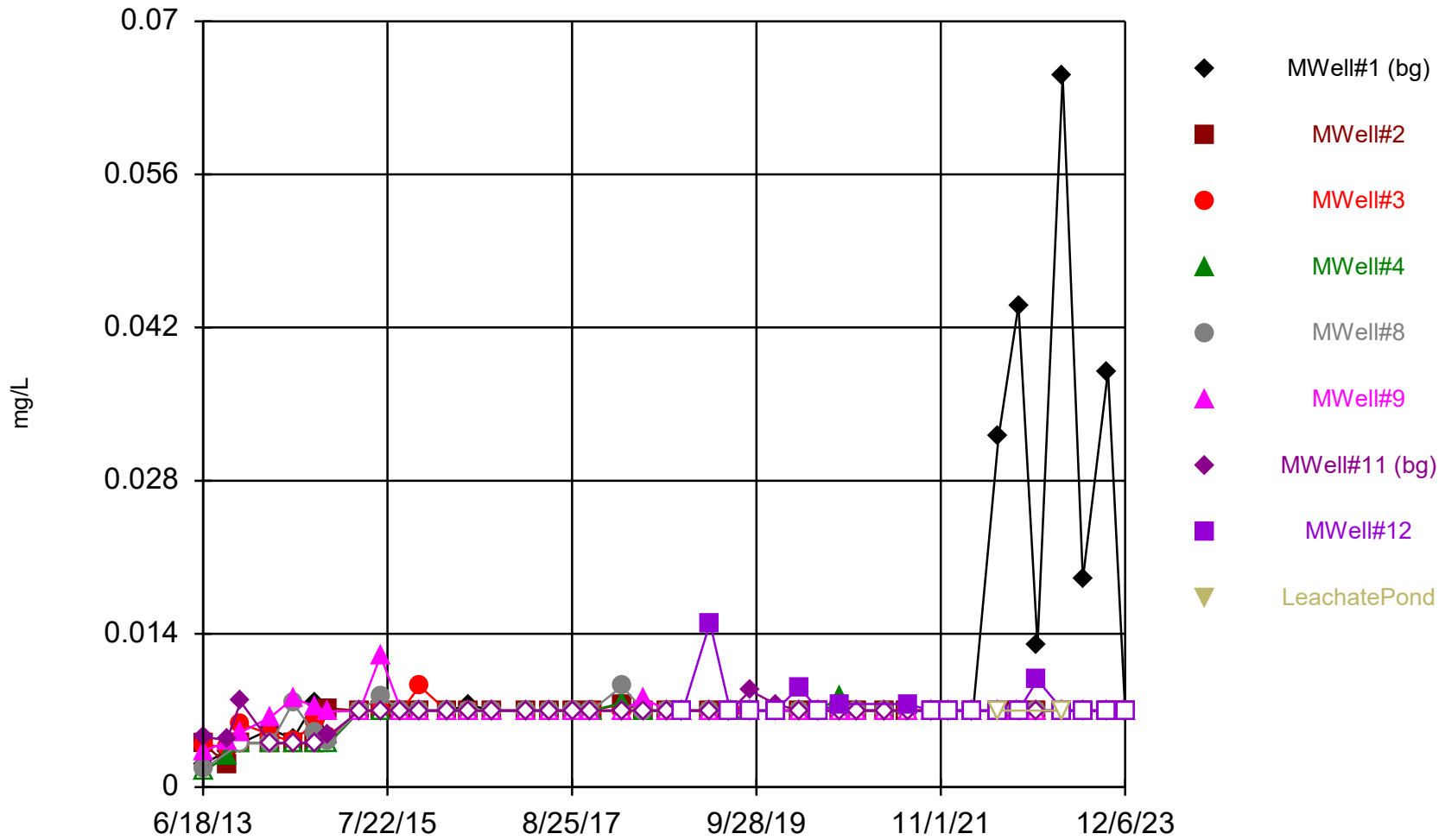
Time Series



Constituent: Vinyl Chloride Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1

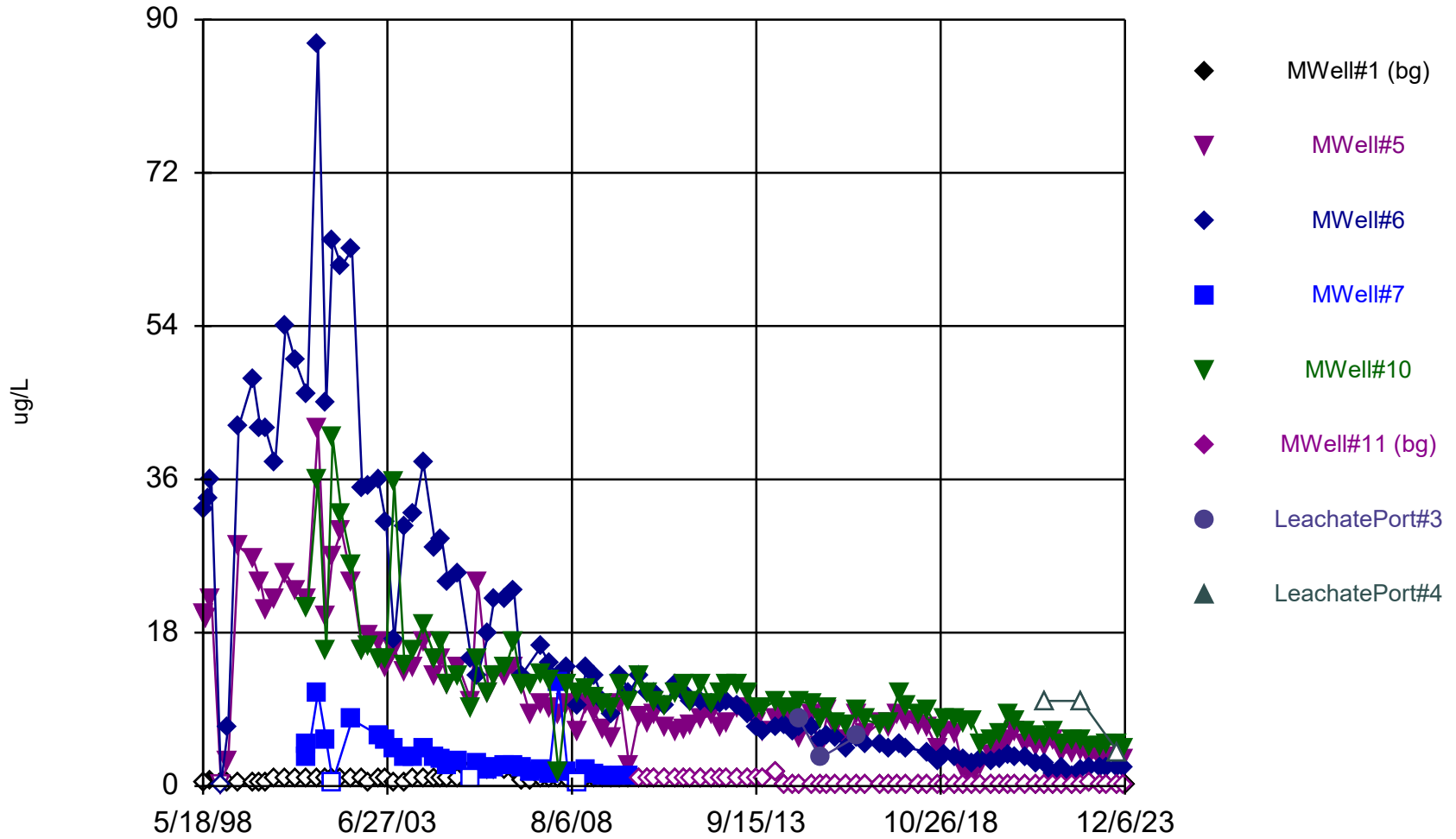
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



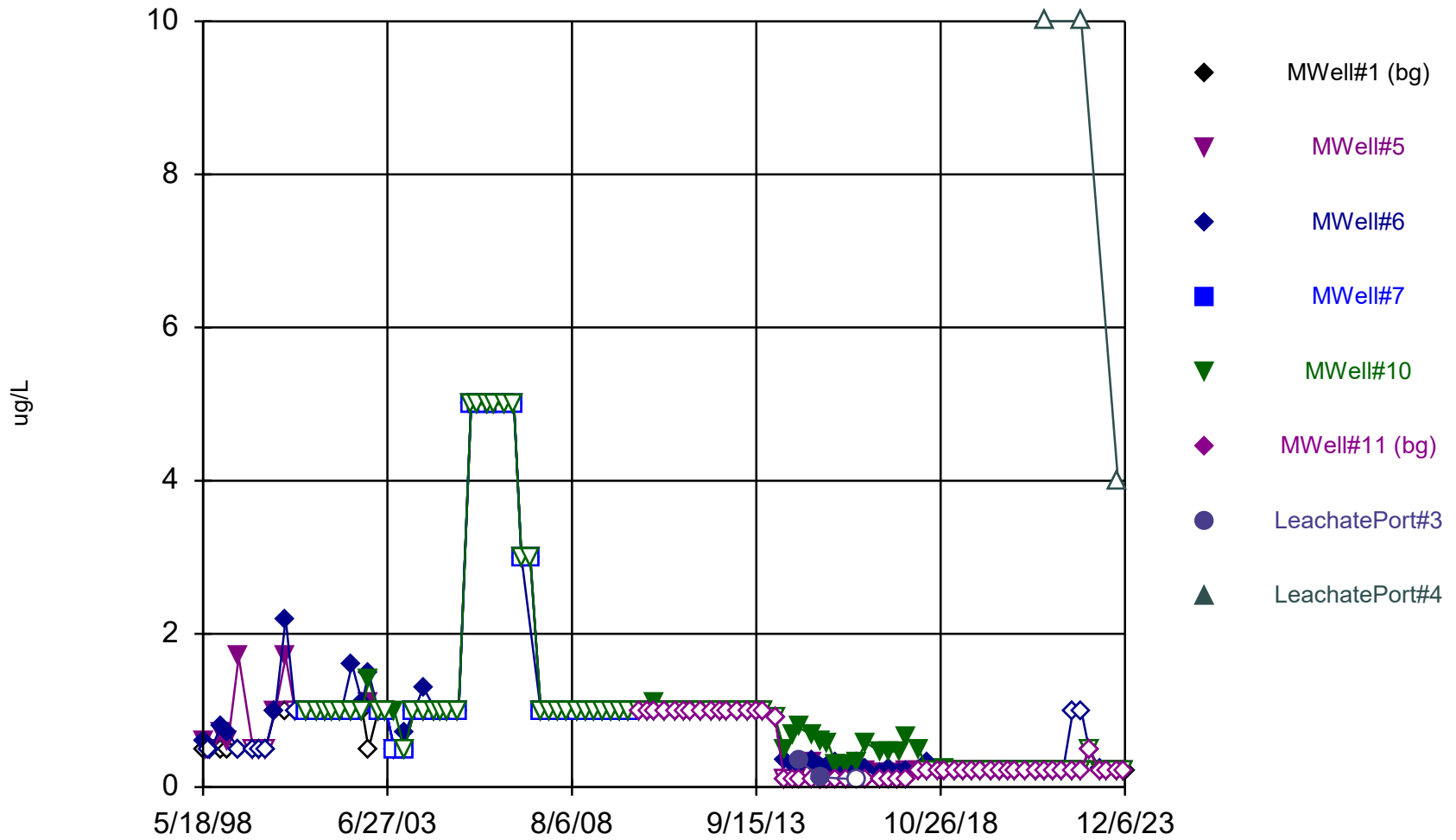
Constituent: Zinc, Total Analysis Run 3/7/2024 10:56 AM View: HRLF_TSP Set1
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



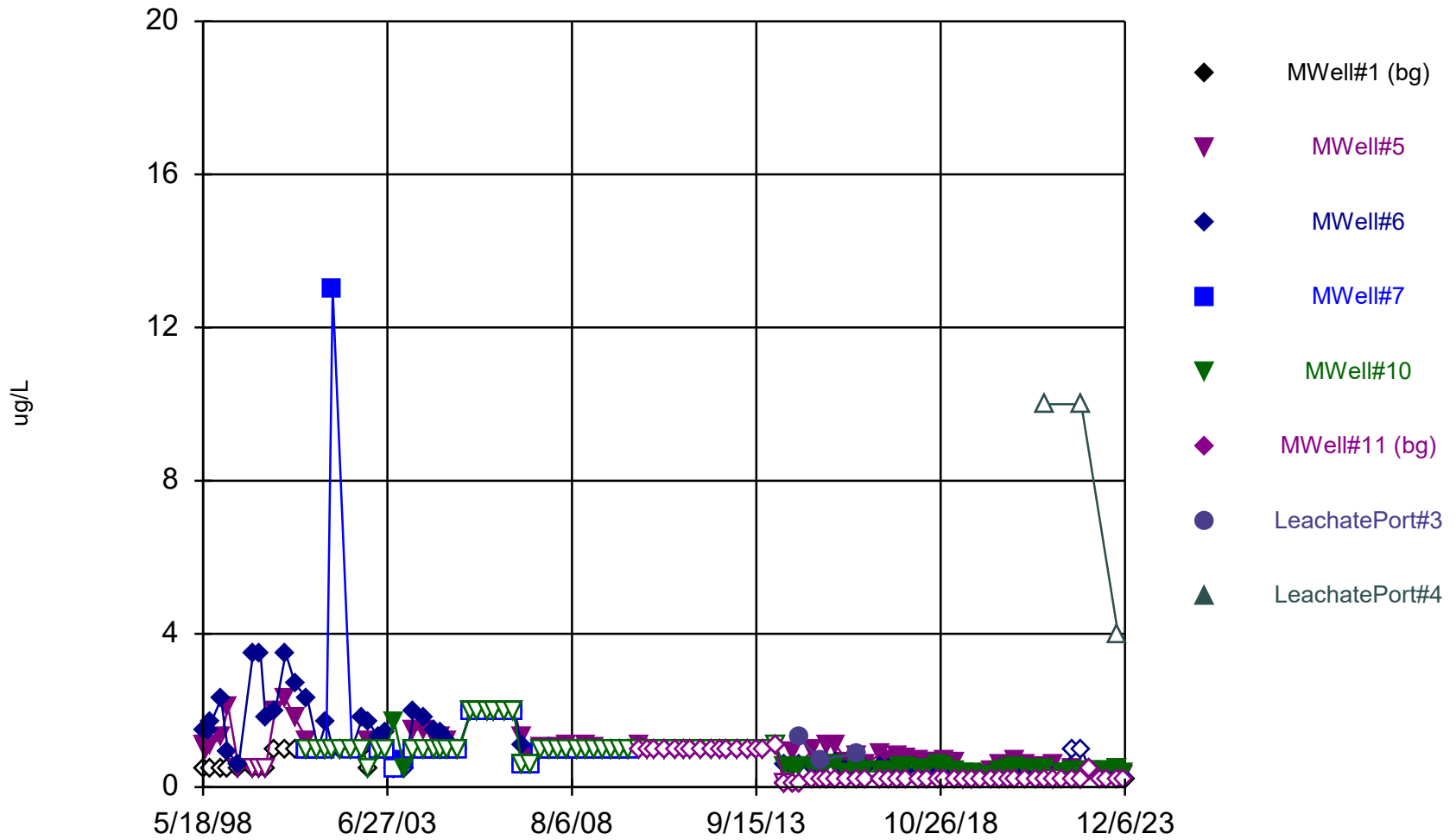
Constituent: 1,1-Dichloroethane Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



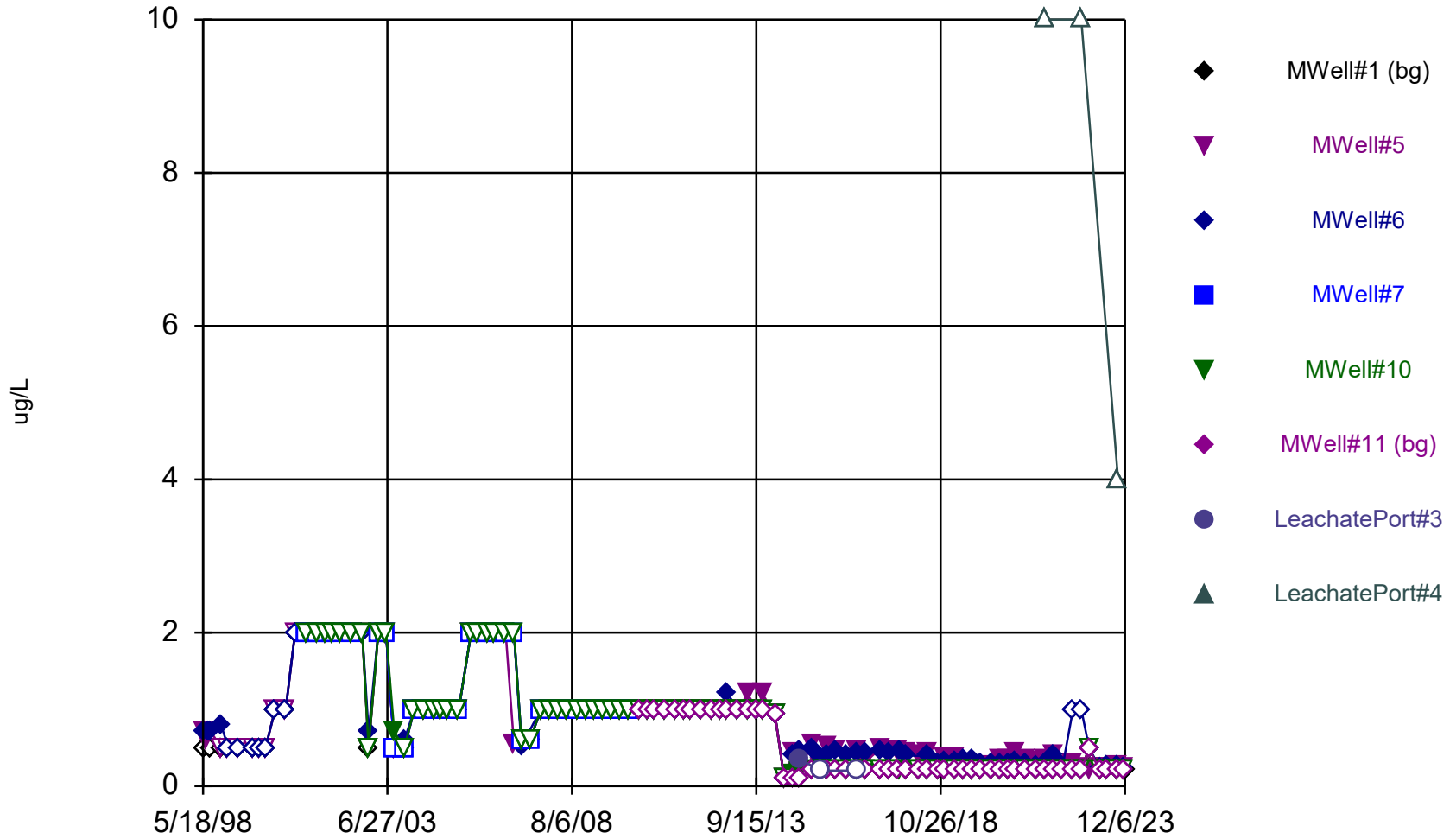
Constituent: 1,1-Dichloroethene Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



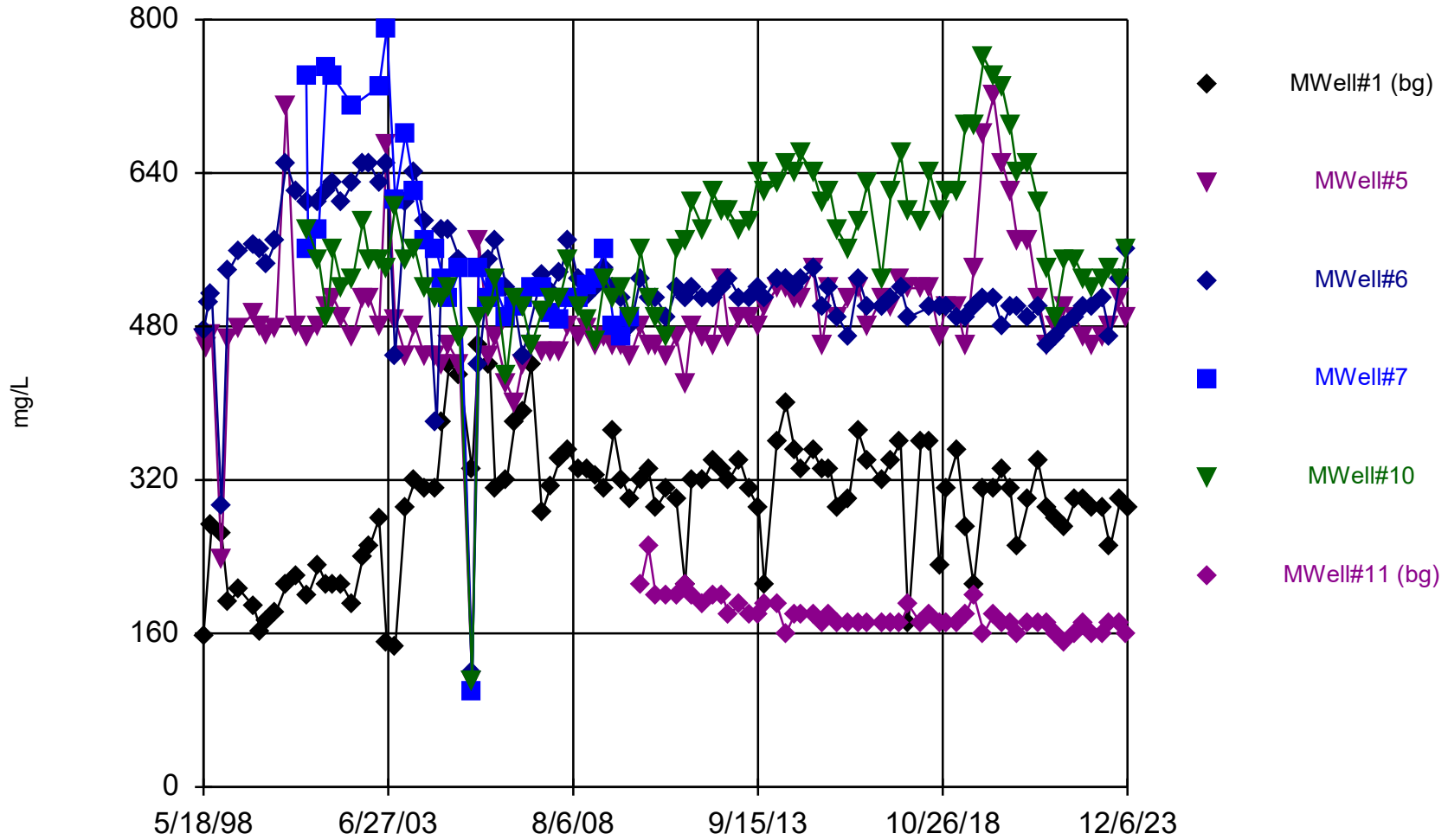
Constituent: 1,2-Dichloroethane Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: 1,2-Dichloropropane Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

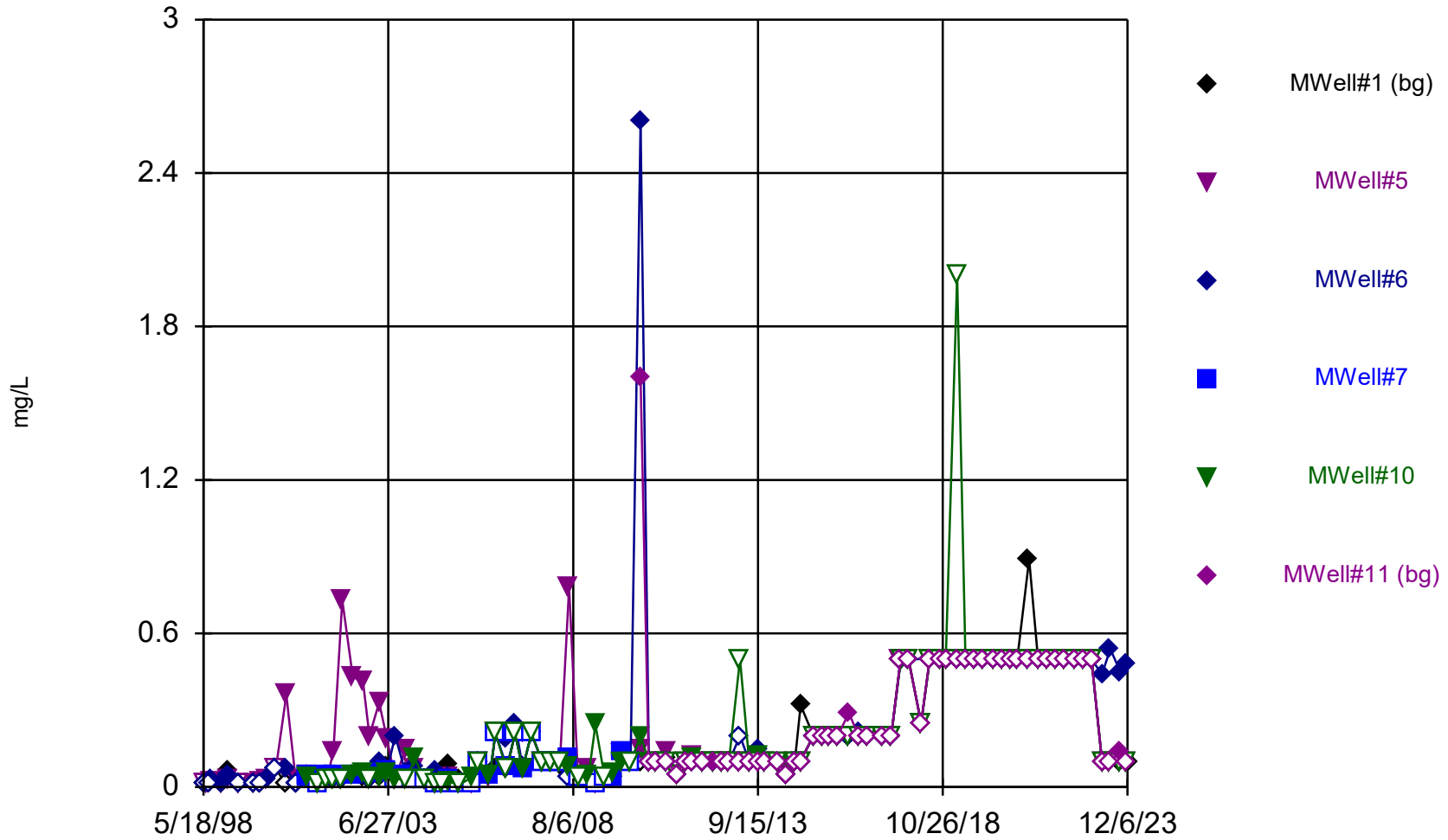
Time Series



Constituent: Alkalinity Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2

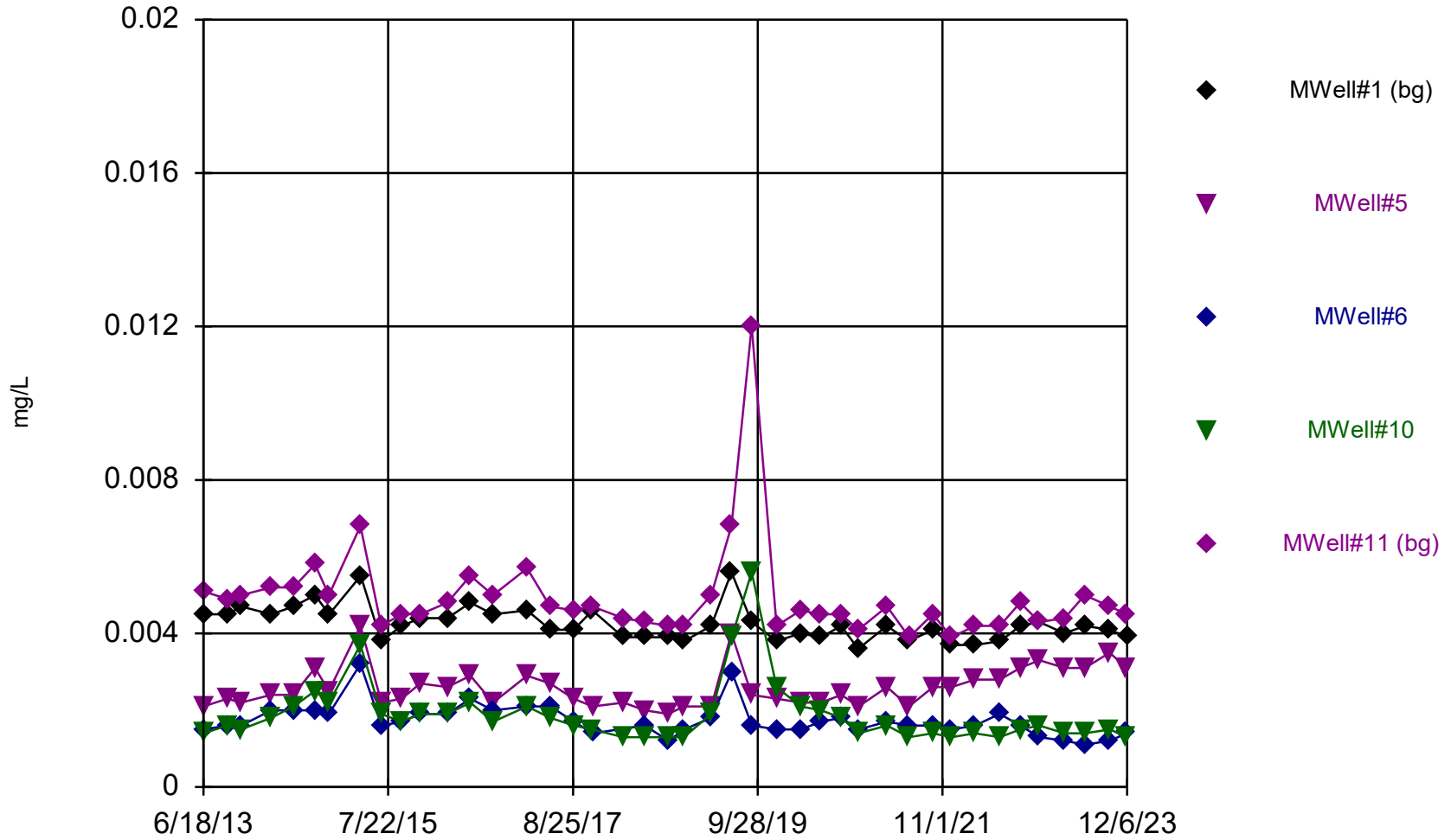
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



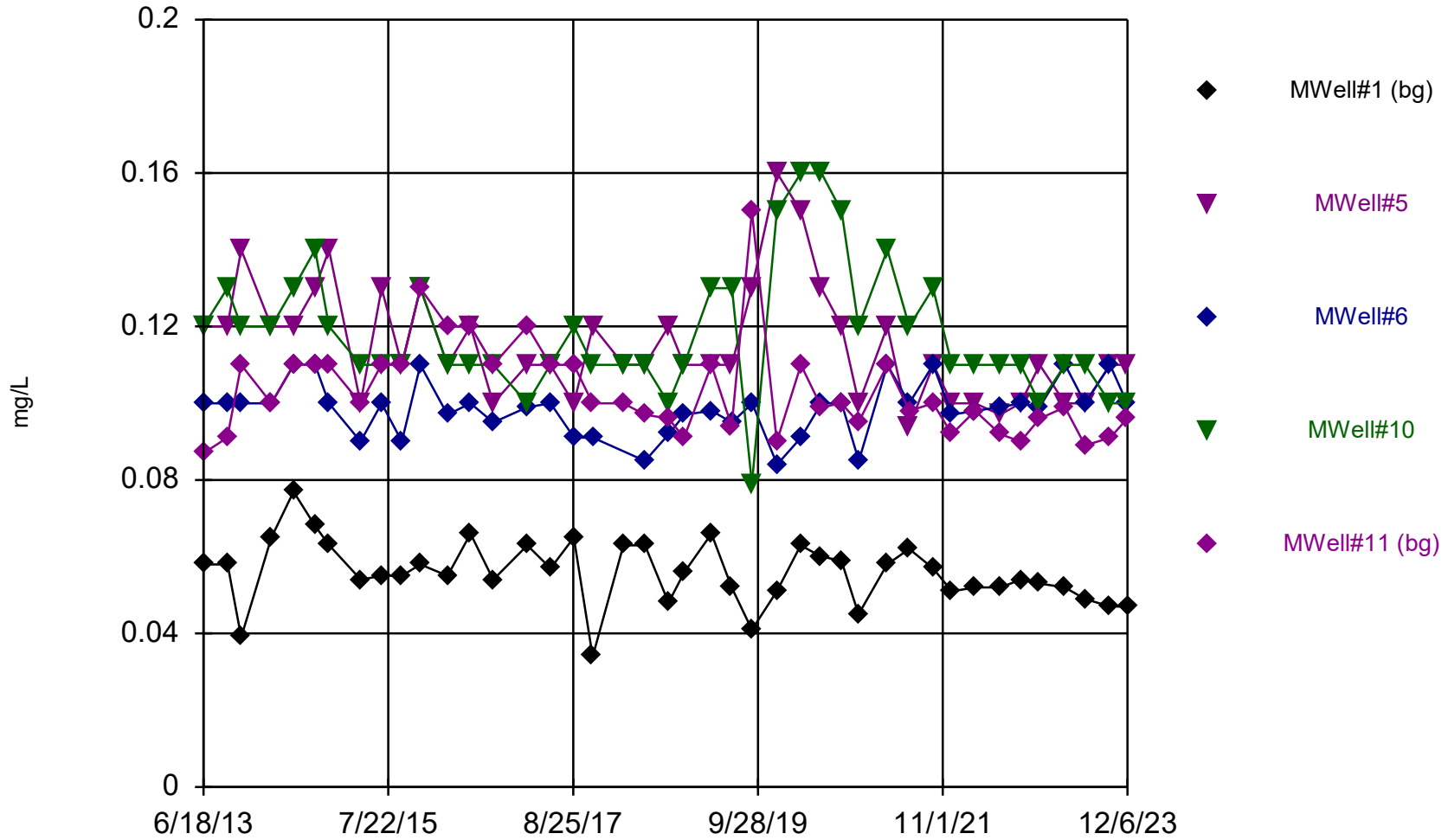
Constituent: Ammonia Nitrogen Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



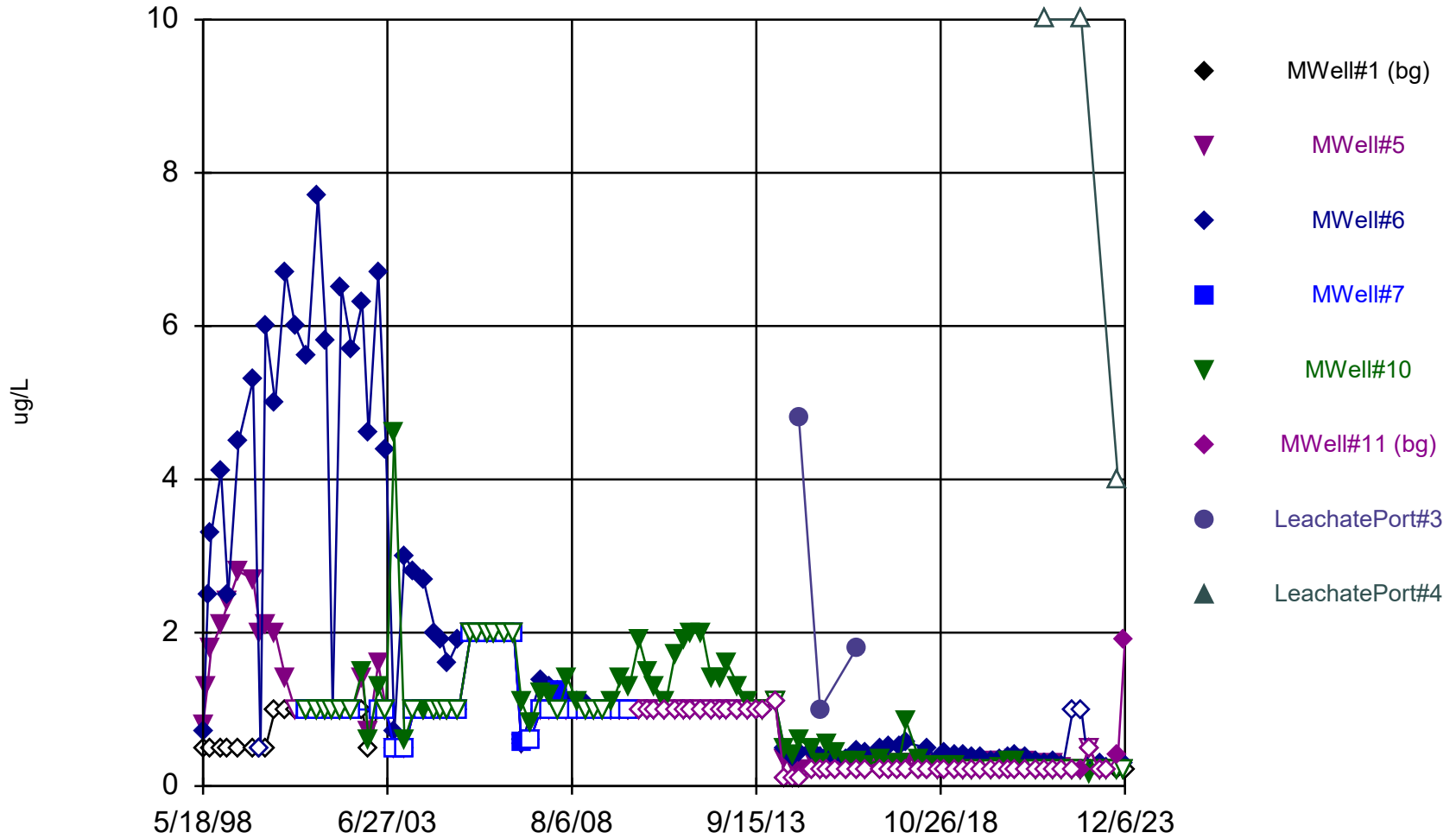
Constituent: Arsenic, Total Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Barium, Total Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

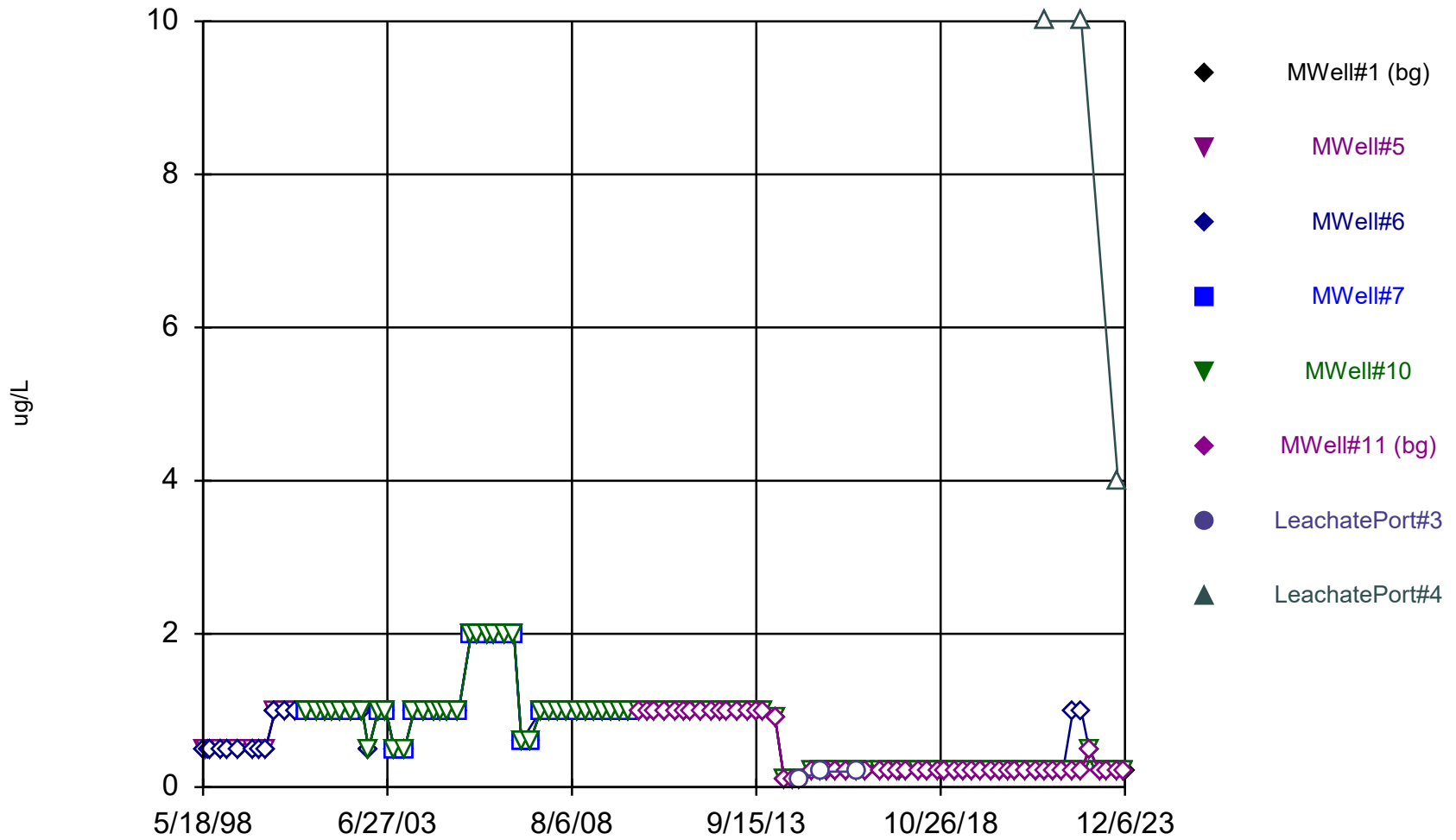
Time Series



Constituent: Benzene Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2

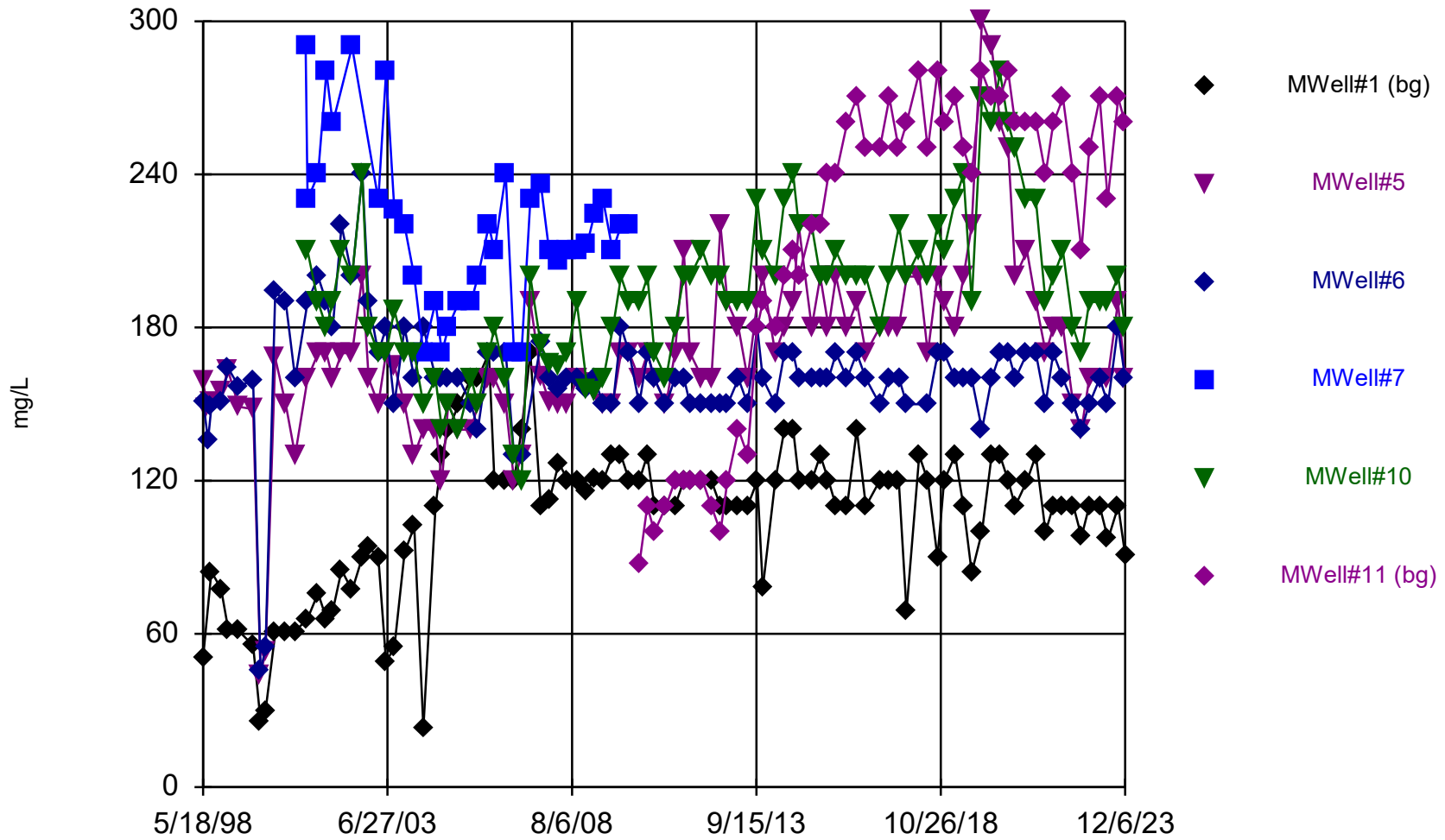
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



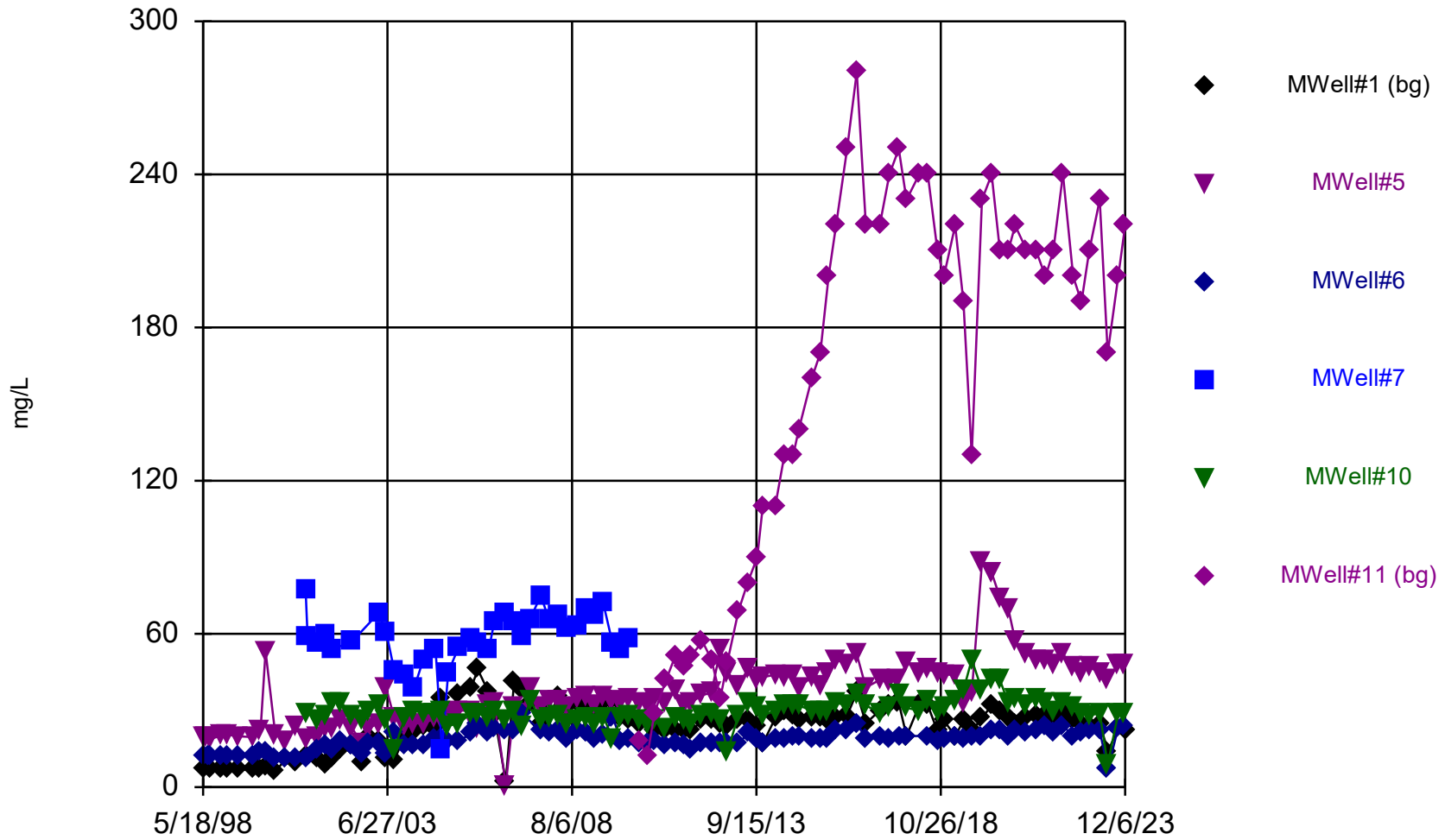
Constituent: Bromodichloromethane Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Calcium, Dissolved Analysis Run 3/7/2024 11:00 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

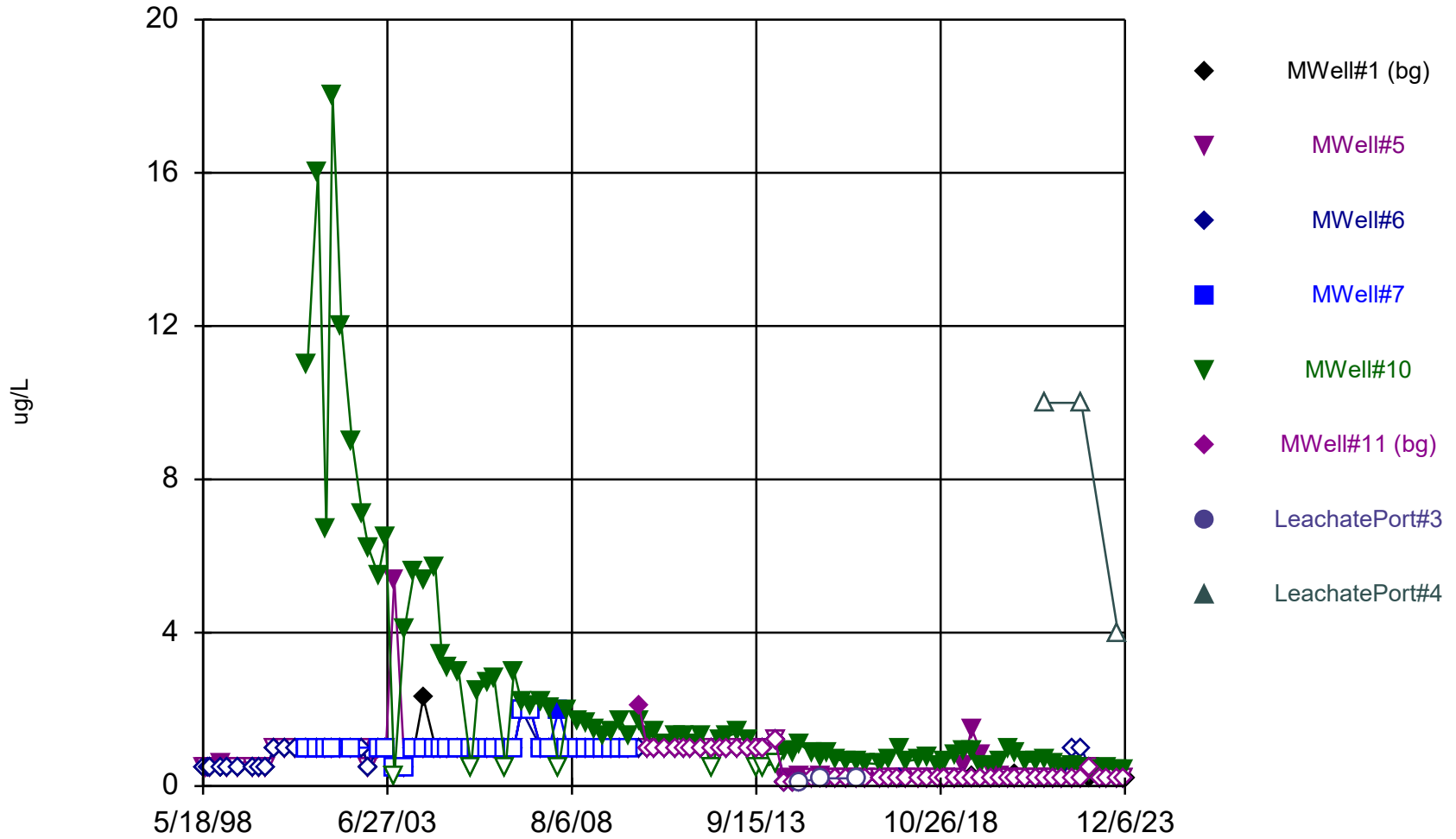
Time Series



Constituent: Chloride Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

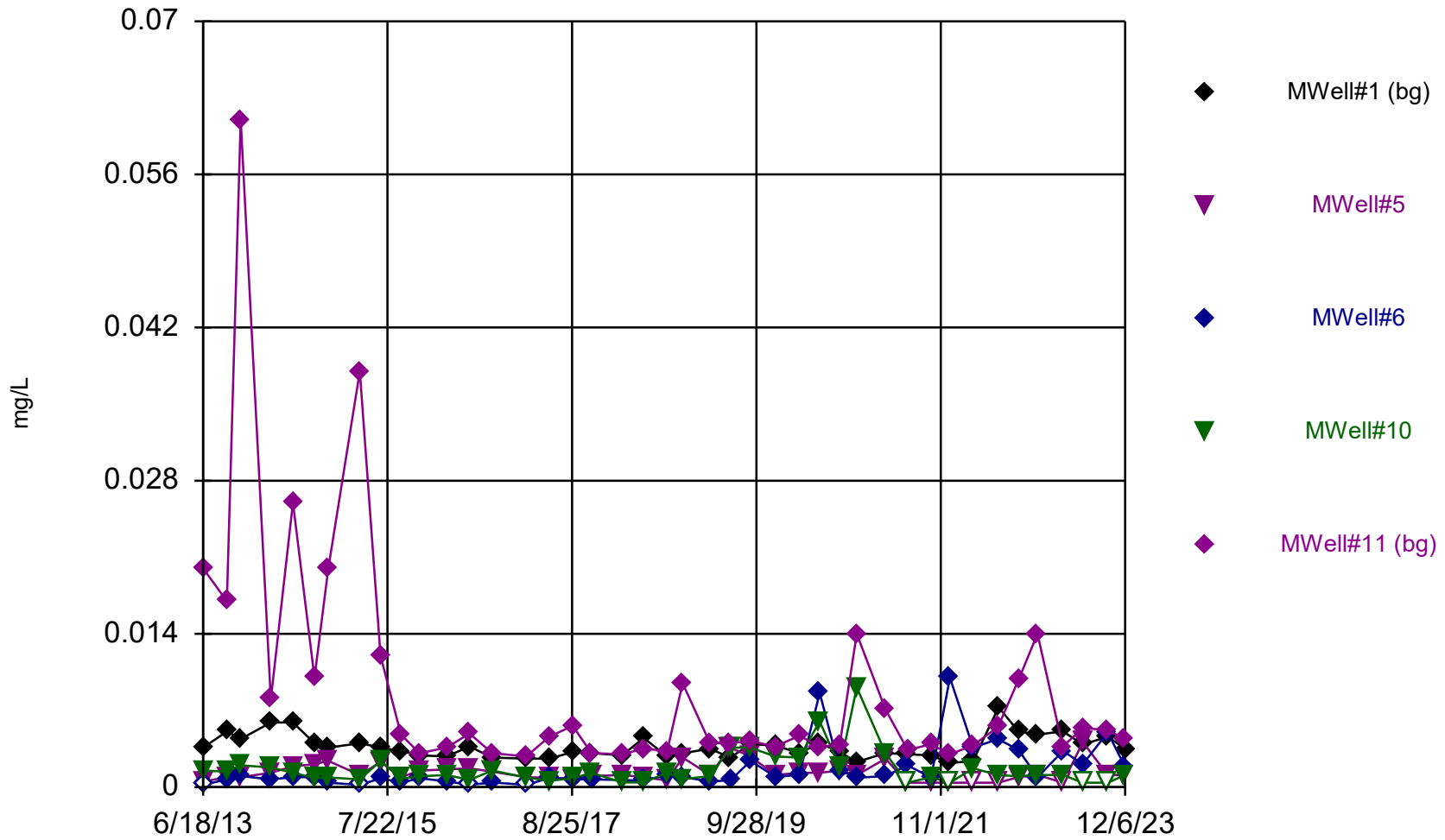
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



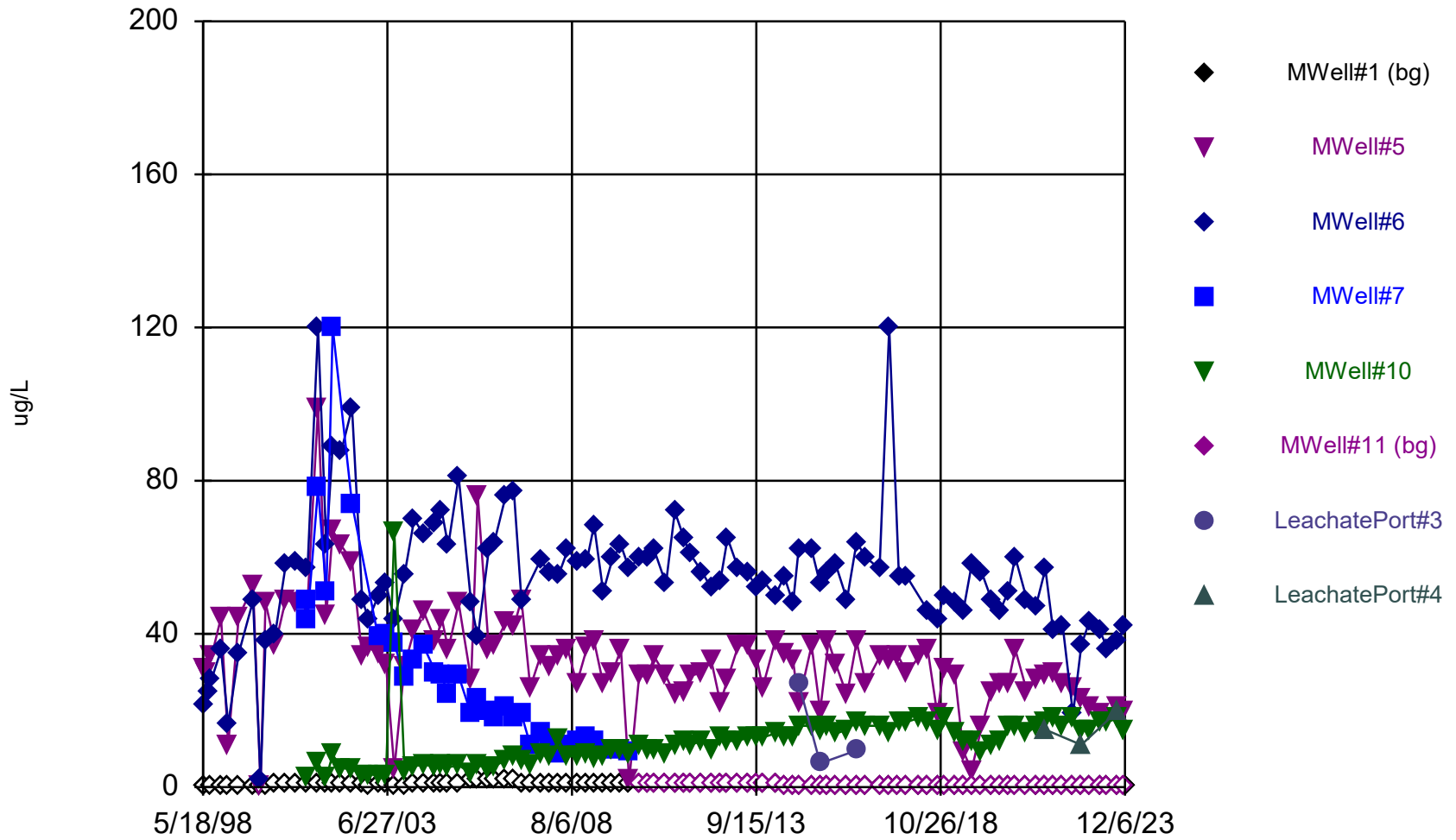
Constituent: Chloroform Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



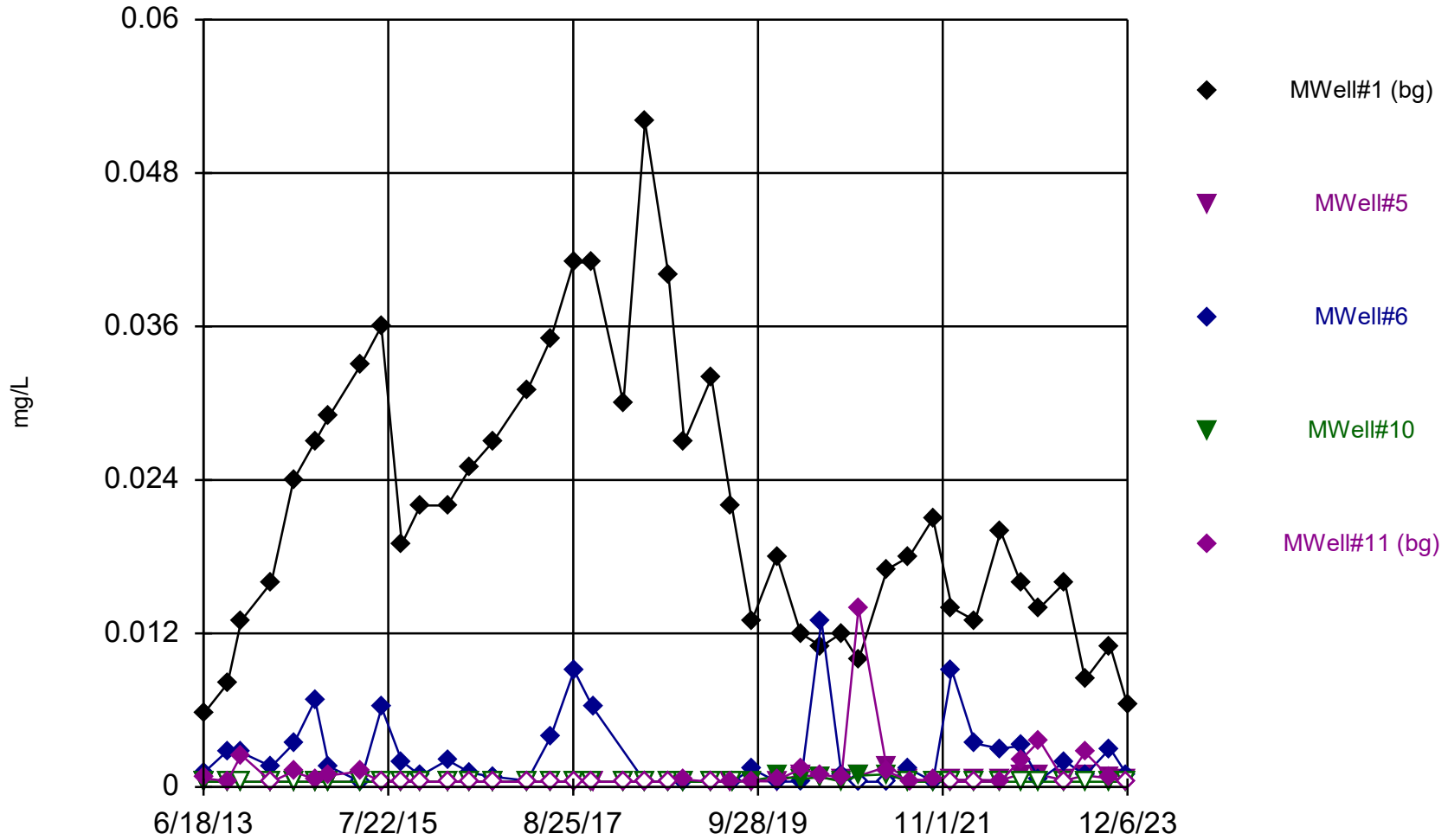
Constituent: Chromium, Total Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



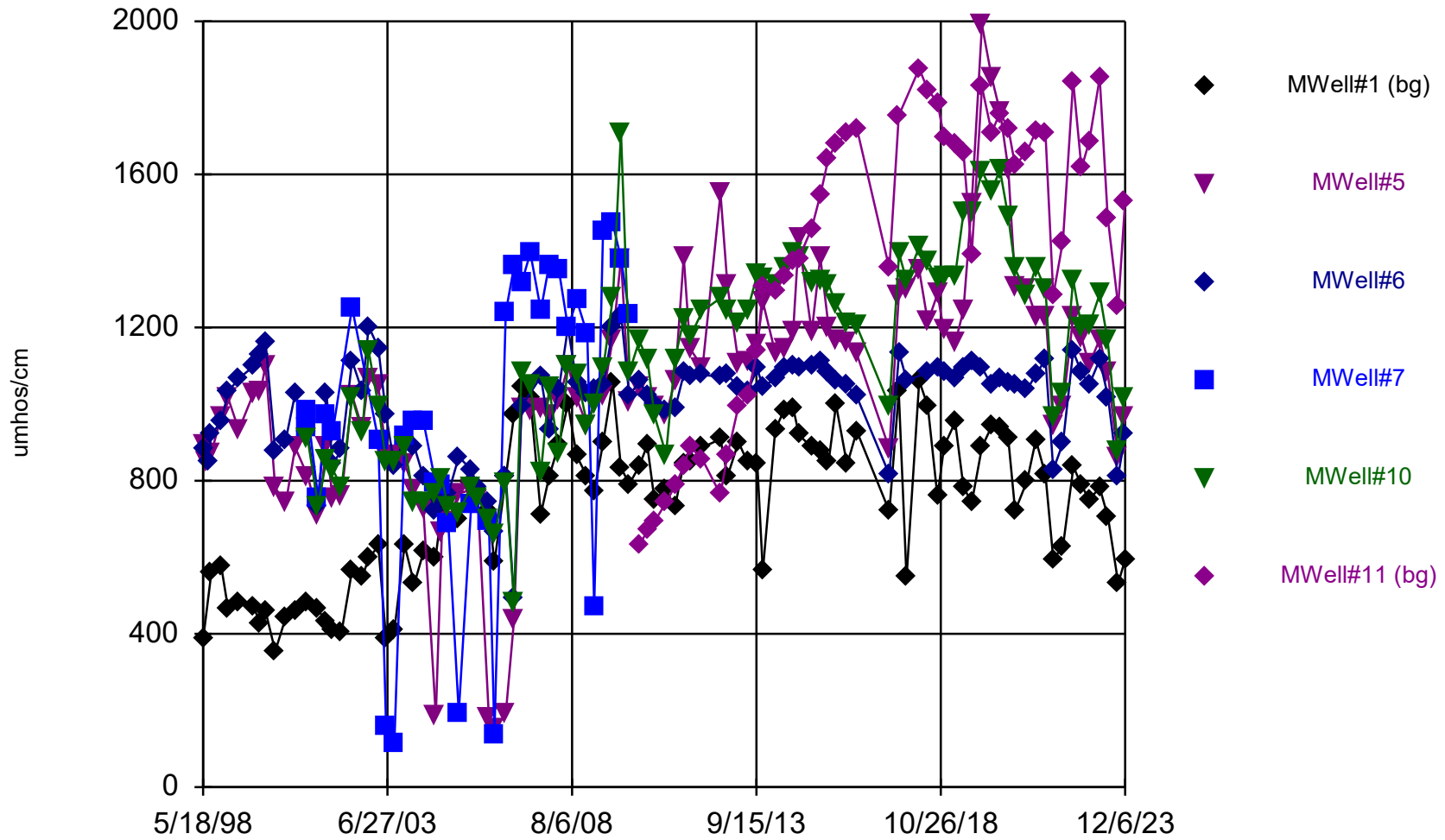
Constituent: cis-1,2-Dichloroethene Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Cobalt, Total Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

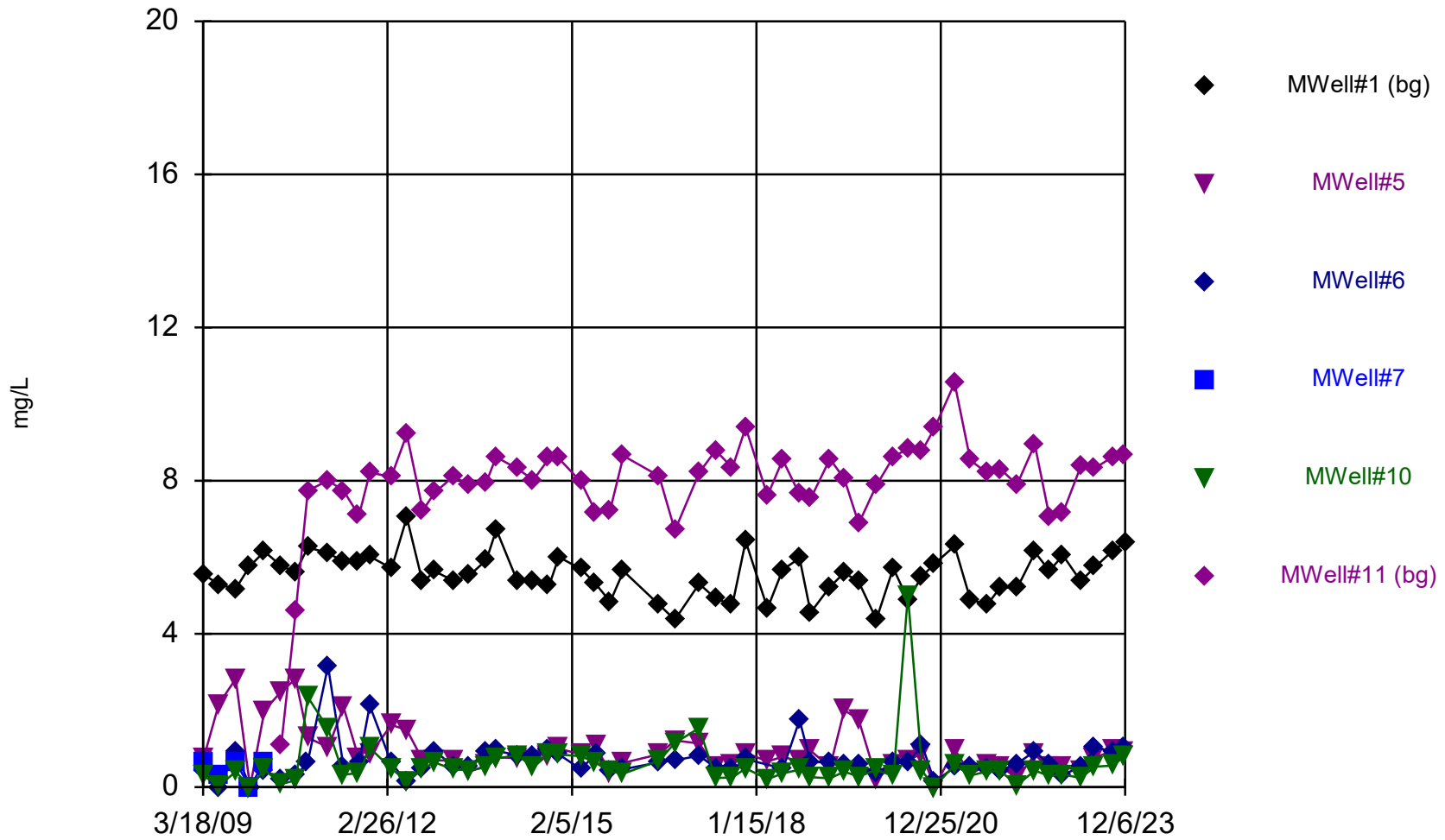
Time Series



Constituent: Conductivity Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

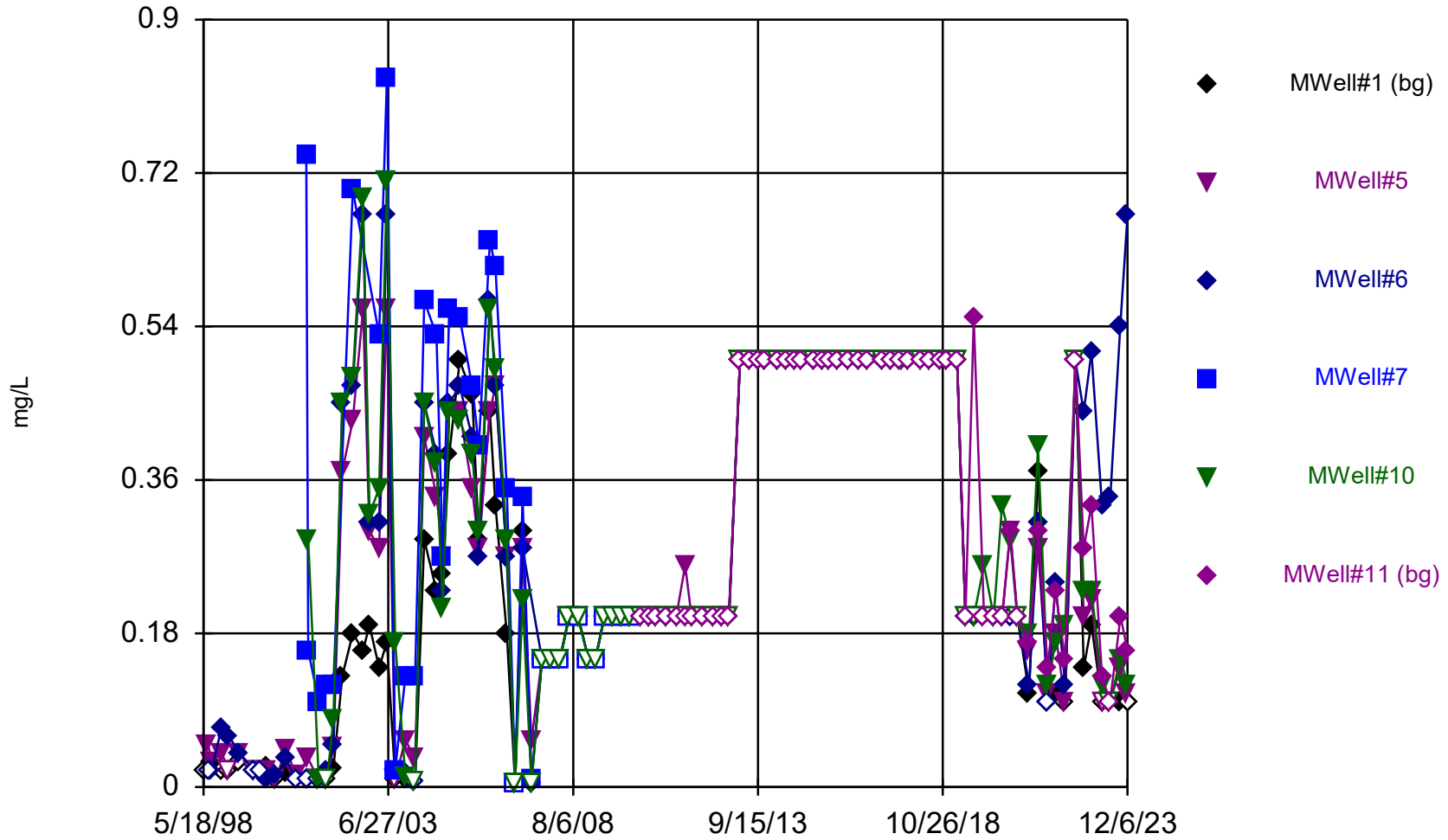
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Dissolved Oxygen Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

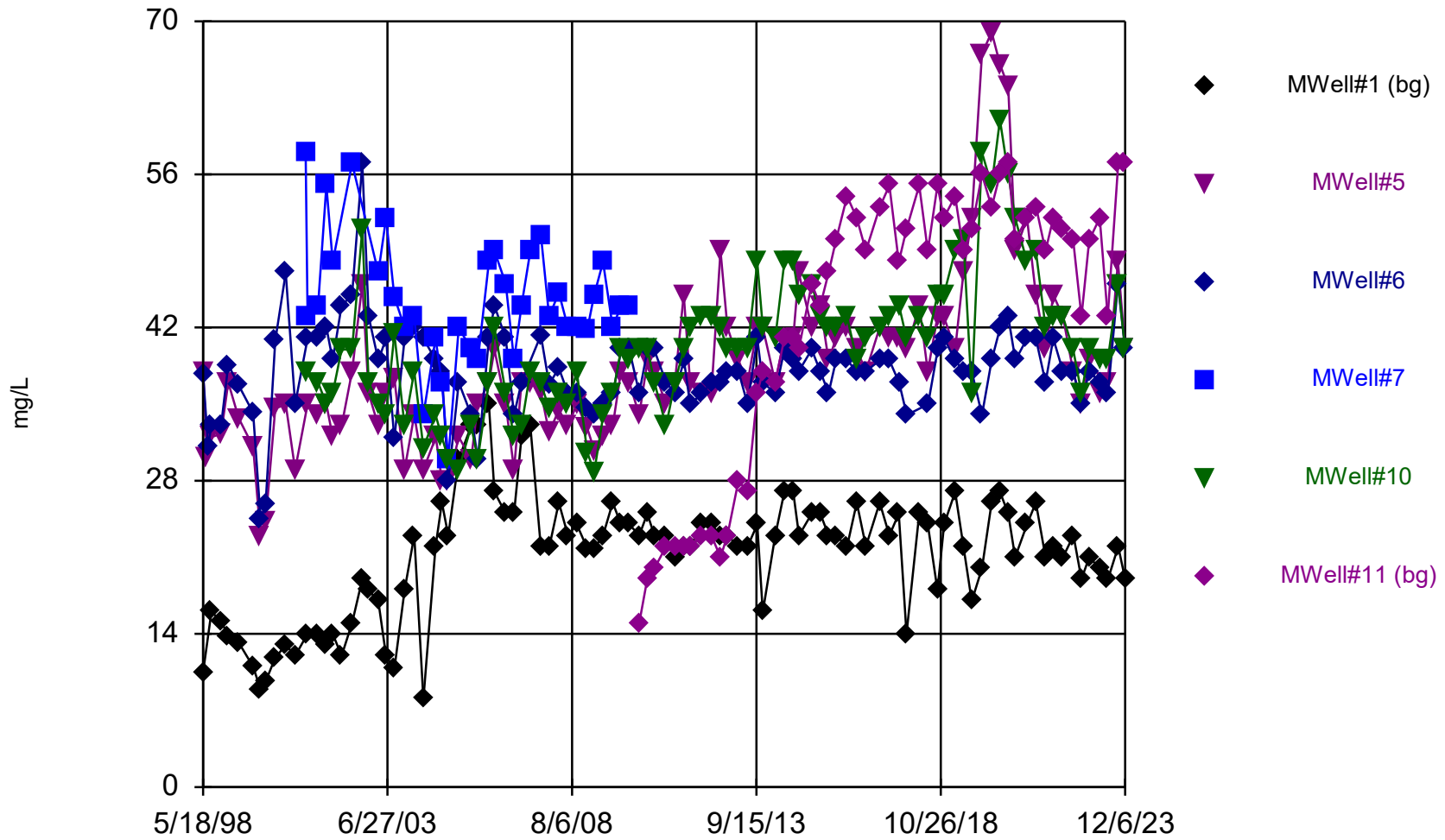
Time Series



Constituent: Iron, Dissolved Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

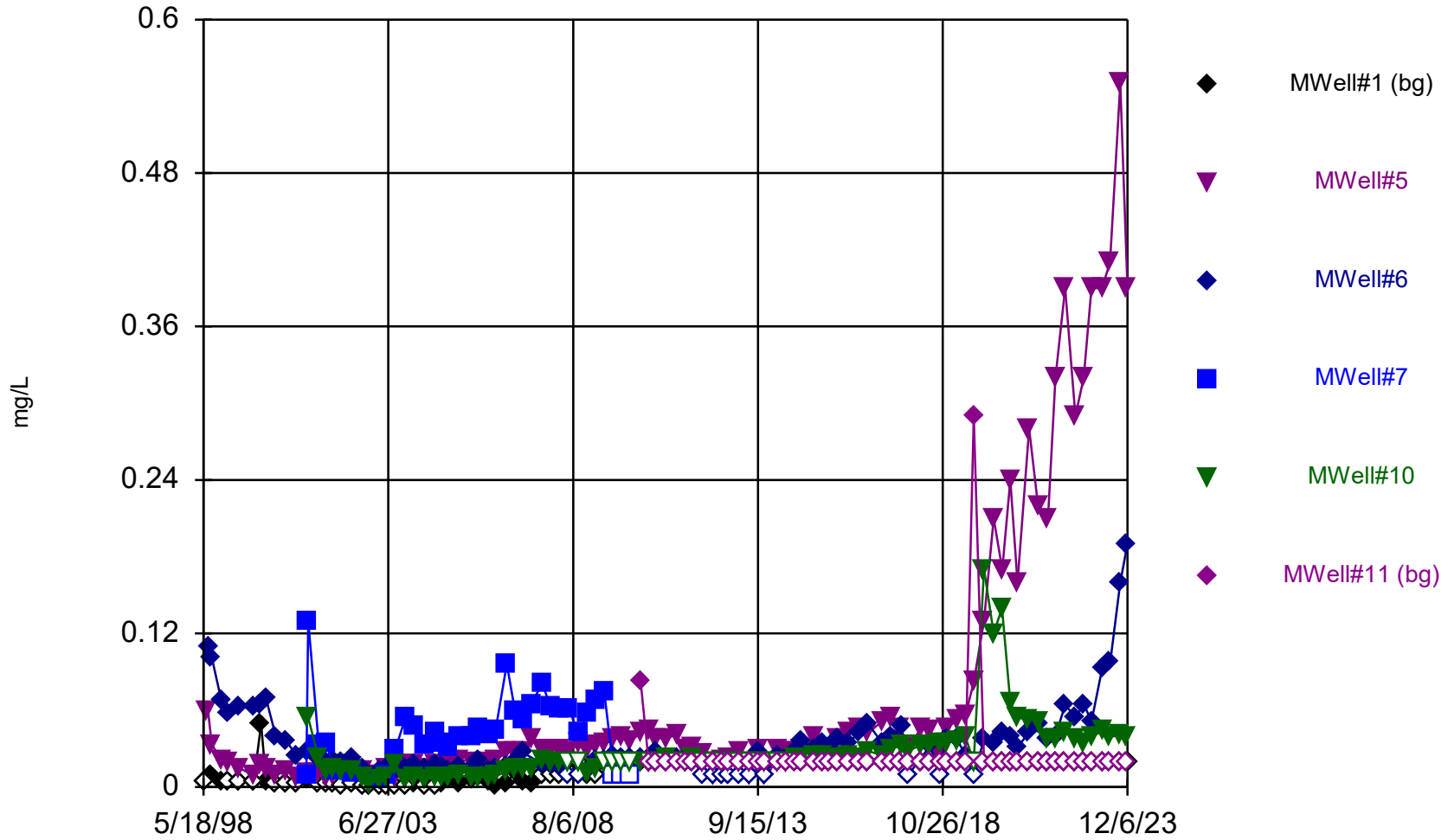
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



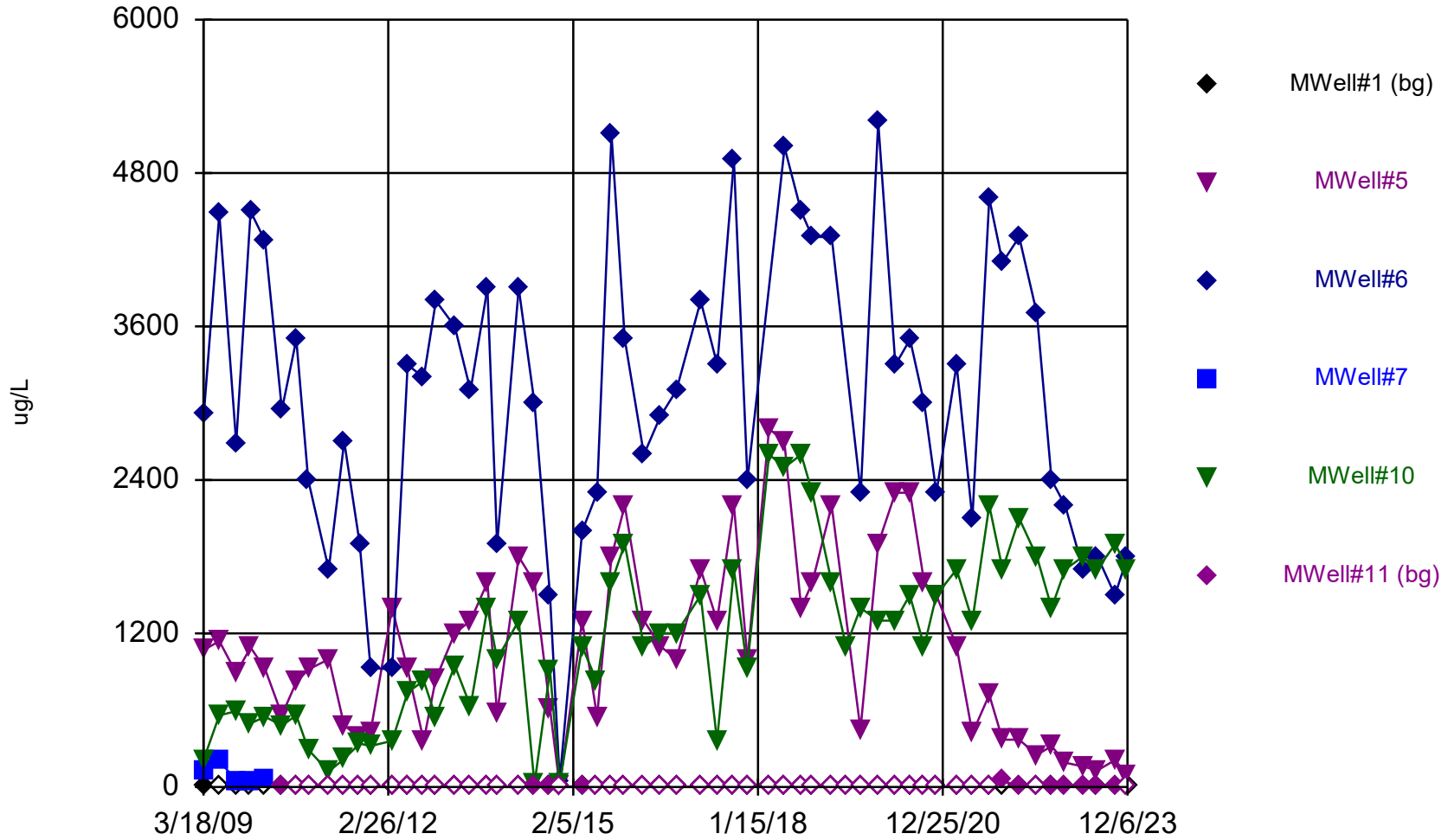
Constituent: Magnesium, Dissolved Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



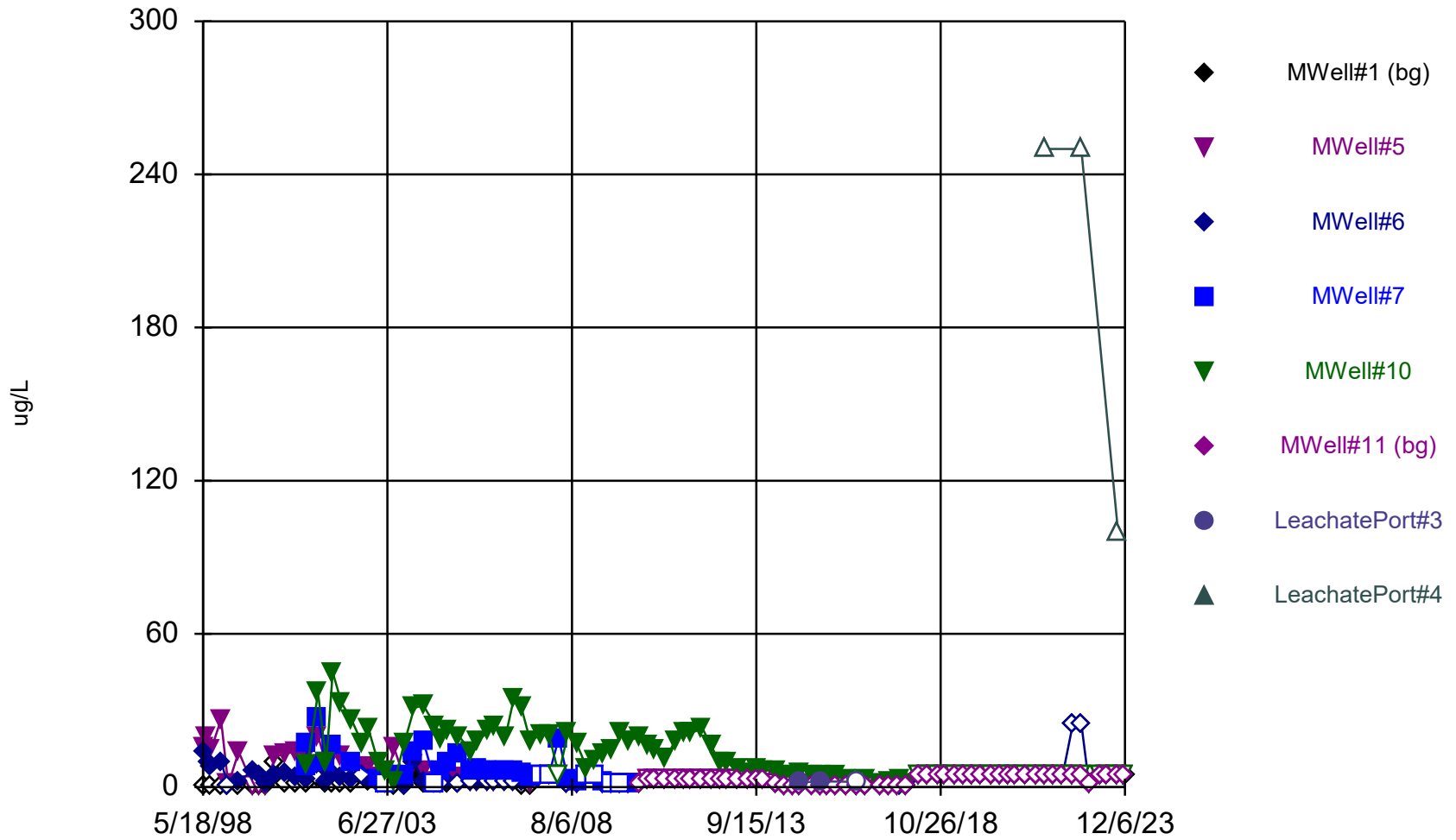
Constituent: Manganese, Dissolved Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



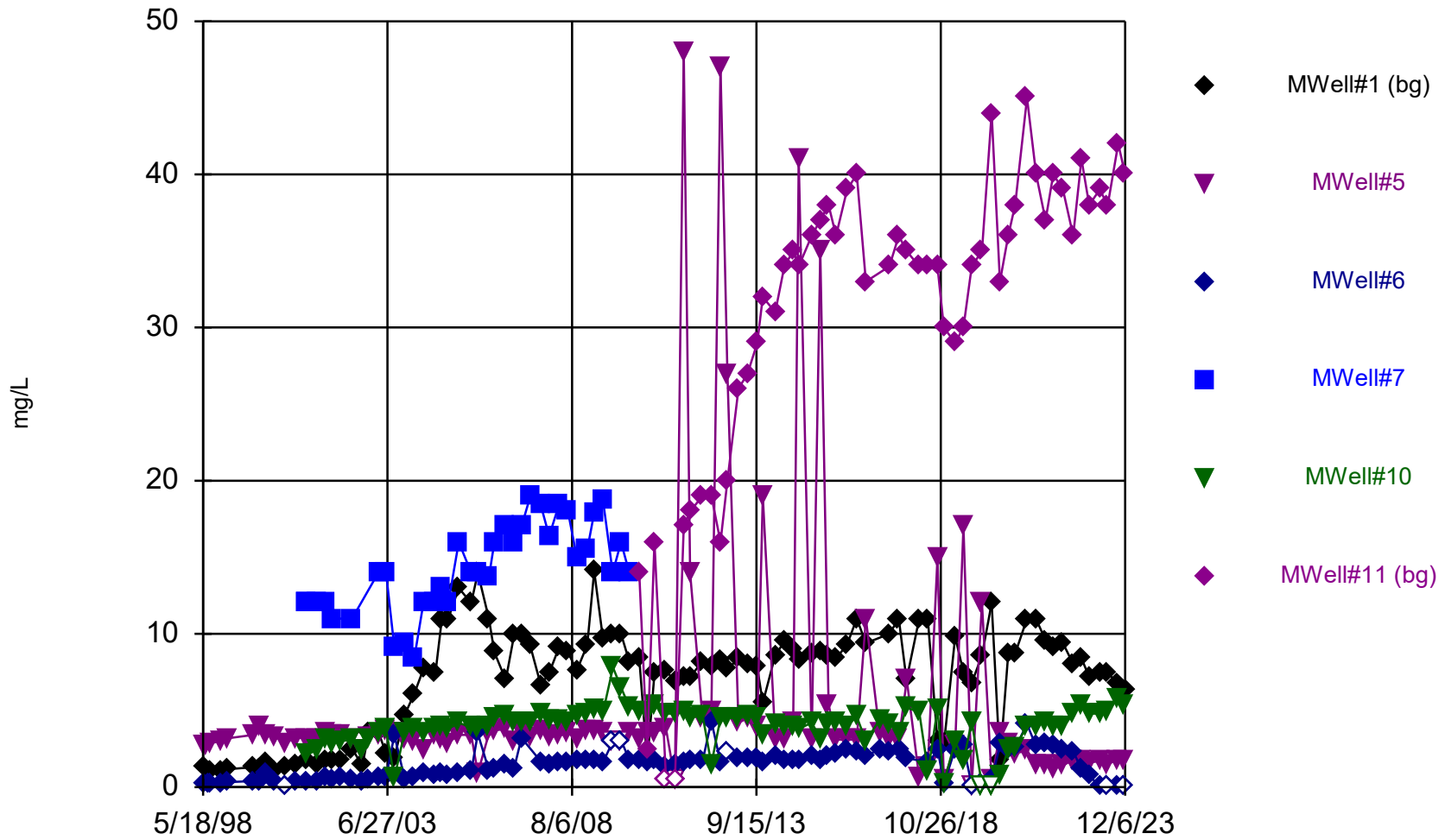
Constituent: Methane Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



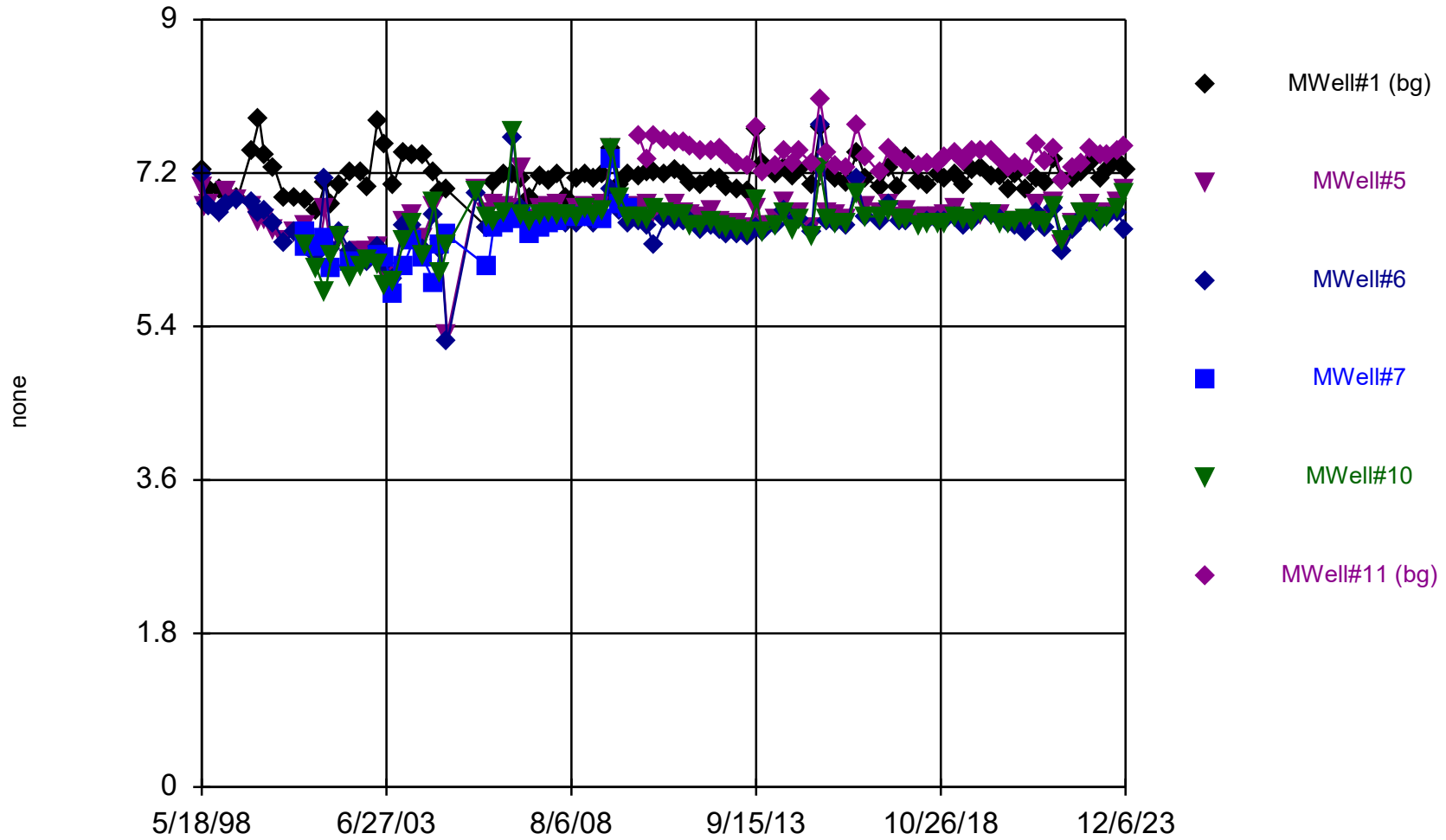
Constituent: Methylene Chloride Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



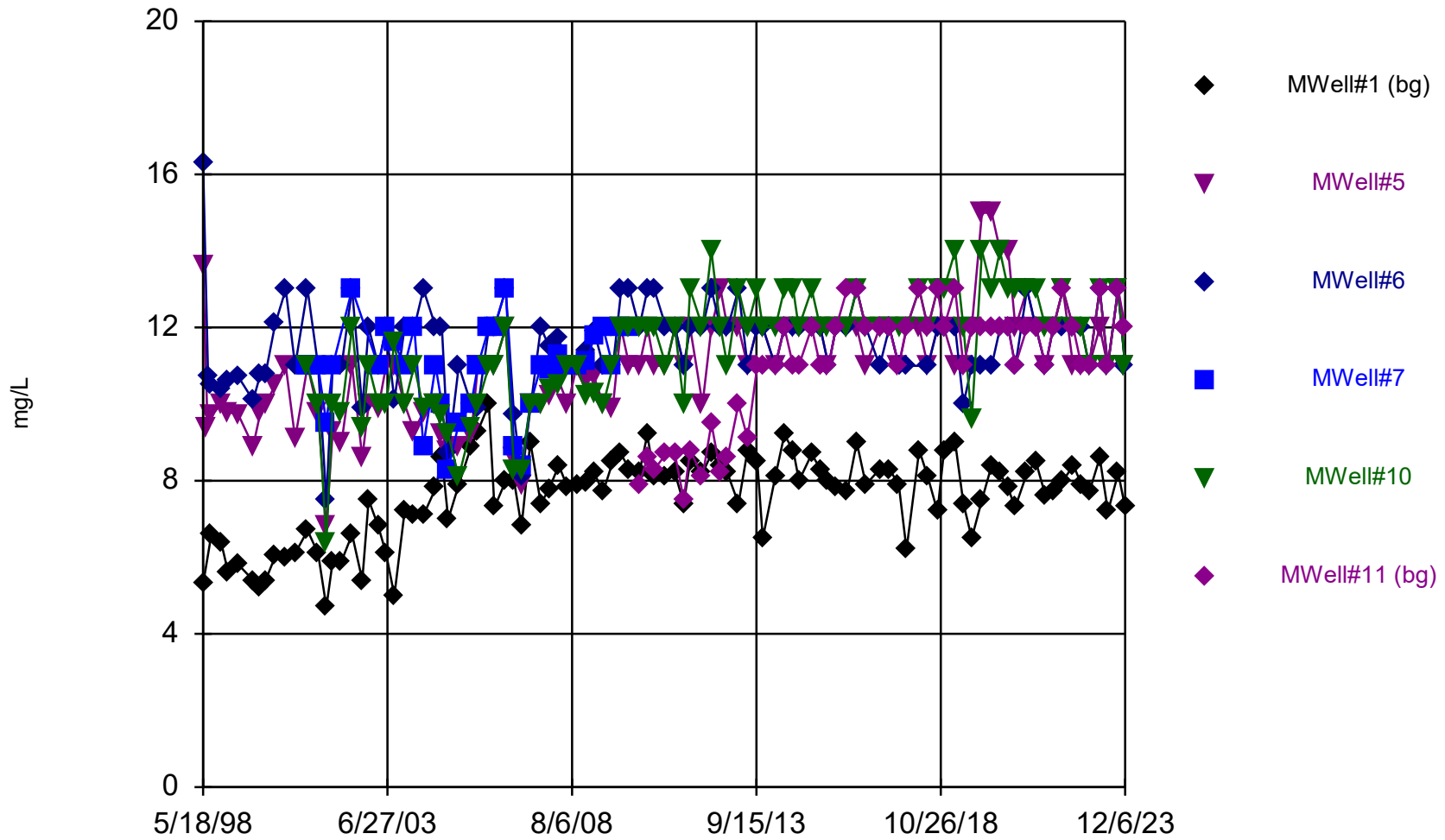
Constituent: Nitrate Nitrogen Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



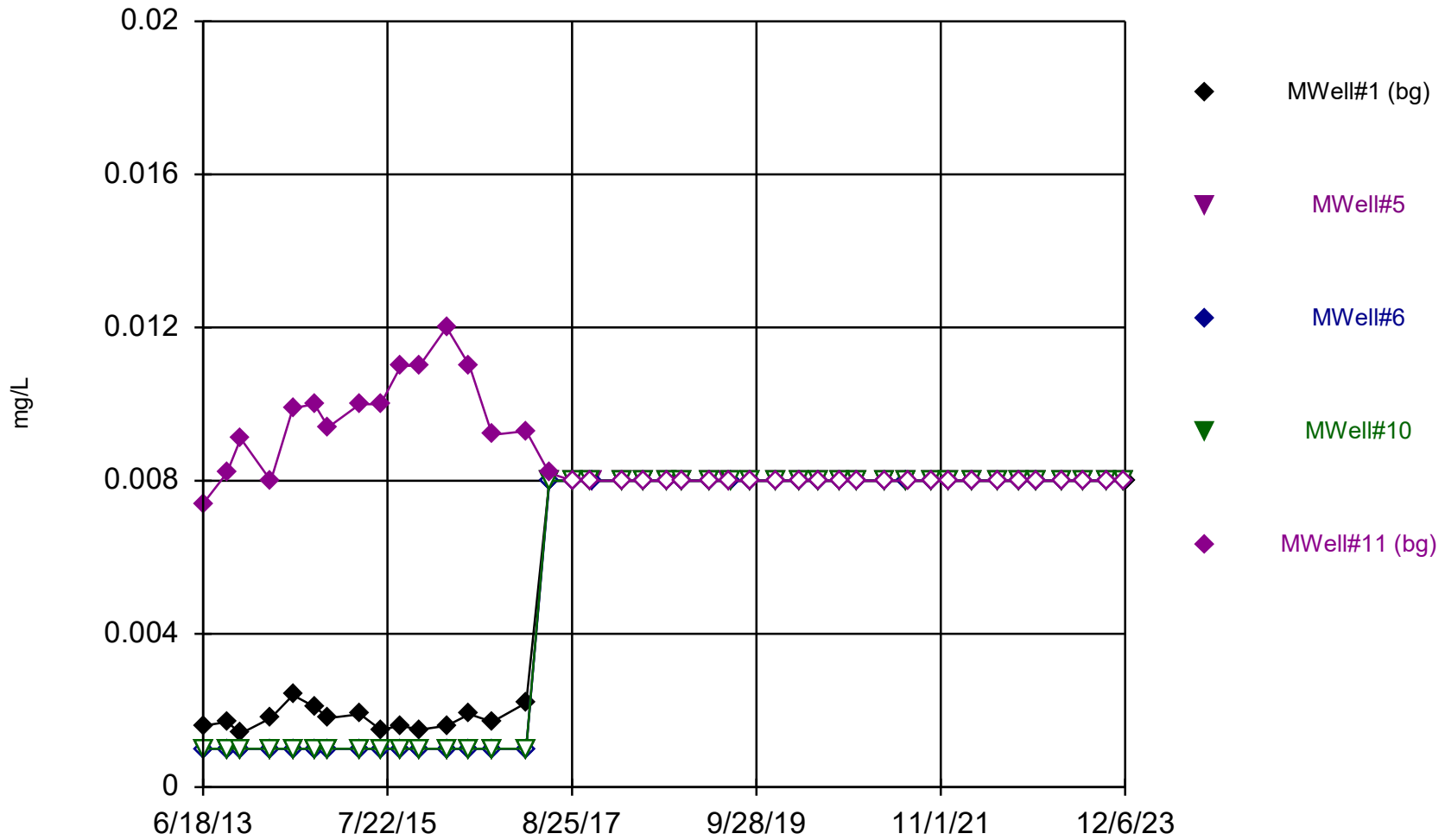
Constituent: pH Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Potassium, Dissolved Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

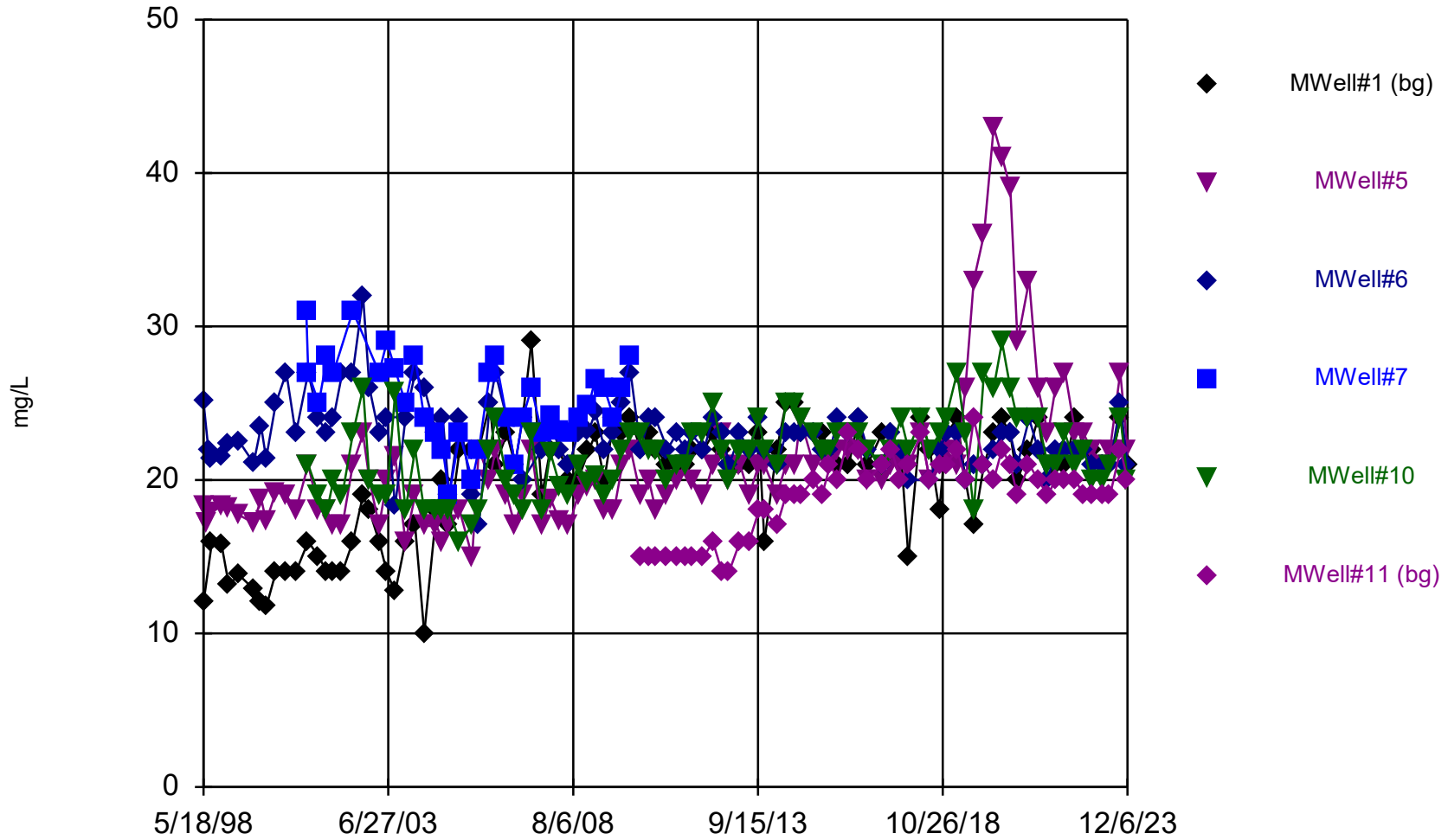
Time Series



Constituent: Selenium, Total Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

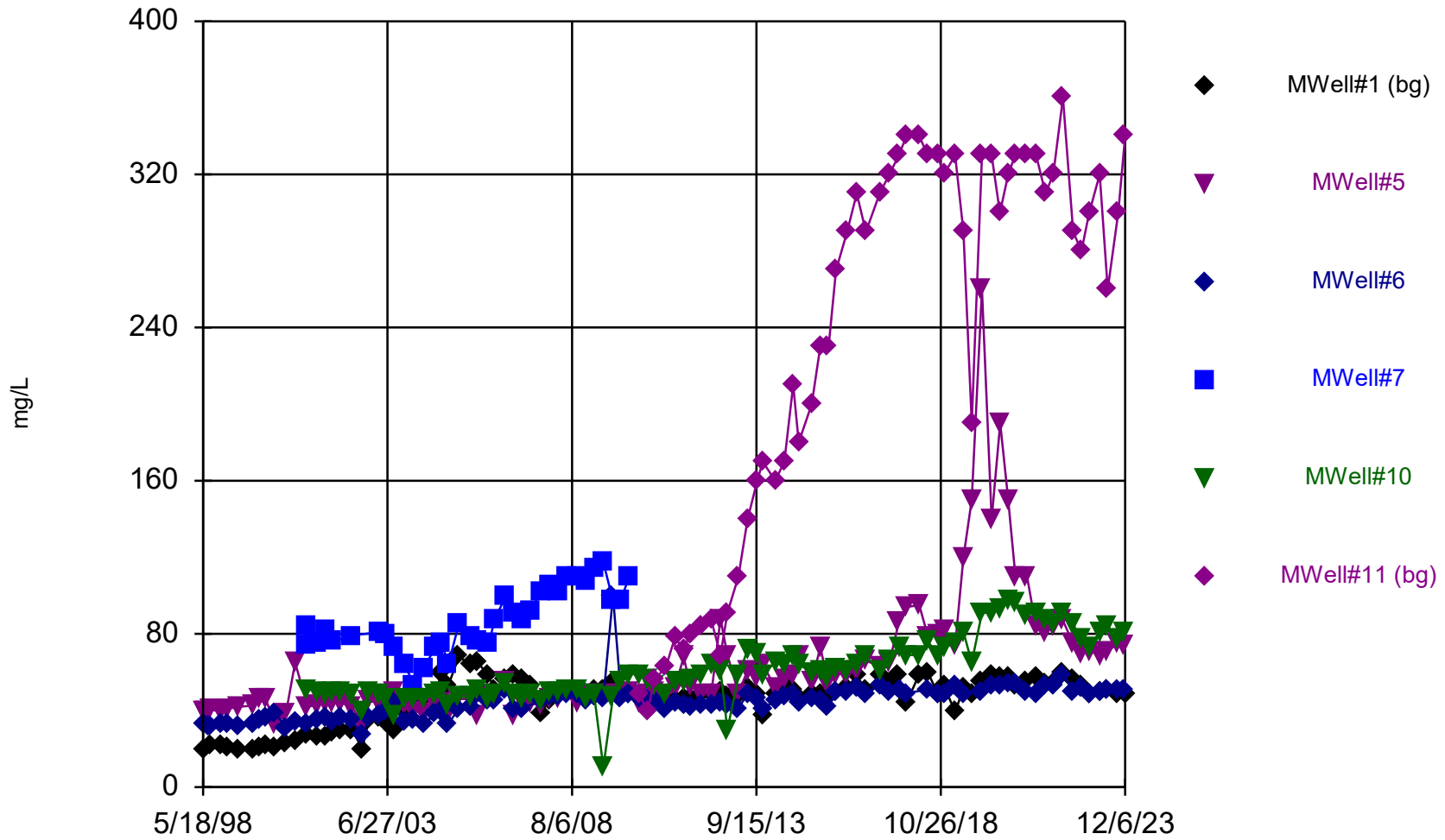
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Sodium, Dissolved Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

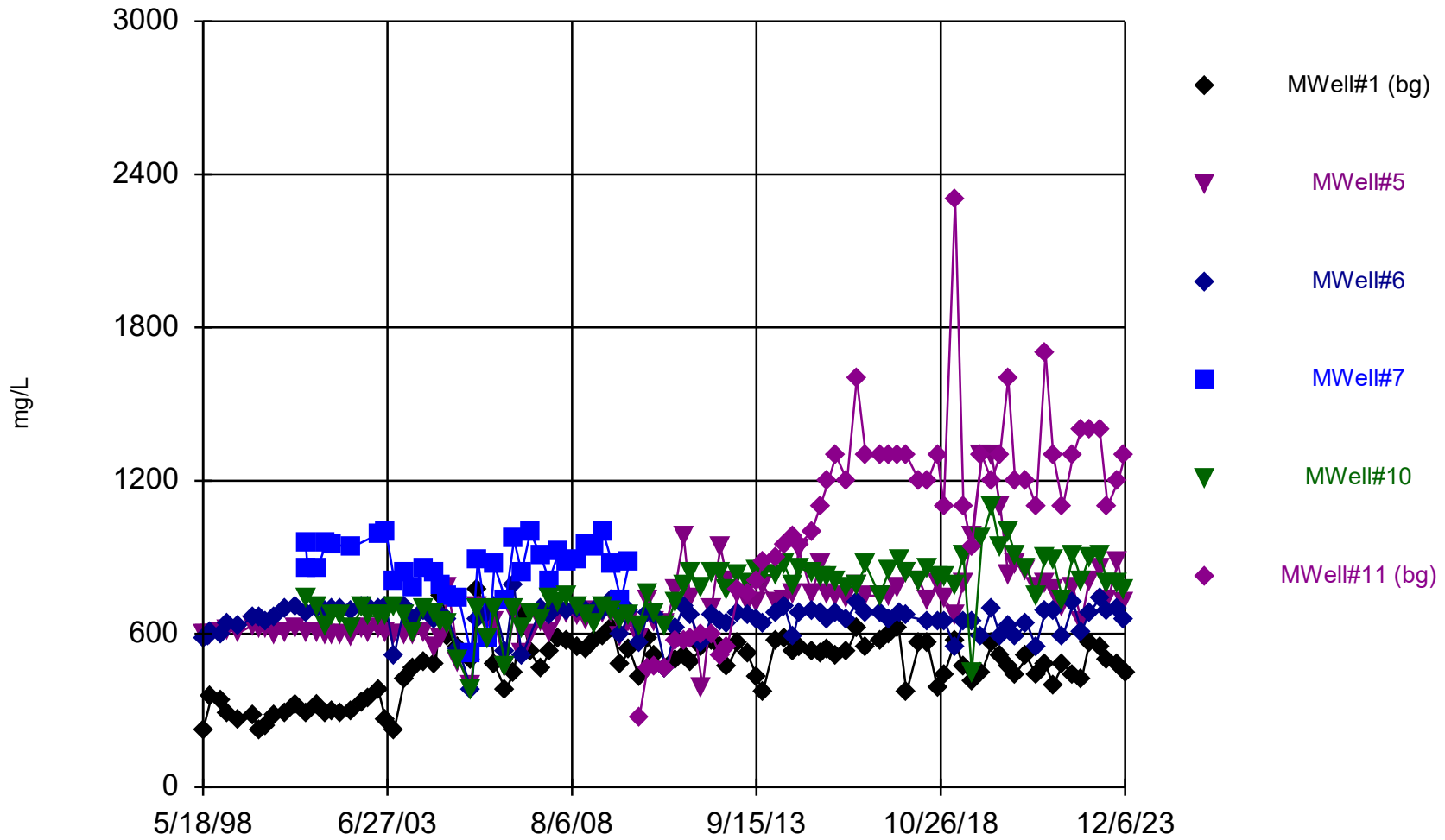
Time Series



Constituent: Sulfate Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

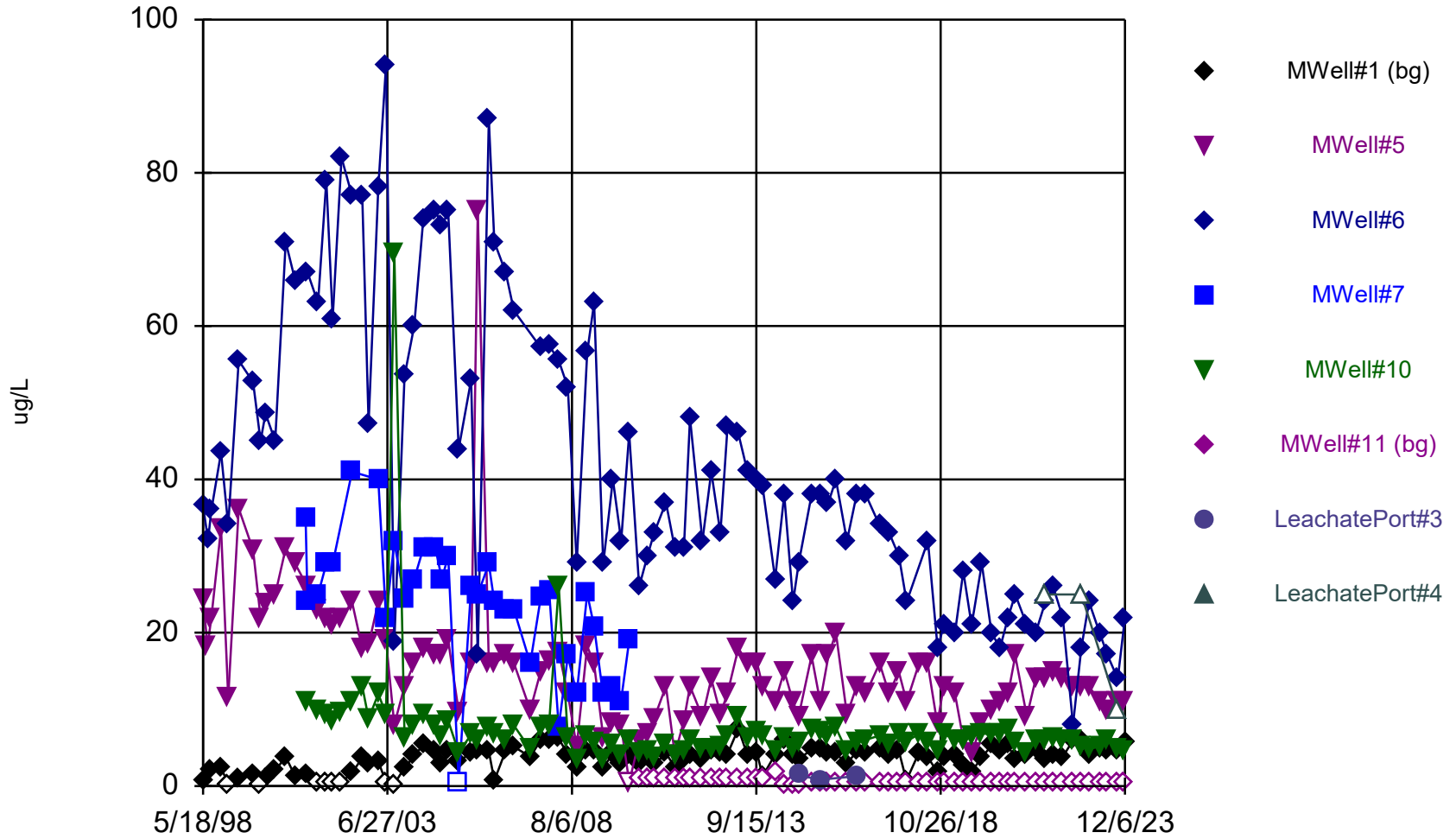
Time Series



Constituent: TDS Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

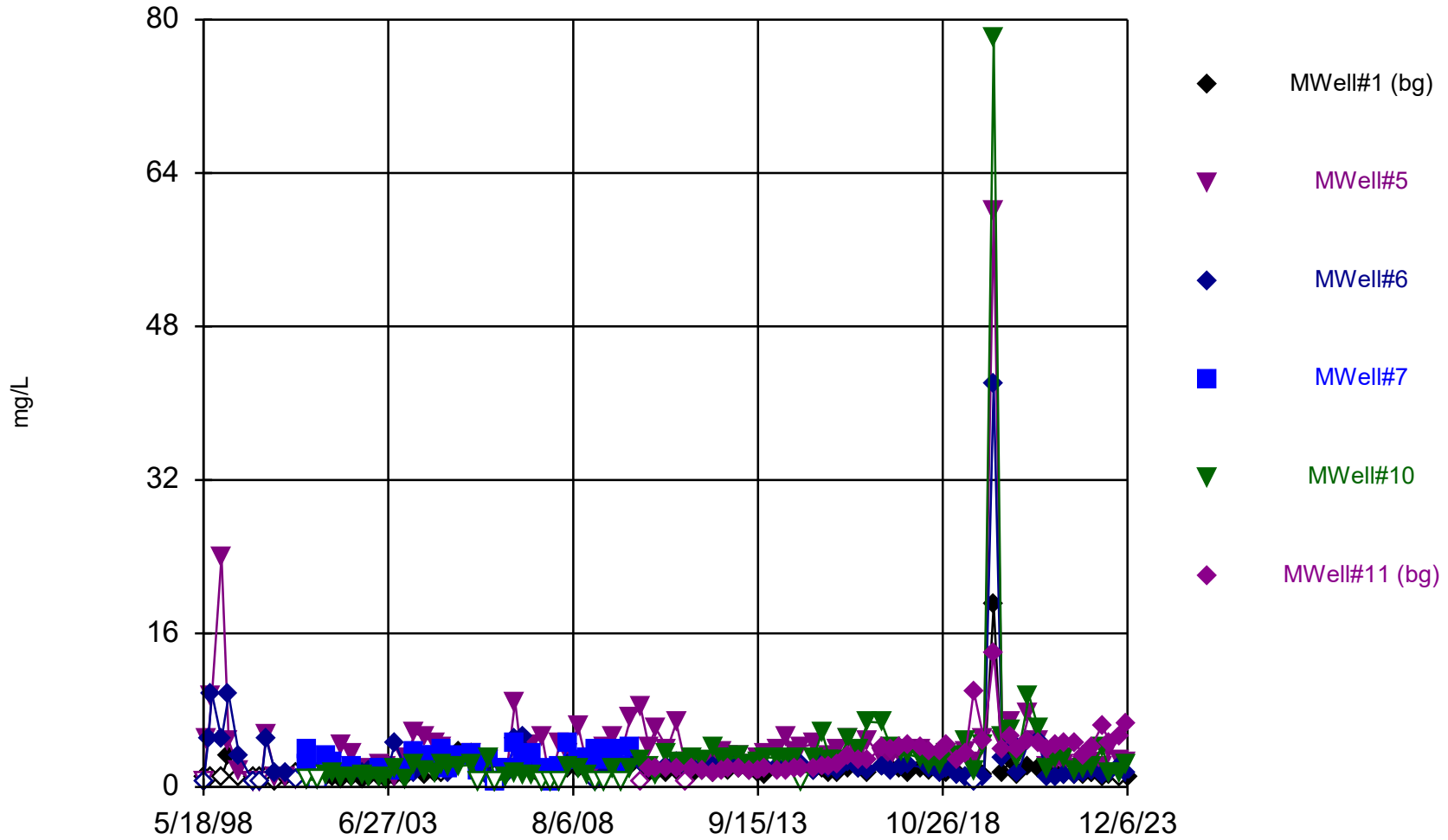
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



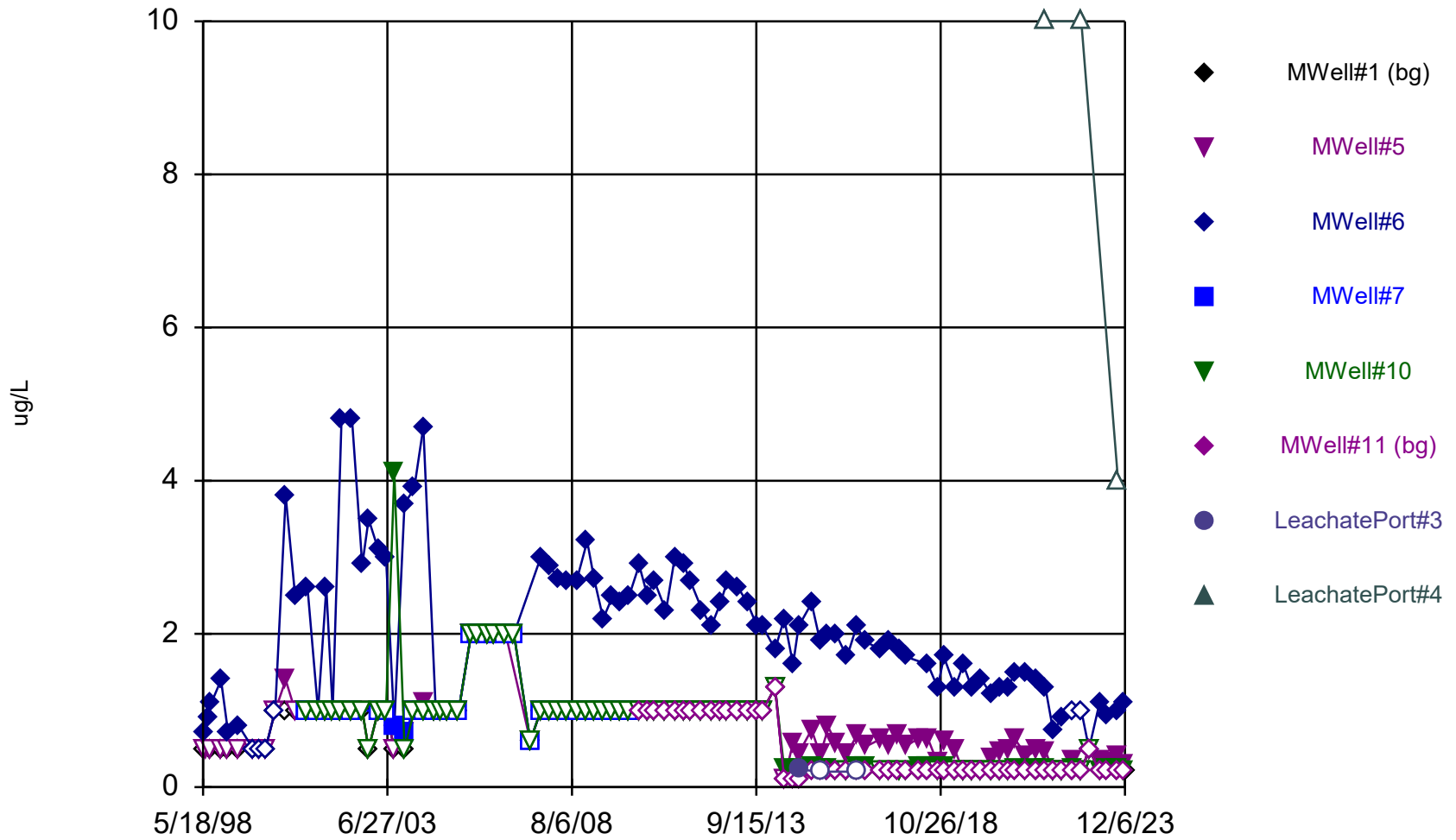
Constituent: Tetrachloroethene Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



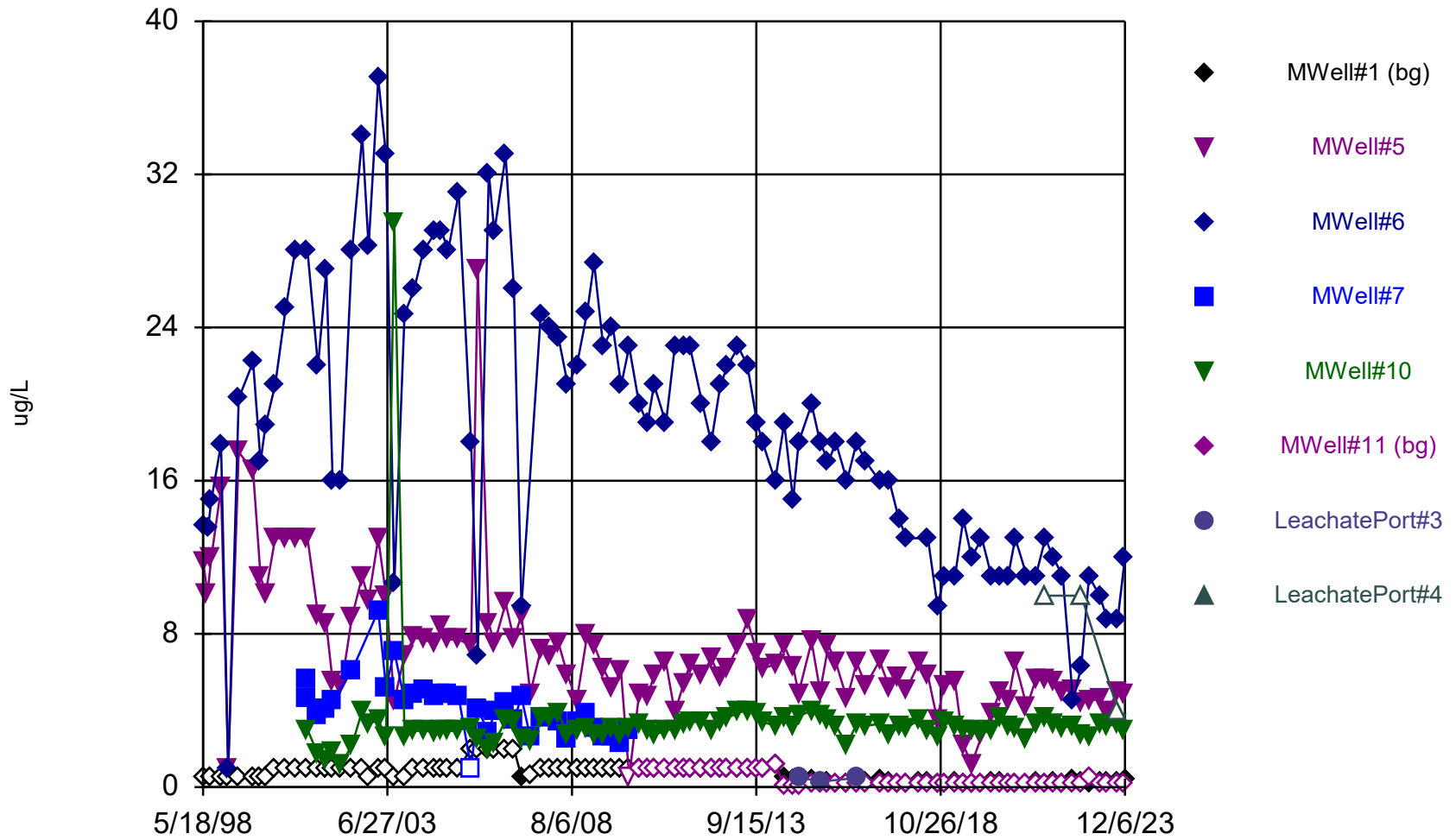
Constituent: TOC Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



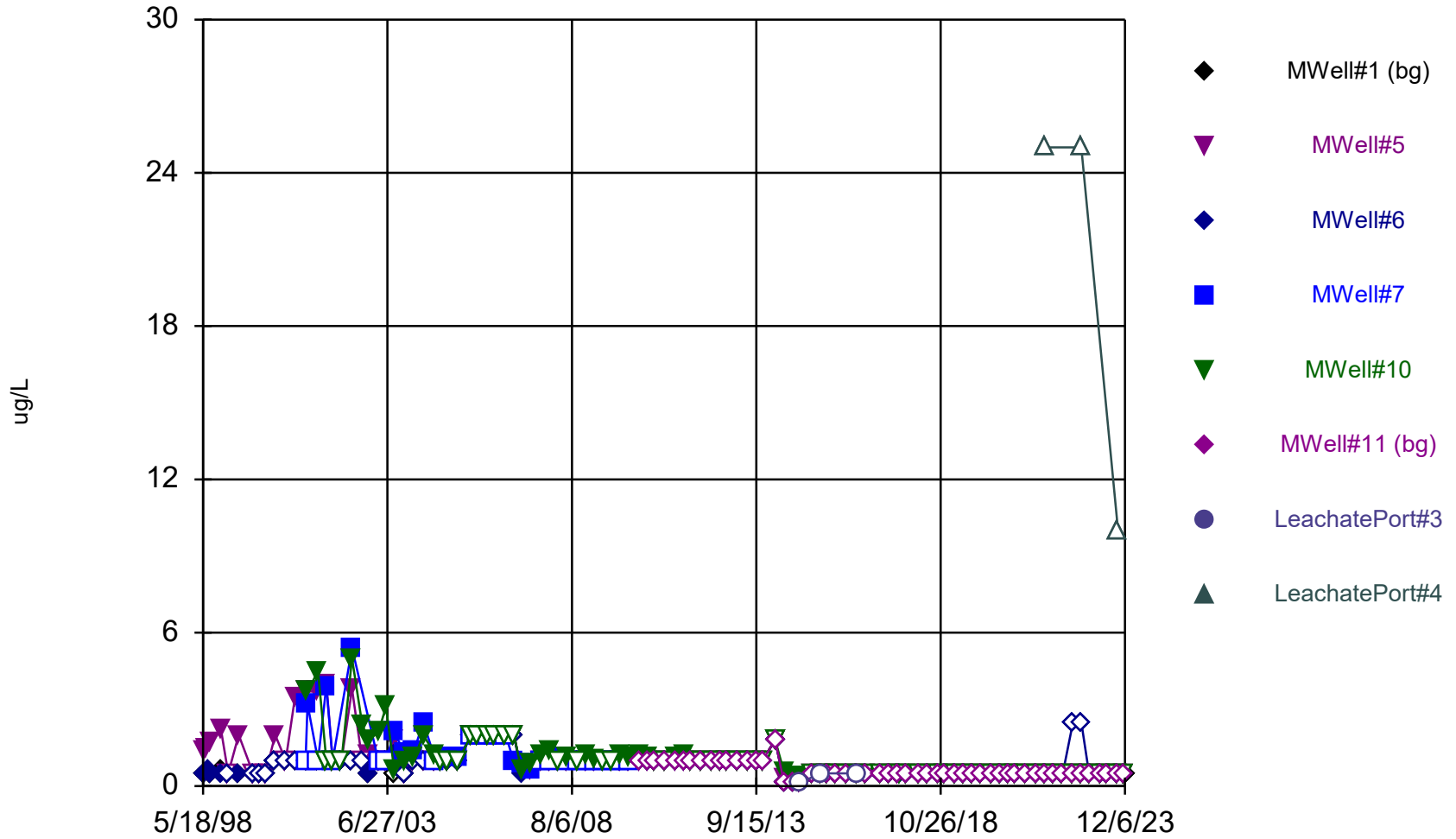
Constituent: trans-1,2-Dichloroethene Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



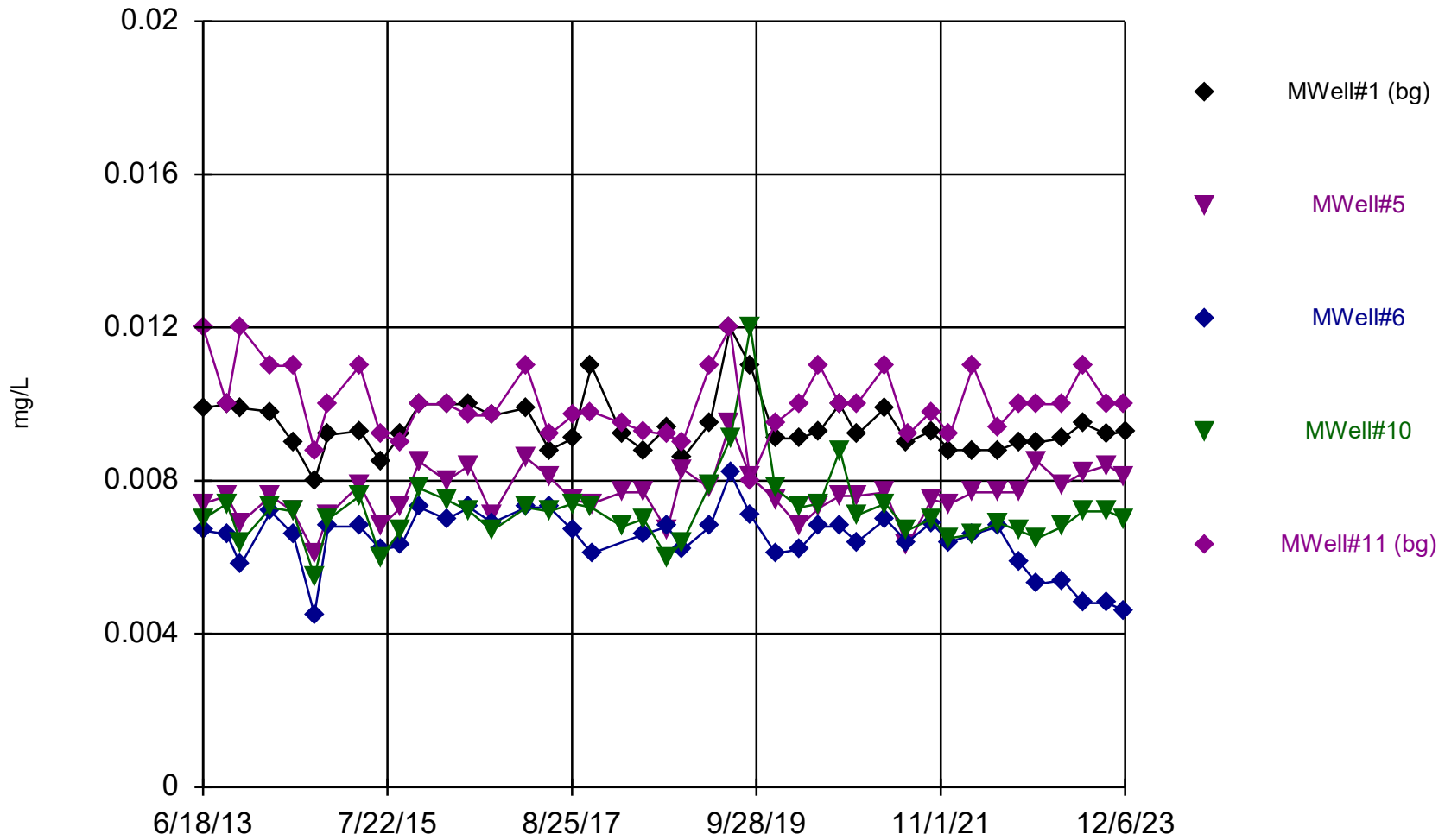
Constituent: Trichloroethene Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Trichlorofluoromethane Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

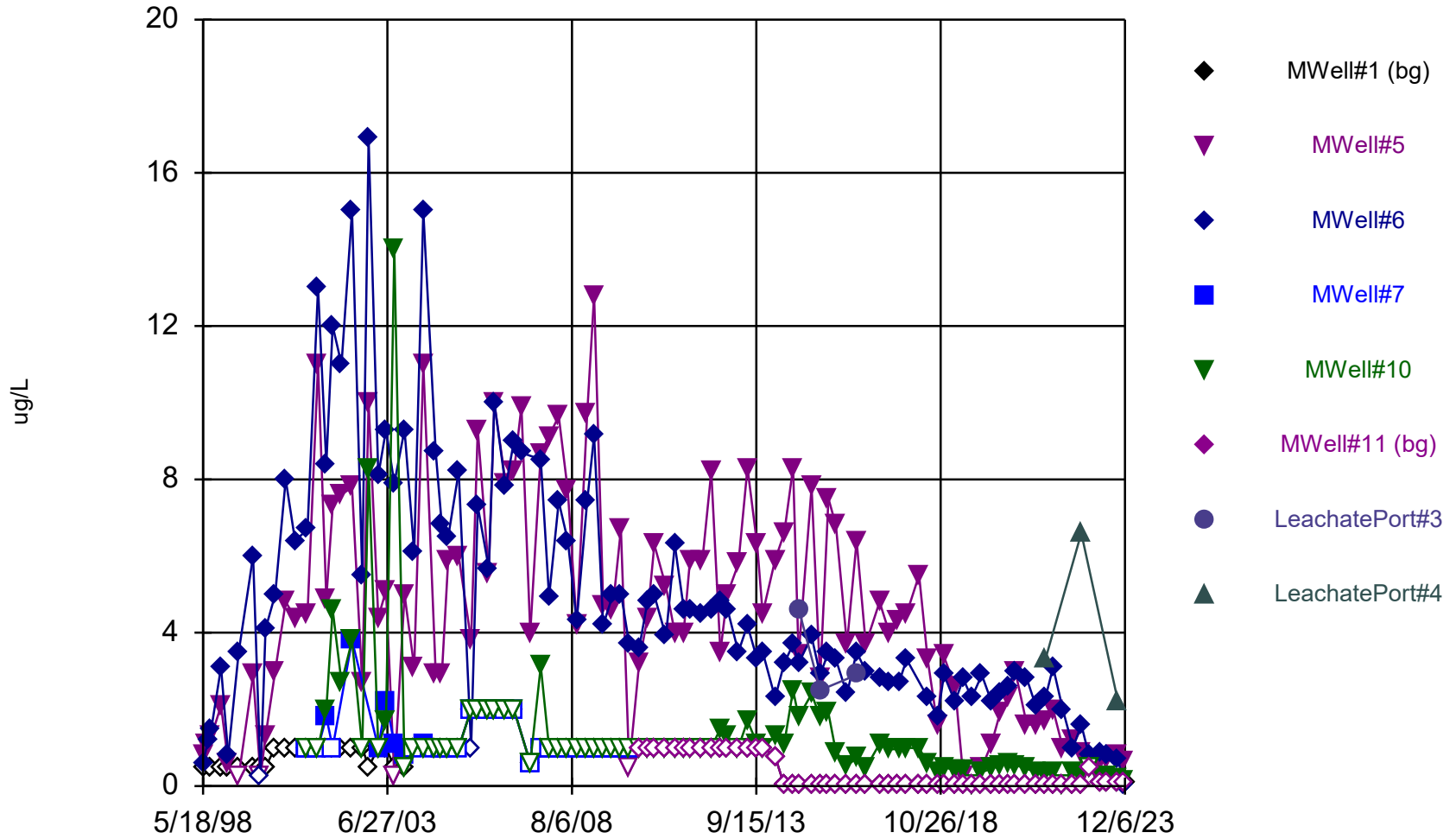
Time Series



Constituent: Vanadium, Total Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2

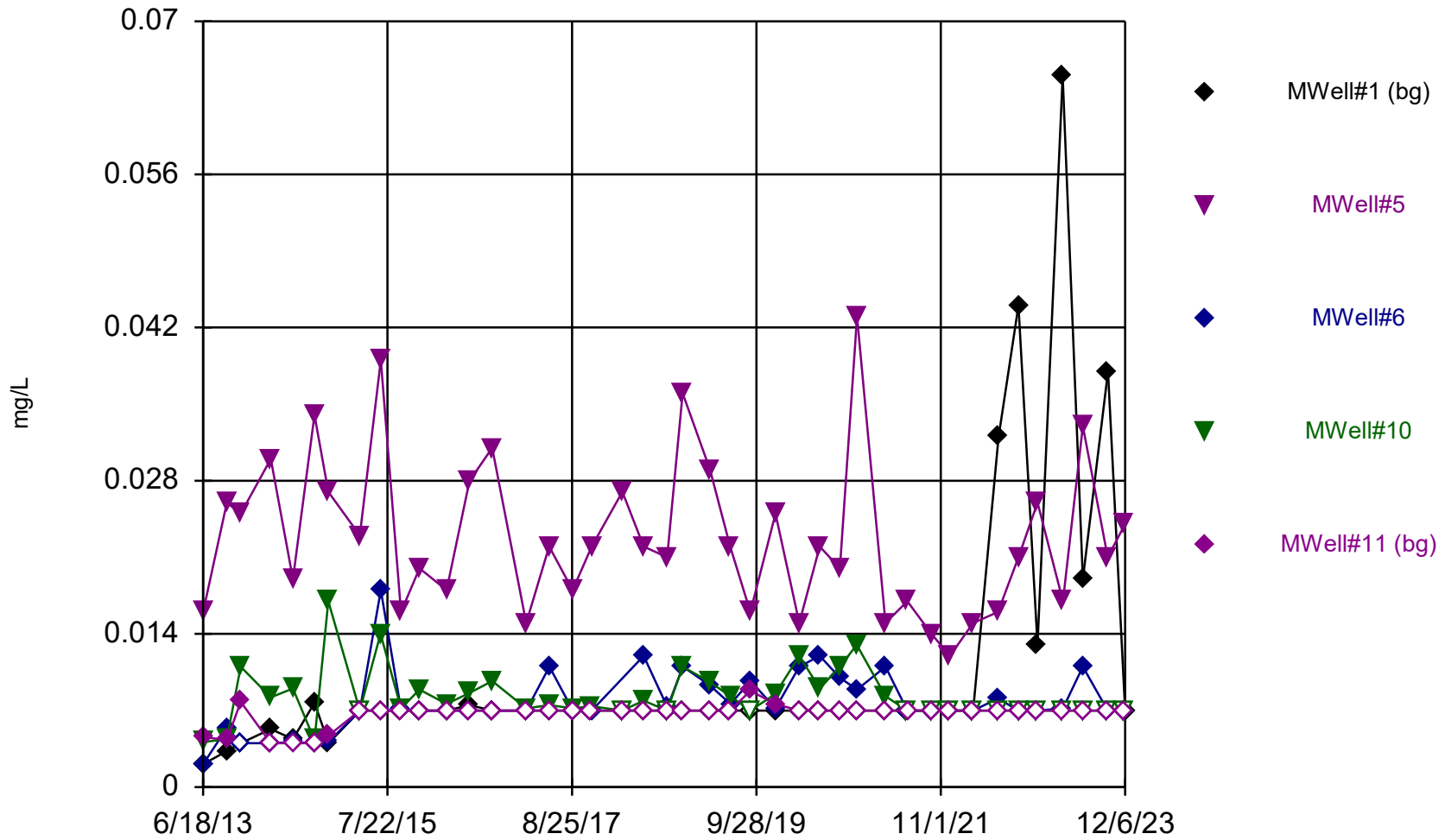
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Vinyl Chloride Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Zinc, Total Analysis Run 3/7/2024 11:01 AM View: HRLF_TSP Set2
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Appendix D

Sen's Slope/
Mann Kendall Tests

D-1

10-Year Trends

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2014 through Fourth Quarter 2023

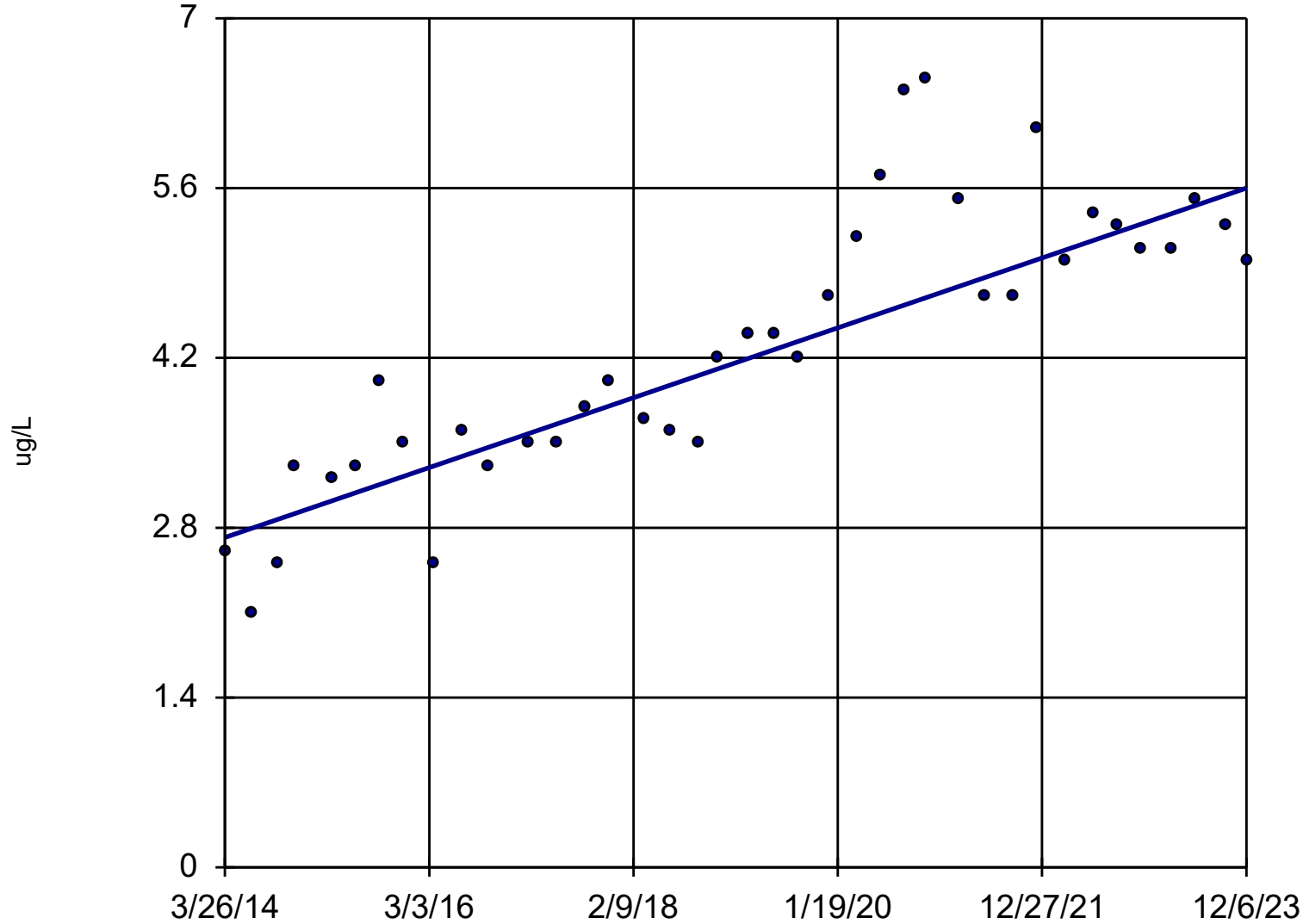
Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
1,1-Dichloroethane (ug/L)	MWell#4	0.2967	510	194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#5	-0.5428	-412	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#6	-0.5259	-557	-186	Yes	38	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#9	-0.1576	-274	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#10	-0.5164	-489	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethene (ug/L)	MWell#10	-0.03518	-414	-194	Yes	39	48.72	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#5	-0.04966	-313	-194	Yes	39	12.82	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#6	-0.02964	-447	-186	Yes	38	10.53	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#10	-0.01338	-257	-194	Yes	39	5.128	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#5	-0.02142	-260	-194	Yes	39	10.26	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#6	-0.01999	-315	-186	Yes	38	13.16	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#5	-0.01005	-212	-194	Yes	39	23.08	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#6	-0.01923	-313	-186	Yes	38	7.895	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#10	-0.02626	-494	-194	Yes	39	33.33	n/a	n/a	0.02	NP
Bromodichloromethane (ug/L)	MWell#3	0.0034	181	171	Yes	36	50	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#3	0.8098	511	171	Yes	36	2.778	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#9	0.02229	214	194	Yes	39	20.51	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#10	-0.0374	-331	-194	Yes	39	2.564	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	0.411	545	194	Yes	39	2.564	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#5	-1.467	-289	-194	Yes	39	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#6	-2.005	-331	-186	Yes	38	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#6	-2.009	-370	-186	Yes	38	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#9	0.2507	246	194	Yes	39	0	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#5	-0.03452	-268	-194	Yes	39	20.51	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#6	-0.1364	-492	-186	Yes	38	7.895	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#9	0.0142	203	194	Yes	39	15.38	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	0.03271	403	194	Yes	39	30.77	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#5	-0.2056	-256	-194	Yes	39	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#6	-0.9844	-450	-186	Yes	38	0	n/a	n/a	0.02	NP

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2014 through Fourth Quarter 2023

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
Trichlorofluoromethane (ug/L)	MWell#4	0.03216	218	194	Yes	39	2.564	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#5	-0.6254	-466	-194	Yes	39	2.564	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#6	-0.2296	-402	-186	Yes	38	2.632	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#10	-0.1309	-522	-194	Yes	39	7.692	n/a	n/a	0.02	NP

Sen's Slope Estimator

MWell#4



n = 39

Slope = 0.2967
units per year.

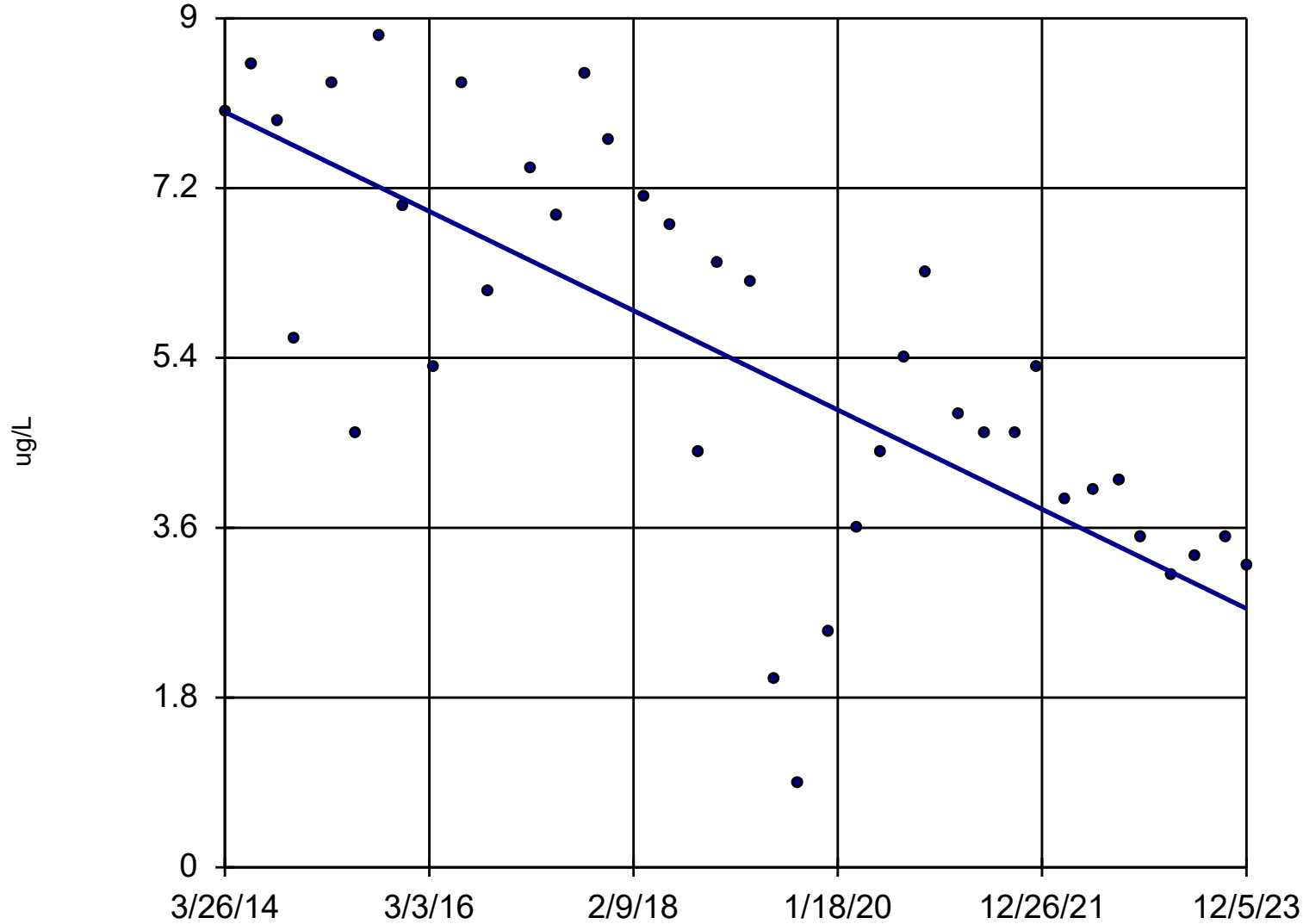
Mann-Kendall
statistic = 510
critical = 194

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.5428
units per year.

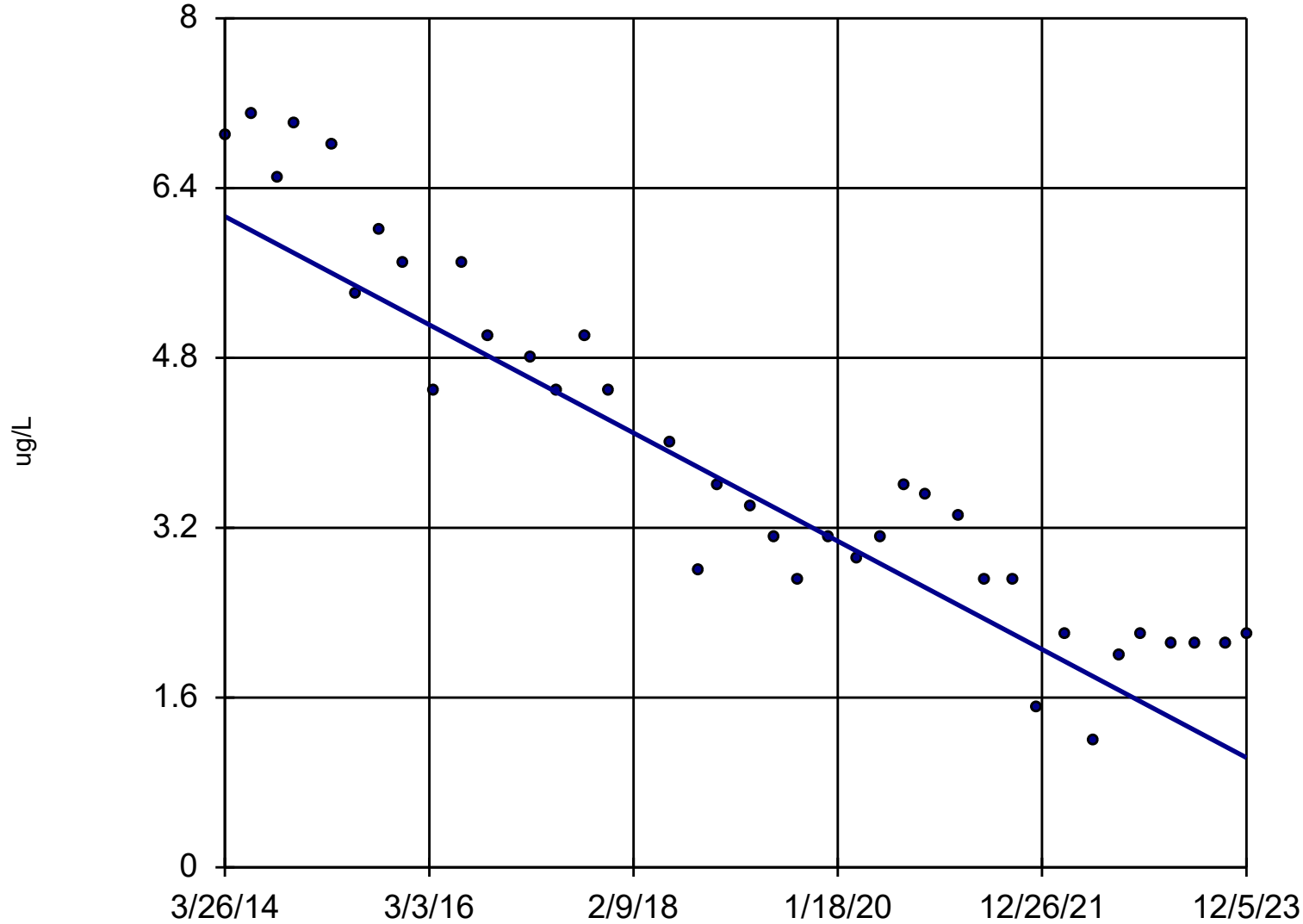
Mann-Kendall
statistic = -412
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.5259
units per year.

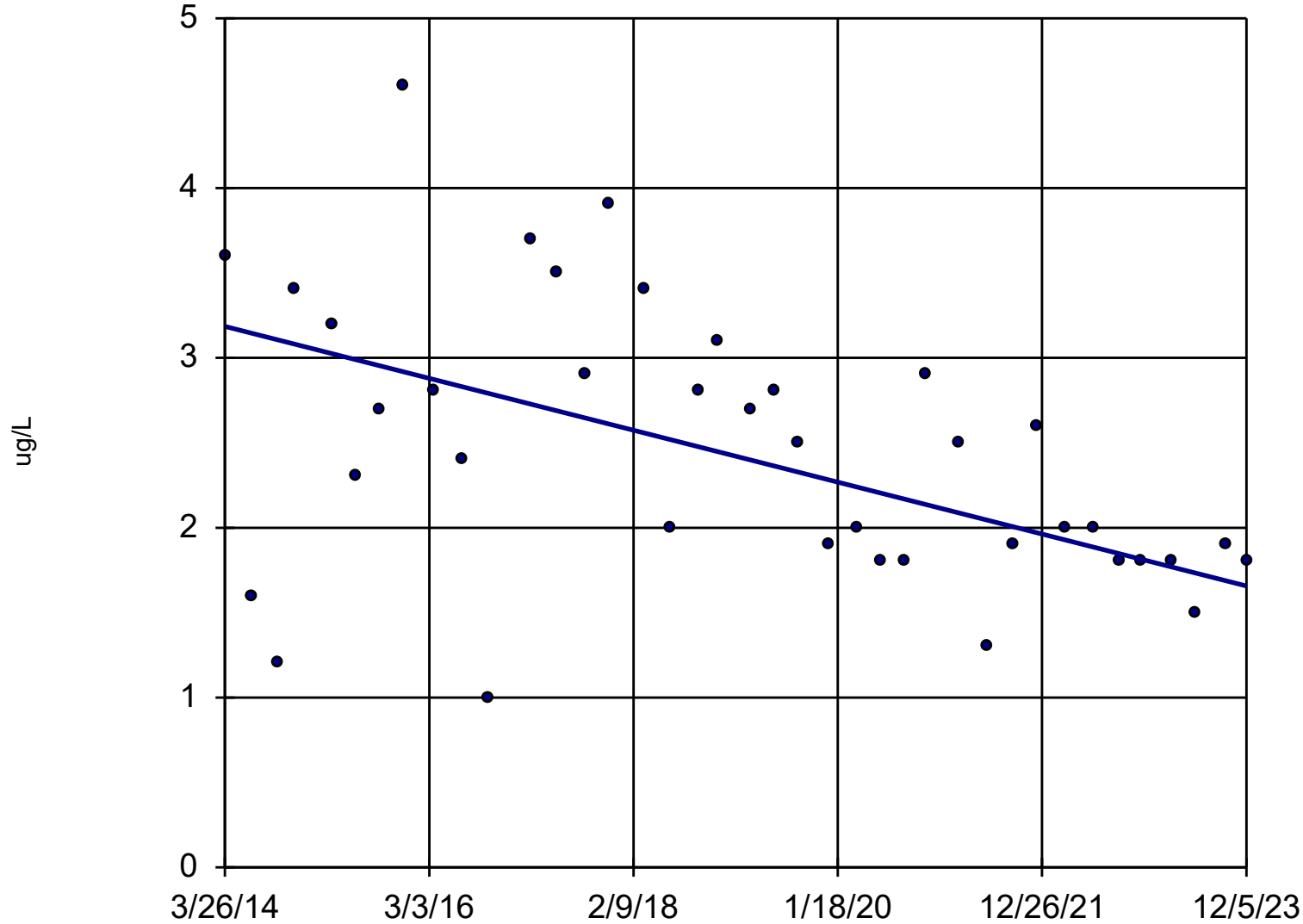
Mann-Kendall
statistic = -557
critical = -186

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 39

Slope = -0.1576
units per year.

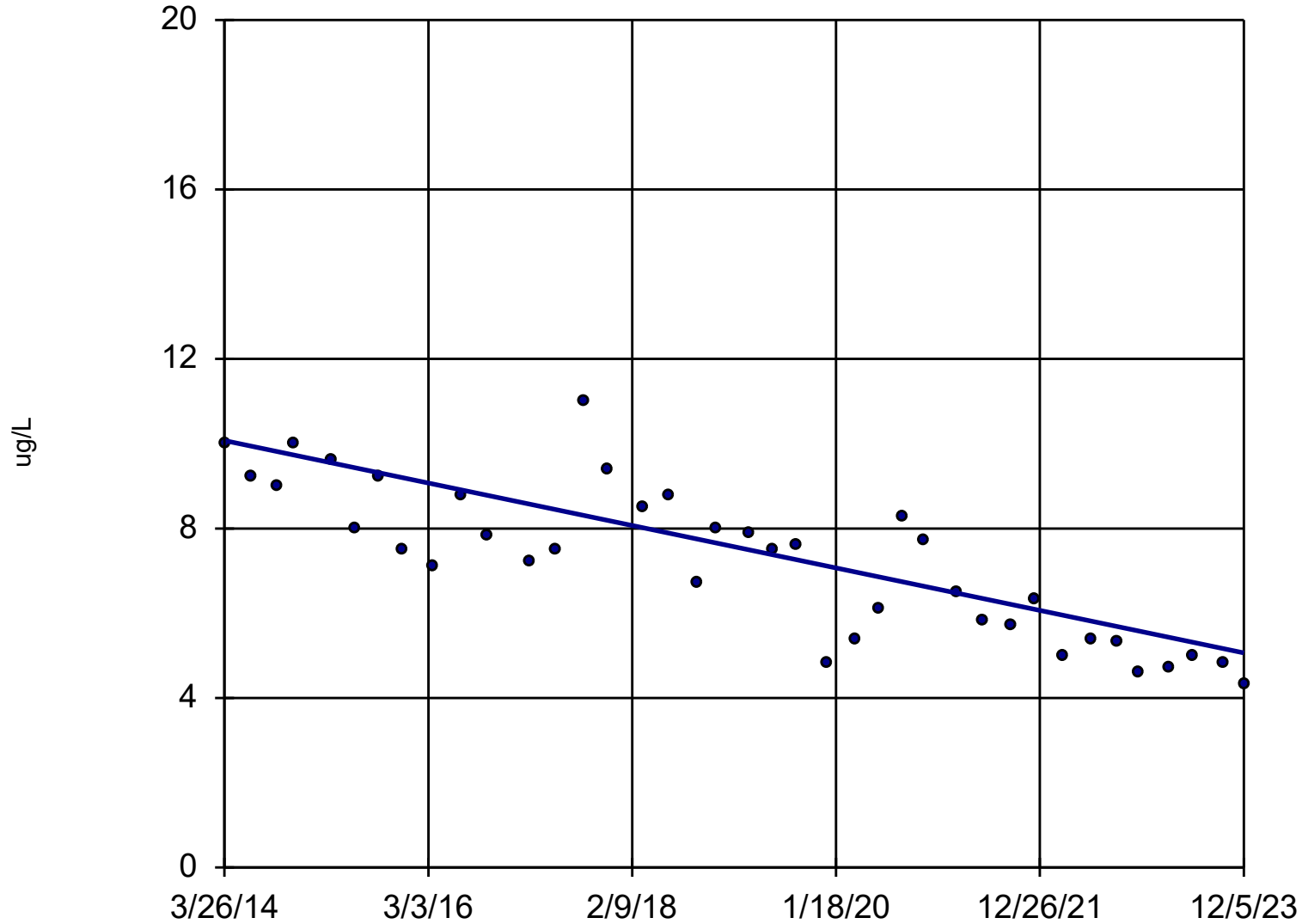
Mann-Kendall
statistic = -274
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.5164
units per year.

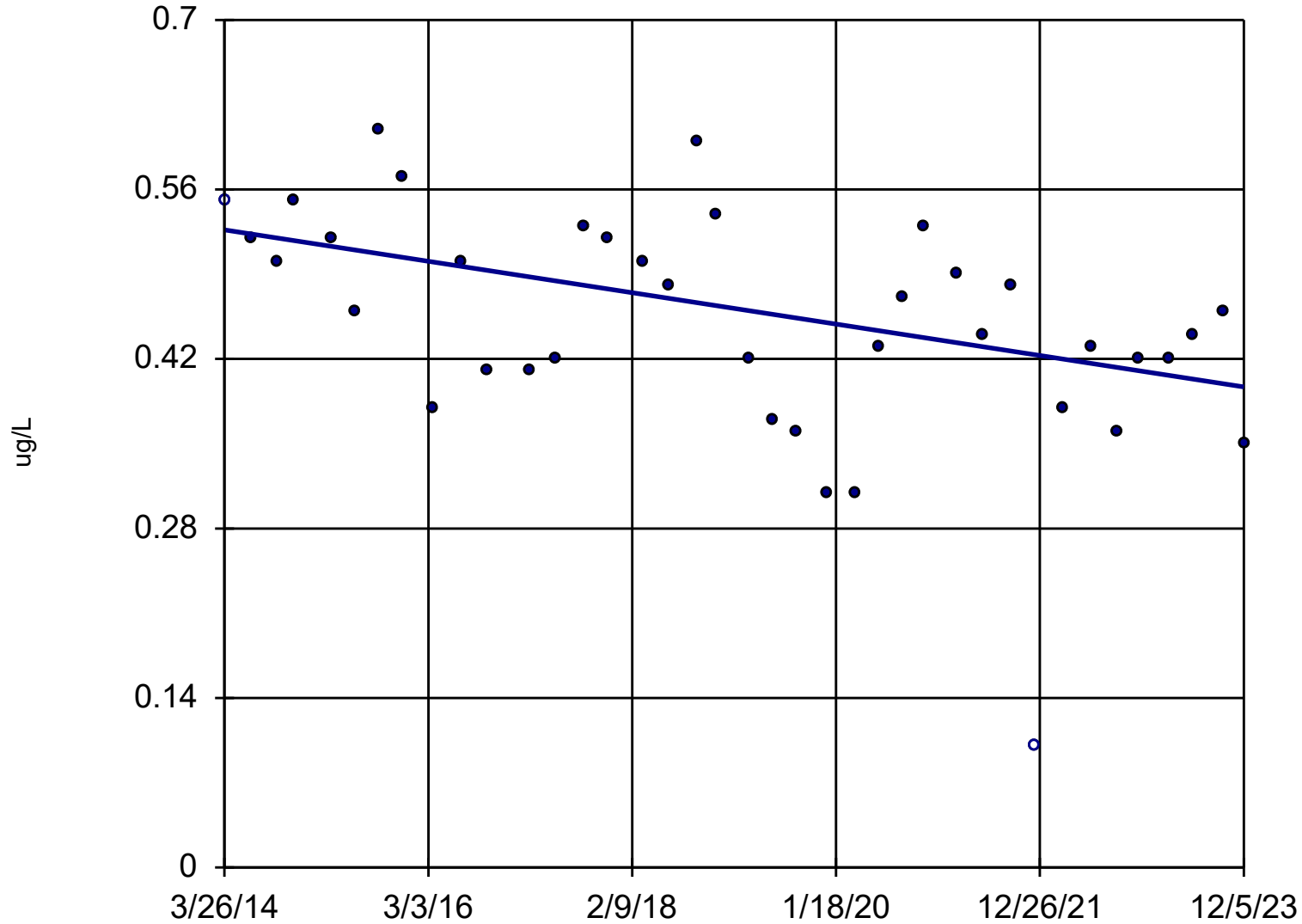
Mann-Kendall
statistic = -489
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.01338
units per year.

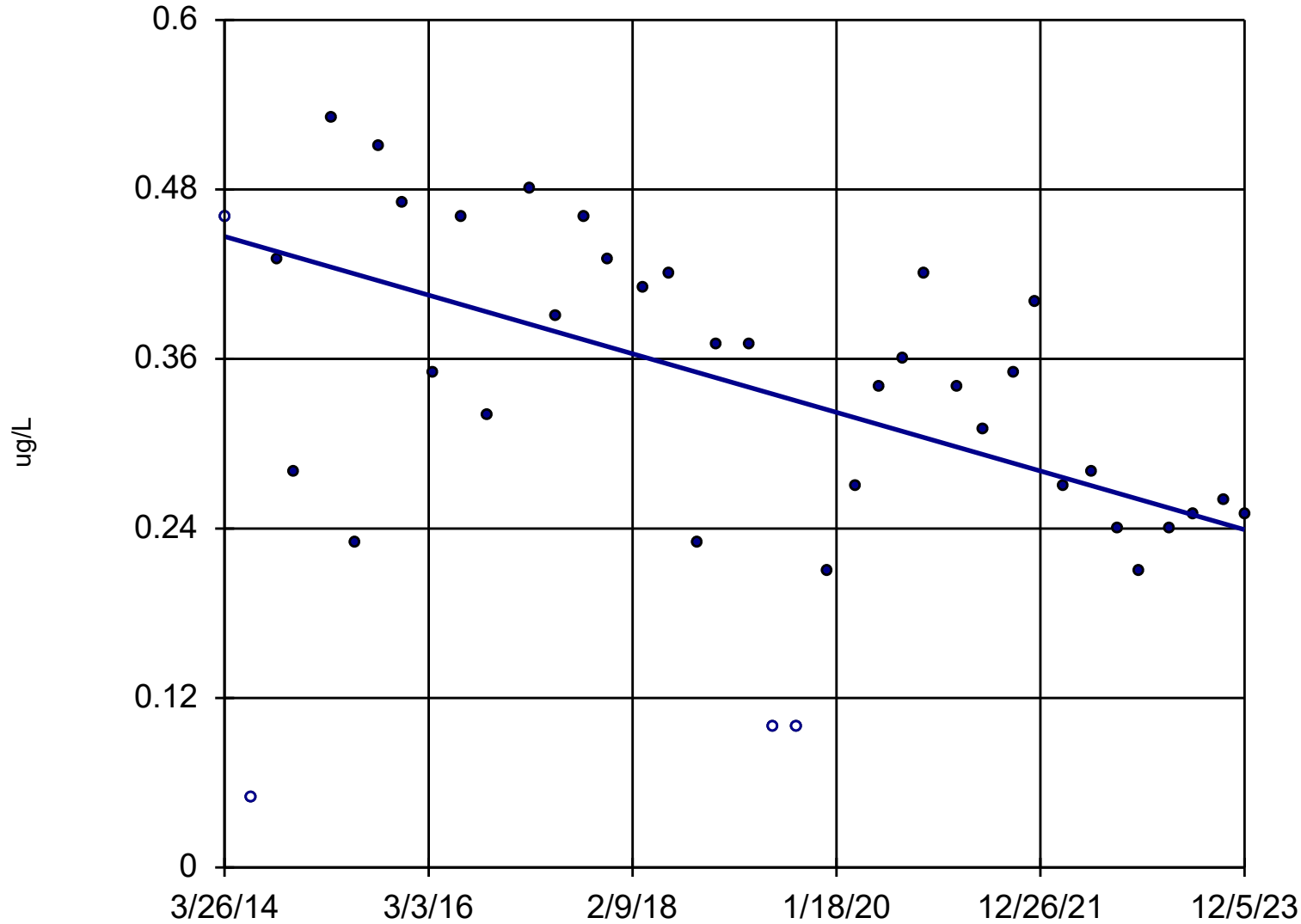
Mann-Kendall
statistic = -257
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,2-Dichloroethane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#5



n = 39

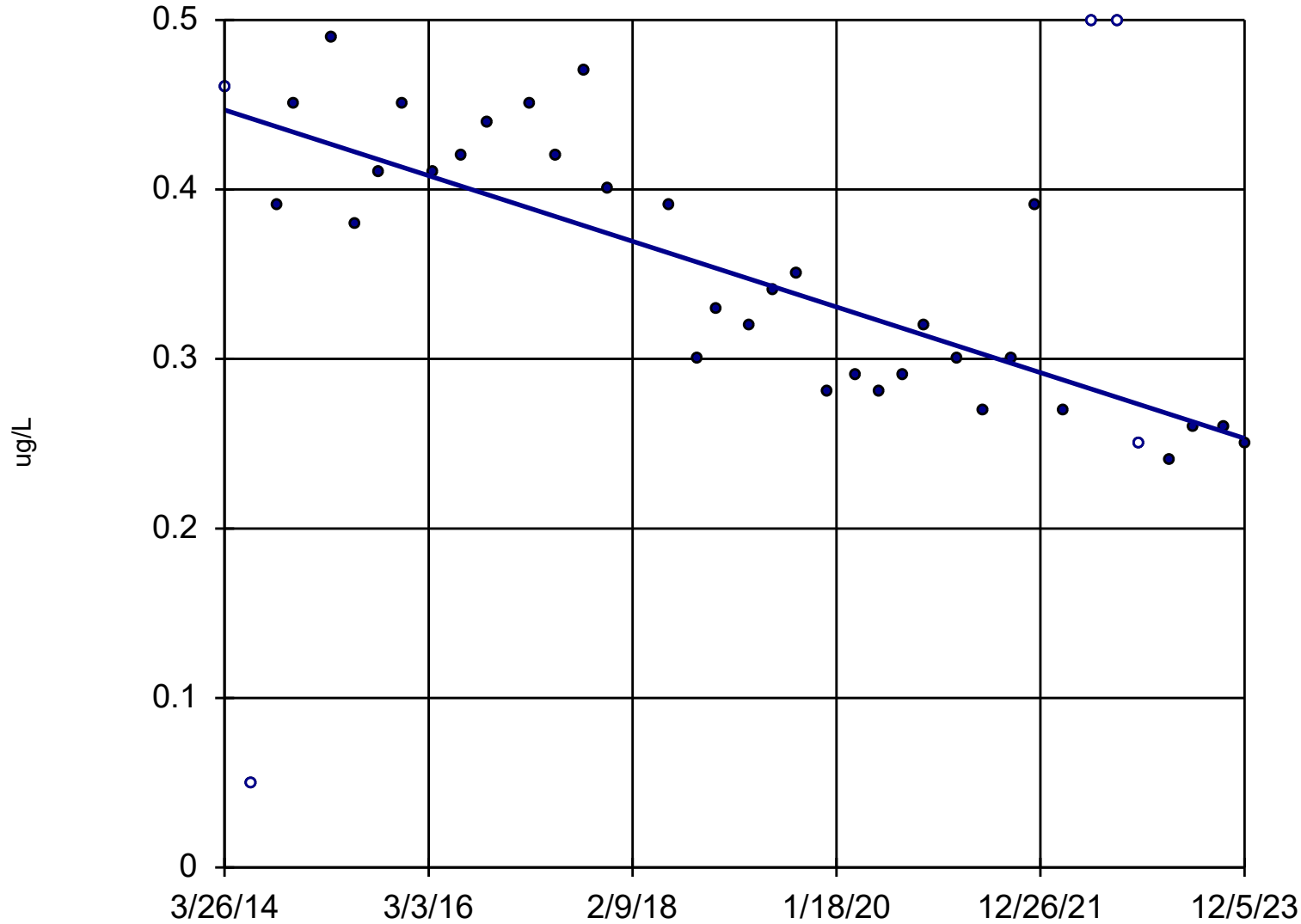
Slope = -0.02142
units per year.

Mann-Kendall
statistic = -260
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.01999
units per year.

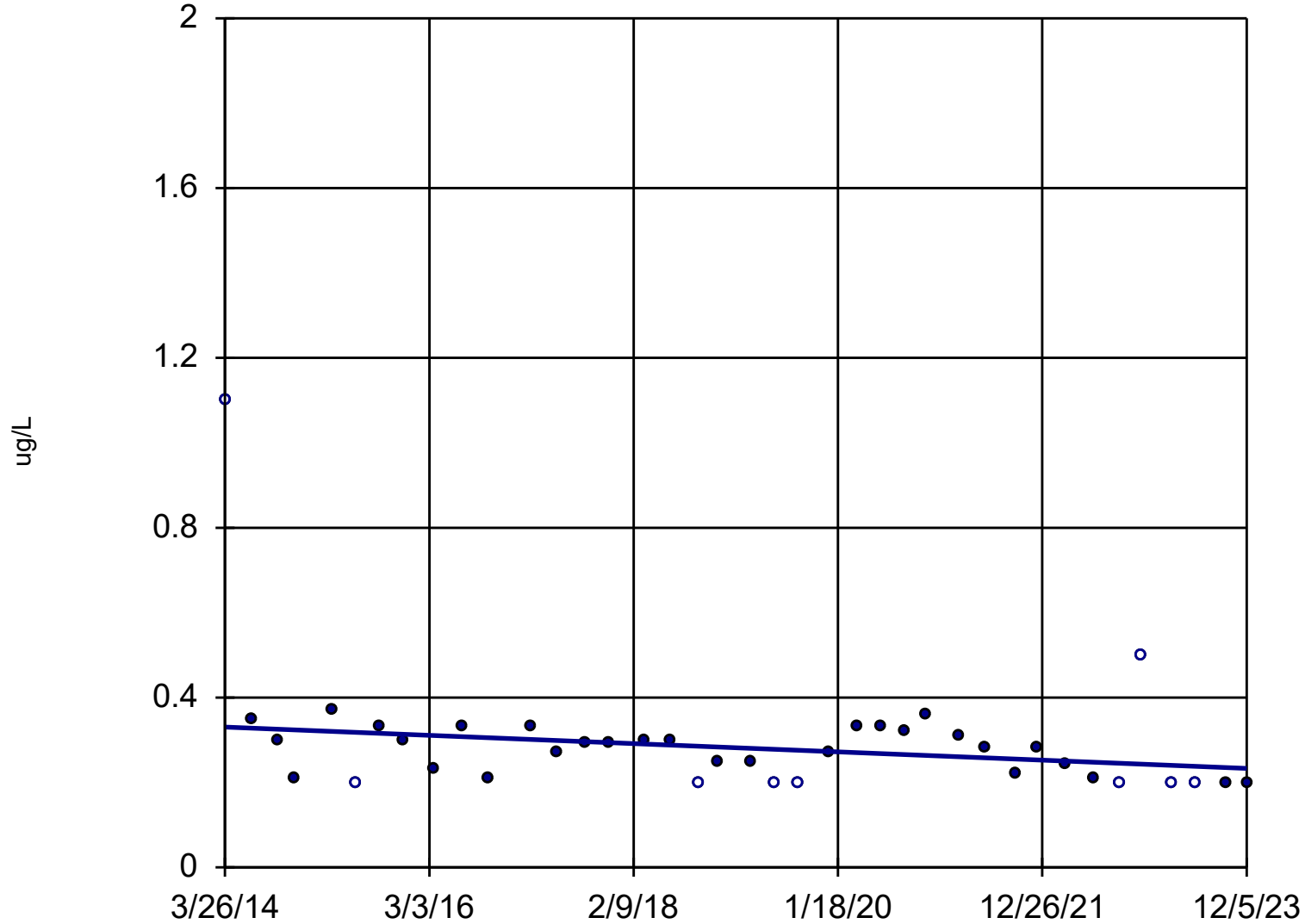
Mann-Kendall
statistic = -315
critical = -186

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,2-Dichloropropane Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.01005
units per year.

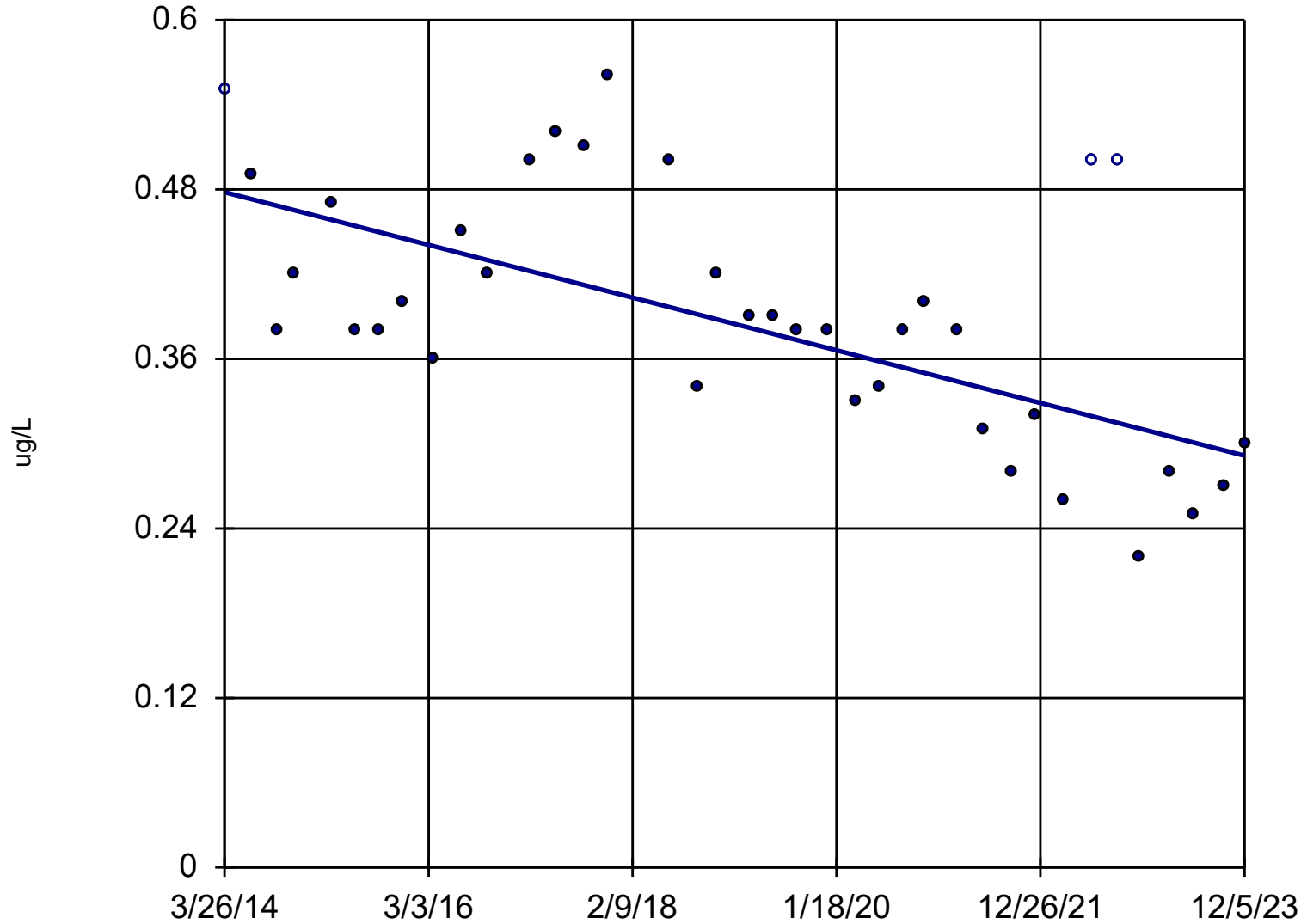
Mann-Kendall
statistic = -212
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Benzene Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

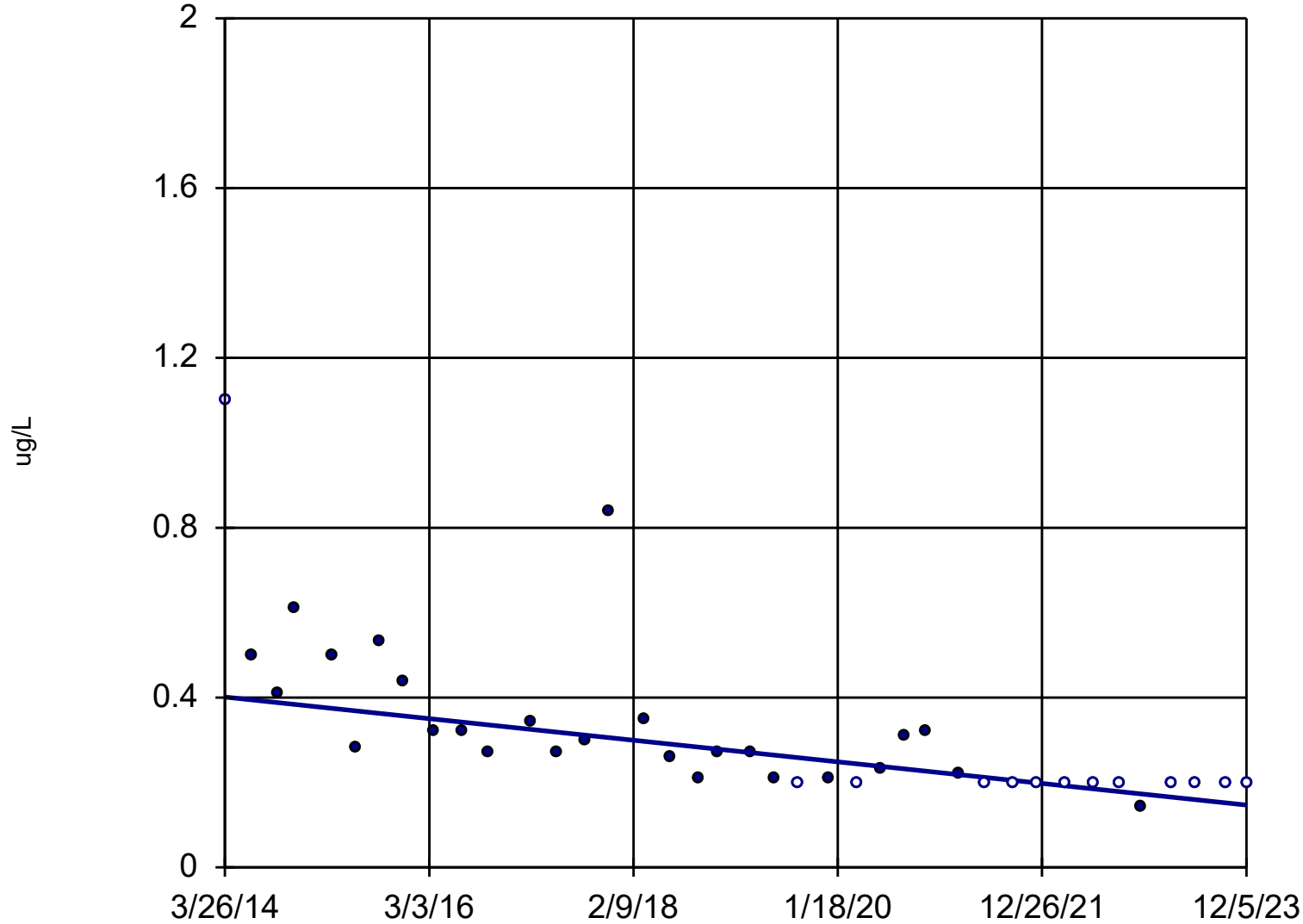
Sen's Slope Estimator

MWell#6



Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.02626
units per year.

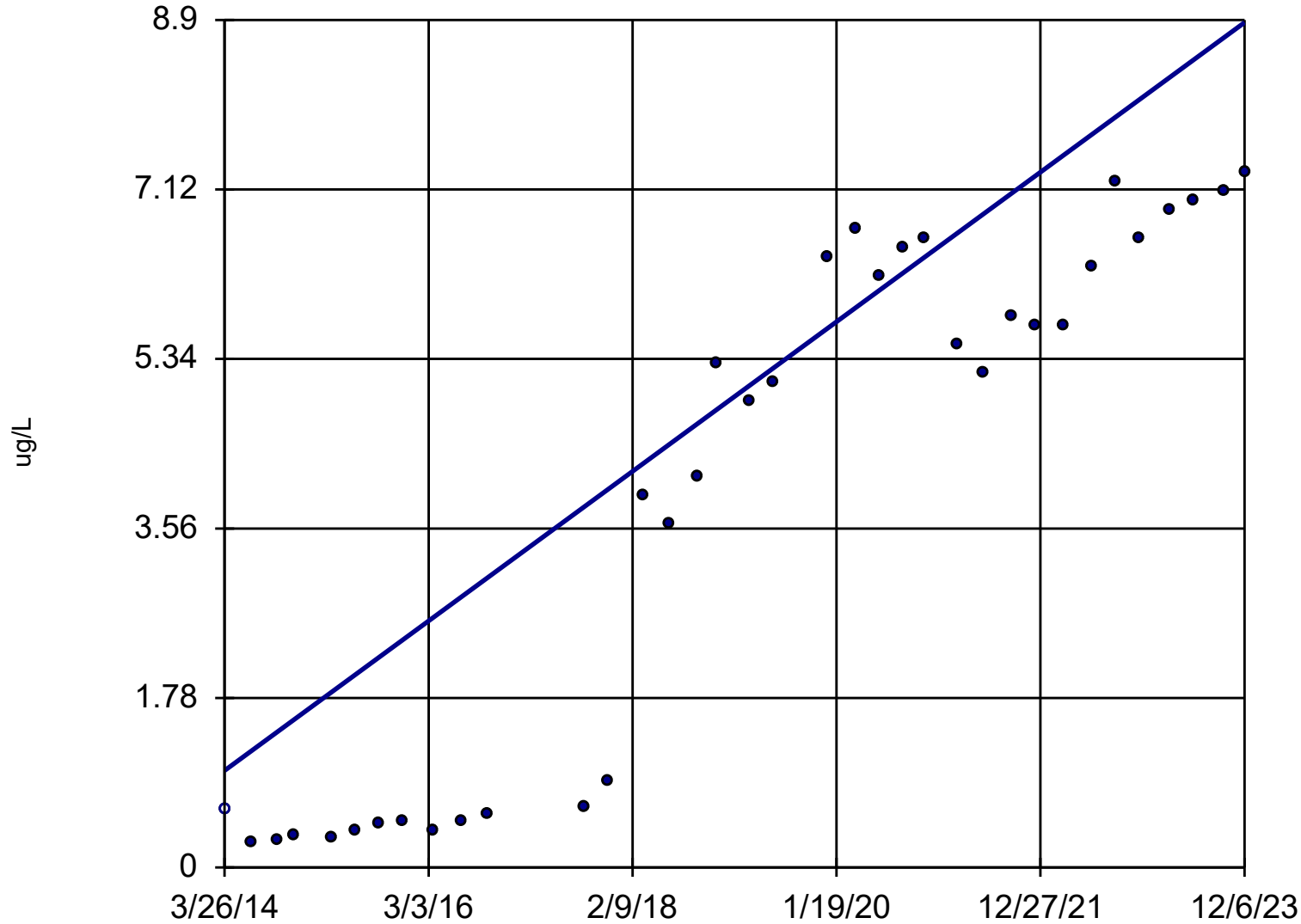
Mann-Kendall
statistic = -494
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Benzene Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#3



n = 36

Slope = 0.8098
units per year.

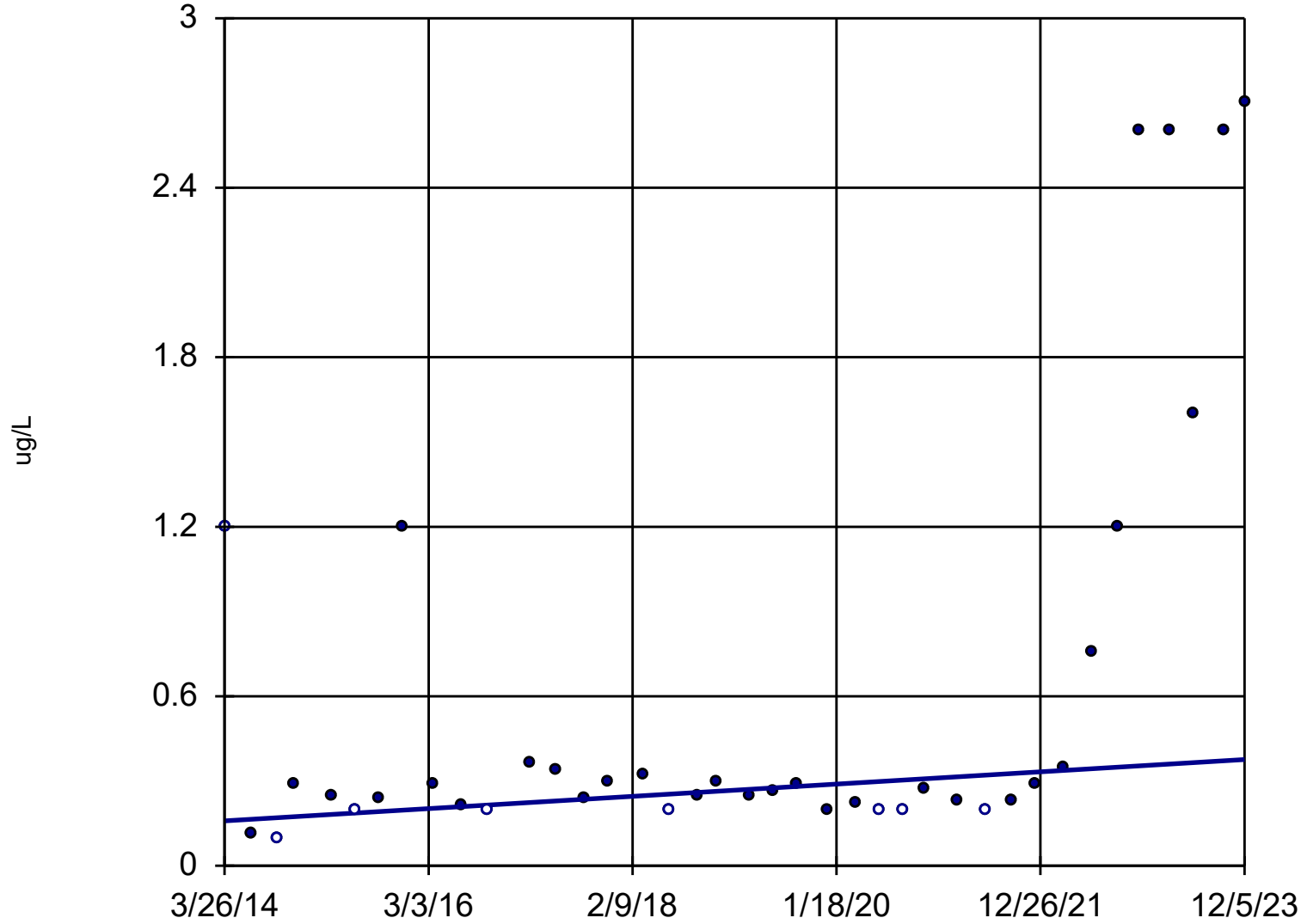
Mann-Kendall
statistic = 511
critical = 171

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 39

Slope = 0.02229
units per year.

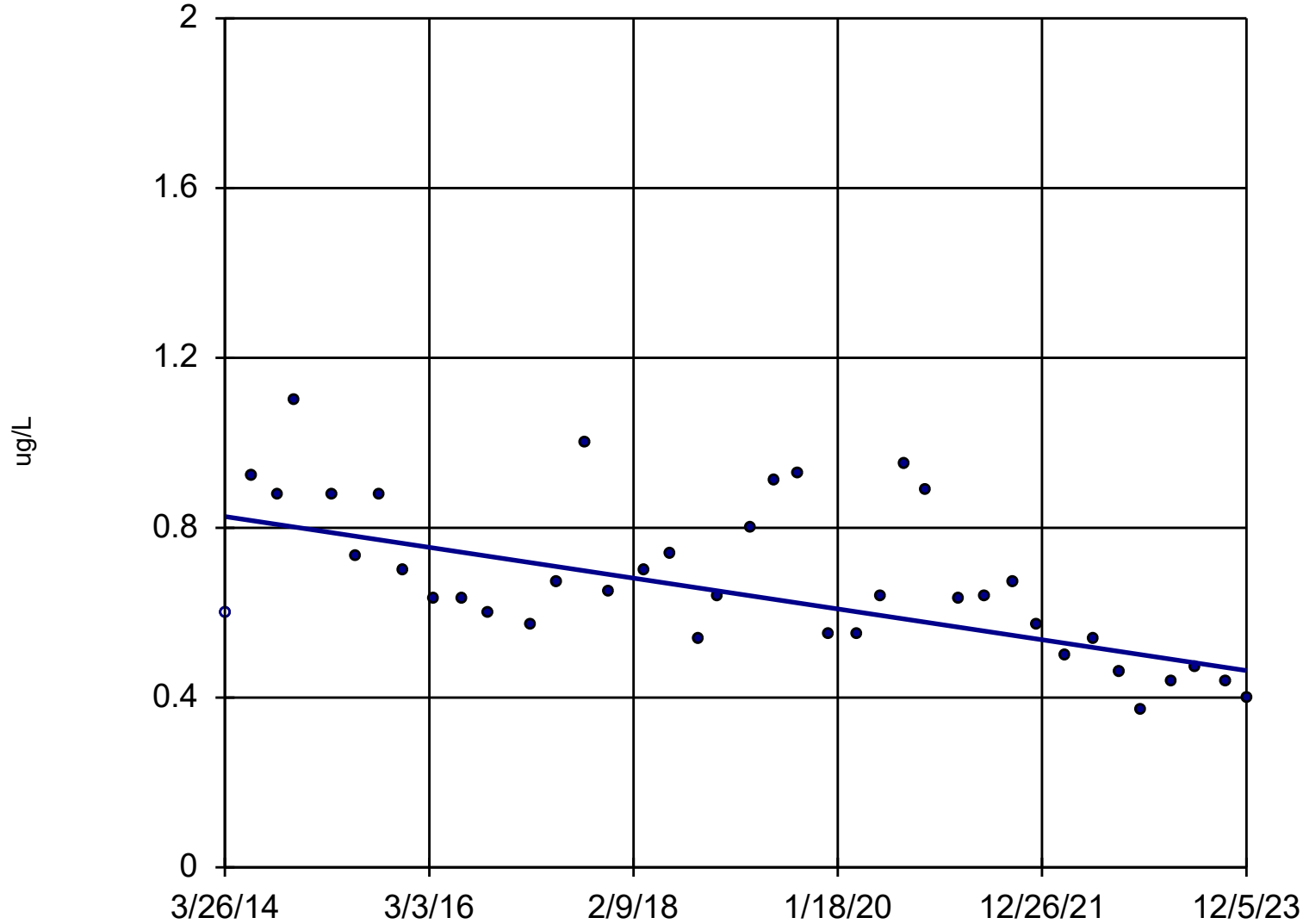
Mann-Kendall
statistic = 214
critical = 194

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.0374
units per year.

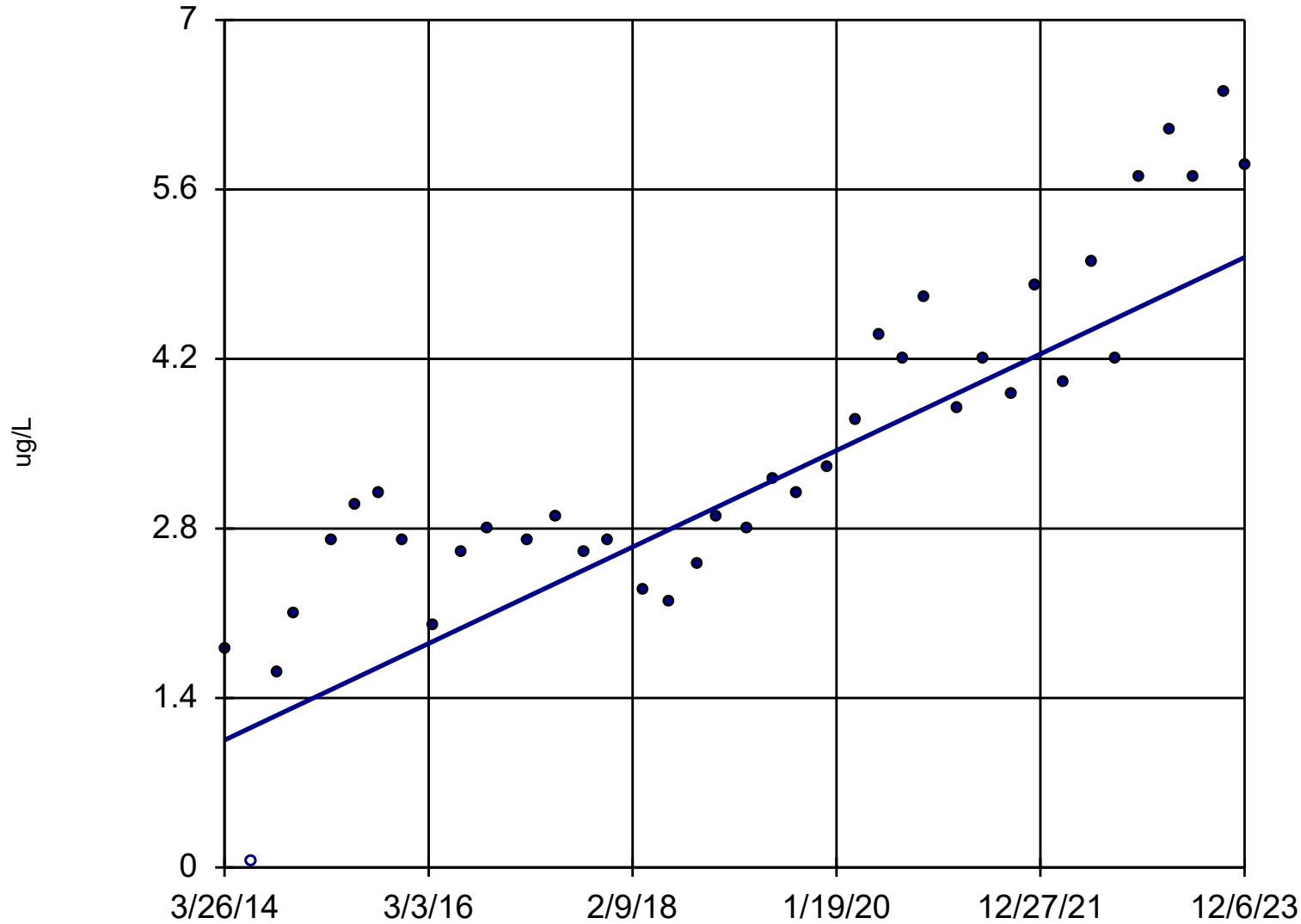
Mann-Kendall
statistic = -331
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 39

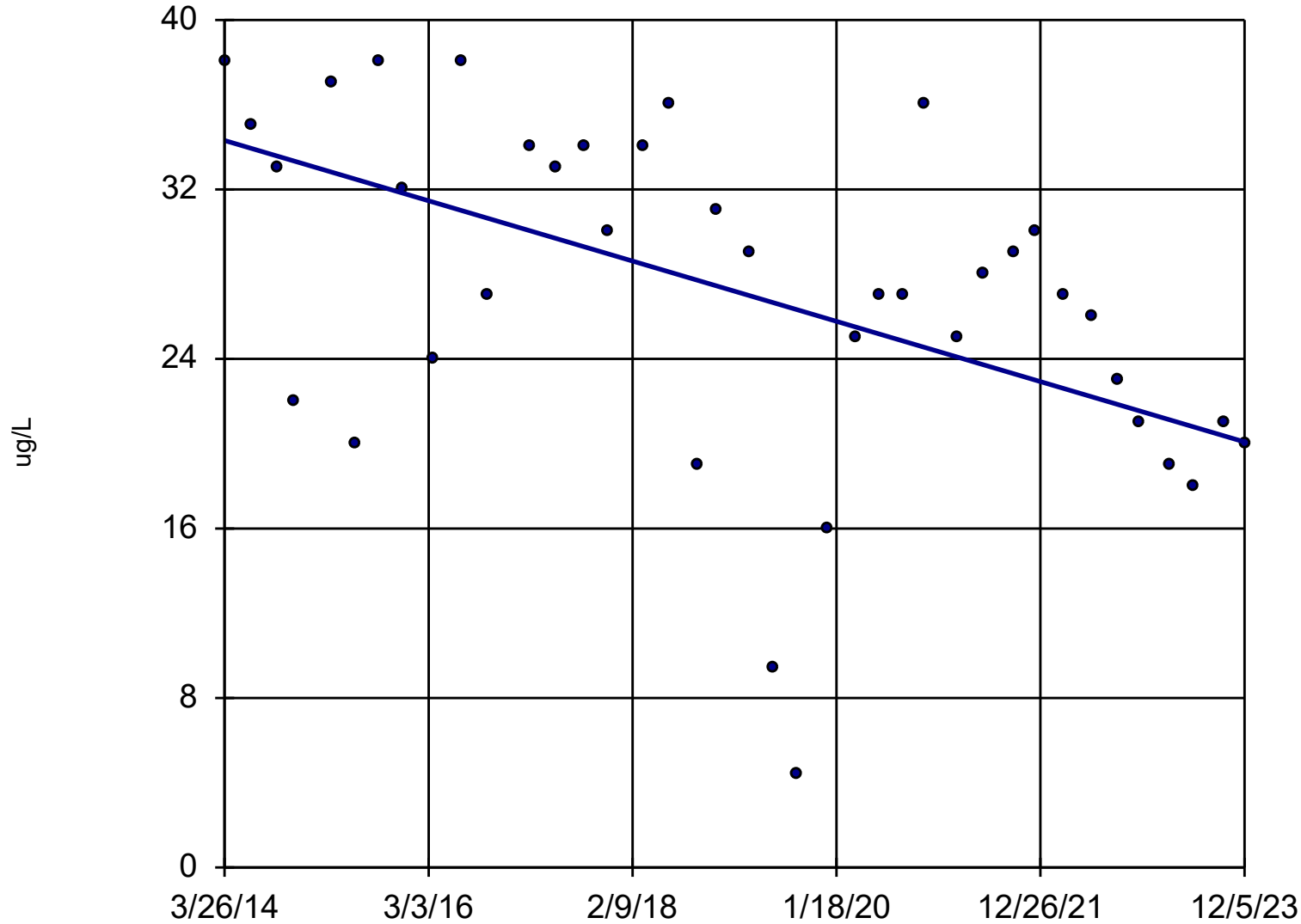
Slope = 0.411
units per year.

Mann-Kendall
statistic = 545
critical = 194

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#5



n = 39

Slope = -1.467
units per year.

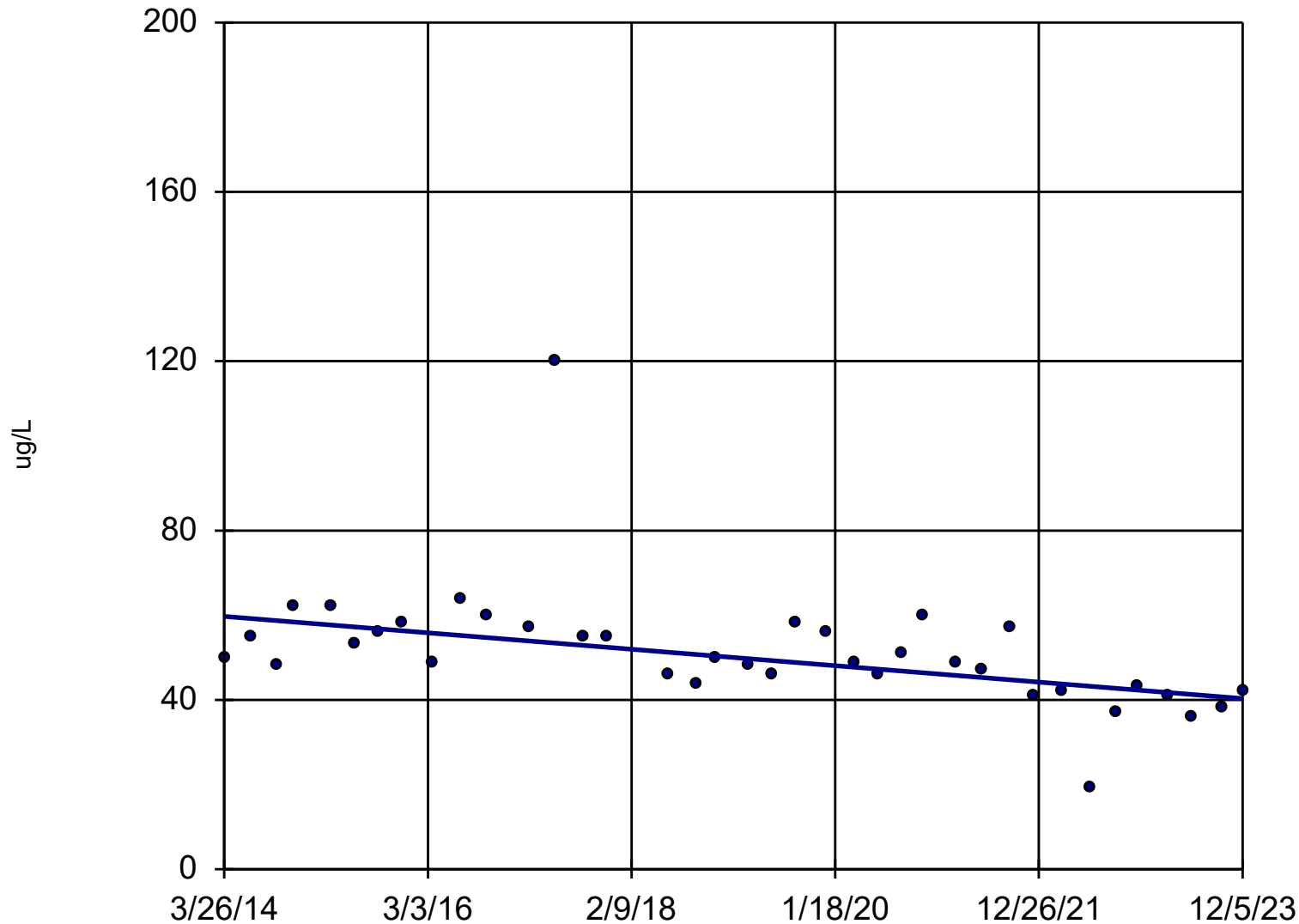
Mann-Kendall
statistic = -289
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -2.005
units per year.

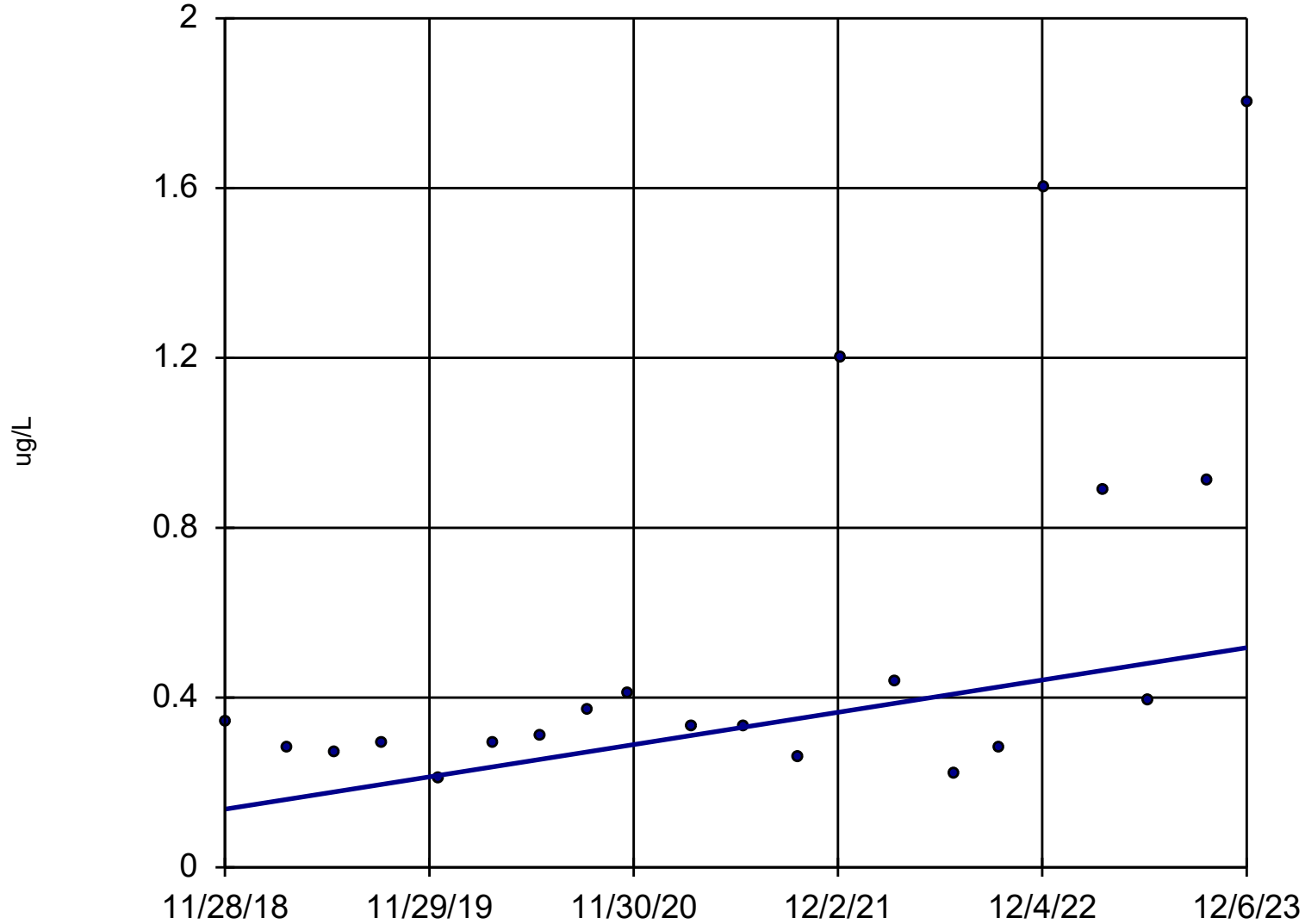
Mann-Kendall
statistic = -331
critical = -186

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#12



n = 21

Slope = 0.07569
units per year.

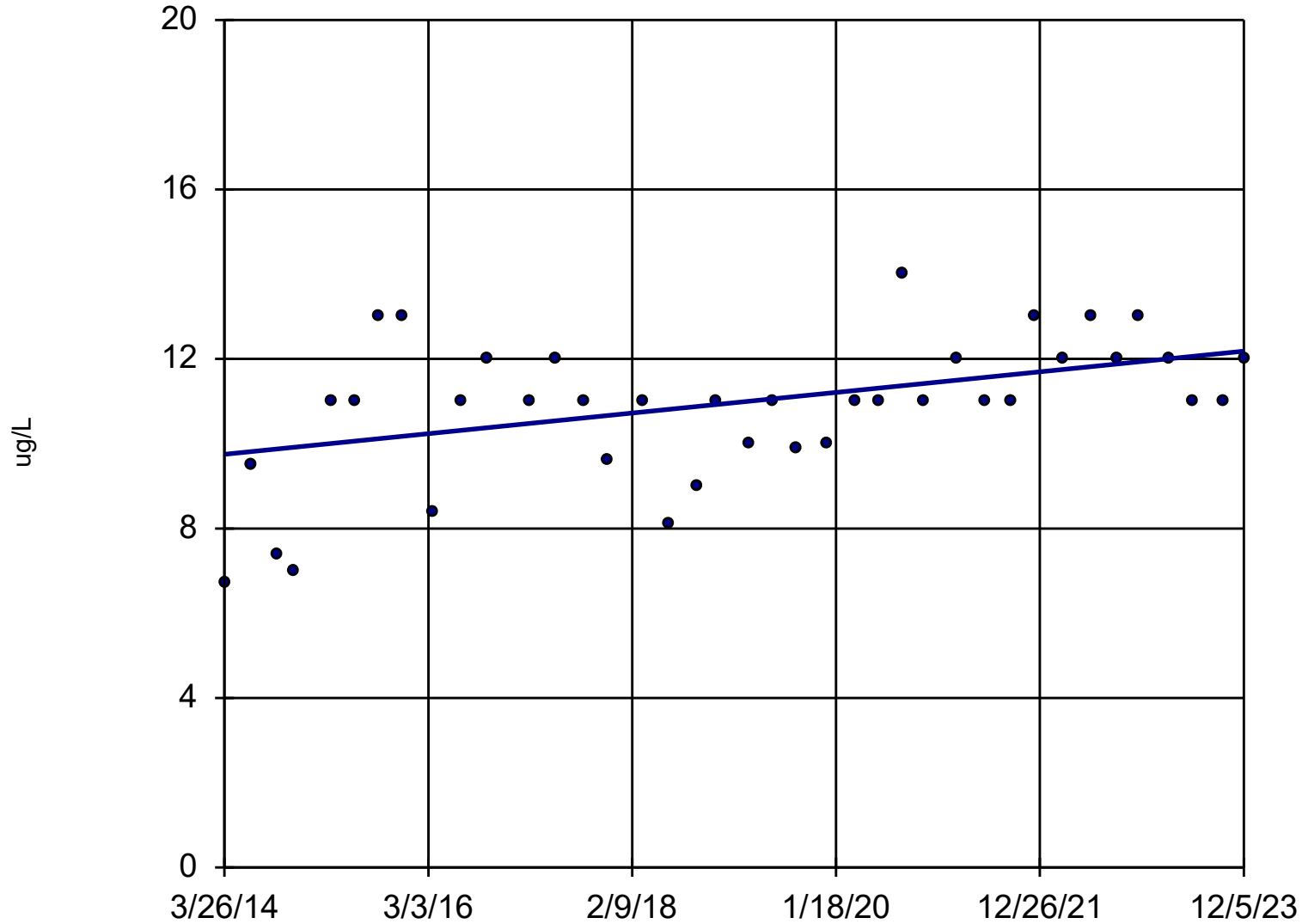
Mann-Kendall
statistic = 89
critical = 78

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:35 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

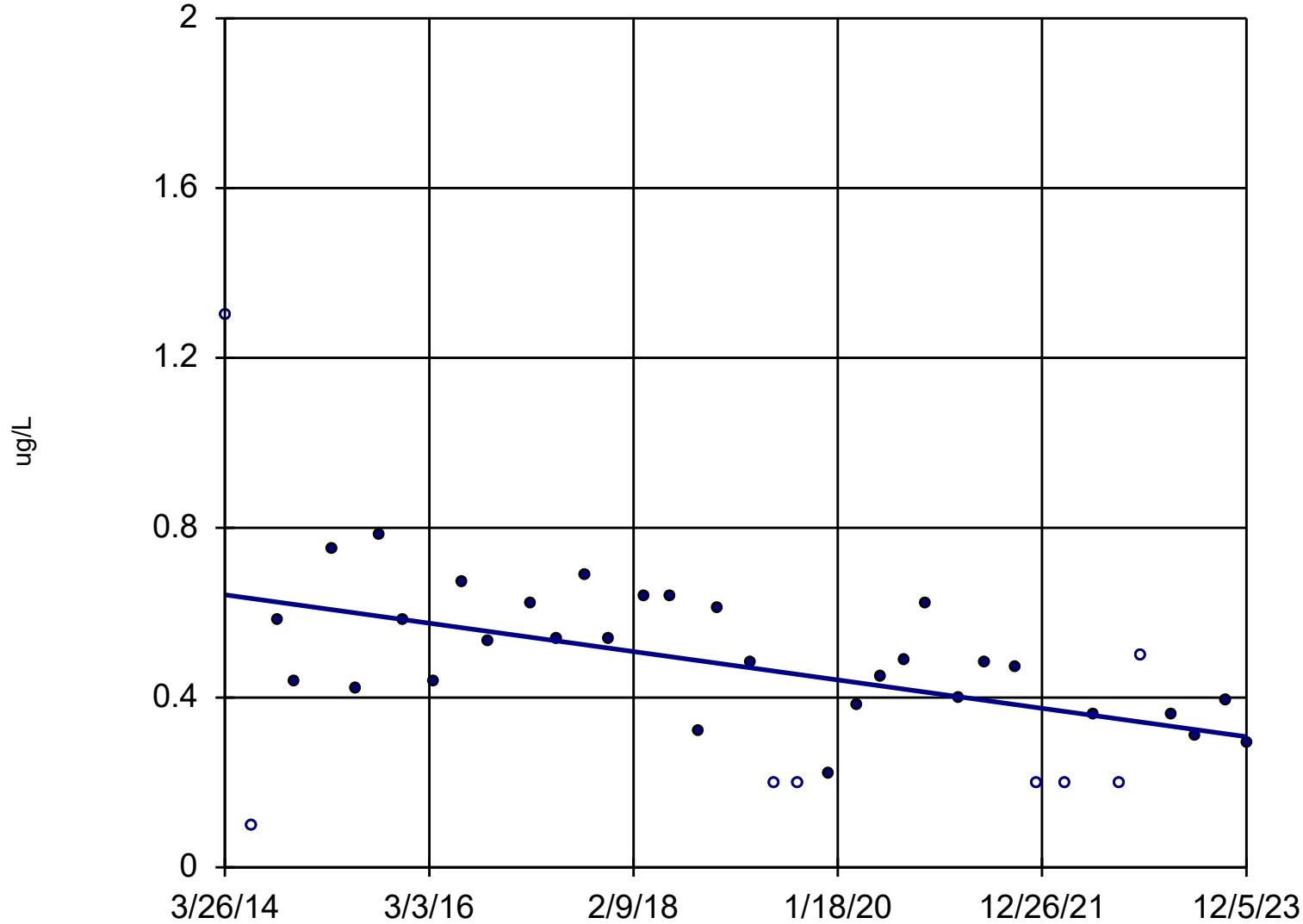
Sen's Slope Estimator

MWell#9



Sen's Slope Estimator

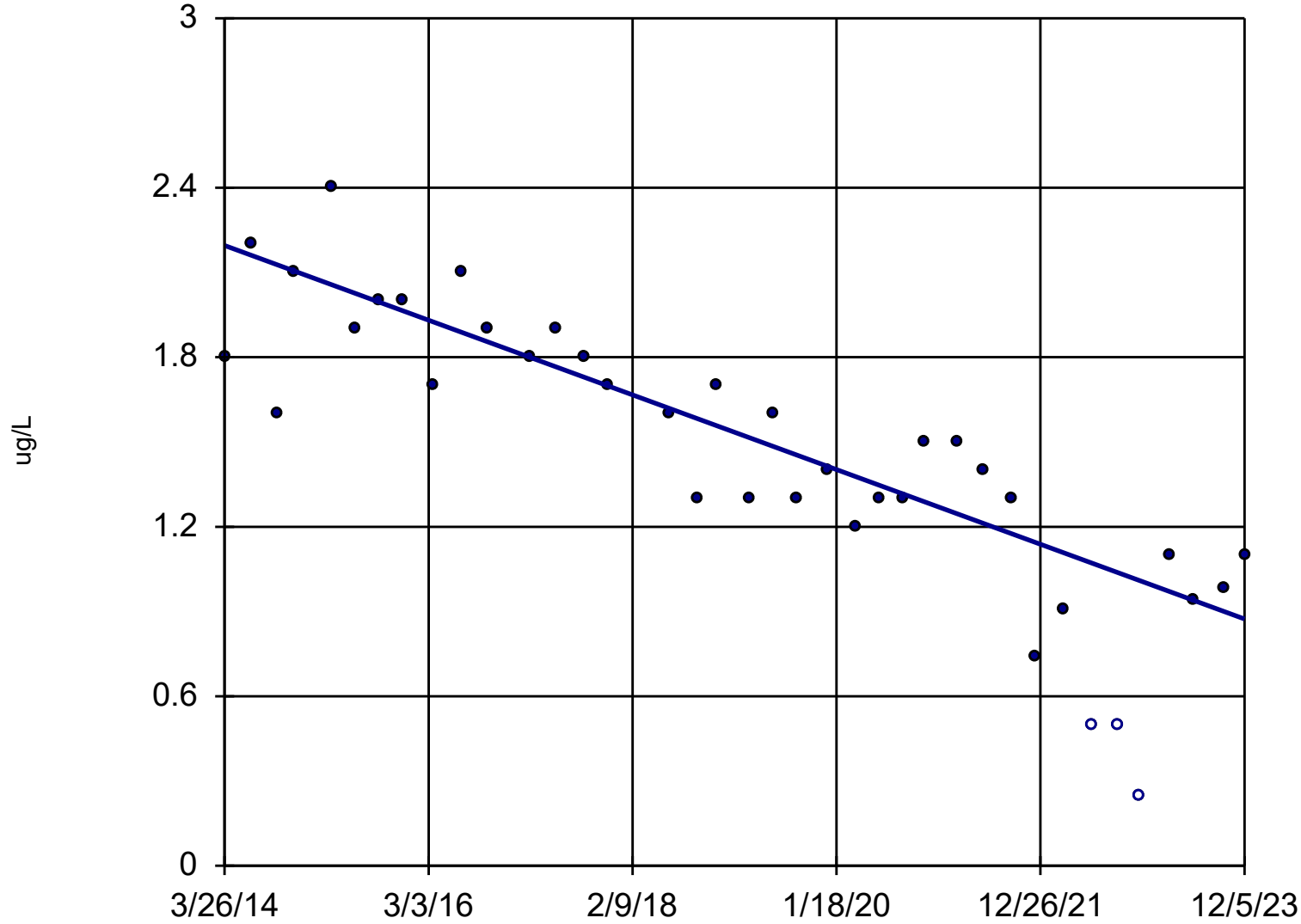
MWell#5



n = 39
Slope = -0.03452 units per year.
Mann-Kendall statistic = -268
critical = -194
Decreasing trend significant at 98% confidence level ($\alpha = 0.01$ per tail).

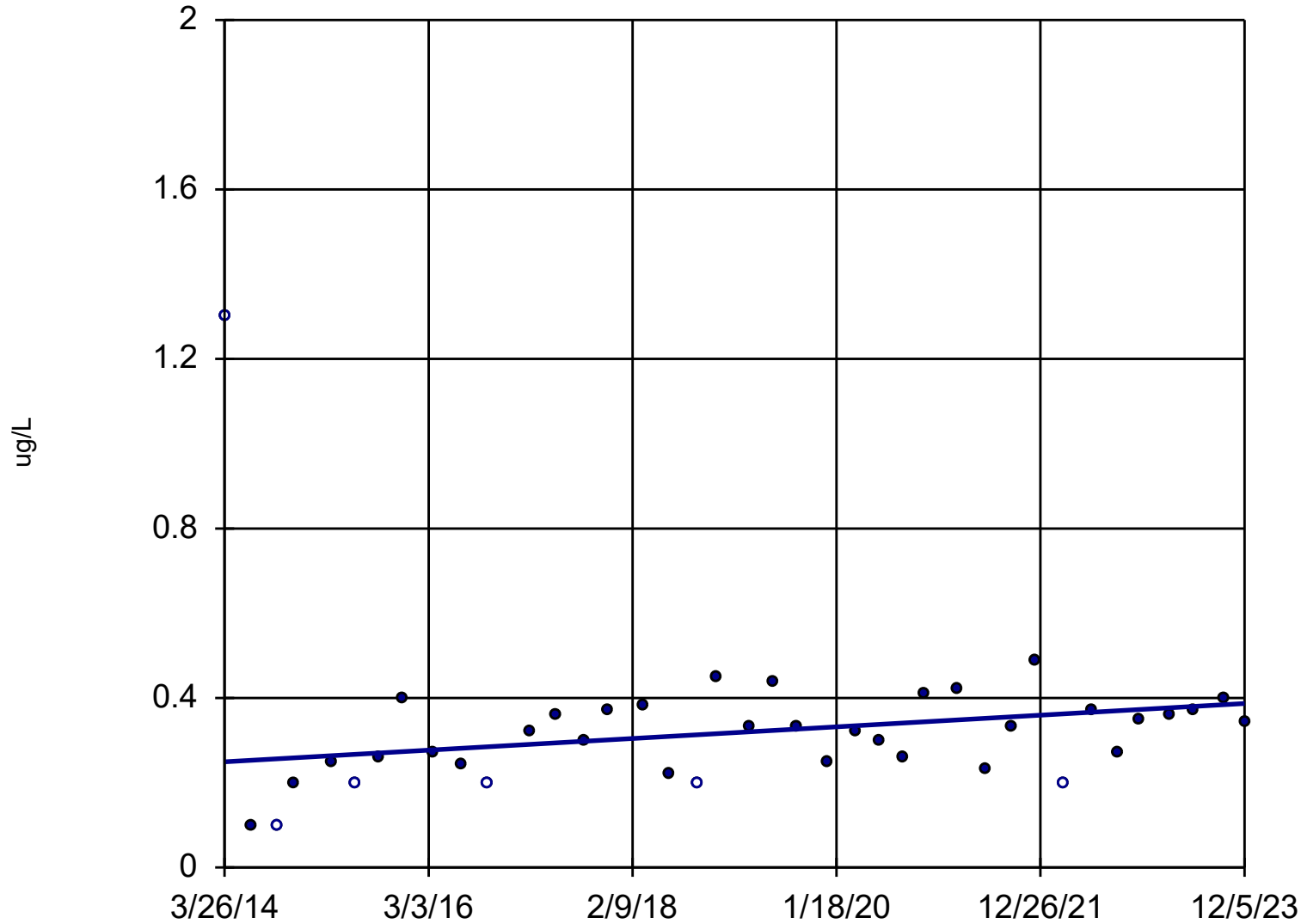
Sen's Slope Estimator

MWell#6



Sen's Slope Estimator

MWell#9



n = 39

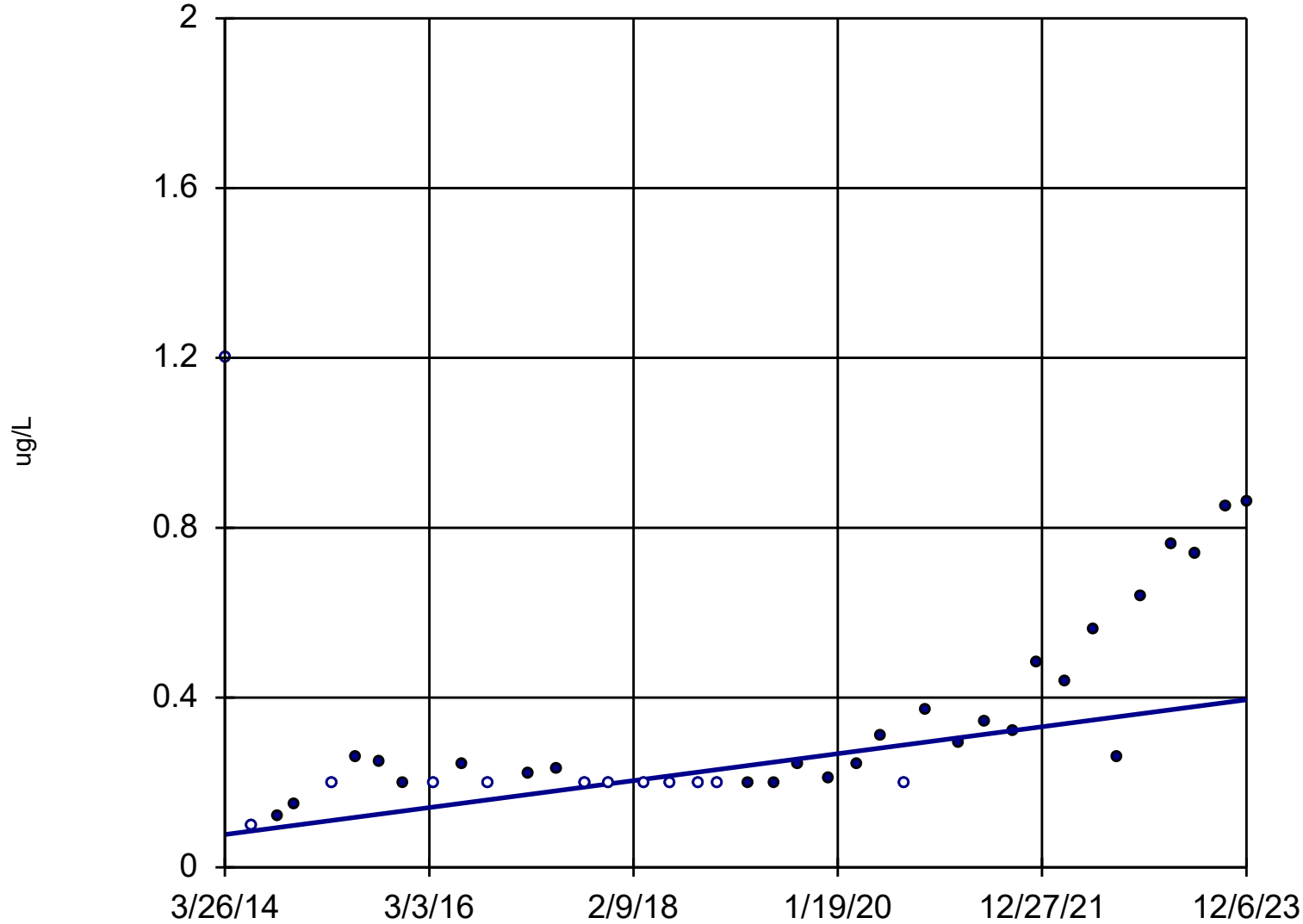
Slope = 0.0142
units per year.

Mann-Kendall
statistic = 203
critical = 194

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#4



n = 39

Slope = 0.03271
units per year.

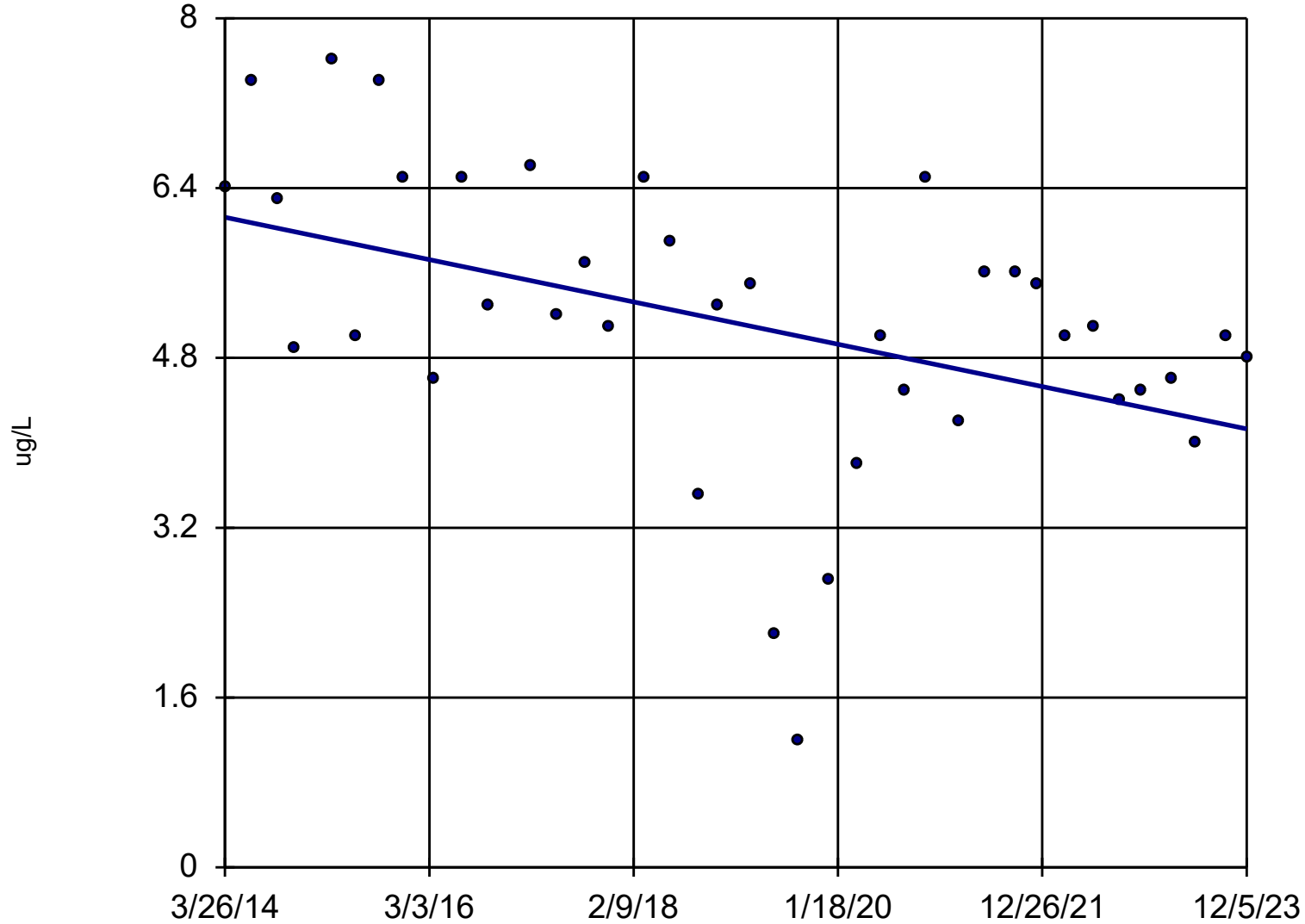
Mann-Kendall
statistic = 403
critical = 194

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Trichloroethene Analysis Run 1/29/2024 12:36 PM View: HRLF_SensSlope 10-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

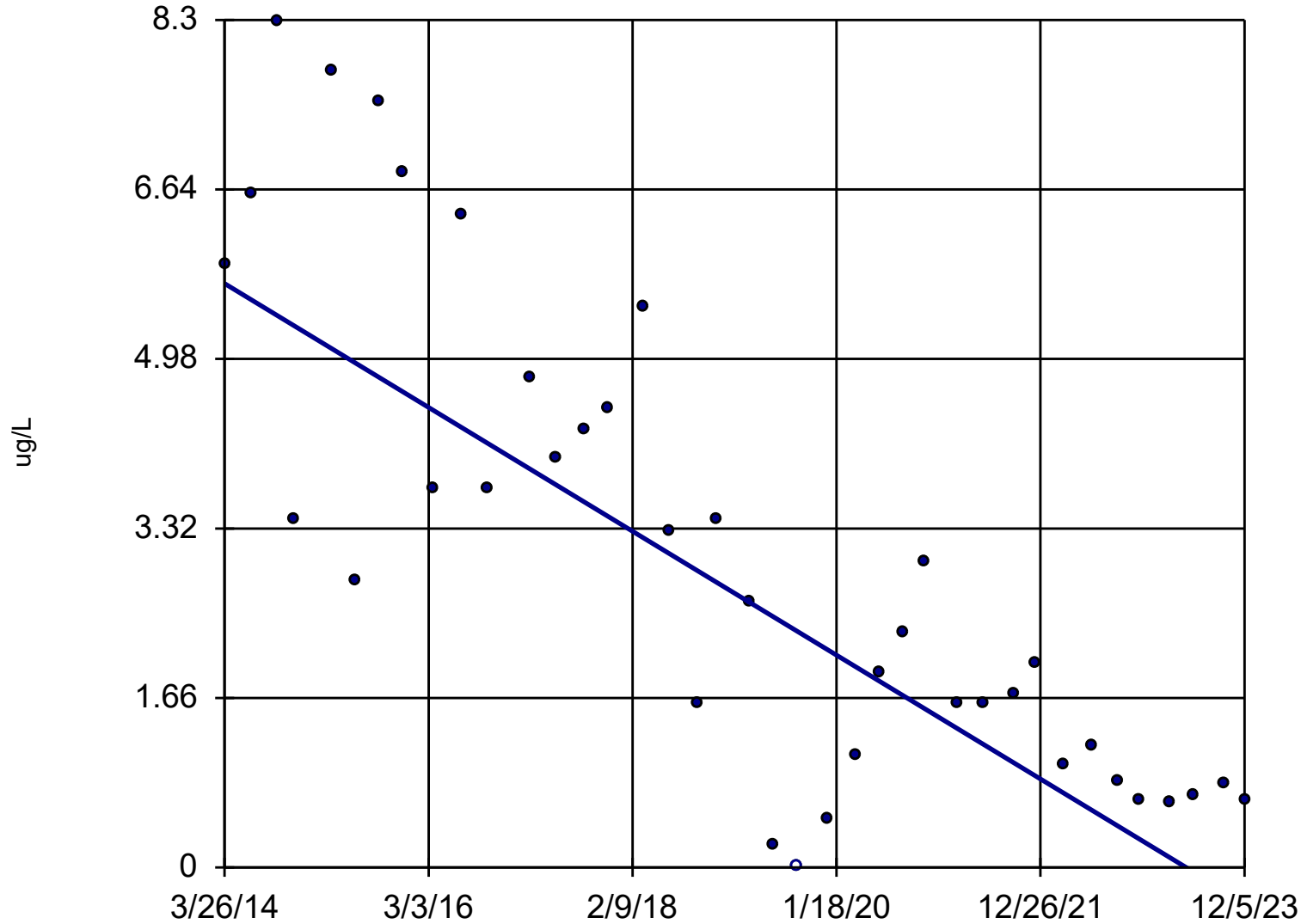
MWell#5



n = 39
Slope = -0.2056 units per year.
Mann-Kendall statistic = -256
critical = -194
Decreasing trend significant at 98% confidence level ($\alpha = 0.01$ per tail).

Sen's Slope Estimator

MWell#5



n = 39

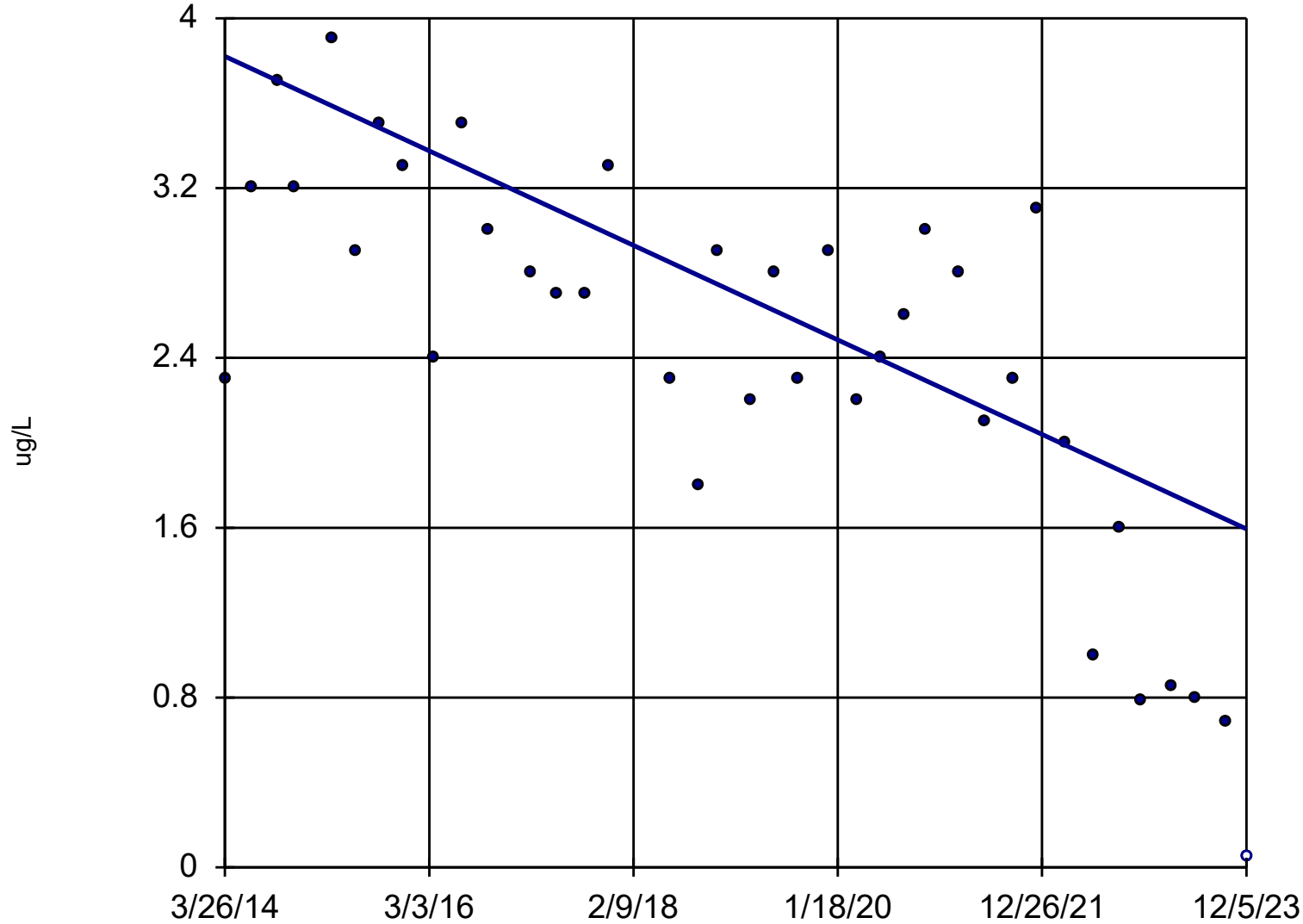
Slope = -0.6254
units per year.

Mann-Kendall
statistic = -466
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#6



n = 38

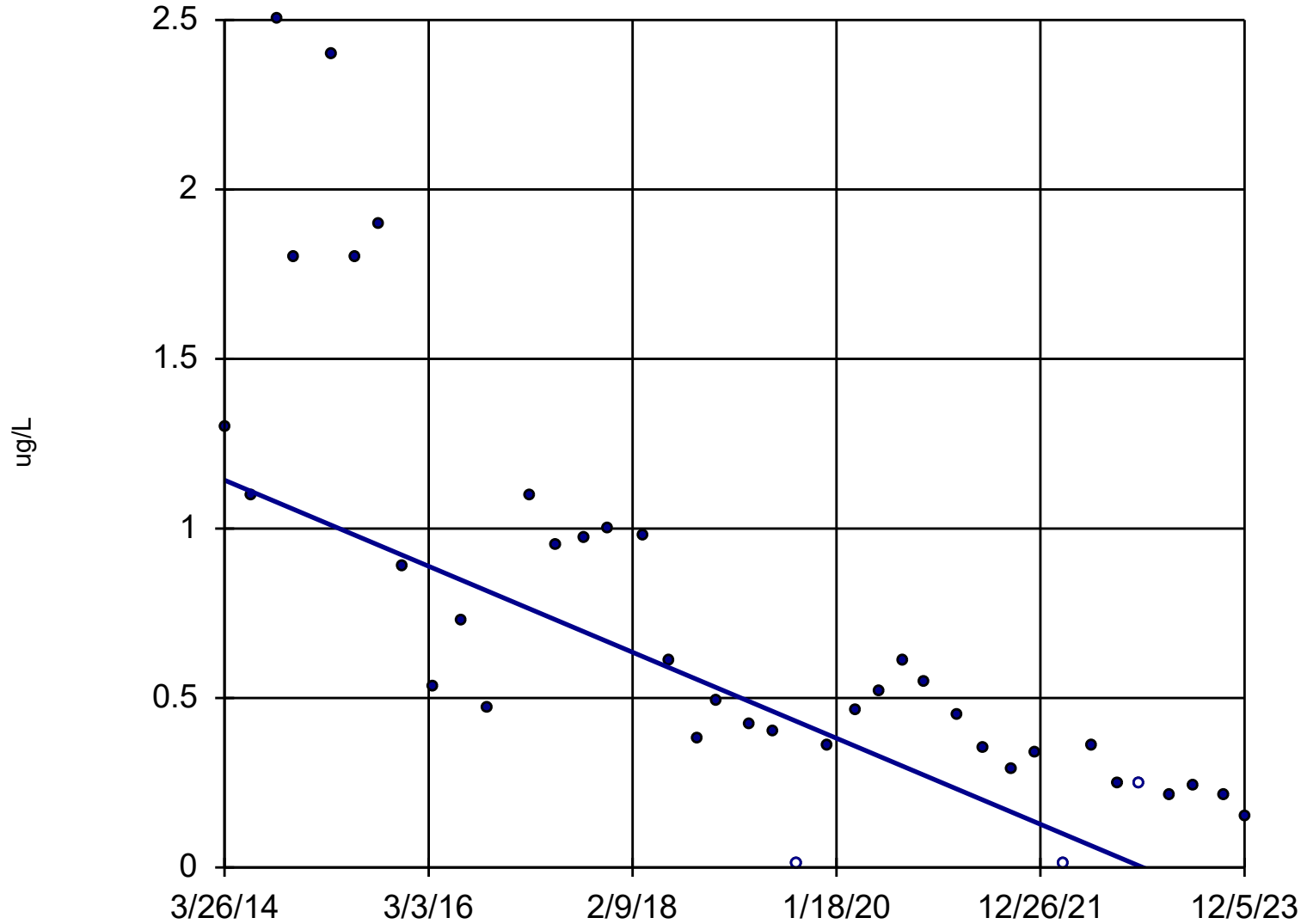
Slope = -0.2296
units per year.

Mann-Kendall
statistic = -402
critical = -186

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.1309
units per year.

Mann-Kendall
statistic = -522
critical = -194

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

D-2

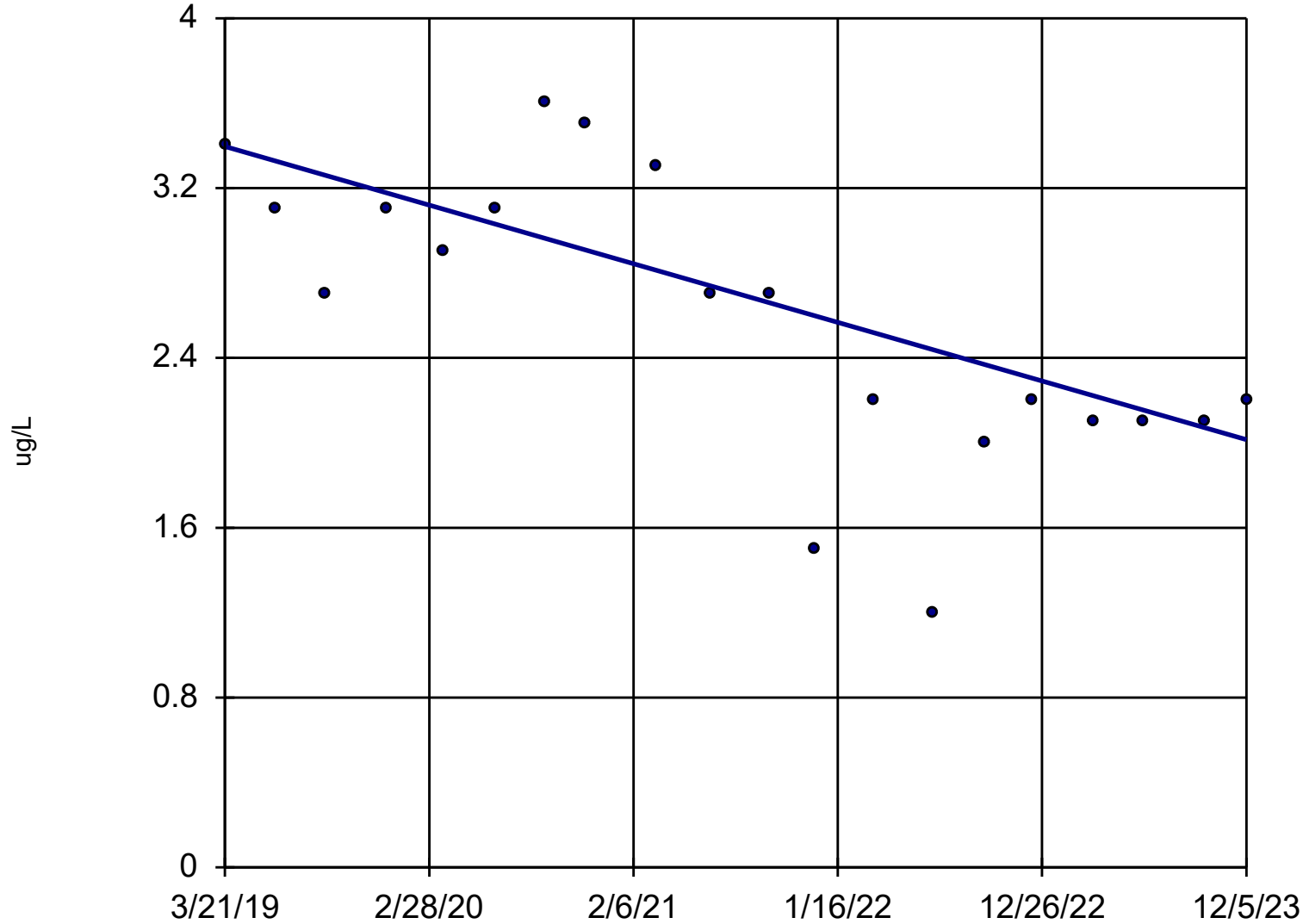
5-Year Trends

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2019 through Fourth Quarter 2023

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
1,1-Dichloroethane (ug/L)	MWell#6	-0.2933	-94	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#9	-0.1514	-74	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#10	-0.6706	-111	-73	Yes	20	0	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#6	-0.02728	-77	-73	Yes	20	10	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#3	0.351	87	68	Yes	19	0	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#9	0.3146	117	73	Yes	20	15	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#10	-0.09208	-119	-73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	0.6412	140	73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#6	-3.499	-90	-73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#10	1.19	89	73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#12	0.08314	91	73	Yes	20	0	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#6	-0.1023	-82	-73	Yes	20	15	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	0.1426	144	73	Yes	20	5	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#6	-0.4817	-105	-73	Yes	20	5	n/a	n/a	0.02	NP

Sen's Slope Estimator

MWell#6



n = 20

Slope = -0.2933
units per year.

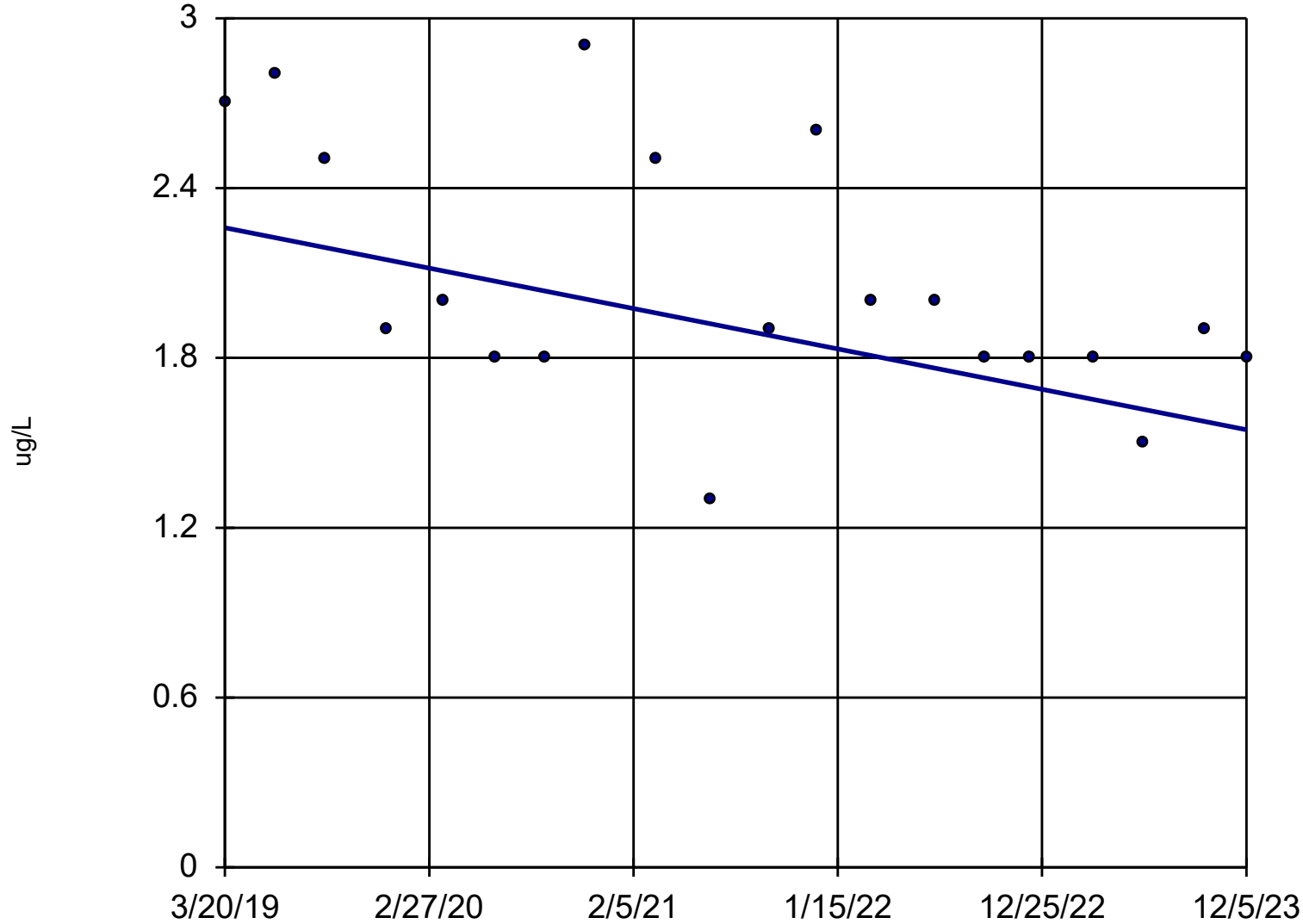
Mann-Kendall
statistic = -94
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 20

Slope = -0.1514
units per year.

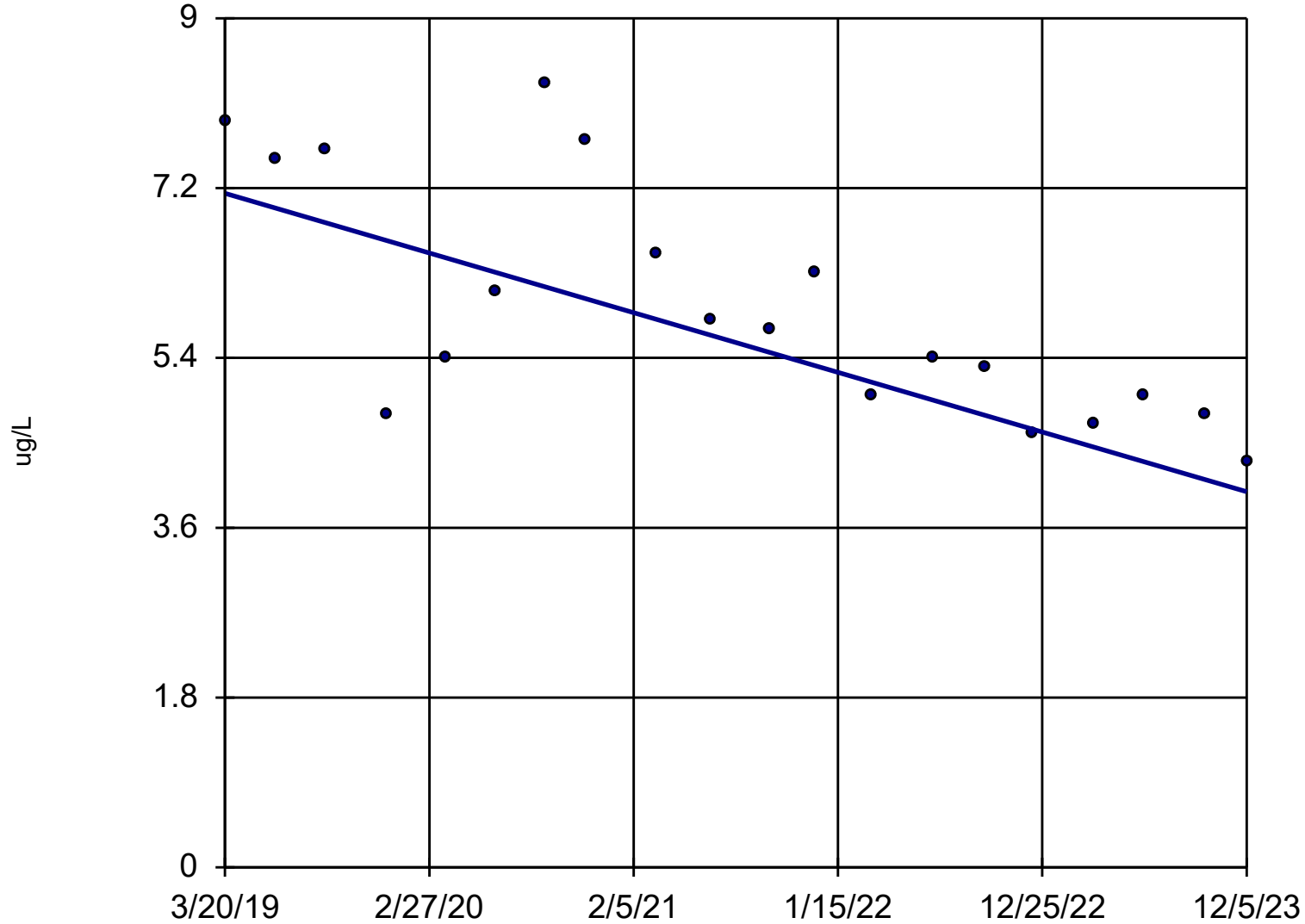
Mann-Kendall
statistic = -74
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 20

Slope = -0.6706
units per year.

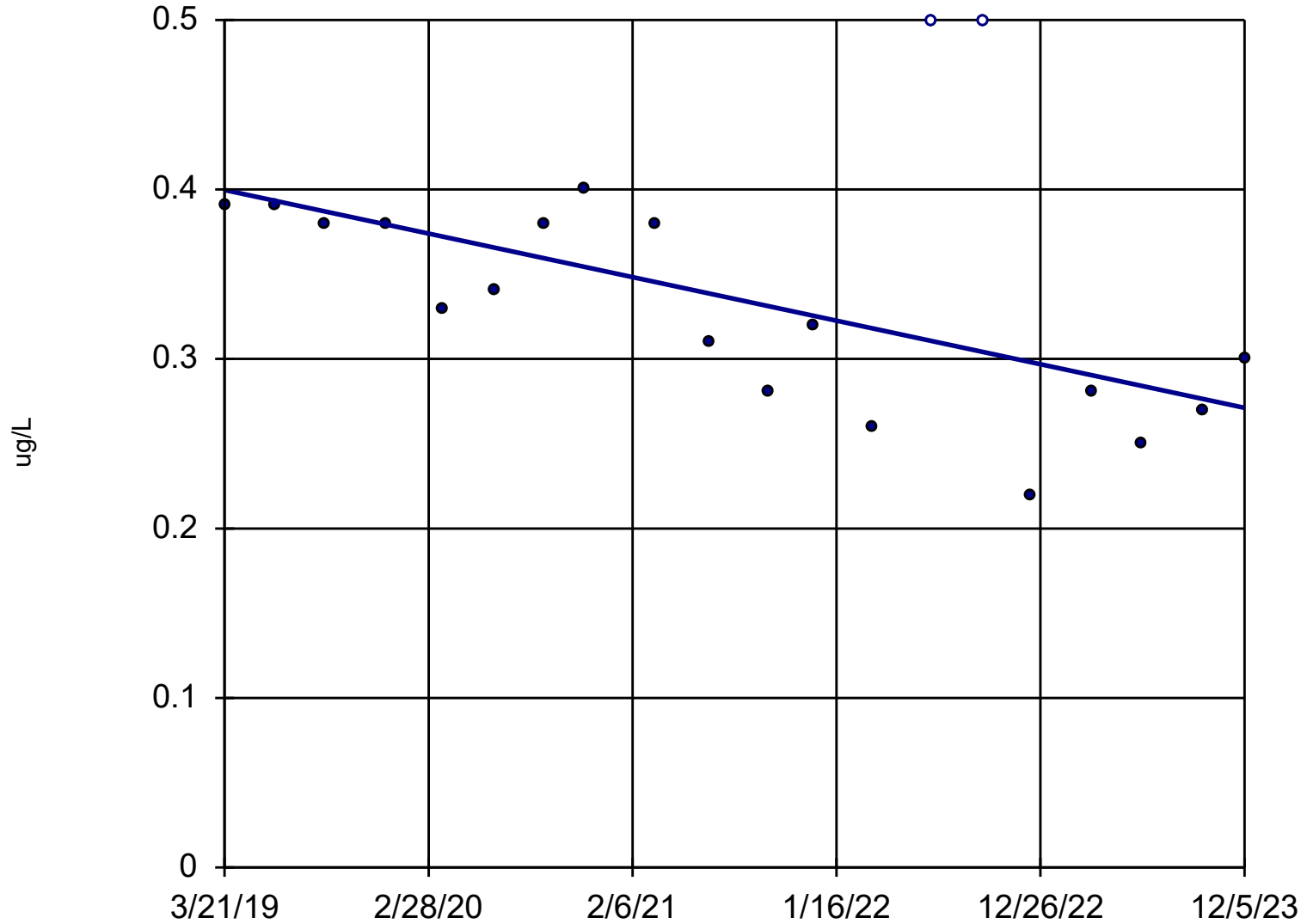
Mann-Kendall
statistic = -111
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 20

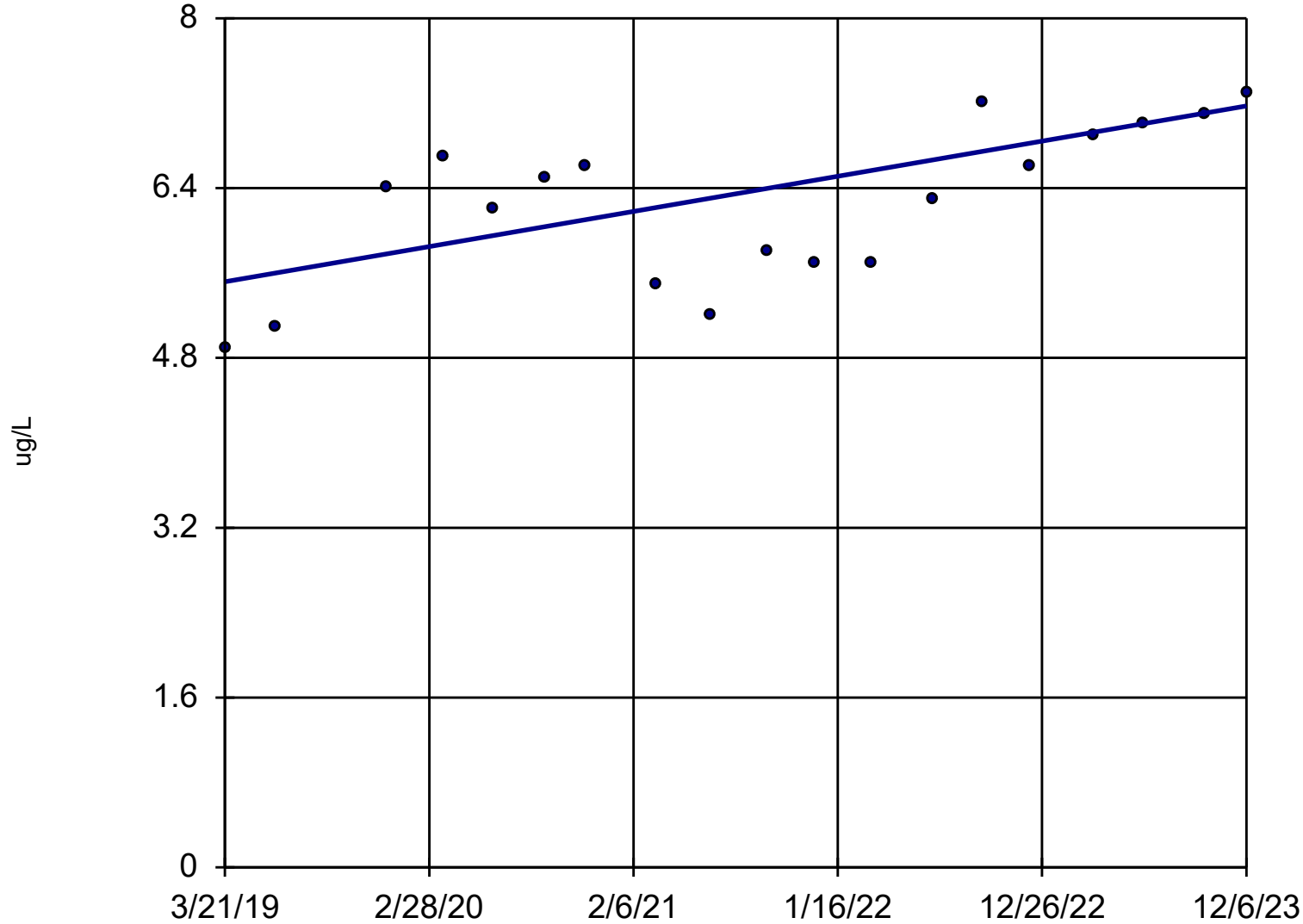
Slope = -0.02728
units per year.

Mann-Kendall
statistic = -77
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#3



n = 19

Slope = 0.351
units per year.

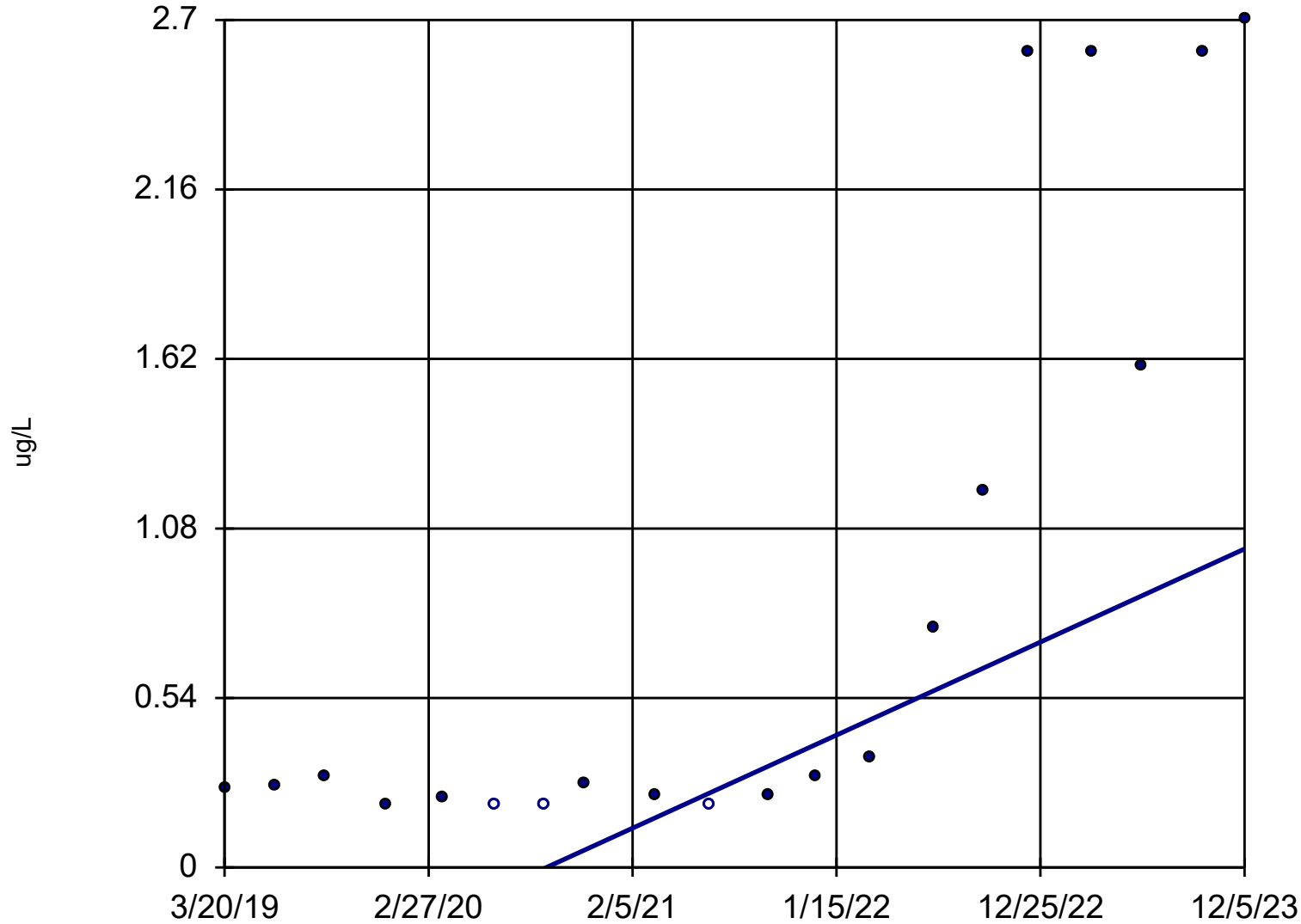
Mann-Kendall
statistic = 87
critical = 68

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 20

Slope = 0.3146
units per year.

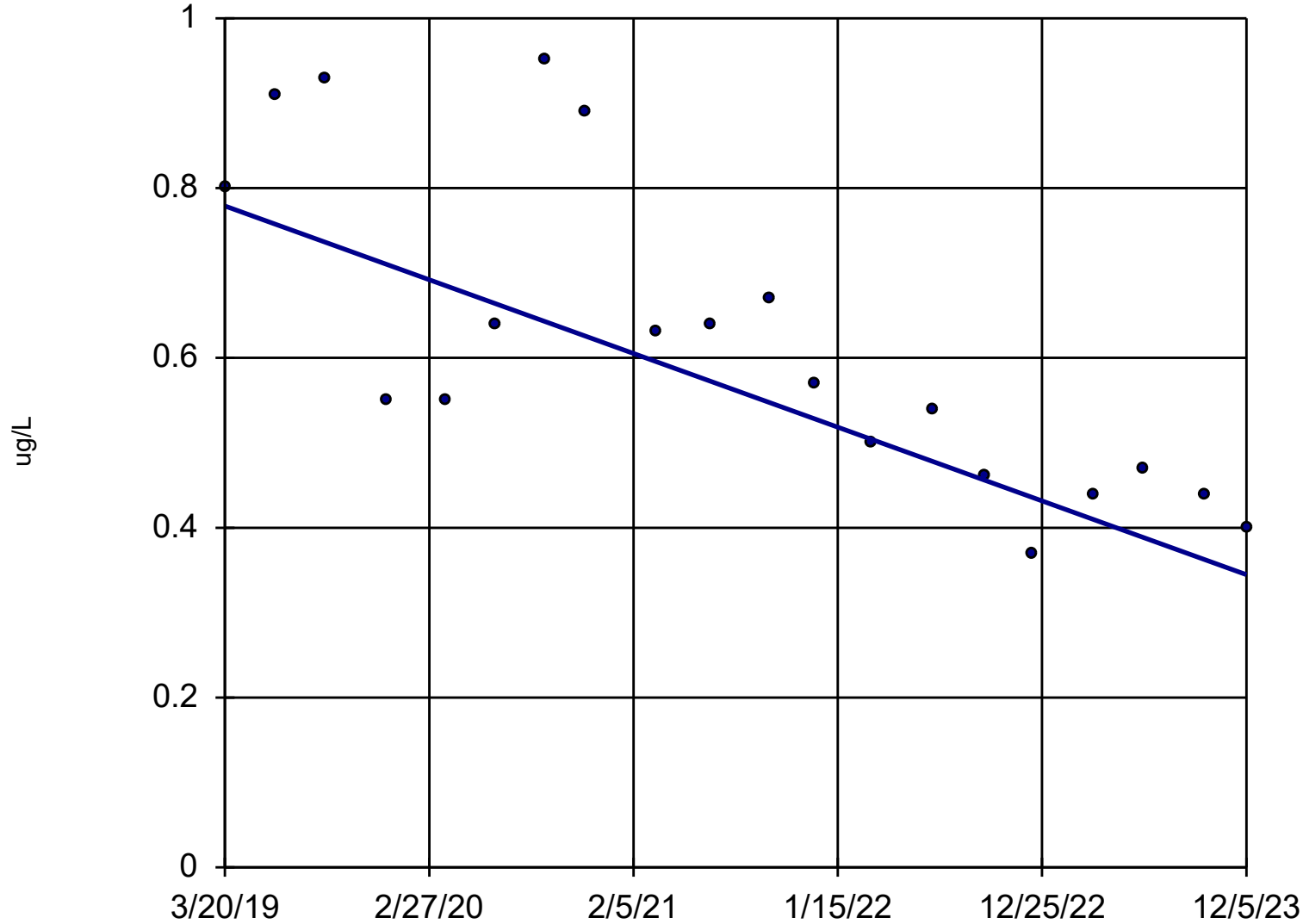
Mann-Kendall
statistic = 117
critical = 73

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 20

Slope = -0.09208
units per year.

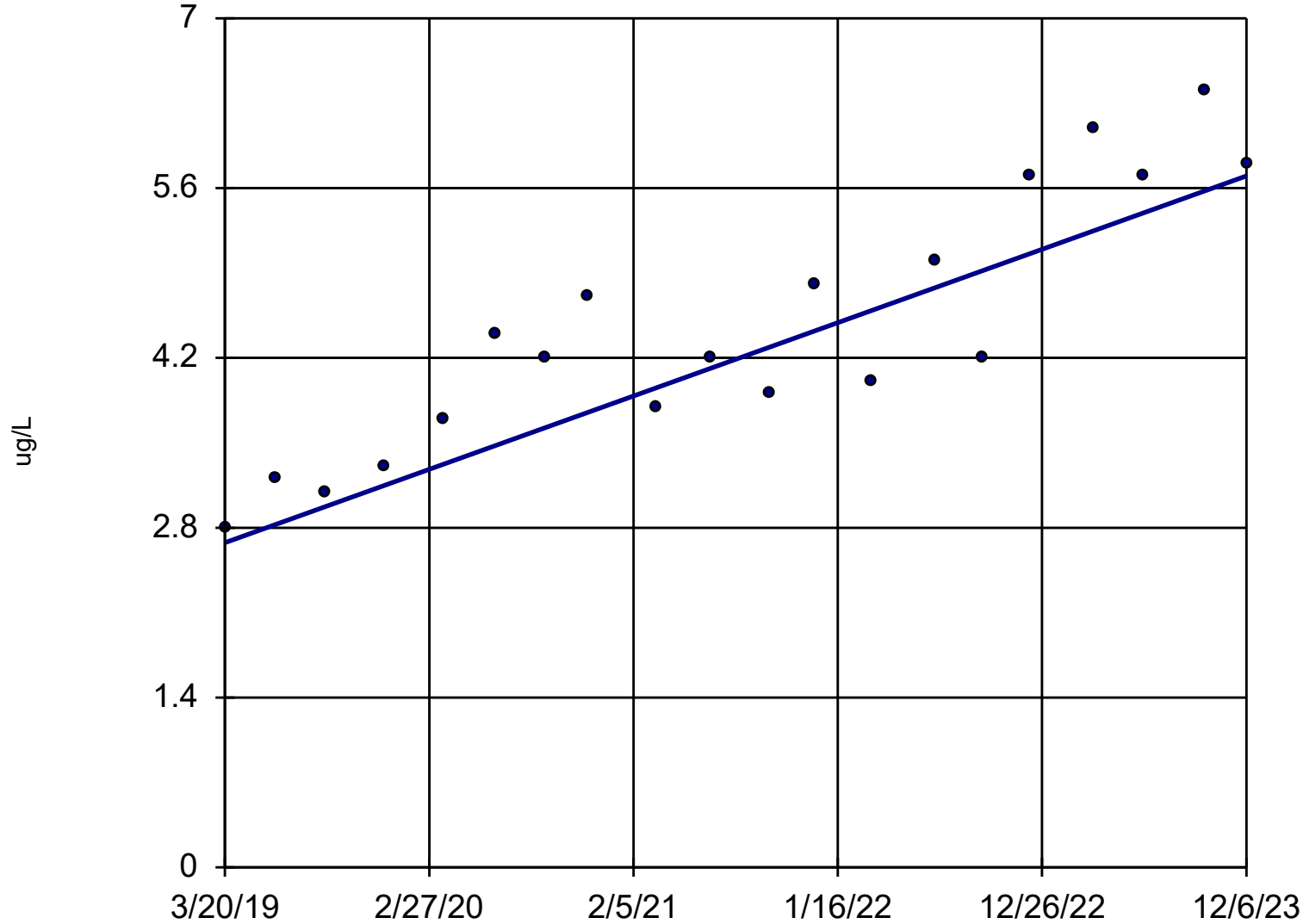
Mann-Kendall
statistic = -119
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 20

Slope = 0.6412
units per year.

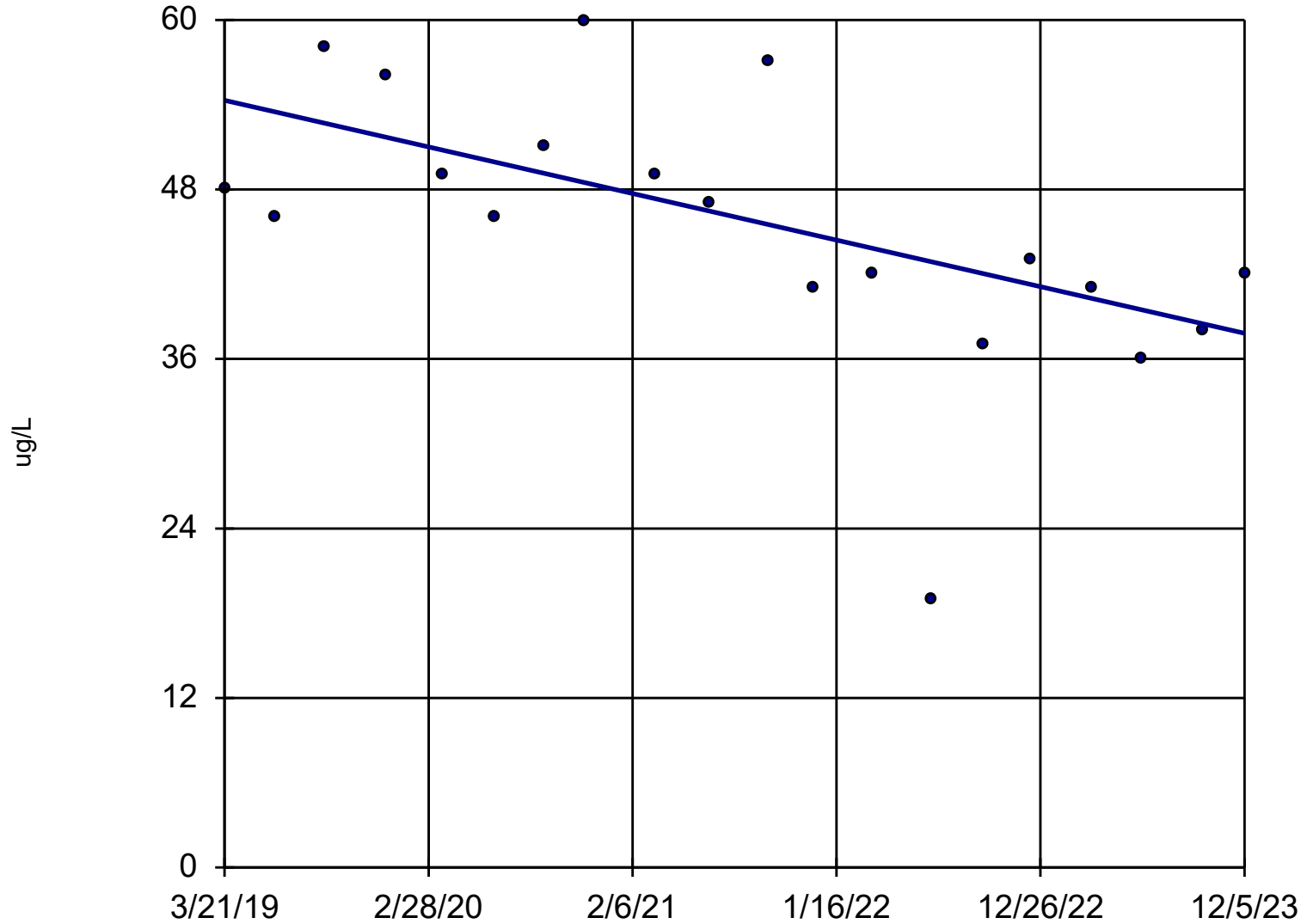
Mann-Kendall
statistic = 140
critical = 73

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 20

Slope = -3.499
units per year.

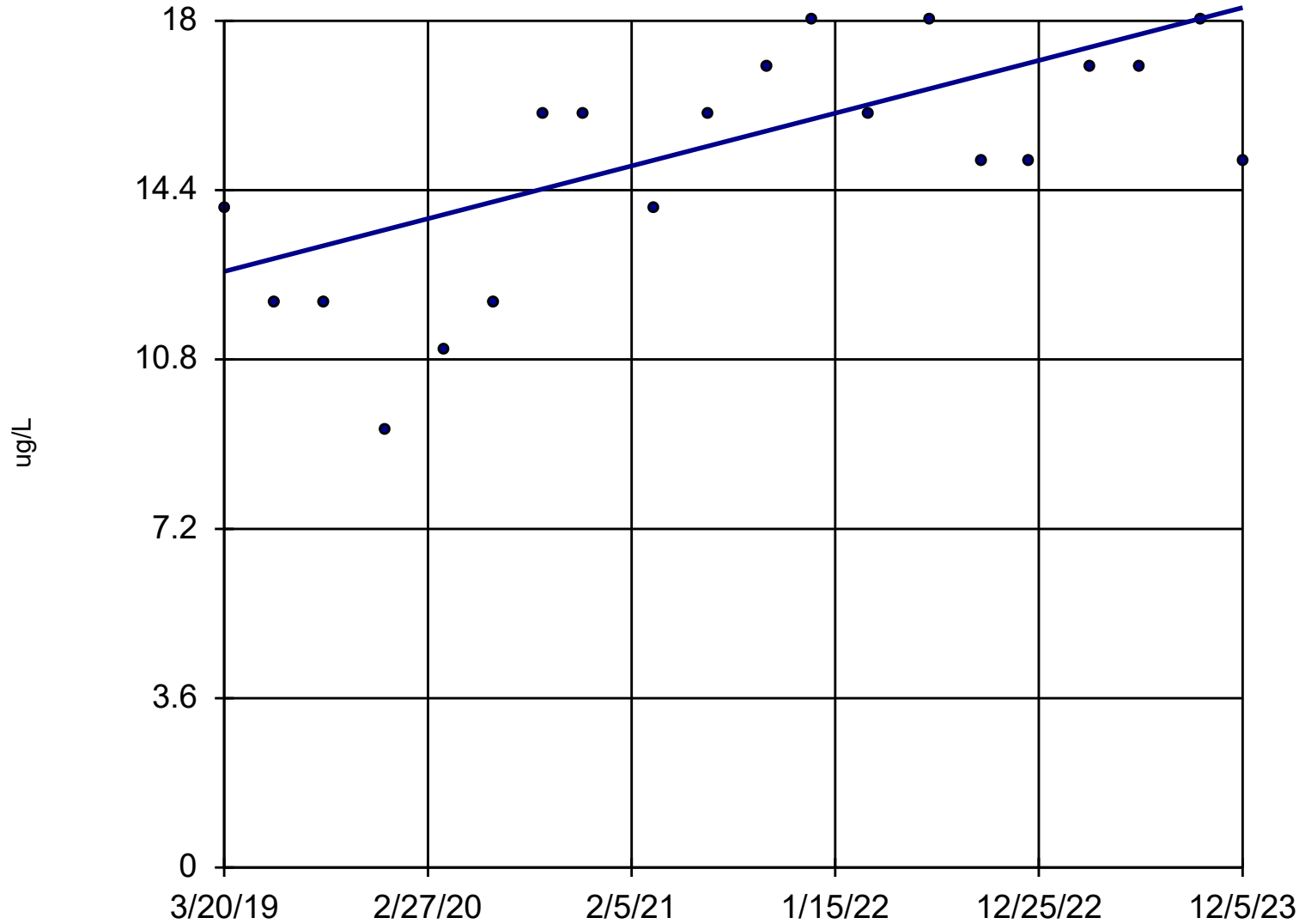
Mann-Kendall
statistic = -90
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 20

Slope = 1.19
units per year.

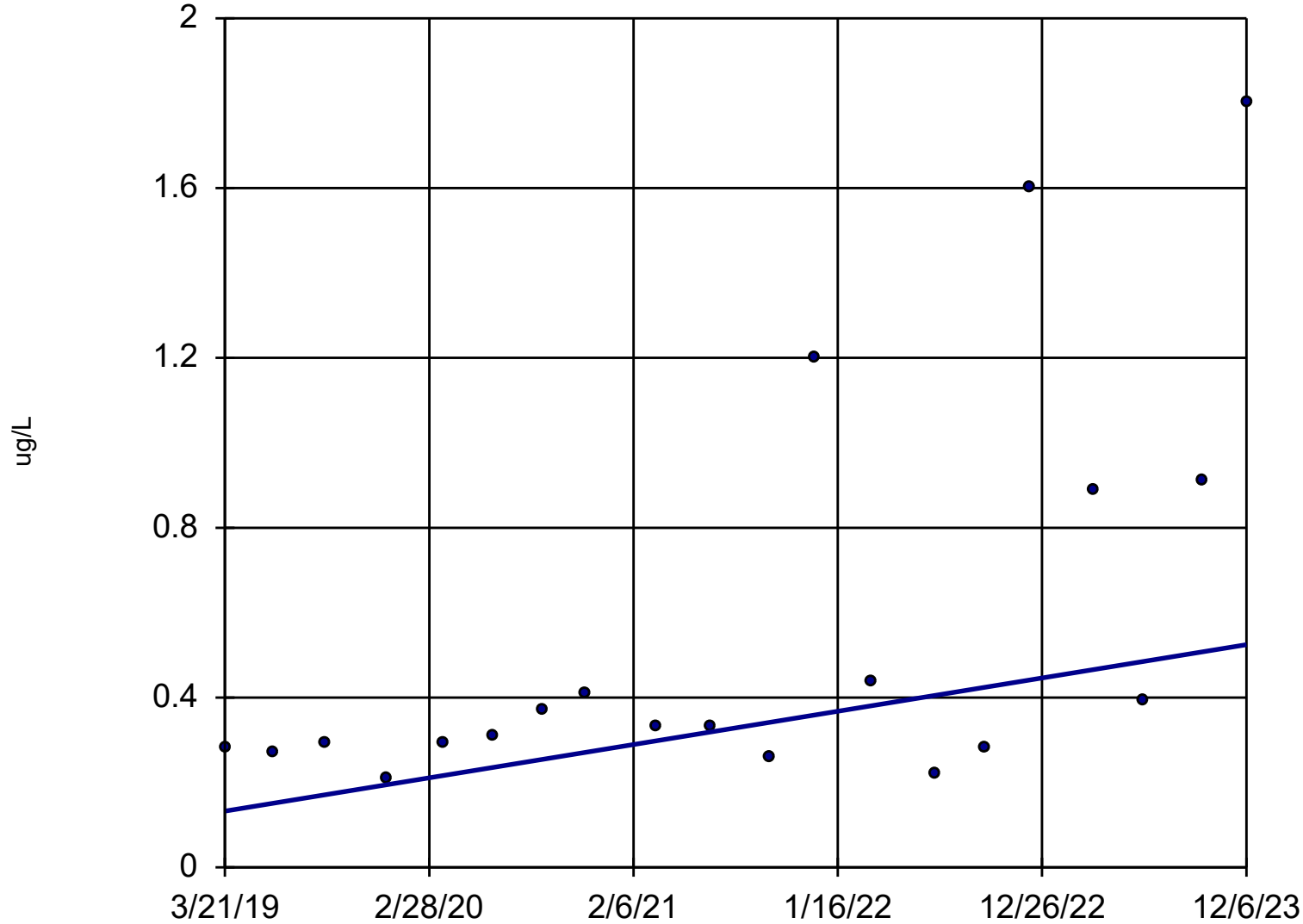
Mann-Kendall
statistic = 89
critical = 73

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#12



n = 20

Slope = 0.08314
units per year.

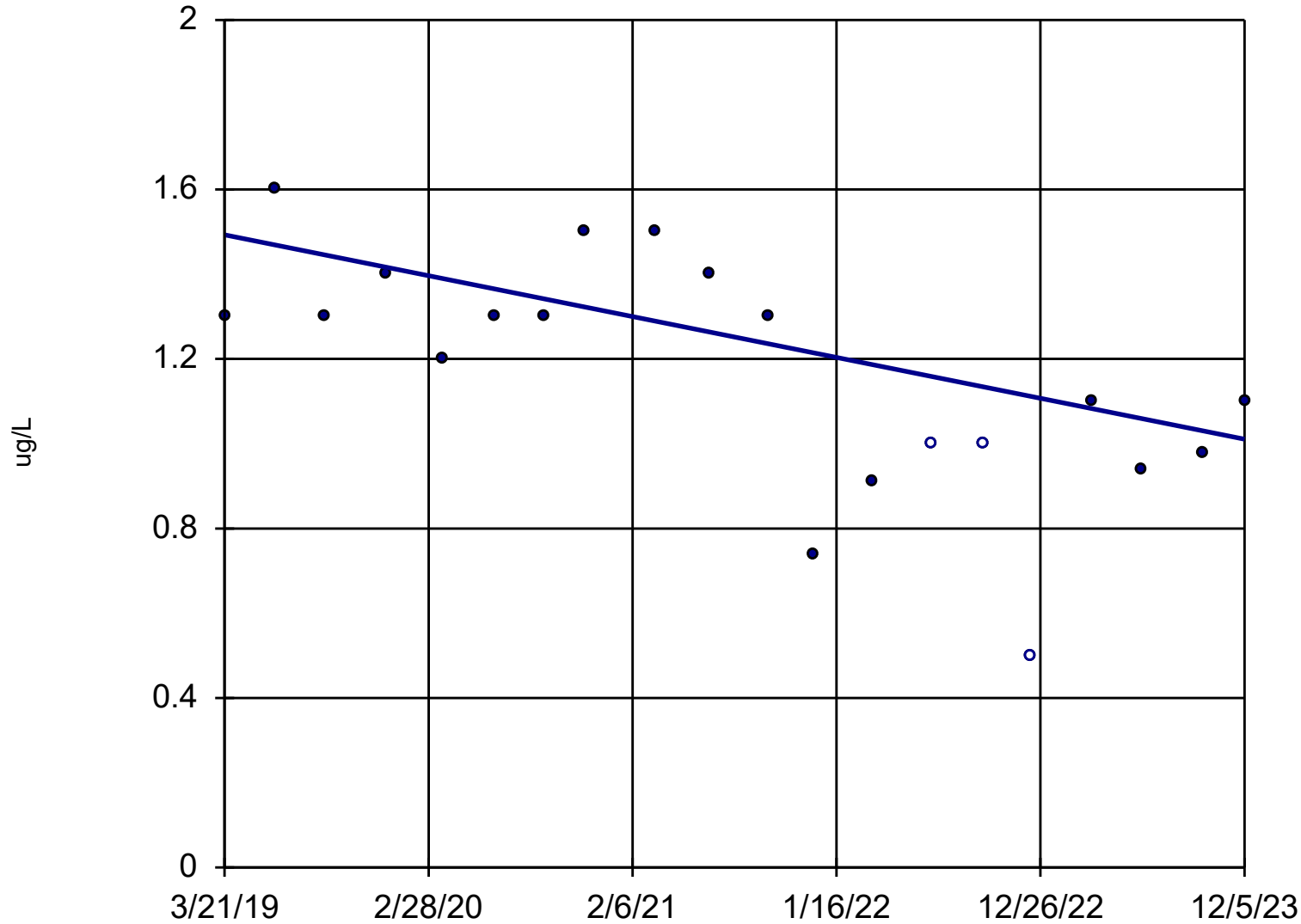
Mann-Kendall
statistic = 91
critical = 73

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:41 PM View: HRLF_SensSlope 5-year
Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 20

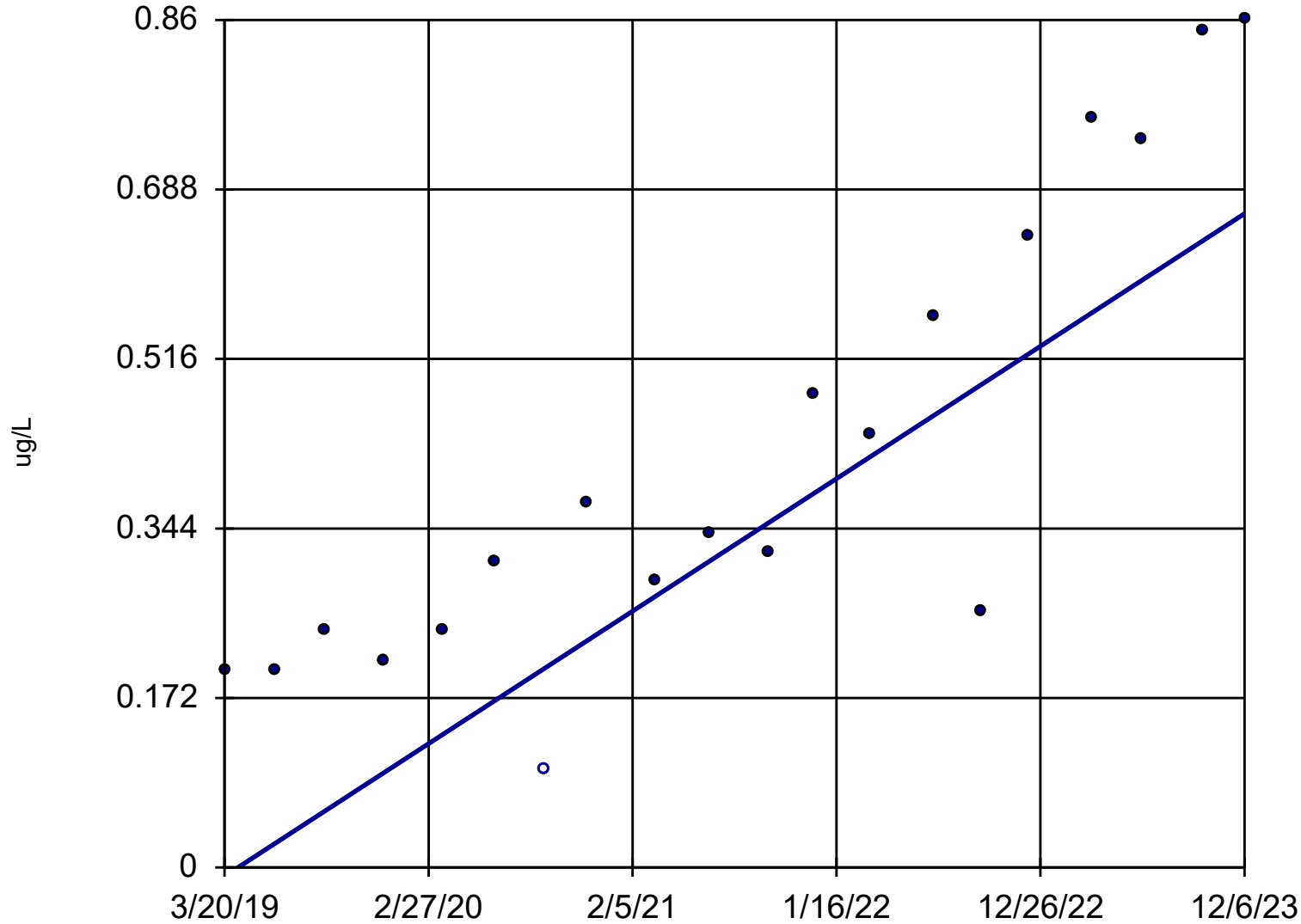
Slope = -0.1023
units per year.

Mann-Kendall
statistic = -82
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#4



n = 20

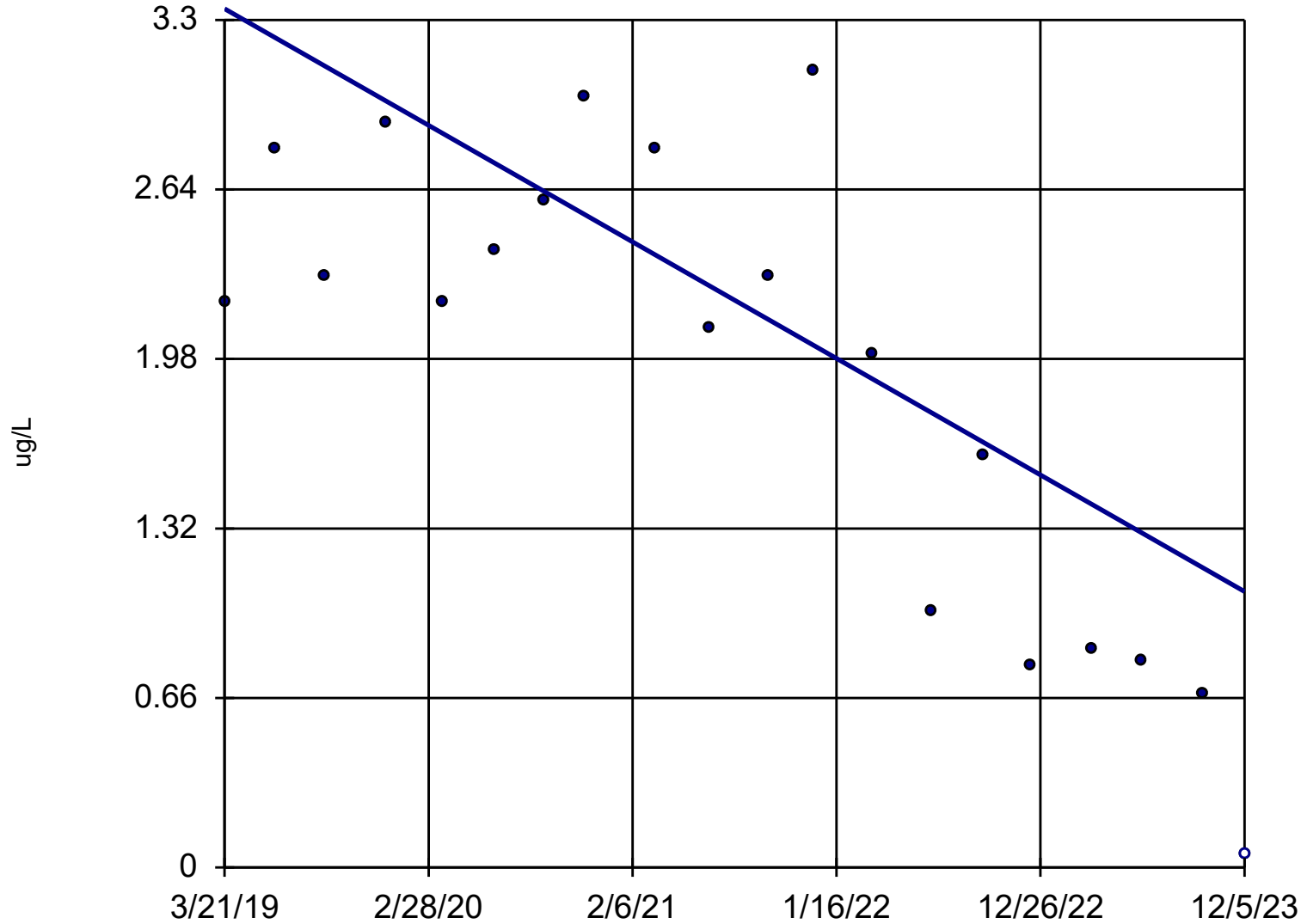
Slope = 0.1426
units per year.

Mann-Kendall
statistic = 144
critical = 73

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Sen's Slope Estimator

MWell#6



n = 20

Slope = -0.4817
units per year.

Mann-Kendall
statistic = -105
critical = -73

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

D-3

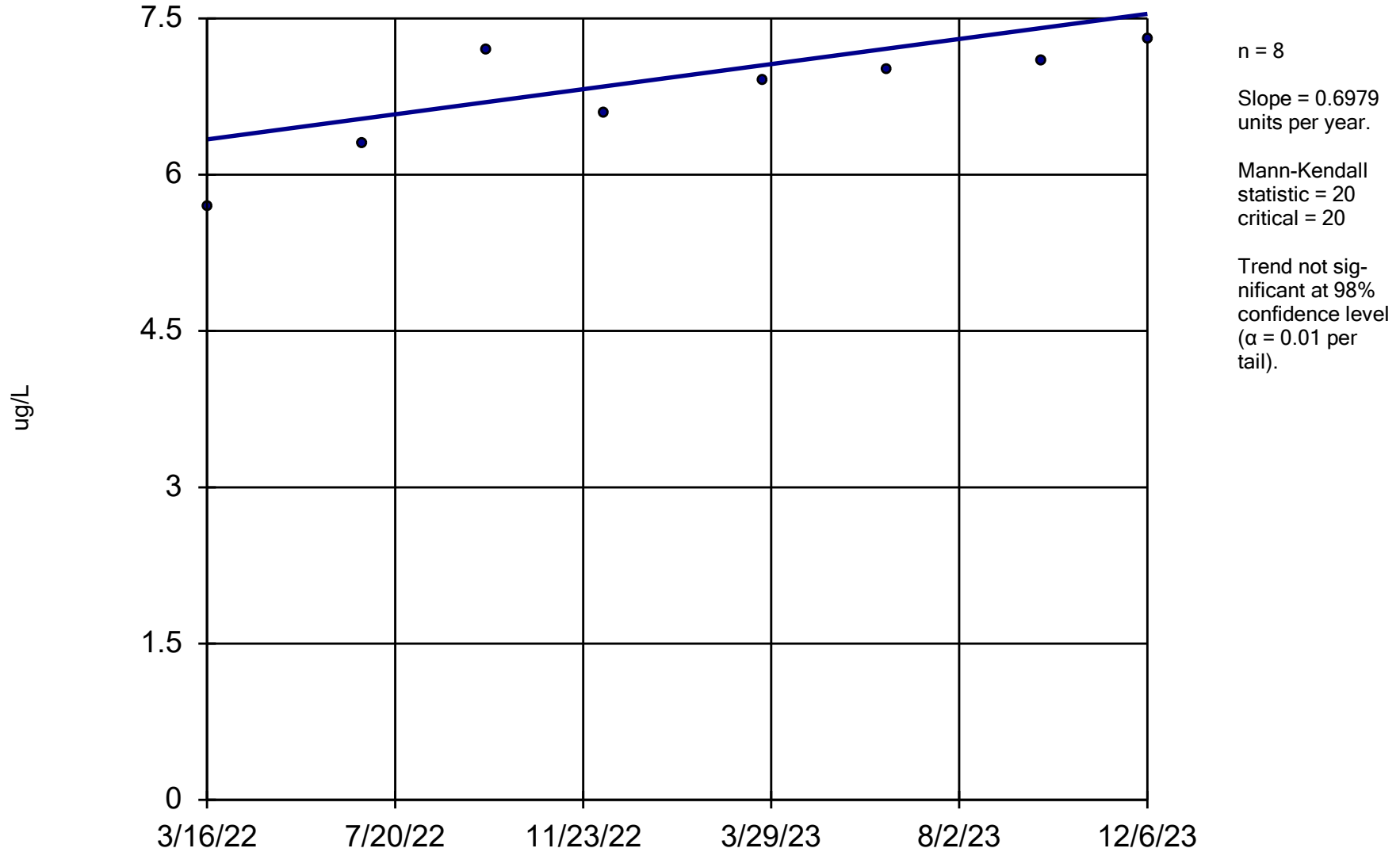
2-Year Trends

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2022 through Fourth Quarter 2023

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
Chloroform (ug/L)	MWell#3	0.6979	20	20	No	8	0	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#9	1.368	21	20	Yes	8	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	1.221	19	20	No	8	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#10	0	1	20	No	8	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#12	0.4982	14	20	No	8	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	0.2466	22	20	Yes	8	0	n/a	n/a	0.02	NP

Sen's Slope Estimator

MWell#3

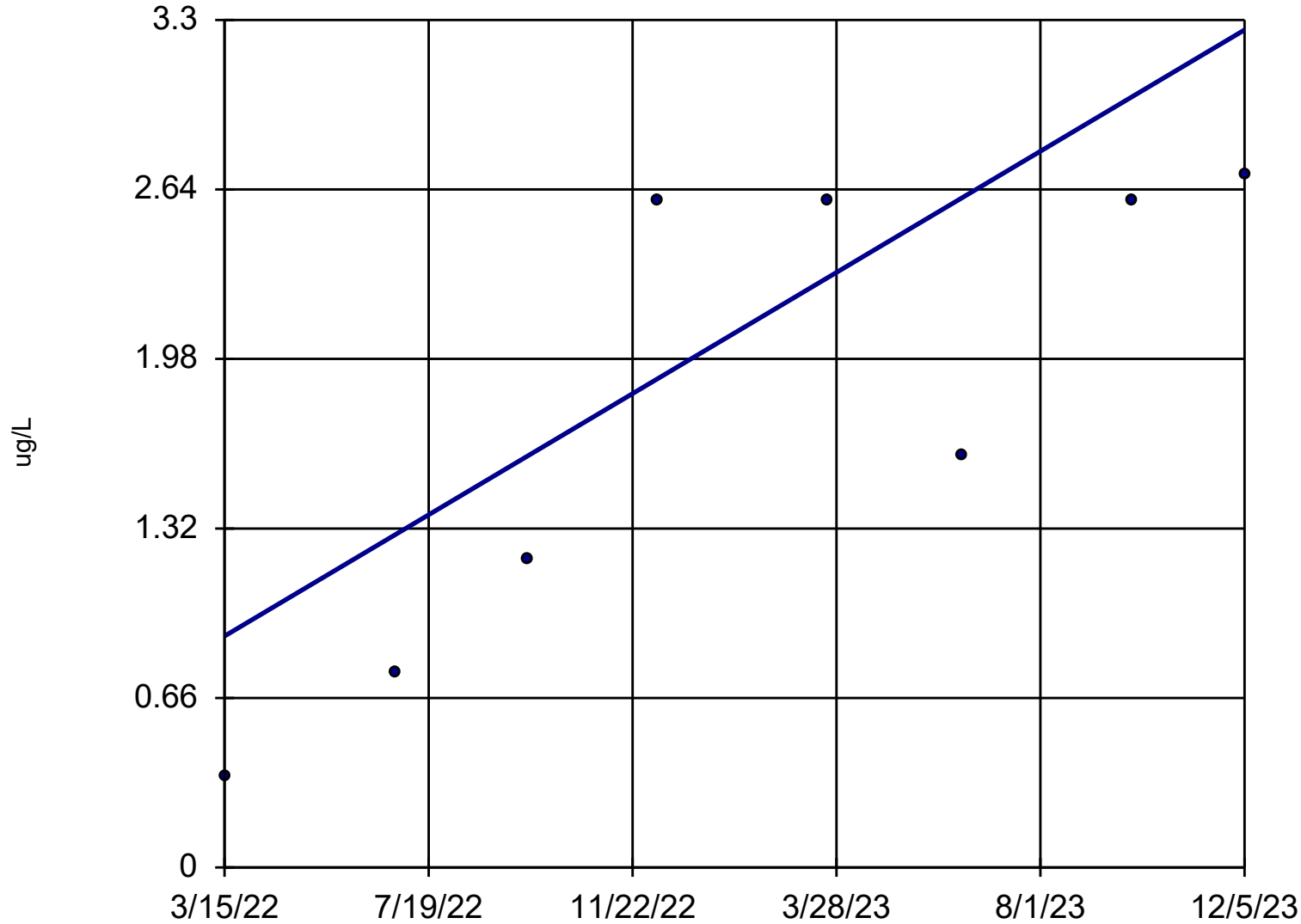


Constituent: Chloroform Analysis Run 1/29/2024 12:47 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 8

Slope = 1.368
units per year.

Mann-Kendall
statistic = 21
critical = 20

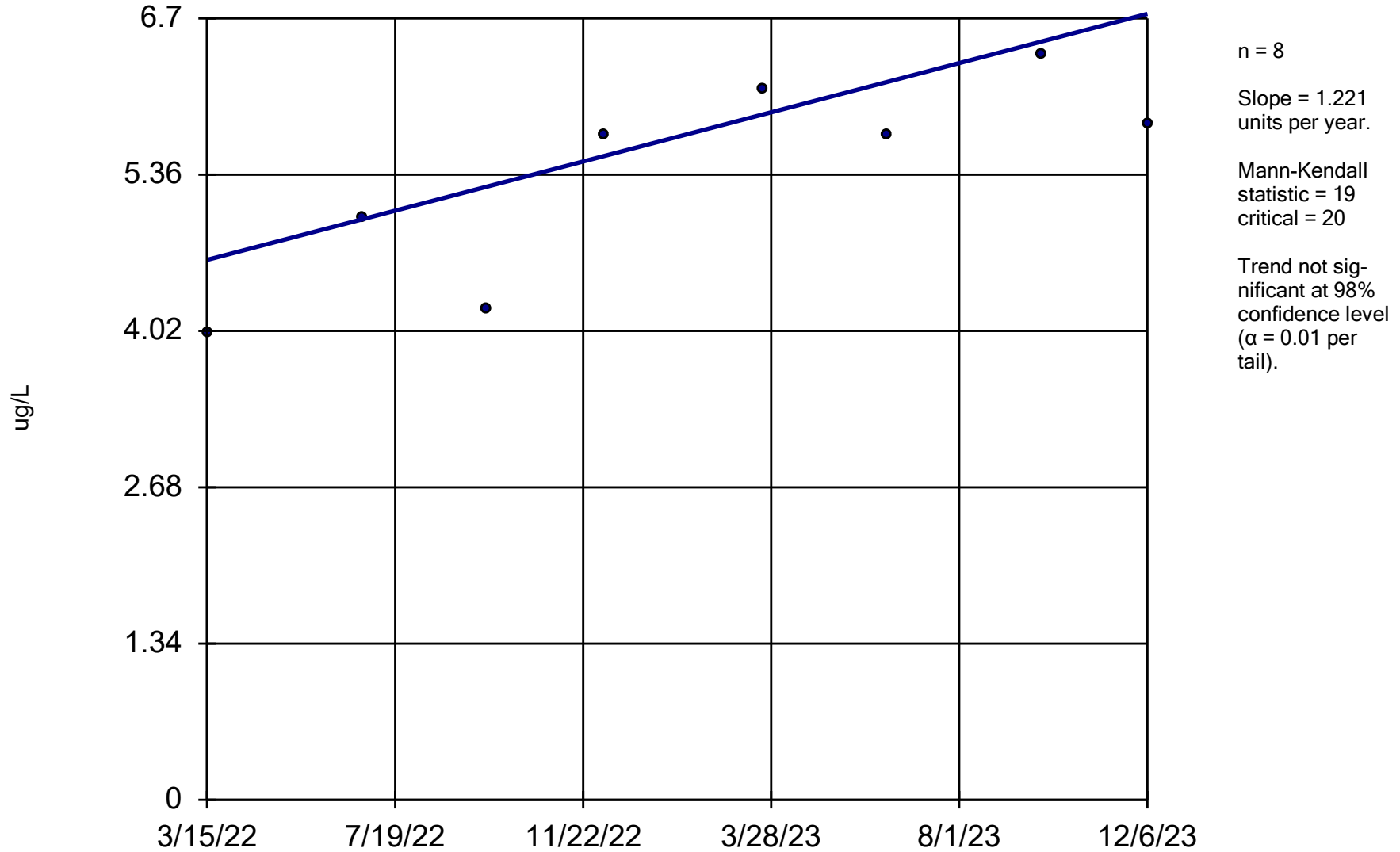
Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloroform Analysis Run 1/29/2024 12:47 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4

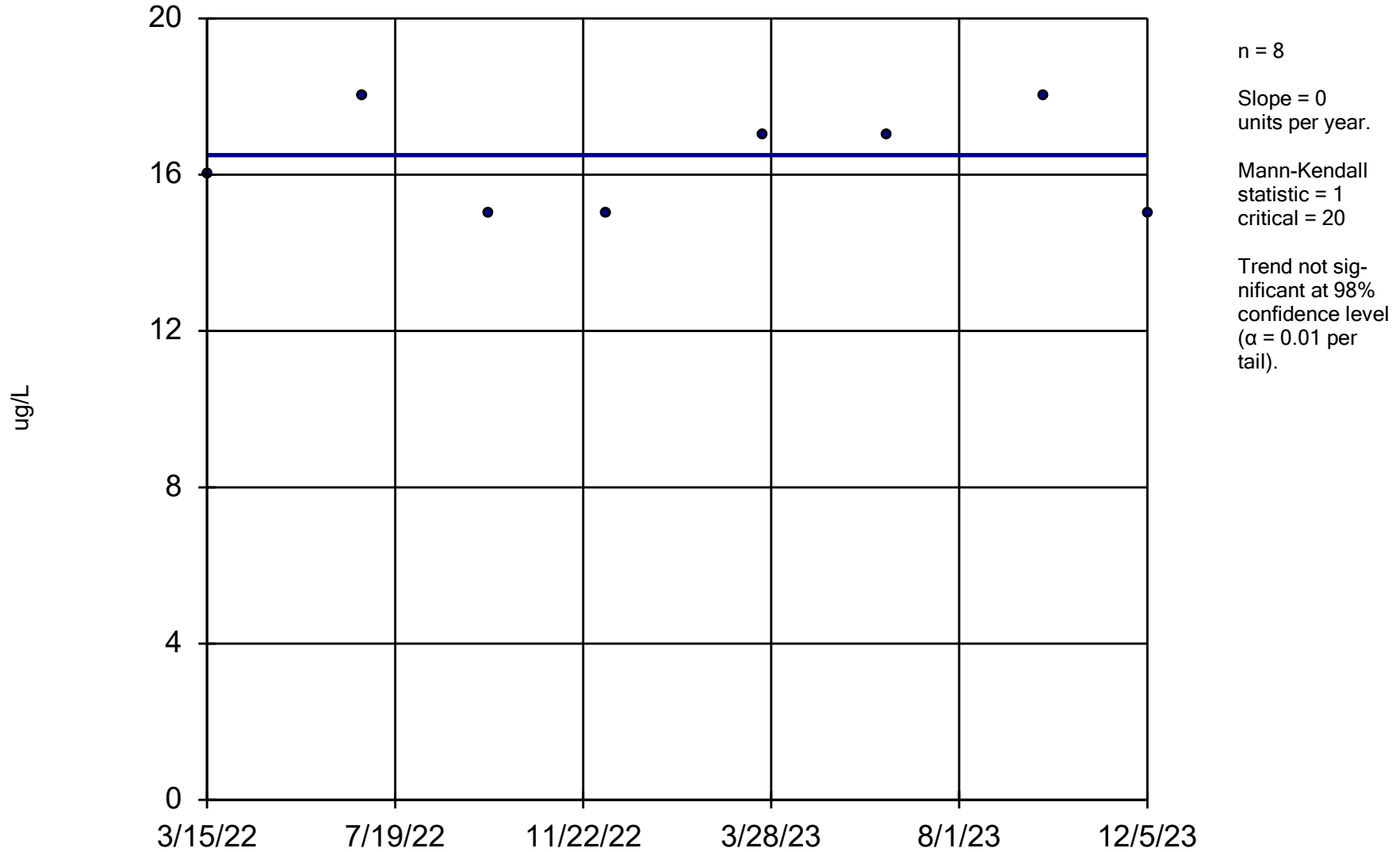


Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:47 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10

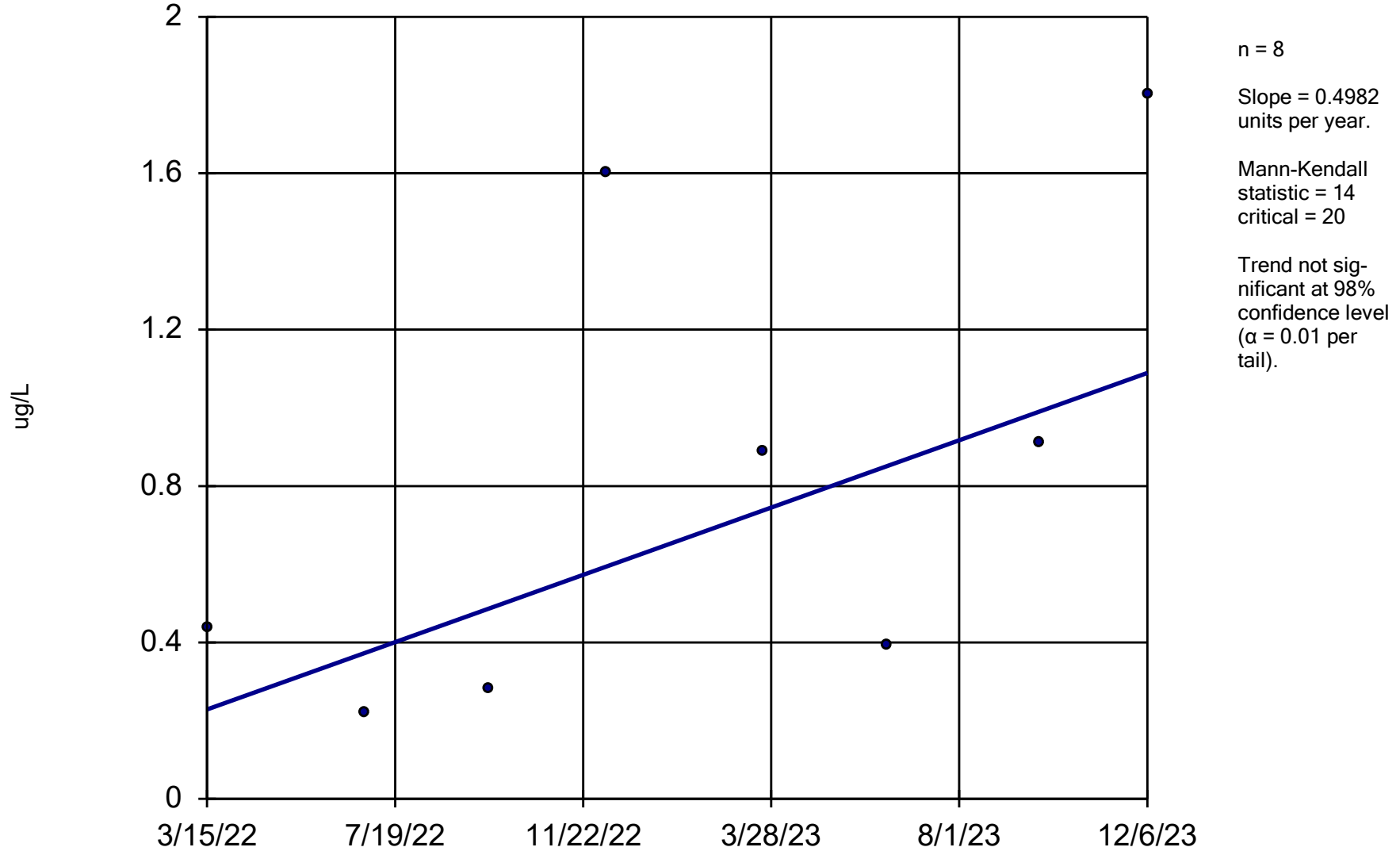


Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:47 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#12

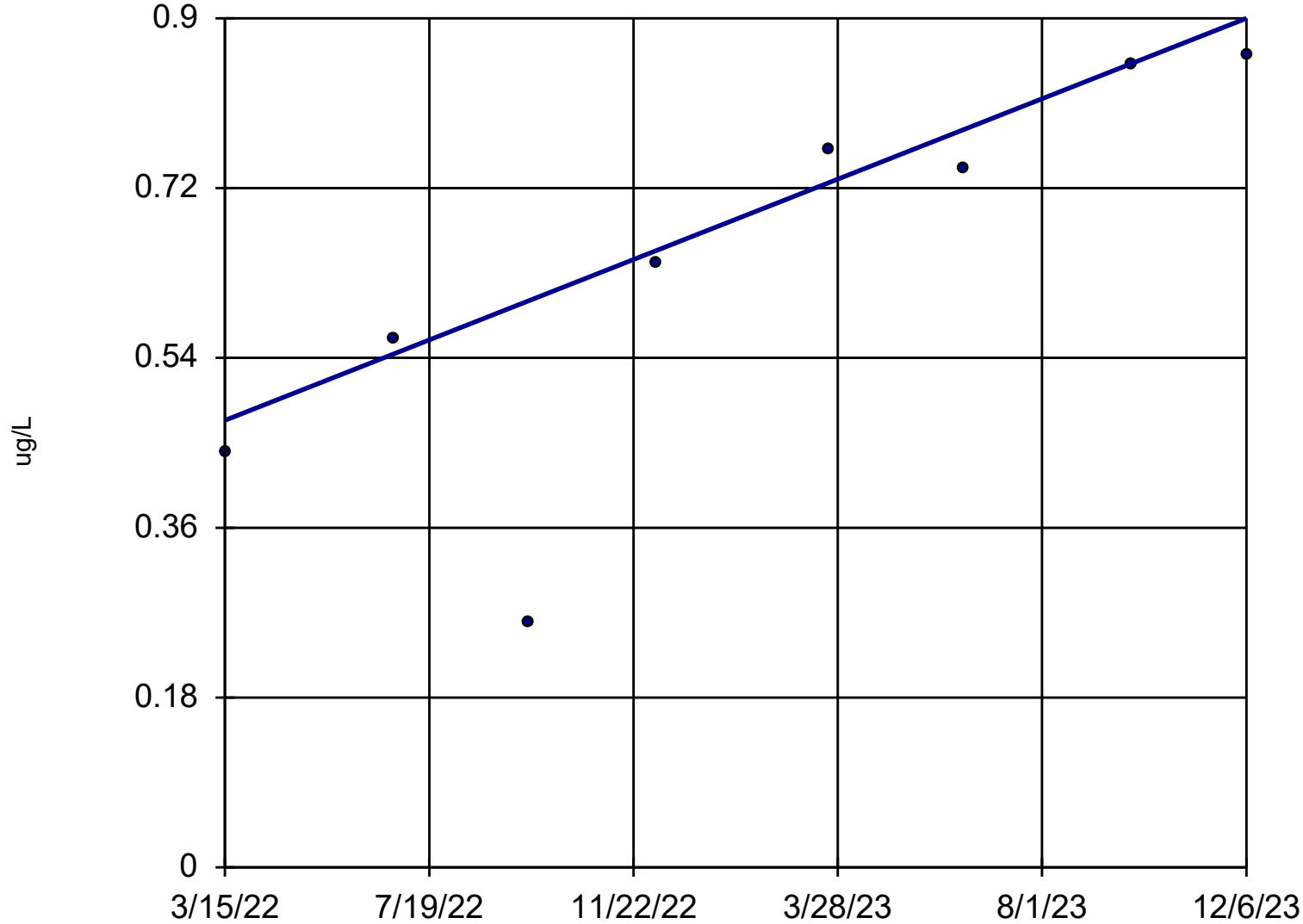


Constituent: cis-1,2-Dichloroethene Analysis Run 1/29/2024 12:47 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 8

Slope = 0.2466
units per year.

Mann-Kendall
statistic = 22
critical = 20

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Trichloroethene Analysis Run 1/29/2024 12:47 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Appendix E

Background Statistical Summary

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023

Summary of Descriptive Statistics

Constituent Name	Well	N	Mean ¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
1,1,1,2-Tetrachloroethane (ug/L)	MWell#1 (bg) ²	127	0.9293	1.014049	1.007	0.08933	1.08361132	1	100
1,1,1,2-Tetrachloroethane (ug/L)	MWell#11	54	0.4781	0.11868025	0.3445	0.04688	0.720560552	0.3	100
1,1,1-Trichloroethane (ug/L)	MWell#1	127	0.9057	1.038361	1.019	0.09046	1.12509661	1	100
1,1,1-Trichloroethane (ug/L)	MWell#11	54	0.432	0.13380964	0.3658	0.04978	0.846759259	0.2	100
1,1,2,2-Tetrachloroethane (ug/L)	MWell#1	127	0.9106	1.038361	1.019	0.0904	1.11904239	1	100
1,1,2,2-Tetrachloroethane (ug/L)	MWell#11	54	0.4341	0.13527684	0.3678	0.05006	0.847270214	0.2	100
1,1,2-Trichloroethane (ug/L)	MWell#1	127	0.9163	1.048576	1.024	0.09084	1.117537924	1	100
1,1,2-Trichloroethane (ug/L)	MWell#11	54	0.4291	0.132496	0.364	0.04954	0.848287113	0.2	100
1,1-Dichloroethane (ug/L)	MWell#1	127	0.9228	1.036324	1.018	0.09038	1.103164283	1	96.06
1,1-Dichloroethane (ug/L)	MWell#11	54	0.4481	0.157609	0.397	0.05403	0.885962955	0.2	100
1,1-Dichloroethene (ug/L)	MWell#1	127	1.117	2.3409	1.53	0.1357	1.369740376	1	100
1,1-Dichloroethene (ug/L)	MWell#11	54	0.415	0.14791716	0.3846	0.05233	0.926746988	0.2	100
1,2,3-Trichloropropane (ug/L)	MWell#1	127	0.9831	1.684804	1.298	0.1152	1.320313295	1	100
1,2,3-Trichloropropane (ug/L)	MWell#11	54	0.4381	0.13097161	0.3619	0.04925	0.826067108	0.2	100
1,2-Dibromo-3-chloropropane (ug/L)	MWell#1	125	2.877	6.205081	2.491	0.2228	0.865832464	2	100
1,2-Dibromo-3-chloropropane (ug/L)	MWell#11	54	1.87	0.17505856	0.4184	0.05694	0.223743316	2	100
1,2-Dibromoethane (ug/L)	MWell#1	126	0.9501	1.750329	1.323	0.1178	1.392485002	1	100
1,2-Dibromoethane (ug/L)	MWell#11	54	0.3613	0.16353936	0.4044	0.05503	1.119291448	0.1	100
1,2-Dichlorobenzene (ug/L)	MWell#1	126	1.104	2.295225	1.515	0.135	1.372282609	1	99.21
1,2-Dichlorobenzene (ug/L)	MWell#11	54	0.5222	0.13801225	0.3715	0.05055	0.711413252	0.3	100
1,2-Dichloroethane (ug/L)	MWell#1	126	0.9437	1.083681	1.041	0.09271	1.1031048	1	100
1,2-Dichloroethane (ug/L)	MWell#11	54	0.4389	0.14055001	0.3749	0.05101	0.854180907	0.2	100
1,2-Dichloropropane (ug/L)	MWell#1	123	0.9896	1.162084	1.078	0.09719	1.089329022	1	100
1,2-Dichloropropane (ug/L)	MWell#11	54	0.4356	0.13667809	0.3697	0.0503	0.848714417	0.2	100
1,4-Dichlorobenzene (ug/L)	MWell#1	126	1.104	2.295225	1.515	0.135	1.372282609	1	99.21
1,4-Dichlorobenzene (ug/L)	MWell#11	54	0.5241	0.14333796	0.3786	0.05153	0.722381225	0.3	100
2-Butanone (ug/L)	MWell#1	121	9.574	65.642404	8.102	0.7365	0.846250261	10	97.52
2-Butanone (ug/L)	MWell#11	54	10.46	10.214416	3.196	0.4349	0.305544933	10	100
2-Hexanone (ug/L)	MWell#1	121	4.888	15.626209	3.953	0.3594	0.808715221	5	99.17
2-Hexanone (ug/L)	MWell#11	54	3.306	1.646089	1.283	0.1746	0.388082275	3	100
4-Methyl-2-pentanone (ug/L)	MWell#1	120	5.477	10.214416	3.196	0.2917	0.58353113	5	100
4-Methyl-2-pentanone (ug/L)	MWell#11	54	6.12	6.959044	2.638	0.3591	0.431045752	5	100

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023

Summary of Descriptive Statistics

Constituent Name	Well	N	Mean¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
Acetone (ug/L)	MWell#1	123	15.29	4897.2004	69.98	6.31	4.576847613	6	95.12
Acetone (ug/L)	MWell#11	54	7.078	12.0409	3.47	0.4722	0.490251483	10	100
Acrylonitrile (ug/L)	MWell#1	121	5.862	21.827584	4.672	0.4248	0.796997612	5	100
Acrylonitrile (ug/L)	MWell#11	54	7.133	8.4681	2.91	0.396	0.407962989	5	100
Alkalinity (mg/L)	MWell#1	117	286.2	5087.9689	71.33	6.594	0.249231307	300	0
Alkalinity (mg/L)	MWell#11	54	178.7	302.0644	17.38	2.365	0.097257974	170	0
Ammonia Nitrogen (mg/L)	MWell#1	126	0.1584	0.03115225	0.1765	0.01572	1.114267677	0.1	79.37
Ammonia Nitrogen (mg/L)	MWell#11	54	0.3033	0.06646084	0.2578	0.03508	0.849983515	0.2	92.59
Antimony, Dissolved (mg/L)	MWell#1	84	0.01785	0.00143338	0.03786	0.004131	2.121008403	0.001	95.24
Antimony, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Antimony, Total (mg/L)	MWell#1	42	0.0005524	3.86516E-08	0.0001966	0.00003034	0.355901521	0.0004	100
Antimony, Total (mg/L)	MWell#11	42	0.0005524	3.86516E-08	0.0001966	0.00003034	0.355901521	0.0004	100
Arsenic, Dissolved (mg/L)	MWell#1	85	0.01001	0.000184416	0.01358	0.001473	1.356643357	0.005	15.29
Arsenic, Dissolved (mg/L)	MWell#11	21	0.004729	7.58118E-07	0.0008707	0.00019	0.184119264	0.0049	0
Arsenic, Total (mg/L)	MWell#1	42	0.00425	1.98648E-07	0.0004457	0.00006877	0.104870588	0.0042	0
Arsenic, Total (mg/L)	MWell#11	42	0.004931	1.6538E-06	0.001286	0.0001984	0.260799027	0.00465	0
Barium, Dissolved (mg/L)	MWell#1	85	0.04488	0.00032364	0.01799	0.001951	0.400846702	0.05	9.412
Barium, Dissolved (mg/L)	MWell#11	21	0.08352	0.000259854	0.01612	0.003518	0.193007663	0.08	0
Barium, Total (mg/L)	MWell#1	42	0.05583	6.83433E-05	0.008267	0.001276	0.148074512	0.0555	0
Barium, Total (mg/L)	MWell#11	42	0.1034	0.000154008	0.01241	0.001915	0.120019342	0.1	0
Benzene (ug/L)	MWell#1	127	0.9402	1.075369	1.037	0.09204	1.102956818	1	100
Benzene (ug/L)	MWell#11	54	0.4741	0.17740944	0.4212	0.05732	0.888420165	0.2	94.44
Beryllium, Dissolved (mg/L)	MWell#1	85	0.001263	1.57252E-06	0.001254	0.000136	0.992874109	0.001	100
Beryllium, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Beryllium, Total (mg/L)	MWell#1	42	0.0004	0	0	0	0	0.0004	100
Beryllium, Total (mg/L)	MWell#11	42	0.0004	0	0	0	0	0.0004	100
Bicarbonate (mg/L)	MWell#1	117	295.4	4279.7764	65.42	6.048	0.221462424	310	0
Bicarbonate (mg/L)	MWell#11	54	178.7	302.0644	17.38	2.365	0.097257974	170	0
Bromochloromethane (ug/L)	MWell#1	126	0.9159	1.044484	1.022	0.09107	1.115842341	1	99.21
Bromochloromethane (ug/L)	MWell#11	54	0.4481	0.14630625	0.3825	0.05205	0.853604106	0.2	100
Bromodichloromethane (ug/L)	MWell#1	127	0.911	1.038361	1.019	0.0904	1.118551043	1	100
Bromodichloromethane (ug/L)	MWell#11	54	0.4352	0.13630864	0.3692	0.05024	0.848345588	0.2	100

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023

Summary of Descriptive Statistics

Constituent Name	Well	N	Mean¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
Bromoform (ug/L)	MWell#1	127	0.9969	0.94322944	0.9712	0.08618	0.974220082	1	100
Bromoform (ug/L)	MWell#11	54	0.637	0.083521	0.289	0.03932	0.453689168	0.5	100
Bromomethane (ug/L)	MWell#1	125	2.055	5.721664	2.392	0.2139	1.163990268	1	99.2
Bromomethane (ug/L)	MWell#11	54	1.872	3.928324	1.982	0.2697	1.058760684	1	100
Cadmium, Dissolved (mg/L)	MWell#1	85	0.002135	5.97803E-06	0.002445	0.0002652	1.145199063	0.001	98.82
Cadmium, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Cadmium, Total (mg/L)	MWell#1	42	0.0004381	1.41134E-08	0.0001188	0.00001834	0.271170966	0.0004	100
Cadmium, Total (mg/L)	MWell#11	42	0.0004381	1.41134E-08	0.0001188	0.00001834	0.271170966	0.0004	100
Calcium, Dissolved (mg/L)	MWell#1	116	101.3	969.0769	31.13	2.89	0.307305035	110	0
Calcium, Dissolved (mg/L)	MWell#11	54	214.6	3877.5529	62.27	8.474	0.290167754	240	0
Calcium, Total (mg/L)	MWell#1	8	118.3	430.1476	20.74	7.333	0.175316991	120	0
Calcium, Total (mg/L)	MWell#11	8	182.5	1164.1744	34.12	12.06	0.186958904	200	0
Carbon Disulfide (ug/L)	MWell#1	121	3.929	169.2601	13.01	1.182	3.311275134	1	98.35
Carbon Disulfide (ug/L)	MWell#11	54	0.4926	0.12974404	0.3602	0.04902	0.731222087	0.3	100
Carbon Tetrachloride (ug/L)	MWell#1	126	0.9571	1.1025	1.05	0.09356	1.097064048	1	100
Carbon Tetrachloride (ug/L)	MWell#11	54	0.4426	0.14622976	0.3824	0.05204	0.86398554	0.2	100
Carbonate (mg/L)	MWell#1	8	6.875	6.697744	2.588	0.9149	0.376436364	5	100
Chloride (mg/L)	MWell#1	128	20.32	109.4116	10.46	0.9249	0.51476378	23	0
Chloride (mg/L)	MWell#11	54	162.4	5925.9204	76.98	10.48	0.474014778	200	0
Chlorobenzene (ug/L)	MWell#1	127	0.9118	1.038361	1.019	0.0904	1.117569642	1	100
Chlorobenzene (ug/L)	MWell#11	54	0.437	0.13823524	0.3718	0.05059	0.850800915	0.2	100
Chloroethane (ug/L)	MWell#1	127	1.848	5.731236	2.394	0.2125	1.295454545	1	100
Chloroethane (ug/L)	MWell#11	54	1.751	4.153444	2.038	0.2773	1.163906339	0.5	100
Chloroform (ug/L)	MWell#1	127	0.9139	1.048576	1.024	0.0909	1.120472699	1	93.7
Chloroform (ug/L)	MWell#11	54	0.4611	0.18887716	0.4346	0.05914	0.942528736	0.2	98.15
Chloromethane (ug/L)	MWell#1	125	2.011	6.210064	2.492	0.2229	1.239184485	1	99.2
Chloromethane (ug/L)	MWell#11	54	1.715	4.268356	2.066	0.2812	1.204664723	0.5	100
Chromium, Dissolved (mg/L)	MWell#1	85	0.006041	5.56665E-05	0.007461	0.0008093	1.23506042	0.0036	30.59
Chromium, Dissolved (mg/L)	MWell#11	21	0.004514	2.2801E-06	0.00151	0.0003295	0.334514843	0.0042	0
Chromium, Total (mg/L)	MWell#1	42	0.003683	1.18592E-06	0.001089	0.000168	0.295682867	0.0035	0
Chromium, Total (mg/L)	MWell#11	42	0.009005	0.000120122	0.01096	0.001691	1.21710161	0.00465	0
cis-1,2-Dichloroethene (ug/L)	MWell#1	127	0.952	1.240996	1.114	0.09889	1.170168067	1	99.21

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023

Summary of Descriptive Statistics

Constituent Name	Well	N	Mean¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
cis-1,2-Dichloroethene (ug/L)	MWell#11	54	0.4389	0.14055001	0.3749	0.05101	0.854180907	0.2	100
cis-1,3-Dichloropropene (ug/L)	MWell#1	125	0.9018	0.89038096	0.9436	0.0844	1.046351741	1	100
cis-1,3-Dichloropropene (ug/L)	MWell#11	54	0.4911	0.119025	0.345	0.04696	0.702504582	0.5	100
Cobalt, Dissolved (mg/L)	MWell#1	85	0.009528	0.000159012	0.01261	0.001368	1.323467674	0.006	55.29
Cobalt, Dissolved (mg/L)	MWell#11	21	0.0004262	4.69499E-09	0.00006852	0.00001495	0.160769592	0.0004	71.43
Cobalt, Total (mg/L)	MWell#1	42	0.02163	0.00011794	0.01086	0.001675	0.502080444	0.0195	0
Cobalt, Total (mg/L)	MWell#11	42	0.001093	4.66992E-06	0.002161	0.0003335	1.977127173	0.00044	45.24
Conductivity (umhos/cm)	MWell#1	113	703.1	42271.36	205.6	19.34	0.292419286	742	0
Conductivity (umhos/cm)	MWell#11	50	1401	144628.09	380.3	53.78	0.271448965	1509	0
Copper, Dissolved (mg/L)	MWell#1	85	0.006729	8.36127E-05	0.009144	0.0009918	1.358894338	0.002	68.24
Copper, Dissolved (mg/L)	MWell#11	21	0.003633	1.18405E-05	0.003441	0.000751	0.947151115	0.0024	14.29
Copper, Total (mg/L)	MWell#1	42	0.002229	1.31103E-06	0.001145	0.0001767	0.513683266	0.002	71.43
Copper, Total (mg/L)	MWell#11	42	0.002781	2.74896E-06	0.001658	0.0002559	0.596188421	0.002	59.52
Dibromochloromethane (ug/L)	MWell#1	126	0.9151	1.048576	1.024	0.09124	1.119003388	1	100
Dibromochloromethane (ug/L)	MWell#11	54	0.4463	0.15350724	0.3918	0.05331	0.877884831	0.2	100
Dibromomethane (ug/L)	MWell#1	123	0.9489	1.106704	1.052	0.09483	1.108652124	1	100
Dibromomethane (ug/L)	MWell#11	54	0.4356	0.13667809	0.3697	0.0503	0.848714417	0.2	100
Dissolved Oxygen (mg/L)	MWell#1	58	5.553	0.31866025	0.5645	0.07412	0.101656762	5.61	0
Dissolved Oxygen (mg/L)	MWell#11	53	7.969	1.653796	1.286	0.1767	0.161375329	8.12	0
Ethane (ug/L)	MWell#1	59	7.064	20.457529	4.523	0.5888	0.640288788	10	100
Ethane (ug/L)	MWell#11	54	6.406	17.589636	4.194	0.5707	0.65469872	10	100
Ethene (ug/L)	MWell#1	59	7	19.864849	4.457	0.5802	0.636714286	10	100
Ethene (ug/L)	MWell#11	54	6.393	17.757796	4.214	0.5734	0.659158455	10	98.15
Ethylbenzene (ug/L)	MWell#1	126	0.9134	1.044484	1.022	0.09108	1.118896431	1	100
Ethylbenzene (ug/L)	MWell#11	54	0.435	0.13608721	0.3689	0.05021	0.848045977	0.2	100
Iodomethane (ug/L)	MWell#1	119	3.018	10.549504	3.248	0.2978	1.07620941	2	100
Iodomethane (ug/L)	MWell#11	54	2.217	14.0625	3.75	0.5103	1.691474966	0.5	100
Iron, Dissolved (mg/L)	MWell#1	128	0.2191	0.03644281	0.1909	0.01688	0.871291648	0.19	70.31
Iron, Dissolved (mg/L)	MWell#11	54	0.347	0.024025	0.155	0.02109	0.446685879	0.315	77.78
Iron, Total (mg/L)	MWell#1	8	0.5	0	0	0	0	0.5	100
Iron, Total (mg/L)	MWell#11	8	0.6	0.07997584	0.2828	0.1	0.471333333	0.5	87.5
Lead, Dissolved (mg/L)	MWell#1	84	0.00669	0.000236544	0.01538	0.001678	2.298953662	0.001	90.48

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023

Summary of Descriptive Statistics

Constituent Name	Well	N	Mean¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
Lead, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Lead, Total (mg/L)	MWell#1	42	0.0005555	3.90063E-08	0.0001975	0.00003048	0.355535554	0.0004	92.86
Lead, Total (mg/L)	MWell#11	42	0.0005507	3.992E-08	0.0001998	0.00003083	0.362810968	0.0004	95.24
Magnesium, Dissolved (mg/L)	MWell#1	116	20.29	35.676729	5.973	0.5546	0.294381469	22	0
Magnesium, Dissolved (mg/L)	MWell#11	54	42.87	166.6681	12.91	1.757	0.30114299	49	0
Magnesium, Total (mg/L)	MWell#1	8	24	16	4	1.414	0.166666667	24	0
Magnesium, Total (mg/L)	MWell#11	8	37.5	47.997184	6.928	2.449	0.184746667	40.5	0
Manganese, Dissolved (mg/L)	MWell#1	128	0.01668	0.000320052	0.01789	0.001581	1.072541966	0.02	80.47
Manganese, Dissolved (mg/L)	MWell#11	54	0.02617	0.001411505	0.03757	0.005113	1.435613298	0.02	96.3
Manganese, Total (mg/L)	MWell#1	8	0.02	0	0	0	0	0.02	100
Manganese, Total (mg/L)	MWell#11	8	0.02137	1.51243E-05	0.003889	0.001375	0.18198409	0.02	87.5
Methane (ug/L)	MWell#1	59	1.693	4.774225	2.185	0.2844	1.290608387	1.2	89.83
Methane (ug/L)	MWell#11	54	2.486	47.128225	6.865	0.9342	2.7614642	1.2	79.63
Methylene Chloride (ug/L)	MWell#1	127	2.665	4.618201	2.149	0.1907	0.806378987	2	97.64
Methylene Chloride (ug/L)	MWell#11	54	3.104	3.564544	1.888	0.2569	0.608247423	3	100
Nickel, Dissolved (mg/L)	MWell#1	85	0.01268	0.000458816	0.02142	0.002324	1.689274448	0.003	69.41
Nickel, Dissolved (mg/L)	MWell#11	21	0.005238	6.38068E-06	0.002526	0.0005513	0.482245132	0.0052	14.29
Nickel, Total (mg/L)	MWell#1	42	0.003038	4.1943E-08	0.0002048	0.0000316	0.067412772	0.003	95.24
Nickel, Total (mg/L)	MWell#11	42	0.005364	3.22965E-05	0.005683	0.0008769	1.059470544	0.003	59.52
Nitrate Nitrogen (mg/L)	MWell#1	126	5.925	14.730244	3.838	0.3419	0.647763713	7.2	0
Nitrate Nitrogen (mg/L)	MWell#11	53	30.95	112.7844	10.62	1.459	0.343134087	34	3.774
pH (none)	MWell#1	117	7.233	0.06335289	0.2517	0.02327	0.034798839	7.18	0
pH (none)	MWell#11	54	7.419	0.02524921	0.1589	0.02162	0.021417981	7.415	0
Potassium, Dissolved (mg/L)	MWell#1	116	7.394	1.498176	1.224	0.1136	0.165539627	7.745	0
Potassium, Dissolved (mg/L)	MWell#11	54	11.07	2.452356	1.566	0.213	0.141463415	11.5	0
Potassium, Total (mg/L)	MWell#1	8	8.713	1.800964	1.342	0.4745	0.154022725	8.55	0
Potassium, Total (mg/L)	MWell#11	8	10.56	1.7424	1.32	0.4667	0.125	11	0
Redox (mv)	MWell#1	59	118.6	5935.1616	77.04	10.03	0.649578415	110	0
Redox (mv)	MWell#11	54	127.4	8740.3801	93.49	12.72	0.733830455	121	0
Selenium, Dissolved (mg/L)	MWell#1	85	0.01254	0.000830592	0.02882	0.003126	2.298245614	0.002	31.76
Selenium, Dissolved (mg/L)	MWell#11	21	0.005469	1.2996E-05	0.003605	0.0007867	0.659169867	0.0048	4.762
Selenium, Total (mg/L)	MWell#1	42	0.005779	9.12644E-06	0.003021	0.0004661	0.522754802	0.008	64.29

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean ¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
Selenium, Total (mg/L)	MWell#11	42	0.008612	0.00000121	0.0011	0.0001698	0.127728751	0.008	61.9
Silver, Dissolved (mg/L)	MWell#1	85	0.0061	0.000150798	0.01228	0.001332	2.013114754	0.001	97.65
Silver, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Silver, Total (mg/L)	MWell#1	42	0.0004	0	0	0	0	0.0004	100
Silver, Total (mg/L)	MWell#11	42	0.0004	0	0	0	0	0.0004	100
Sodium, Dissolved (mg/L)	MWell#1	116	19.28	17.280649	4.157	0.386	0.215612033	21	0
Sodium, Dissolved (mg/L)	MWell#11	54	19.02	6.734025	2.595	0.3532	0.136435331	20	0
Sodium, Total (mg/L)	MWell#1	8	22.38	9.696996	3.114	1.101	0.139142091	23	0
Sodium, Total (mg/L)	MWell#11	8	18.5	1.999396	1.414	0.5	0.076432432	19	0
Styrene (ug/L)	MWell#1	126	1.053	0.91450969	0.9563	0.08519	0.908167142	1	100
Styrene (ug/L)	MWell#11	54	0.76	0.08277129	0.2877	0.03915	0.378552632	1	100
Sulfate (mg/L)	MWell#1	128	40.83	212.2849	14.57	1.288	0.356845457	47	0
Sulfate (mg/L)	MWell#11	54	234.6	10670.89	103.3	14.06	0.440323956	290	0
TDS (mg/L)	MWell#1	117	449	15400.81	124.1	11.48	0.276391982	470	0
TDS (mg/L)	MWell#11	54	1070	140775.04	375.2	51.06	0.350654206	1150	0
Temperature (C)	MWell#1	128	20.24	5.461569	2.337	0.2066	0.115464427	20.34	0
Temperature (C)	MWell#11	54	20.73	4.498641	2.121	0.2886	0.102315485	20.9	0
Tetrachloroethene (ug/L)	MWell#1	126	3.229	2.927521	1.711	0.1524	0.529885413	3.8	18.25
Tetrachloroethene (ug/L)	MWell#11	54	0.6389	0.08732025	0.2955	0.04021	0.462513695	0.5	100
Thallium, Dissolved (mg/L)	MWell#1	85	0.006758	0.000218153	0.01477	0.001602	2.185557857	0.001	98.82
Thallium, Dissolved (mg/L)	MWell#11	21	0.0009619	6.47542E-09	0.00008047	0.00001756	0.083657345	0.001	100
Thallium, Total (mg/L)	MWell#1	42	0.001	0	0	0	0	0.001	100
Thallium, Total (mg/L)	MWell#11	42	0.001	0	0	0	0	0.001	100
TOC (mg/L)	MWell#1	127	1.607	2.979076	1.726	0.1531	1.074051027	1.4	29.13
TOC (mg/L)	MWell#11	54	3.443	5.0176	2.24	0.3049	0.650595411	3.25	3.704
Toluene (ug/L)	MWell#1	127	0.9149	1.065024	1.032	0.09154	1.12799213	1	99.21
Toluene (ug/L)	MWell#11	54	0.435	0.13608721	0.3689	0.05021	0.848045977	0.2	100
Total Suspended Solids (mg/L)	MWell#1	37	2.078	0.48678529	0.6977	0.1147	0.335755534	2	100
Total Suspended Solids (mg/L)	MWell#11	37	3.162	18.550249	4.307	0.7081	1.362112587	2	78.38
trans-1,2-Dichloroethene (ug/L)	MWell#1	126	0.9167	1.046529	1.023	0.09114	1.11595942	1	100
trans-1,2-Dichloroethene (ug/L)	MWell#11	54	0.4426	0.14622976	0.3824	0.05204	0.86398554	0.2	100
trans-1,3-Dichloropropene (ug/L)	MWell#1	125	0.8748	0.91929744	0.9588	0.08576	1.096021948	1	100

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2023

Summary of Descriptive Statistics

Constituent Name	Well	N	Mean¹	Variance	Standard Deviation	Standard Error	Coefficient of Variation	Median	% Non-Detects
trans-1,3-Dichloropropene (ug/L)	MWell#11	54	0.4287	0.13242321	0.3639	0.04952	0.848845346	0.2	100
trans-1,4-Dichloro-2-butene (ug/L)	MWell#1	116	2.866	4.338889	2.083	0.1934	0.72679693	2	100
trans-1,4-Dichloro-2-butene (ug/L)	MWell#11	54	3.033	3.367225	1.835	0.2497	0.60501154	2	100
Trichloroethene (ug/L)	MWell#1	127	0.9308	1.010025	1.005	0.0892	1.079716373	1	76.38
Trichloroethene (ug/L)	MWell#11	54	0.4407	0.14318656	0.3784	0.0515	0.858633991	0.2	100
Trichlorofluoromethane (ug/L)	MWell#1	127	1.197	3.485689	1.867	0.1656	1.559732665	1	96.85
Trichlorofluoromethane (ug/L)	MWell#11	54	0.6407	0.09150625	0.3025	0.04117	0.472139847	0.5	100
Vanadium, Dissolved (mg/L)	MWell#1	85	0.0137	0.000192377	0.01387	0.001504	1.012408759	0.0107	16.47
Vanadium, Dissolved (mg/L)	MWell#11	21	0.0098	2.41181E-06	0.001553	0.000339	0.158469388	0.0098	0
Vanadium, Total (mg/L)	MWell#1	42	0.009433	5.20851E-07	0.0007217	0.0001114	0.076508004	0.00925	0
Vanadium, Total (mg/L)	MWell#11	42	0.01005	8.1036E-07	0.0009002	0.0001389	0.089572139	0.01	0
Vinyl Acetate (ug/L)	MWell#1	121	4.286	31.214569	5.587	0.5079	1.30354643	2	100
Vinyl Acetate (ug/L)	MWell#11	54	2.491	2.948089	1.717	0.2337	0.689281413	2	100
Vinyl Chloride (ug/L)	MWell#1	126	1.096	4.255969	2.063	0.1838	1.88229927	1	100
Vinyl Chloride (ug/L)	MWell#11	54	0.3209	0.19501056	0.4416	0.06009	1.376129635	0.02	100
Xylenes (ug/L)	MWell#1	88	1.349	0.82065481	0.9059	0.09657	0.67153447	1	100
Xylenes (ug/L)	MWell#11	54	0.9837	0.71605444	0.8462	0.1151	0.860221612	0.5	100
Zinc, Dissolved (mg/L)	MWell#1	96	0.009889	0.000102212	0.01011	0.001032	1.022348064	0.00545	53.13
Zinc, Dissolved (mg/L)	MWell#11	21	0.006676	3.92377E-05	0.006264	0.001367	0.938286399	0.0041	28.57
Zinc, Total (mg/L)	MWell#1	46	0.01164	0.000146894	0.01212	0.001787	1.041237113	0.007	69.57
Zinc, Total (mg/L)	MWell#11	42	0.006686	1.10881E-06	0.001053	0.0001624	0.15749327	0.007	85.71

¹ All statistics based on Non-Detects = 1/2 MDL ² (bg) indicates a background well.

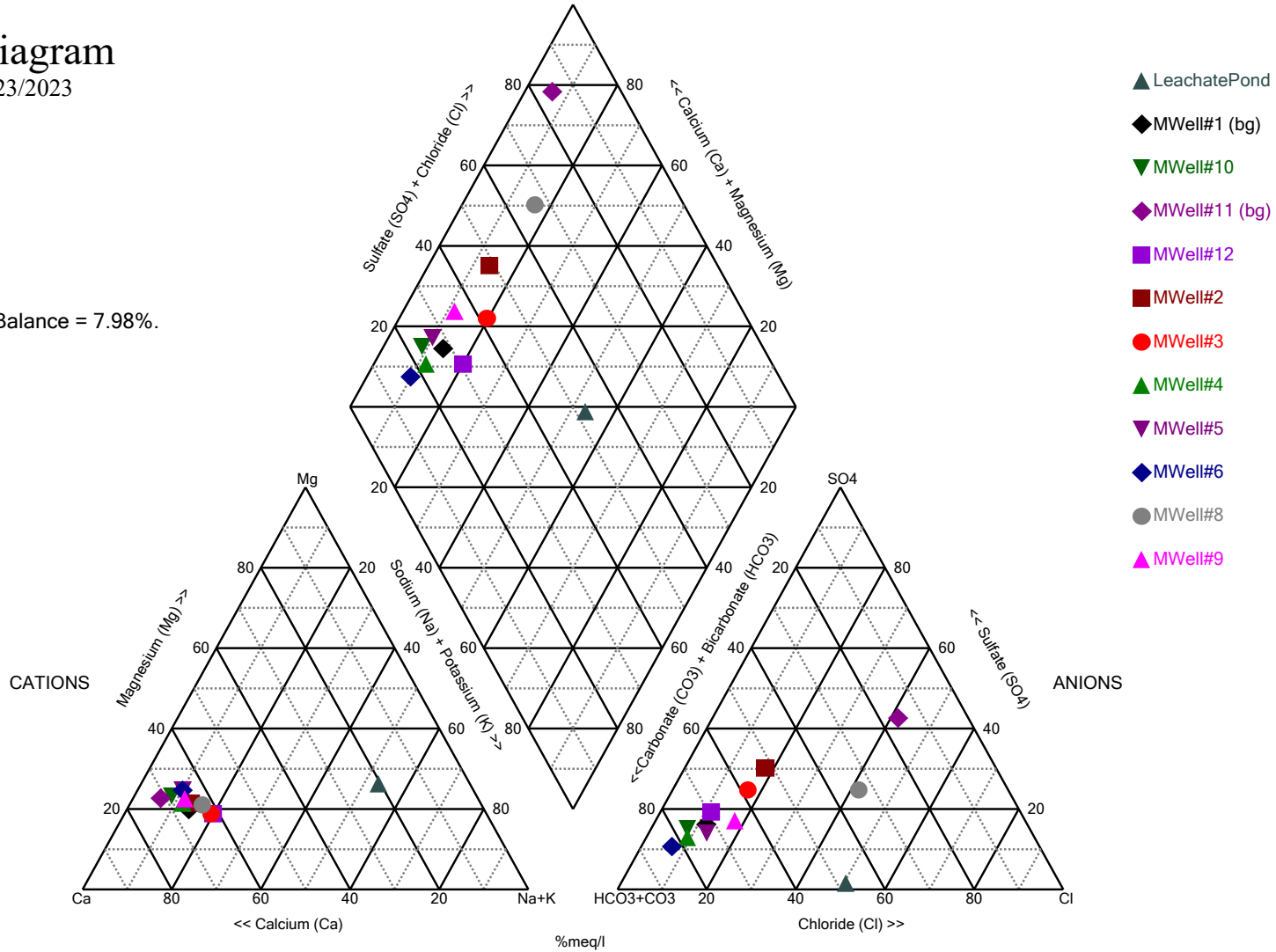
Appendix F

Geochemical Evaluation

Piper Diagram

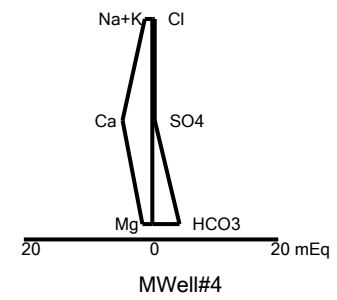
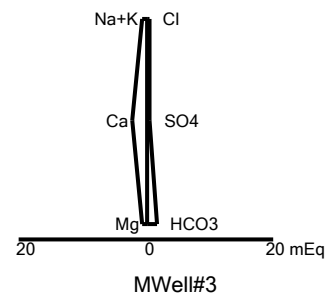
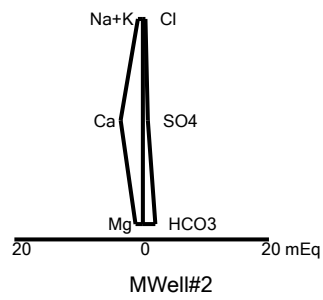
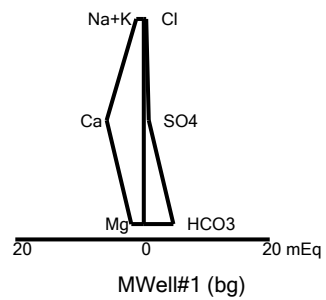
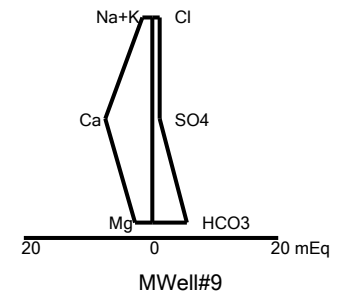
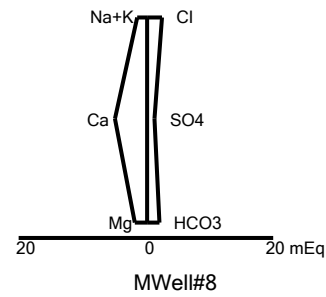
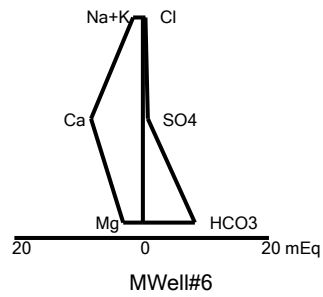
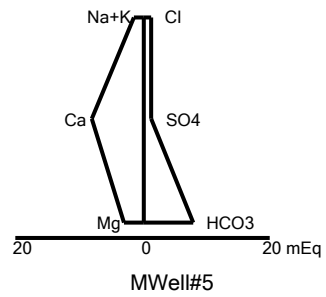
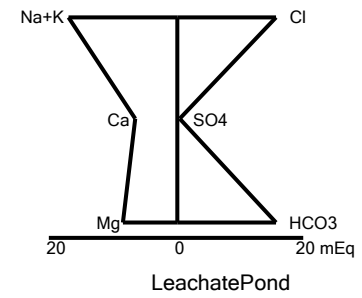
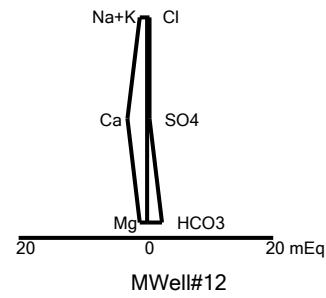
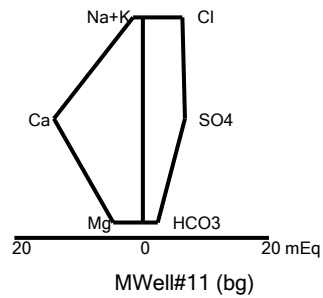
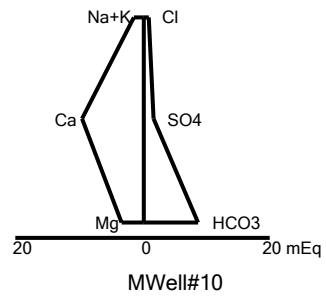
3/22/2023, 3/23/2023

Cation-Anion Balance = 7.98%.



Analysis Run 5/3/2023 7:56 PM

Horn Rapids Landfill Client: City of Richland Data: 1Q_23_PIPER



Stiff Diagram - 3/22/2023, 3/23/2023 Analysis Run 5/3/2023 4:35 PM
Horn Rapids Landfill Client: City of Richland Data: 1Q_23_PIPER

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, First Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6		
	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																		
Na 0.0435	21	0.91	11.05	12	0.52	10.32	11	0.48	14.85	14	0.61	8.85	21	0.91	7.50	21	0.91	7.43
Ca 0.0499	110	5.49	66.37	66	3.29	65.14	40	2.00	61.94	92	4.59	66.70	160	7.98	65.53	160	7.98	64.96
Mg 0.08229	20	1.65	19.90	13	1.07	21.16	7.2	0.59	18.39	18	1.48	21.52	36	2.96	24.32	37	3.04	24.77
Fe(+2) 0.03581	0.05	0.00	0.02	0.05	0.00	0.04	0.05	0.00	0.06	0.05	0.00	0.03	0.05	0.00	0.01	0.33	0.01	0.10
K 0.02558	8.6	0.22	2.66	6.6	0.17	3.34	6	0.15	4.76	7.8	0.20	2.90	12	0.31	2.52	13	0.33	2.71
Mn 0.0364	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.39	0.01	0.12	0.092	0.00	0.03
TOTAL	8.27	100.00	100.00	5.06	100.00	100.00	3.22	100.00	100.00	6.88	100.00	100.00	12.18	100.00	100.00	12.29	100.00	100.00
ANIONS																		
HCO ₃ ²⁻ 0.02	290	5.80	71.83	120	2.40	48.40	96	1.92	59.03	260	5.20	75.41	470	9.40	76.88	510	10.20	85.96
SO ₄ 0.02082	50	1.04	12.89	54	1.12	22.67	31	0.65	19.84	33	0.69	9.96	69	1.44	11.75	50	1.04	8.77
Cl 0.02821	25	0.71	8.73	23	0.65	13.09	15	0.42	13.01	16	0.45	6.55	45	1.27	10.38	22	0.62	5.23
CO ₃ ²⁻ 0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO ₃ 0.0714	7.4	0.53	6.54	11	0.79	15.84	3.7	0.26	8.12	7.8	0.56	8.08	1.7	0.12	0.99	0.065	0.00	0.04
TOTAL	8.07	100.00	100.00	4.96	100.00	100.00	3.25	100.00	100.00	6.90	100.00	100.00	12.23	100.00	100.00	11.87	100.00	100.00
(meq/L cations- anions)/(meq/L cations+anions)*100			1.20			0.97			-0.47			-0.09			-0.18			1.75

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, First Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12			Leachate Pond		
	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																		
Na 0.0435	25	1.09	13.69	22	0.96	9.04	20	0.87	6.26	19	0.83	4.37	18	0.78	16.02	300	13.05	41.14
Ca 0.0499	100	4.99	62.80	140	6.99	66.00	190	9.48	68.21	270	13.47	71.22	60	2.99	61.27	130	6.49	20.45
Mg 0.08229	20	1.65	20.71	29	2.39	22.55	39	3.21	23.09	52	4.28	22.62	11	0.91	18.52	100	8.23	25.94
Fe(+2) 0.03581	0.05	0.00	0.02	0.05	0.00	0.02	0.12	0.00	0.03	0.13	0.00	0.02	0.05	0.00	0.04	2.0	0.07	0.23
K 0.02558	8.6	0.22	2.77	9.9	0.25	2.39	13	0.33	2.39	13	0.33	1.76	7.9	0.20	4.14	150	3.84	12.10
Mn 0.0364	0.01	0.00	0.00	0.01	0.00	0.00	0.044	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01	1.3	0.05	0.15
TOTAL	7.95	100.00	TOTAL	10.58	100.00	TOTAL	13.90	100.00	TOTAL	18.92	100.00	TOTAL	4.89	100.00	TOTAL	31.72	100.00	
ANIONS																		
HCO ₃ ² 0.02	130	2.60	32.15	350	7.00	66.79	530	10.60	78.83	160	3.20	16.72	160	3.20	67.84	940	18.80	54.09
SO ₄ 0.02082	73	1.52	18.79	71	1.48	14.10	81	1.69	12.54	320	6.66	34.82	34	0.71	15.01	21	0.44	1.26
Cl 0.02821	90	2.54	31.40	52	1.47	14.00	29	0.82	6.08	230	6.49	33.91	14	0.39	8.37	550	15.52	44.64
CO ₃ ² 0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO ₃ 0.0714	20	1.43	17.66	7.5	0.54	5.11	4.8	0.34	2.55	39	2.78	14.55	5.8	0.41	8.78	0.025	0.00	0.01
TOTAL	8.09	100.00	TOTAL	10.48	100.00	TOTAL	13.45	100.00	TOTAL	19.14	100.00	TOTAL	4.72	100.00	TOTAL	34.75	100.00	
(meq/L cations-anions)/(meq/L cations+anions)*100			-0.88			0.49			1.65			-0.58			1.76			-4.56

¹Reference: Hem 1985.

²HCO₃ and CO₃ reported as CaCO₃, conversion factor adjusted accordingly.

= Outside WAC 173-351-420(5)(a) acceptable range

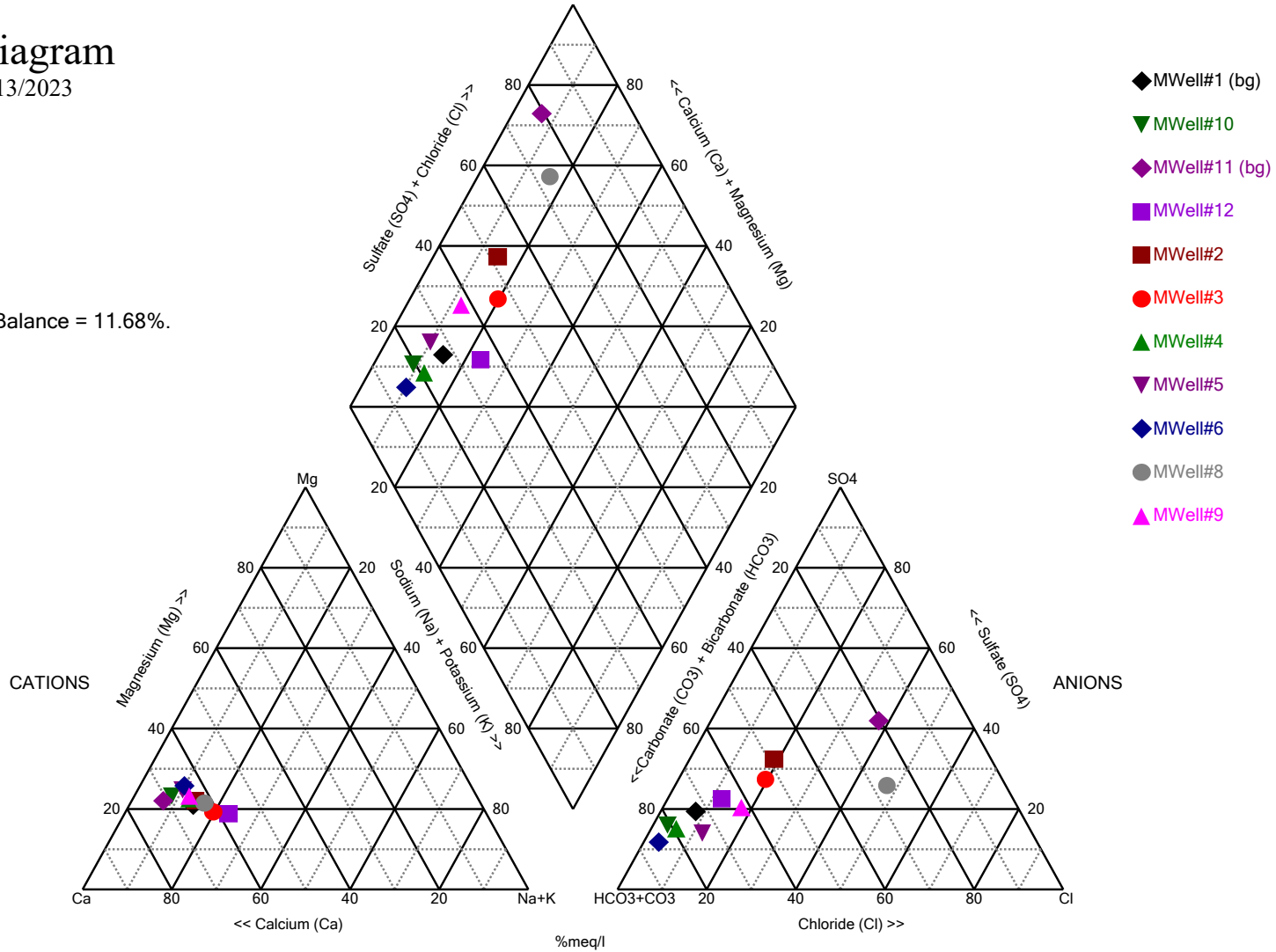
Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).

5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L

Piper Diagram

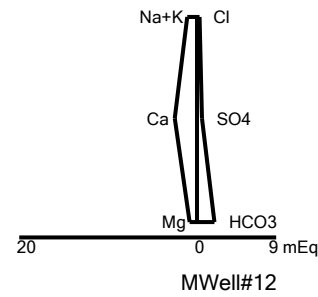
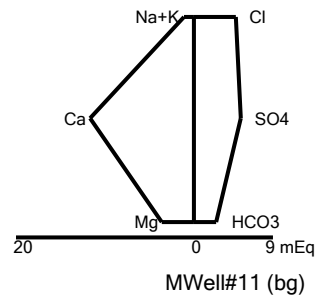
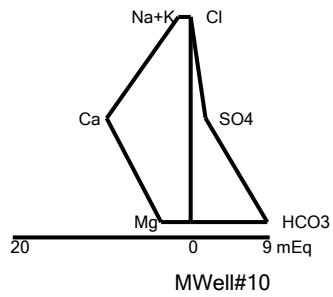
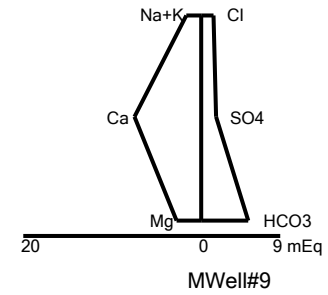
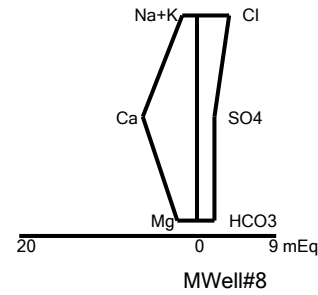
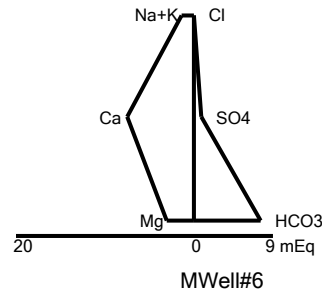
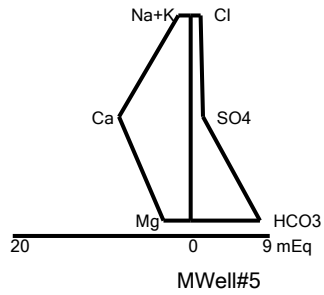
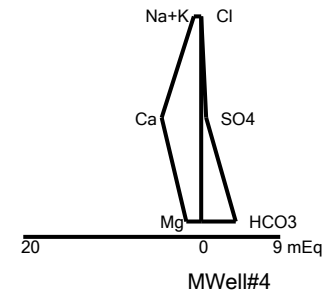
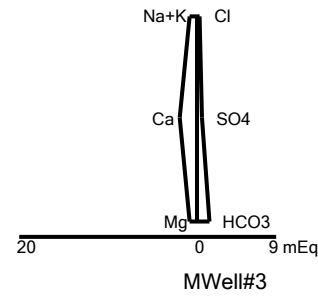
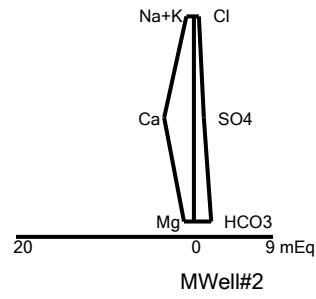
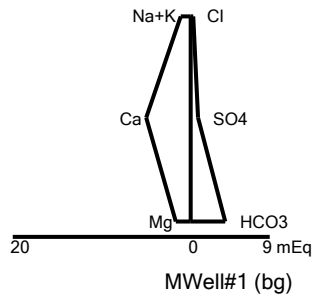
6/14/2023, 6/13/2023

Cation-Anion Balance = 11.68%.



Analysis Run 8/4/2023 4:31 PM

Horn Rapids Landfill Client: City of Richland Data: 2Q_23_PIPER



Stiff Diagram - 6/14/2023, 6/13/2023 Analysis Run 8/4/2023 4:34 PM
Horn Rapids Landfill Client: City of Richland Data: 2Q_23_PIPER

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Second Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6				
	Value	Value	Percent of Total	Value	Value	Percent of Total	Value	Value	Percent of Total	Value	Value	Percent of Total	Value	Value	Percent of Total	Value	Value	Percent of Total		
	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)		
CATIONS																				
Na	0.0435	21	0.91	12.17	13	0.57	11.60	11	0.48	15.42	15	0.65	9.89	22	0.96	7.79	21	0.91	7.84	
Ca	0.0499	97	4.84	64.51	62	3.09	63.47	38	1.90	61.12	86	4.29	65.03	160	7.98	65.00	150	7.49	64.20	
Mg	0.08229	19	1.56	20.84	13	1.07	21.95	7.2	0.59	19.10	18	1.48	22.45	37	3.04	24.79	36	2.96	25.41	
Fe(+2)	0.03581	0.05	0.00	0.02	0.05	0.00	0.04	0.05	0.00	0.06	0.05	0.00	0.03	0.05	0.00	0.01	0.34	0.01	0.10	
K	0.02558	7.2	0.18	2.45	5.6	0.14	2.94	5.2	0.13	4.29	6.7	0.17	2.60	11	0.28	2.29	11	0.28	2.41	
Mn	0.0364	0.010	0.00	0.00	0.010	0.00	0.01	0.010	0.00	0.01	0.010	0.00	0.01	0.41	0.01	0.12	0.098	0.00	0.03	
		TOTAL	7.50	100.00	TOTAL	4.87	100.00	TOTAL	3.10	100.00	TOTAL	6.60	100.00	TOTAL	12.28	100.00	TOTAL	11.66	100.00	
ANIONS																				
HCO ₃ ²	0.02	250	5.00	71.58	120	2.40	45.01	86	1.72	54.60	240	4.80	75.82	480	9.60	77.61	470	9.40	88.15	
SO ₄	0.02082	51	1.06	15.20	61	1.27	23.82	34	0.71	22.47	35	0.73	11.51	71	1.48	11.95	51	1.06	9.96	
Cl	0.02821	14	0.39	5.65	26	0.73	13.76	17	0.48	15.22	8.7	0.25	3.88	42	1.18	9.58	7.1	0.20	1.88	
CO ₃ ²	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	
NO ₃	0.0714	7.4	0.53	7.56	13	0.93	17.41	3.4	0.24	7.71	7.8	0.56	8.80	1.5	0.11	0.87	0.025	0.00	0.02	
		TOTAL	6.99	100.00	TOTAL	5.33	100.00	TOTAL	3.15	100.00	TOTAL	6.33	100.00	TOTAL	12.37	100.00	TOTAL	10.66	100.00	
(meq/L cations-anions)/(meq/L cations+anions)*100			3.58			-4.48			-0.77			2.07			-0.35			4.45		

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Second Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12			
	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	
CATIONS																
Na	0.0435	31	1.35	13.99	27	1.17	10.18	21	0.91	6.58	19	0.83	5.13	19	0.83	19.21
Ca	0.0499	120	5.99	62.14	150	7.49	64.89	190	9.48	68.27	230	11.48	71.17	50	2.50	57.98
Mg	0.08229	25	2.06	21.35	32	2.63	22.83	39	3.21	23.11	43	3.54	21.94	9.7	0.80	18.55
Fe(+2)	0.03581	0.05	0.00	0.02	0.05	0.00	0.02	0.05	0.00	0.01	0.05	0.00	0.01	0.05	0.00	0.04
K	0.02558	9.4	0.24	2.50	9.4	0.24	2.08	11	0.28	2.03	11	0.28	1.74	7.1	0.18	4.22
Mn	0.0364	0.010	0.00	0.00	0.010	0.00	0.00	0.039	0.00	0.01	0.010	0.00	0.00	0.010	0.00	0.01
		TOTAL	9.64	100.00	TOTAL	11.54	100.00	TOTAL	13.89	100.00	TOTAL	16.13	100.00	TOTAL	4.30	100.00
ANIONS																
HCO ₃ ²⁻	0.02	130	2.60	25.45	340	6.80	63.93	540	10.80	82.10	170	3.40	20.83	130	2.60	63.38
SO ₄	0.02082	97	2.02	19.77	85	1.77	16.64	84	1.75	13.30	260	5.41	33.16	35	0.73	17.76
Cl	0.02821	130	3.67	35.90	52	1.47	13.79	8.8	0.25	1.89	170	4.80	29.38	13	0.37	8.94
CO ₃ ²⁻	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO ₃	0.0714	27	1.93	18.87	8.4	0.60	5.64	5.0	0.36	2.71	38	2.71	16.62	5.7	0.41	9.92
		TOTAL	10.21	100.00	TOTAL	10.64	100.00	TOTAL	13.15	100.00	TOTAL	16.32	100.00	TOTAL	4.10	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100																
				-2.91			4.05			2.72			-0.61			2.39

¹Reference: Hem 1985.

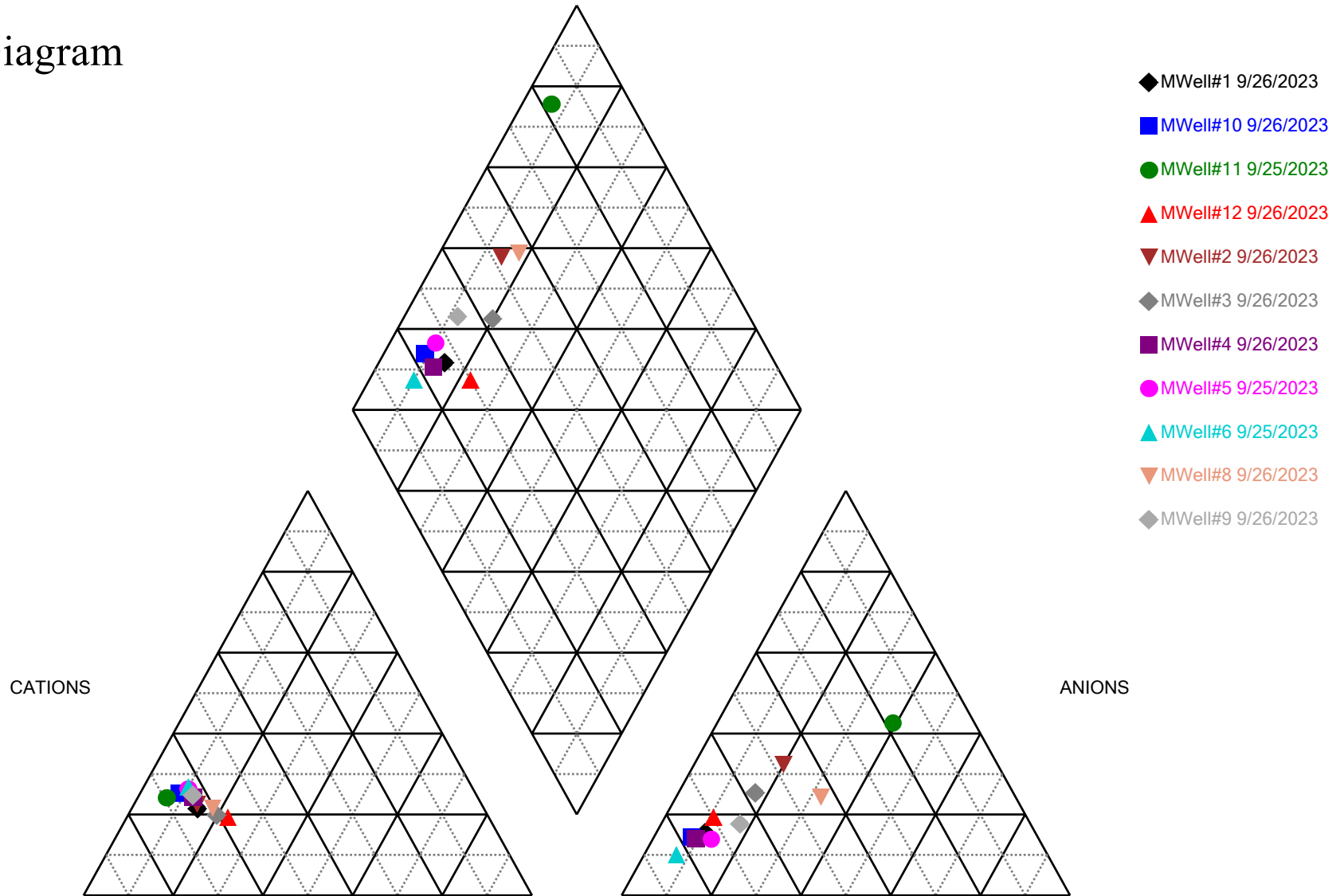
²HCO₃ and CO₃ reported as CaCO₃, conversion factor adjusted accordingly.

☐ = Outside WAC 173-351-420(5)(a) acceptable range

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).

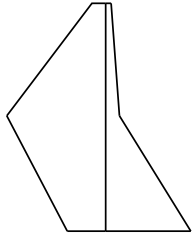
5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L

Piper Diagram

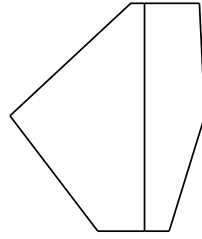


Analysis Run 11/8/2023 3:52 PM

Horn Rapids Landfill Client: City of Richland Data: 3Q_23_PIPER



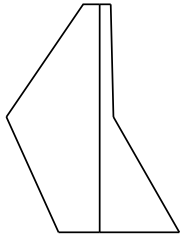
MWWell#10 9/26/2023



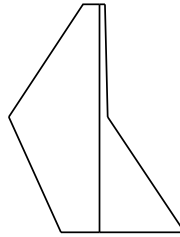
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MWWell#12 9/26/2023



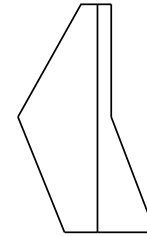
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MWWell#6 9/25/2023



MWWell#8 9/26/2023



MWWell#9 9/26/2023



MWWell#1 9/26/2023



MWWell#2 9/26/2023



MWWell#3 9/26/2023



MWWell#4 9/26/2023

Stiff Diagram Analysis Run 11/8/2023 3:53 PM
Horn Rapids Landfill Client: City of Richland Data: 3Q_23_PIPER

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Third Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6		
	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																		
Sodium Na 0.0435	24	1.04	12.20	14	0.61	11.18	13	0.57	15.85	18	0.78	9.95	27	1.17	7.85	25	1.09	7.65
Calcium Ca 0.0499	110	5.49	64.15	69	3.44	63.21	43	2.15	60.16	100	4.99	63.39	190	9.48	63.36	180	8.98	63.20
Magnesium Mg 0.08229	22	1.81	21.16	15	1.23	22.66	8.6	0.71	19.84	23	1.89	24.04	48	3.95	26.40	46	3.79	26.63
Iron Fe(+2) 0.03581	0.1	0.00	0.04	0.05	0.00	0.03	0.05	0.00	0.05	0.05	0.00	0.02	0.14	0.01	0.03	0.54	0.02	0.14
Potassium K 0.02558	8.2	0.21	2.45	6.2	0.16	2.91	5.7	0.15	4.09	8.0	0.20	2.60	13	0.33	2.22	13	0.33	2.34
Manganese Mn 0.0364	0.010	0.00	0.00	0.010	0.00	0.01	0.010	0.00	0.01	0.010	0.00	0.00	0.55	0.020	0.13	0.16	0.01	0.04
TOTAL	8.56	100.00	TOTAL	5.45	100.00	TOTAL	3.57	100.00	TOTAL	7.87	100.00	TOTAL	14.96	100.00	TOTAL	14.21	100.00	
ANIONS																		
Bicarbonate HCO ₃ ² 0.02	300	6.00	73.77	120	2.40	44.02	100	2.00	58.30	260	5.20	73.38	510	10.20	77.02	530	10.60	86.07
Sulfate SO ₄ 0.02082	48	1.00	12.29	62	1.29	23.68	34	0.71	20.63	36	0.75	10.58	75	1.56	11.79	51	1.06	8.62
Chloride Cl 0.02821	23	0.65	7.98	27	0.76	13.97	16	0.45	13.16	17	0.48	6.77	48	1.35	10.22	23	0.65	5.27
Carbonate CO ₃ ² 0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Nitrate NO ₃ 0.0714	6.8	0.49	5.97	14	1.00	18.33	3.8	0.27	7.91	9.2	0.66	9.27	1.8	0.13	0.97	0.065	0.00	0.04
TOTAL	8.13	100.00	TOTAL	5.45	100.00	TOTAL	3.43	100.00	TOTAL	7.09	100.00	TOTAL	13.24	100.00	TOTAL	12.32	100.00	
(meq/L cations-anions)/(meq/L cations+anions)*100			2.54			-0.05			1.95			5.26			6.09			7.15

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Third Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12			
	Value	Value	Percent	Value	Value	Percent	Value	Value	Percent	Value	Value	Percent	Value	Value	Percent	
	(mg/L)	(meq/L)	of Total (meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	(mg/L)	(meq/L)	(meq/L)	
CATIONS																
Na	0.0435	25	1.09	14.87	28	1.22	9.67	24	1.04	6.89	22	0.96	4.92	22	0.96	18.61
Ca	0.0499	89	4.44	60.74	160	7.98	63.42	200	9.98	65.88	270	13.47	69.23	60	2.99	58.22
Mg	0.08229	19	1.56	21.38	38	3.13	24.84	46	3.79	24.99	57	4.69	24.10	12	0.99	19.20
Fe(+2)	0.03581	0.05	0.00	0.02	0.13	0.00	0.04	0.15	0.01	0.04	0.20	0.01	0.04	0.05	0.00	0.03
K	0.02558	8.5	0.22	2.97	10	0.26	2.03	13	0.33	2.20	13	0.33	1.71	7.9	0.20	3.93
Mn	0.0364	0.010	0.00	0.00	0.010	0.00	0.00	0.041	0.00	0.01	0.010	0.00	0.00	0.010	0.00	0.01
		TOTAL	7.31	100.00	TOTAL	12.59	100.00	TOTAL	15.15	100.00	TOTAL	19.46	100.00	TOTAL	5.14	100.00
ANIONS																
HCO ₃ ²	0.02	140	2.80	42.02	370	7.40	66.64	530	10.60	78.90	170	3.40	18.59	170	3.40	68.77
SO ₄	0.02082	59	1.23	18.43	77	1.60	14.44	77	1.60	11.93	300	6.25	34.16	36	0.75	15.16
Cl	0.02821	58	1.64	24.55	54	1.52	13.72	29	0.82	6.09	200	5.64	30.85	14	0.39	7.99
CO ₃ ²	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO ₃	0.0714	14	1.00	15.00	8.1	0.58	5.21	5.8	0.41	3.08	42	3.00	16.40	5.6	0.40	8.09
		TOTAL	6.66	100.00	TOTAL	11.10	100.00	TOTAL	13.44	100.00	TOTAL	18.29	100.00	TOTAL	4.94	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				4.63			6.27			5.99			3.11			1.97

¹Reference: Hem 1985.

²HCO₃ and CO₃ reported as CaCO₃, conversion factor adjusted accordingly.

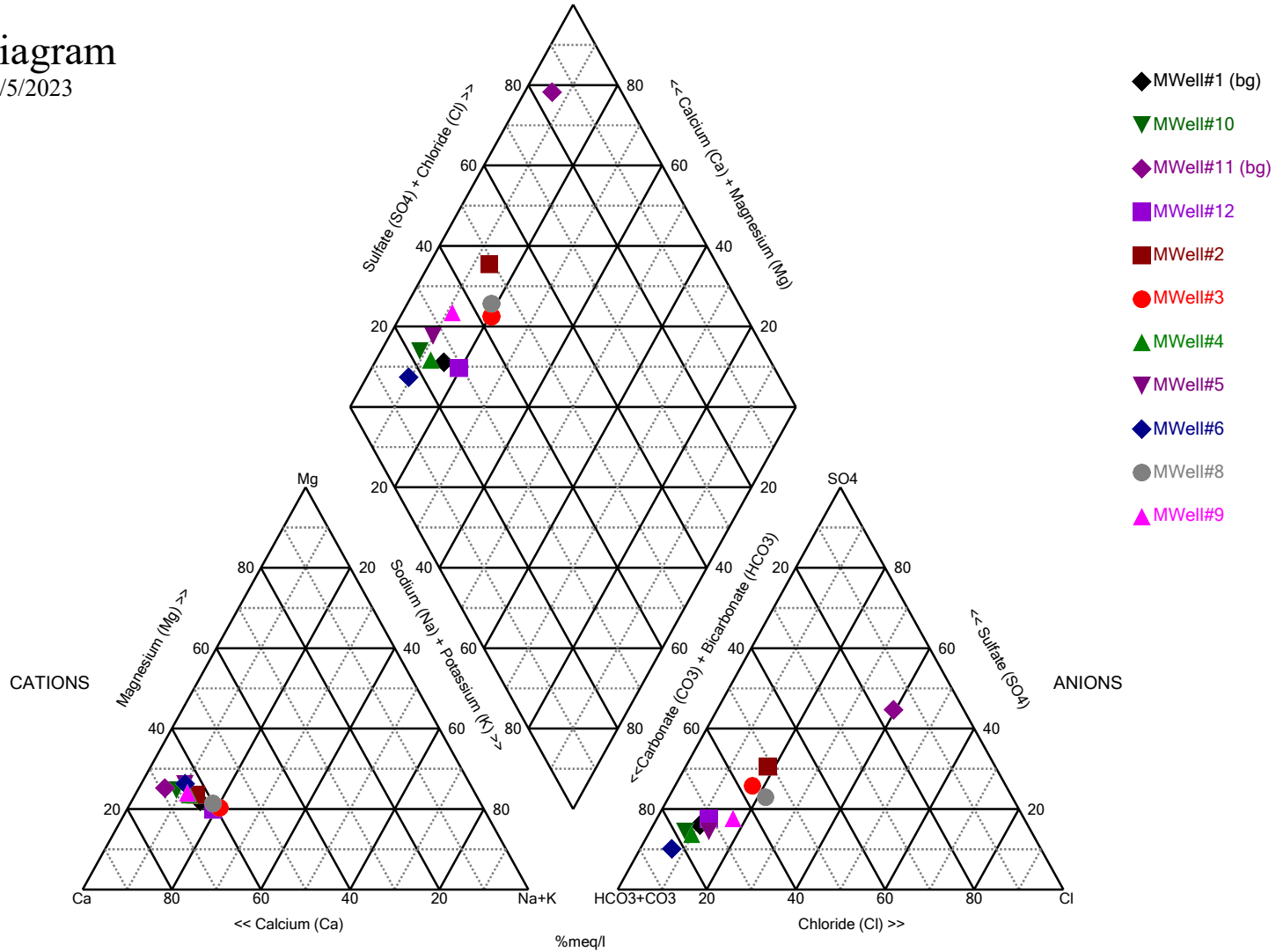
= Outside WAC 173-351-420(5)(a) acceptable range

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).

5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L

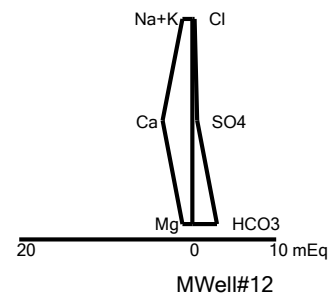
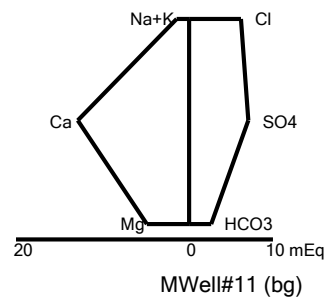
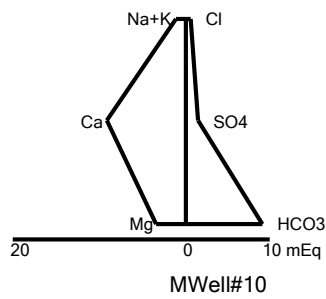
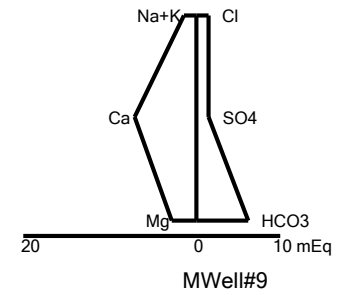
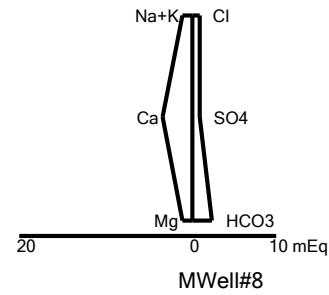
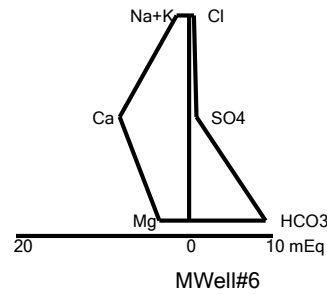
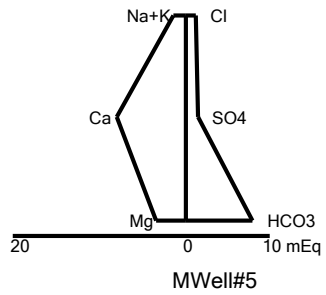
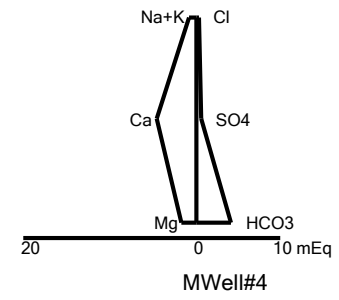
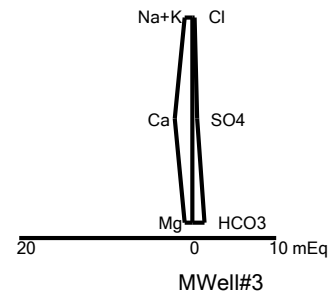
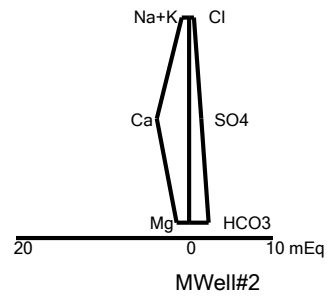
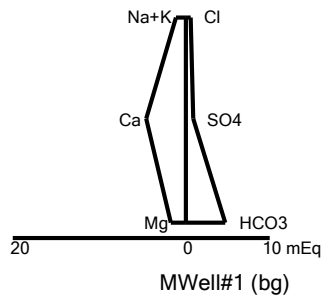
Piper Diagram

12/6/2023, 12/5/2023



Analysis Run 1/26/2024 2:27 PM

Horn Rapids Landfill Client: City of Richland Data: 4Q_23_PIPER_final



Stiff Diagram - 12/6/2023, 12/5/2023 Analysis Run 1/26/2024 2:28 PM
Horn Rapids Landfill Client: City of Richland Data: 4Q_23_PIPER_final

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Fourth Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6			
	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	
CATIONS																			
Na	0.0435	21	0.91	12.68	14	0.61	10.92	12	0.52	16.20	15	0.65	9.36	22	0.96	7.64	21	0.91	7.31
Ca	0.0499	91	4.54	63.01	70	3.49	62.61	38	1.90	58.85	90	4.49	64.40	160	7.98	63.71	160	7.98	63.86
Mg	0.08229	19	1.56	21.69	16	1.32	23.60	8.0	0.66	20.43	20	1.65	23.60	40	3.29	26.27	40	3.29	26.33
Fe(+2)	0.03581	0.05	0.00	0.02	0.05	0.00	0.03	0.05	0.00	0.06	0.05	0.00	0.03	0.11	0.00	0.03	0.67	0.02	0.19
K	0.02558	7.3	0.19	2.59	6.2	0.16	2.84	5.6	0.14	4.45	7.1	0.18	2.60	11	0.28	2.25	11	0.28	2.25
Mn	0.0364	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.39	0.01	0.11	0.19	0.01	0.06
TOTAL		7.21	100.00		TOTAL	5.58	100.00	TOTAL	3.22	100.00	TOTAL	6.97	100.00	TOTAL	12.53	100.00	TOTAL	12.50	100.00
ANIONS																			
HCO ₃ ²⁻	0.02	290	5.80	73.70	150	3.00	47.27	92	1.84	58.27	260	5.20	72.95	490	9.80	76.42	560	11.20	86.55
SO ₄	0.02082	48	1.00	12.70	70	1.46	22.96	32	0.67	21.10	37	0.77	10.81	74	1.54	12.01	51	1.06	8.21
Cl	0.02821	22	0.62	7.89	29	0.82	12.89	15	0.42	13.40	17	0.48	6.73	48	1.35	10.56	24	0.68	5.23
CO ₃ ²⁻	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO ₃	0.0714	6.3	0.45	5.72	15	1.07	16.88	3.2	0.23	7.24	9.5	0.68	9.52	1.8	0.13	1.00	0.025	0.00	0.01
TOTAL		7.87	100.00		TOTAL	6.35	100.00	TOTAL	3.16	100.00	TOTAL	7.13	100.00	TOTAL	12.82	100.00	TOTAL	12.94	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				-4.40			-6.43			1.00			-1.10			-1.15			-1.73

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Fourth Quarter 2023

Conversion Factor ¹ (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12			
	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	
CATIONS																
Na	0.0435	19	0.83	15.45	23	1.00	9.22	20	0.87	6.48	20	0.87	4.62	20	0.87	16.02
Ca	0.0499	64	3.19	59.69	140	6.99	64.37	180	8.98	66.88	260	12.97	68.84	66	3.29	60.65
Mg	0.08229	14	1.15	21.53	32	2.63	24.27	40	3.29	24.51	57	4.69	24.89	13	1.07	19.70
Fe(+2)	0.03581	0.1	0.00	0.07	0.05	0.00	0.02	0.12	0.00	0.03	0.16	0.01	0.03	0.05	0.00	0.03
K	0.02558	6.8	0.17	3.25	9	0.23	2.12	11	0.28	2.10	12	0.31	1.63	7.6	0.19	3.58
Mn	0.0364	0.01	0.00	0.01	0.01	0.00	0.00	0.04	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01
		TOTAL	5.35	100.00	TOTAL	10.85	100.00	TOTAL	13.43	100.00	TOTAL	18.85	100.00	TOTAL	5.43	100.00
ANIONS																
HCO ₃ ²⁻	0.02	150	3.00	52.75	370	7.40	67.06	560	11.20	79.53	160	3.20	16.55	190	3.80	69.72
SO ₄	0.02082	48	1.00	17.57	76	1.58	14.34	81	1.69	11.97	340	7.08	36.60	37	0.77	14.13
Cl	0.02821	32	0.90	15.87	53	1.50	13.55	29	0.82	5.81	220	6.21	32.09	16	0.45	8.28
CO ₃ ²⁻	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO ₃	0.0714	11	0.79	13.81	7.8	0.56	5.05	5.3	0.38	2.69	40	2.86	14.77	6	0.43	7.86
		TOTAL	5.69	100.00	TOTAL	11.03	100.00	TOTAL	14.08	100.00	TOTAL	19.34	100.00	TOTAL	5.45	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100																
				-3.06			-0.83			-2.37			-1.29			-0.19

¹Reference: Hem 1985.

²HCO₃ and CO₃ reported as CaCO₃, conversion factor adjusted accordingly.

☐ = Outside WAC 173-351-420(5)(a) acceptable range

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).

5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L

**Summary of Cation/Anion Charge Balance Differences,
 2023 Groundwater Data, Horn Rapids Landfill**

Monitoring Well	First Quarter RPD ¹	Second Quarter RPD ¹	Third Quarter RPD ¹	Fourth Quarter RPD ¹
Well #1	1.20	3.58	2.54	-4.40
Well #2	0.97	-4.48	-0.05	-6.43
Well #3	-0.47	-0.77	1.95	1.00
Well #4	-0.09	2.07	5.26	-1.10
Well #5	-0.18	-0.35	6.09	-1.15
Well #6	1.75	4.45	7.15	-1.73
Well #8	-0.88	-2.91	4.63	-3.06
Well #9	0.49	4.05	6.27	-0.83
Well #10	1.65	2.72	5.99	-2.37
Well #11	-0.58	-0.61	3.11	-1.29
Well #12	1.76	2.39	1.97	-0.19
Leachate Pond	-4.56	NA	NA	NA

Note:

¹ Reported in relative percent difference (RPD). For each sample the analytical results were converted into milliequivalents per liter (meq/L) and the cation meq/L summed (C) and the anion meq/L summed (A).

$$RPD = \frac{2(C-A)}{C+A} \times 100$$

[] = Outside WAC 173-351-420(5)(a) acceptable range

NA= Not available

Appendix G

Groundwater Data and Potentiometric Surface Map

Table G-1. Groundwater Elevation Data, First Quarter 2023, Horn Rapids Landfill

Well	Northing ¹	Easting	Reference Elevation (NAVD88) ²	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.42	387.26
MW-2	372,460.09	2,294,368.28	469.73	83.74	385.99
MW-3	371,529.10	2,294,408.23	481.28	95.23	386.05
MW-4	370,722.92	2,294,379.43	462.52	76.46	386.06
MW-5	371,784.64	2,293,120.19	469.94	83.55	386.39
MW-6	370,965.00	2,293,109.43	484.54	98.01	386.53
MW-8	370,228.88	2,293,869.87	476.47	90.36	386.11
MW-9	370,175.53	2,293,150.76	490.75	104.30	386.45
MW-10 ³	372,265.23	2,293,111.61	464.08	76.26	387.82
MW-11	373,725.48	2,291,860.98	481.16	94.18	386.98
MW-12	368,946.27	1,934,322.73	477.63	91.58	386.05

Groundwater levels measured on March 22 and 23, 2023

Notes:

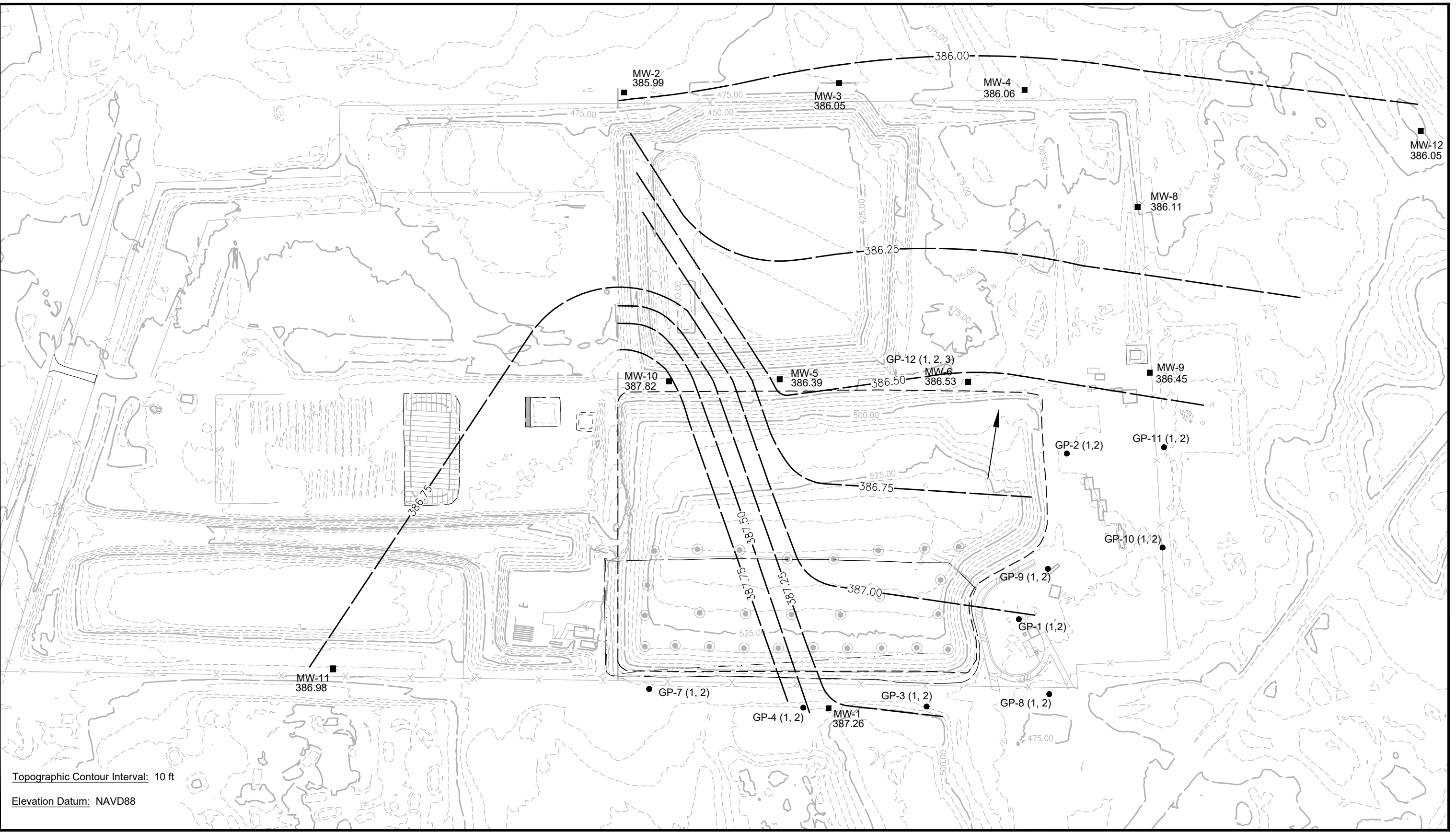
¹Northing and Easting will be updated with new survey data

²Updated to NAVD88 in accordance with Ecology guidance

³Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

Note: Depth to water at MW-8 recorded after initial 5 minutes of purging

FILE: BL3820004P04T02-F-G1-1stQ2023 LAYOUT: G1 DATE: May 18, 2023 2:14:36 PM
 PATH: U:\PSO\Projects\Clients\3820-City of Richmond\555-3820-004 HornRapid201EM\995\Sec\CADD\555-3820-004 Phase 04\Task 02\Figures
 PLOTTED BY: purgobut



Parametrix DATE: May 18, 2023 FILE: BL3820004P04T02-F-G1-1stQ2023

LEGEND:

- Approximate extent of refuse
- Approximate site boundary
- Groundwater elevation contour
- Approximate groundwater flow direction

Monitoring Stations

- Monitoring well, with groundwater elevation in ft NAVD88 measured March 22 and 23, 2023
- Gas Probe (1, 2, 3) with variable-depth screens



Figure G1
Potentiometric Surface Map
First Quarter 2023
Horn Rapids Landfill

Table G-2. Groundwater Elevation Data, Second Quarter 2023, Horn Rapids Landfill

Well	Northing ¹	Easting	Reference Elevation (NAVD88) ²	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.51	387.17
MW-2	372,460.09	2,294,368.28	469.73	83.71	386.02
MW-3	371,529.10	2,294,408.23	481.28	95.32	385.96
MW-4	370,722.92	2,294,379.43	462.52	76.63	385.89
MW-5	371,784.64	2,293,120.19	469.94	83.61	386.33
MW-6	370,965.00	2,293,109.43	484.54	98.32	386.22
MW-8	370,228.88	2,293,869.87	476.47	90.45	386.02
MW-9	370,175.53	2,293,150.76	490.75	104.58	386.17
MW-10	372,265.23	2,293,111.61	464.08	76.84	387.24
MW-11	373,725.48	2,291,860.98	481.16	94.02	387.14
MW-12	368,946.27	1,934,322.73	477.63	91.92	385.71

Groundwater levels measured on June 13 and 14, 2023

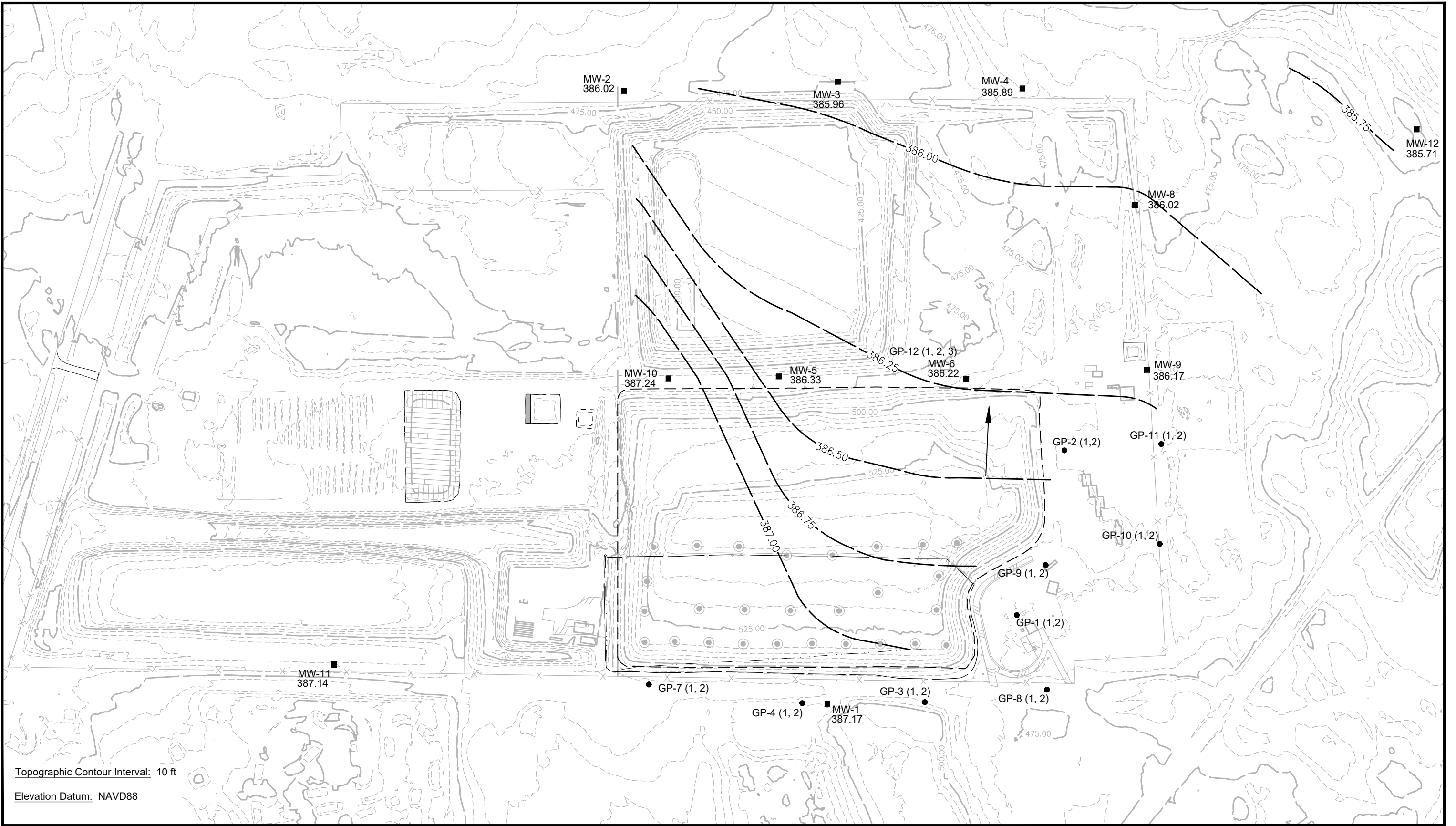
Notes:

¹Northing and Easting will be updated with new survey data

²Updated to NAVD88 in accordance with Ecology guidance

³Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G1-2ndQ2023 LAYOUT: G1 PATH: U:\PSC\Projects\Clients\3820-City of Richmond\555-3820-004 HornRapid201\EM\995\cadd\555-3820-004\Phase 04\Task 02\Figures\ PLOTTED BY: purgobut DATE: Wednesday, August 16, 2023 12:23:49 PM



Parametrix DATE: Aug 16, 2023 FILE: BL3820004P04T02-F-G1-2ndQ2023

LEGEND:

- Approximate extent of refuse
- Approximate site boundary
- Groundwater elevation contour
- Approximate groundwater flow direction

Monitoring Stations

- Monitoring well, with groundwater elevation in ft NAVD88 measured June 13 and 14, 2023
- Gas Probe (1, 2, 3) with variable-depth screens



Figure G2
Potentiometric Surface Map
Second Quarter 2023
Horn Rapids Landfill

Table G-3. Groundwater Elevation Data, Third Quarter 2023, Horn Rapids Landfill

Well	Northing ¹	Easting	Reference Elevation (NAVD88) ²	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.95	386.73
MW-2	372,460.09	2,294,368.28	469.73	84.10	385.63
MW-3	371,529.10	2,294,408.23	481.28	95.45	385.83
MW-4	370,722.92	2,294,379.43	462.52	76.75	385.77
MW-5	371,784.64	2,293,120.19	469.94	83.52	386.42
MW-6	370,965.00	2,293,109.43	484.54	98.36	386.18
MW-8	370,228.88	2,293,869.87	476.47	90.55	385.92
MW-9	370,175.53	2,293,150.76	490.75	104.65	386.10
MW-10	372,265.23	2,293,111.61	464.08	77.20	386.88
MW-11	373,725.48	2,291,860.98	481.16	93.08	388.08
MW-12	368,946.27	1,934,322.73	477.63	92.10	385.53

Groundwater levels measured on September 25 and 26, 2023

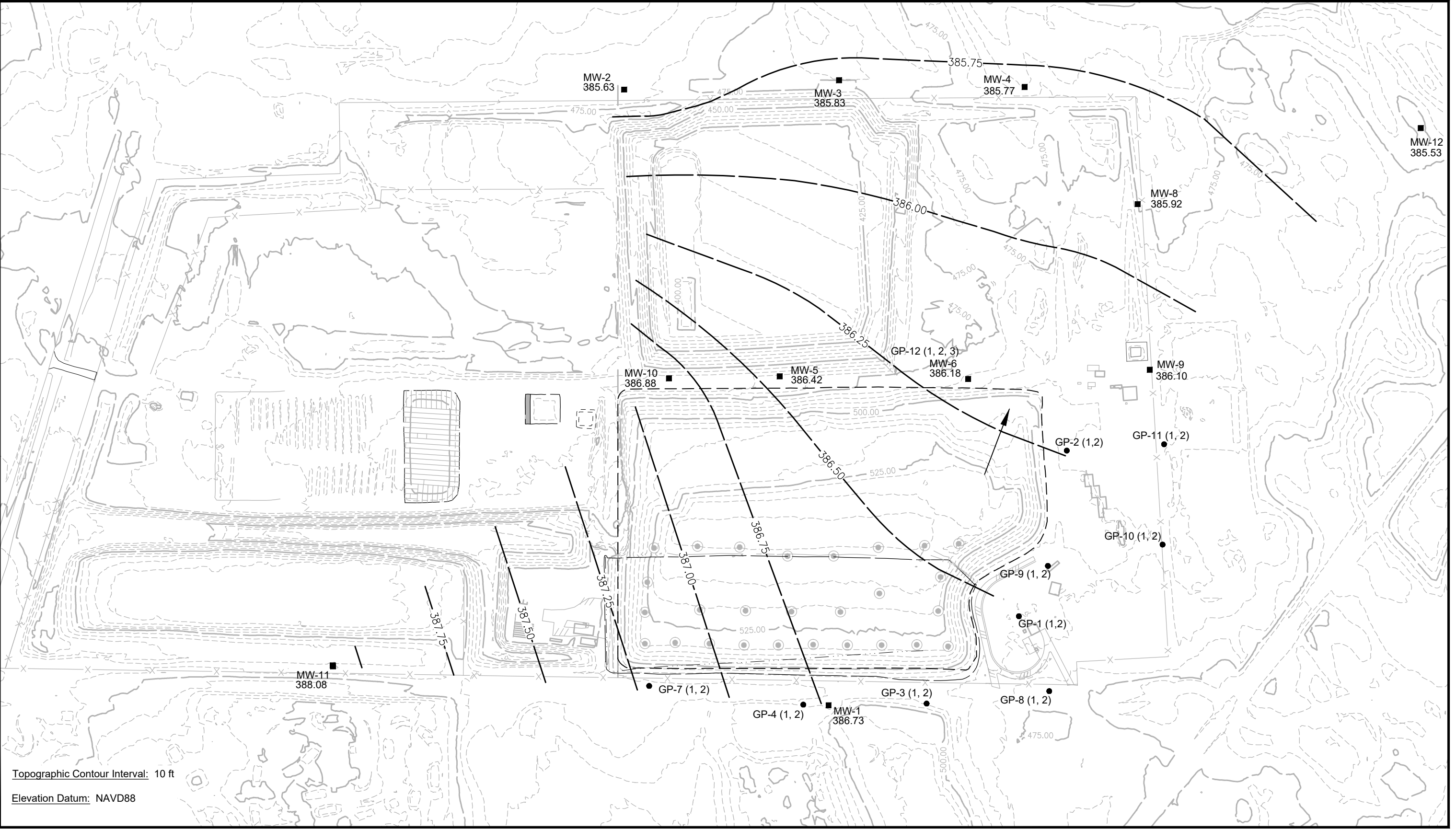
Notes:

¹Northing and Easting will be updated with new survey data

²Updated to NAVD88 in accordance with Ecology guidance

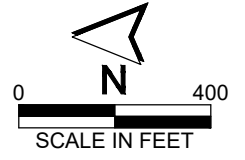
³Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G1-3rdQ2023 LAYOUT: G1 PATH: U:\FSO\Projects\Clients\3820-City of Richland\555-3820-04 HornRapid2011EM\995\ca\CADD\555-3820-04\Phase 04\Task 02\Figures\ PLOTTED BY: purgubut DATE: Monday, November 20, 2023 8:09:34 PM



Topographic Contour Interval: 10 ft
Elevation Datum: NAVD88

Parametrix DATE: Nov 20, 2023 FILE: BL3820004P04T02-F-G1-3rdQ2023



- LEGEND:**
- Approximate extent of refuse
 - Approximate site boundary
 - Groundwater elevation contour
 - Approximate groundwater flow direction

- Monitoring Stations**
- Monitoring well, with groundwater elevation in ft NAVD88 measured September 25 and 26, 2023
 - Gas Probe (1, 2, 3) with variable-depth screens

**Figure G3
Potentiometric Surface Map
Third Quarter 2023
Horn Rapids Landfill**

Table G-4. Groundwater Elevation Data, Fourth Quarter 2023, Horn Rapids Landfill

Well	Northing ¹	Easting	Reference Elevation (NAVD88) ²	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.50	387.18
MW-2	372,460.09	2,294,368.28	469.73	83.90	385.83
MW-3	371,529.10	2,294,408.23	481.28	95.00	386.28
MW-4	370,722.92	2,294,379.43	462.52	76.42	386.10
MW-5	371,784.64	2,293,120.19	469.94	83.65	386.29
MW-6	370,965.00	2,293,109.43	484.54	98.10	386.44
MW-8	370,228.88	2,293,869.87	476.47	90.30	386.17
MW-9	370,175.53	2,293,150.76	490.75	104.35	386.40
MW-10	372,265.23	2,293,111.61	464.08	76.80	387.28
MW-11	373,725.48	2,291,860.98	481.16	94.10	387.06
MW-12	368,946.27	1,934,322.73	477.63	91.45	386.18

Groundwater levels measured on December 5 and 6, 2023

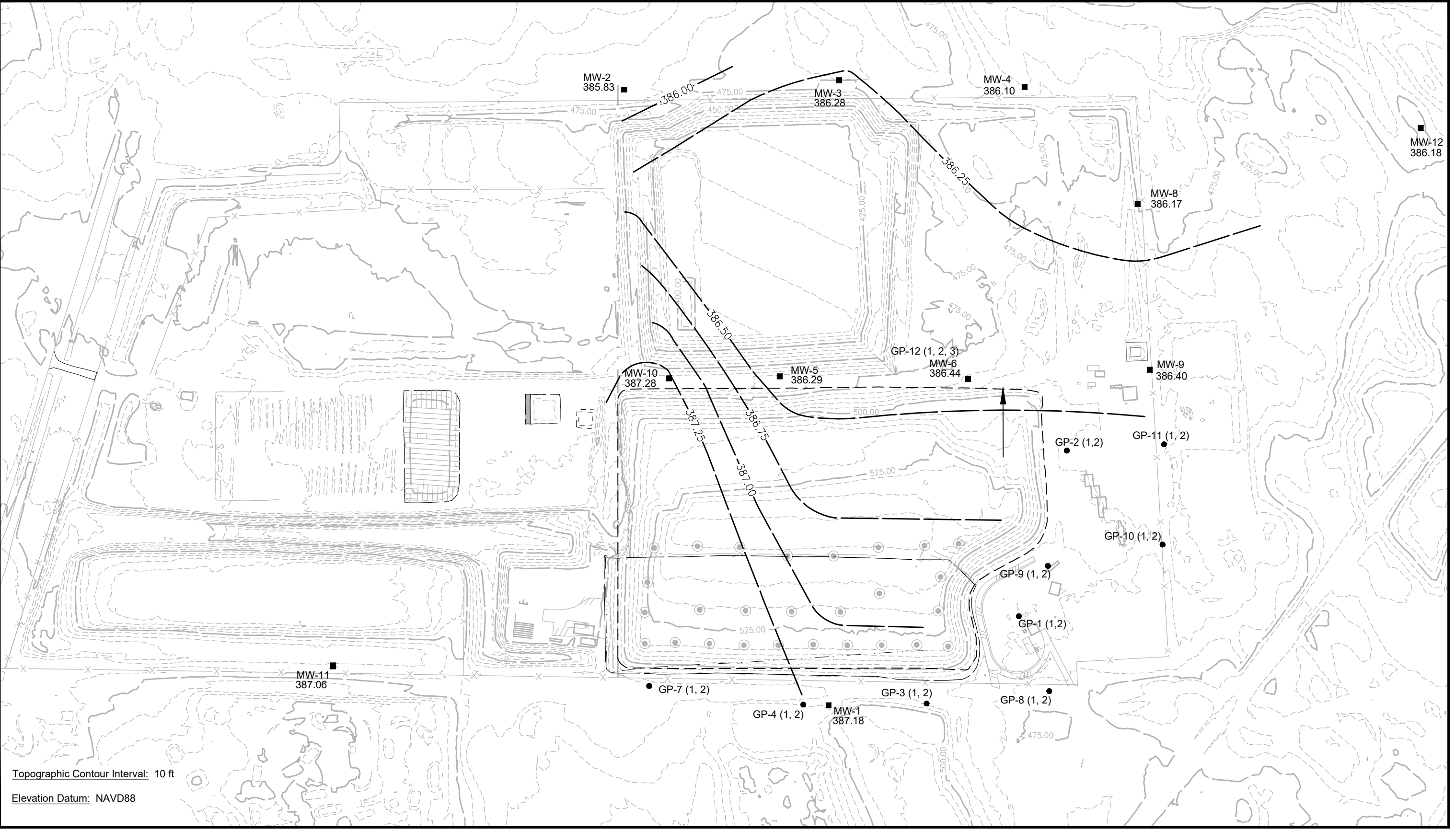
Notes:

¹Northing and Easting will be updated with new survey data

²Updated to NAVD88 in accordance with Ecology guidance

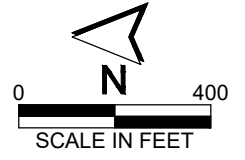
³Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G1-4thQ2023 LAYOUT: G1 PATH: U:\FSO\Projects\Clients\3820-04 HornRapid\2011EM\995eca\CADD\555-3820-04 Phase 04\Task 02\Figures\ PLOTTED BY: purgobut DATE: Monday, February 5, 2024 1:36:53 PM



Topographic Contour Interval: 10 ft
Elevation Datum: NAVD88

Parametrix DATE: Feb 05, 2024 FILE: BL3820004P04T02-F-G1-4thQ2023



LEGEND:

	Approximate extent of refuse
	Approximate site boundary
	Groundwater elevation contour
	Approximate groundwater flow direction

Monitoring Stations

	Monitoring well, with groundwater elevation in ft NAVD88 measured December 5 and 6, 2023
	Gas Probe (1, 2, 3) with variable-depth screens

**Figure G4
Potentiometric Surface Map
Fourth Quarter 2024
Horn Rapids Landfill**

Appendix H

Landfill Gas Data

**HORN RAPIDS LANDFILL
PERIMETER GAS PROBES**

MONITORED DATA				
PROBE	PRESSURE	CH4	O2	CO2
	INCHES W.C.	(% VOL)	(% VOL)	(% VOL)

DATE: 3/27/23

GP-1-1	-0.29	0.1	22.2	0.1
GP-1-2	-0.28	0.1	22.2	0.1
GP-2-1	-0.26	0.1	22.0	0.1
GP-2-2	-0.29	0.1	22.0	0.1
GP-3-1	-0.16	0.1	22.4	0.1
GP-3-2	-0.38	0.1	22.5	0.1
GP-4-1	-0.51	0.1	22.0	0.1
GP-4-2	-0.50	0.1	22.2	0.1
GP-7-1	-0.26	0.2	21.6	0.1
GP-7-2	-0.13	0.1	21.7	0.1
GP-8-1	-0.30	0.1	22.5	0.2
GP-8-2	-0.26	0.1	22.6	0.1
GP-9-1	-0.62	0.1	22.1	0.1
GP-9-2	-0.37	0.1	21.9	0.2
GP-10-1	-0.41	0.1	22.5	0.2
GP-10-2	-0.34	0.1	21.3	1.3
GP-11-1	-0.32	0.1	22.6	0.1
GP-11-2	-0.29	0.1	22.5	0.2
GP-12-1	-0.28	0.1	21.4	0.2
GP-12-2	-0.29	0.2	21.1	0.5
GP-12-3	-0.13	3.9	6.4	17.2
GP-13	-0.14	0.1	22	0.10
GP-14	-0.11	0.1	22	0.10
GP-15	-0.12	0.1	22	0.20

COMMENTS:

Weather: 35° F, clear
Barometer: 29.75 in. of mercury steady

DATE: 10/27/23

GP-1-1	-0.10	0.1	20.6	0.5
GP-1-2	-0.09	0.0	20.5	0.7
GP-2-1	-0.11	0.0	19.6	1.4
GP-2-2	-0.17	0.1	20.6	0.3
GP-3-1	-0.42	0.0	21.3	0.1
GP-3-2	-0.29	0.0	21.0	0.0
GP-4-1	-0.48	0.0	21.3	0.1
GP-4-2	-0.41	0.0	21.0	0.0
GP-7-1	-0.21	0.0	21.2	0.1
GP-7-2	-0.15	0.1	21.2	0.1
GP-8-1	-0.15	0.0	20.9	0.2
GP-8-2	-0.19	0.1	20.6	0.2
GP-9-1	-0.54	0.1	21.3	0.0
GP-9-2	-0.20	0.0	19.7	0.7
GP-10-1	-0.38	0.0	19.8	1.4
GP-10-2	-0.01	0.1	19.8	1.5
GP-11-1	-0.18	0.2	20.8	0.1
GP-11-2	-0.11	0.0	20.9	0.2
GP-12-1	0.06	5.8	0.3	23.6
GP-12-2	0.10	0.9	6.6	15.6
GP-12-3	0.05	0.4	17.3	4.3
GP-13	0.02	0.0	20.7	0.0
GP-14	0.13	0.1	21.1	0.0
GP-15	0.19	0.0	21.0	0.1

COMMENTS:

Weather: 54 to 58° F, cloudy
Barometer: 29.37 in. of mercury steady

MONITORED DATA				
PROBE	PRESSURE	CH4	O2	CO2
	INCHES W.C.	(% VOL)	(% VOL)	(% VOL)

DATE: 6/30/23

GP-1-1	-0.12	0.0	20.7	0.4
GP-1-2	-0.07	0.0	20.9	0.5
GP-2-1	-0.13	0.0	20.2	1.1
GP-2-2	-0.32	0.0	20.7	0.2
GP-3-1	-0.52	0.0	21.0	0.0
GP-3-2	-0.38	0.0	21.0	0.0
GP-4-1	-0.50	0.0	21.1	0.0
GP-4-2	-0.44	0.0	20.9	0.2
GP-7-1	-0.31	0.0	21.3	0.0
GP-7-2	-0.14	0.0	21.2	0.1
GP-8-1	-0.15	0.0	20.9	0.1
GP-8-2	-0.17	0.0	20.6	0.4
GP-9-1	-0.61	0.0	21.1	0.0
GP-9-2	-0.21	0.0	19.8	0.9
GP-10-1	-0.43	0.0	19.7	1.3
GP-10-2	-0.13	0.0	19.6	1.4
GP-11-1	-0.21	0.0	20.8	0.1
GP-11-2	-0.09	0.0	20.8	0.2
GP-12-1	0.01	26.2	5.2	24.0
GP-12-2	-0.20	1.0	15.7	5.0
GP-12-3	-0.08	0.0	20.6	0.1
GP-13	0.09	0.0	20.6	0.0
GP-14	0.16	0.0	20.7	0.0
GP-15	0.15	0.0	20.4	0.1

COMMENTS:

Weather: 69 to 75° F, clear
Barometer: 29.44 in. of mercury steady

DATE: 12/20/23

GP-1-1	-0.12	0.0	20.7	0.5
GP-1-2	-0.08	0.0	20.6	0.6
GP-2-1	-0.12	0.0	19.6	1.5
GP-2-2	-0.18	0.1	20.6	0.3
GP-3-1	-0.39	0.0	21.2	0.1
GP-3-2	-0.29	0.0	21.1	0.0
GP-4-1	-0.46	0.0	21.4	0.0
GP-4-2	-0.40	0.0	21.0	0.0
GP-7-1	-0.21	0.0	21.1	0.1
GP-7-2	-0.14	0.1	21.3	0.1
GP-8-1	-0.14	0.0	20.7	0.2
GP-8-2	-0.17	0.1	20.4	0.2
GP-9-1	-0.52	0.1	21.2	0.0
GP-9-2	-0.19	0.0	19.6	0.7
GP-10-1	-0.31	0.0	19.8	1.4
GP-10-2	-0.05	0.1	19.7	1.5
GP-11-1	-0.17	0.1	20.8	0.1
GP-11-2	-0.10	0.0	20.8	0.2
GP-12-1	0.04	6.1	0.2	23.4
GP-12-2	0.09	0.8	6.6	15.6
GP-12-3	0.05	0.5	17.3	4.3
GP-13	0.03	0.0	21.0	0.0
GP-14	0.12	0.1	20.9	0.0
GP-15	0.17	0.0	21.1	0.1

COMMENTS:

Weather: 43 to 46° F, cloudy
Barometer: 29.54 in. of mercury steady

Appendix I

Field Data Sheets

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number: <u>555-3820-004</u>	Date: <u>3/22/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>A. Romey</u>
<u>Richland, WA 99354</u>	Purged By: <u>A. Romey</u>

Casing Diameter: 2" 4" 6" Other

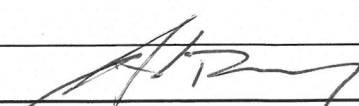
Initial Depth to Water (feet): <u>102.42</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>139</u>	Date Purged: <u>3/22/23</u>
Top of Screen (feet): <u>114</u>	Purge Time (from/to): 1613 <u>1613 - 1635</u>
Reference Point (surveyor's notch, etc.): _____	Time Sampled: <u>1645</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>102.42</u>							
<u>1623</u>	<u>102.46</u>	<u>7.16</u>	<u>771</u>	<u>17.2</u>	<u>123.6</u>	<u>6.23</u>	<u>Cl</u>	217.0 <u>217.0</u>
<u>1627</u>	<u>102.46</u>	<u>7.14</u>	<u>768</u>	<u>19.2</u>	<u>121.5</u>	<u>5.70</u>	<u>Cl</u>	<u>217.0</u>
<u>1631</u>	<u>102.46</u>	<u>7.11</u>	<u>791</u>	<u>20.0</u>	<u>120.2</u>	<u>5.55</u>	<u>Cl</u>	<u>217.0</u>
<u>1635</u>	<u>102.46</u>	<u>7.12</u>	<u>782</u>	<u>20.2</u>	<u>118.9</u>	<u>5.38</u>	<u>Cl</u>	<u>217.0</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~400ml/min</u>	Sampling Flow Rate: <u>same ~100ml/min for VOA's</u>
Field Parameter Instrument: <u>YSI Pro Plus</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>delivery</u>	Field QC Sample Number: <u>_____</u>

Well Integrity: OK - pump still stuck ~4' up in well -
 Remarks: makes all measurements difficult

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number: <u>555-3820-004</u>	Date: <u>3/22/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>[Signature]</u>
<u>Richland, WA 99354</u>	Purged By: <u>A. ROMNEY</u>

Casing Diameter: 2" x 4" 6" Other

Initial Depth to Water (feet): <u>83.74</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>123</u>	Date Purged: <u>3/22/23</u>
Top of Screen (feet) <u>98</u>	Purge Time (from/to): <u>1511 - 1533</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1535</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>83.74</u>	<u>7.70</u>						
<u>1521</u>	<u>83.75</u>	<u>6.67</u>	<u>522.5</u>	<u>18.8</u>	<u>112.2</u>	<u>6.59</u>	<u>cl</u>	<u>200.0</u>
<u>1525</u>	<u>83.75</u>	<u>7.67</u>	<u>530.9</u>	<u>20.0</u>	<u>110.8</u>	<u>6.52</u>	<u>cl</u>	<u>200.0</u>
<u>1529</u>	<u>83.75</u>	<u>7.67</u>	<u>525.5</u>	<u>20.2</u>	<u>108.9</u>	<u>6.34</u>	<u>cl</u>	<u>200.0</u>
<u>1533</u>	<u>83.75</u>	<u>7.67</u>	<u>522.7</u>	<u>20.2</u>	<u>107.2</u>	<u>6.34</u>	<u>cl</u>	<u>200.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>480ml/min</u>	Sampling Flow Rate: <u>SAME - VOAs</u>
Field Parameter Instrument: <u>YSI PRO PLUS</u>	<u>~150 ml/min</u>

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
	<u>Energy Northwest (nitrate)</u>
Shipment Method: <u>delivery</u>	Field QC Sample Number: <u> </u>

Well Integrity: Good

Remarks:

Signature: [Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number: <u>555-3820-004</u>	Date: <u>3/23/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>ARomey</u>
<u>Richland, WA 99354</u>	Purged By: <u>ARomey</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>95.23</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>136</u>	Date Purged: <u>3/23/23</u>
Top of Screen (feet): <u>111</u>	Purge Time (from/to): <u>1357 - 1447*</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1455</u>

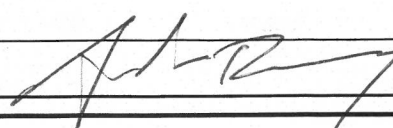
TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>95.23</u>							
1435	1407	<u>7.84</u>	<u>332.6</u>	<u>18.1</u>	<u>114.6</u>	<u>9.76</u>	<u>cl</u>	<u>227.0</u>
1439	1411	<u>7.81</u>	<u>338.5</u>	<u>19.2</u>	<u>114.0</u>	<u>9.36</u>	<u>cl</u>	<u>227.0</u>
1443	1415	<u>7.80</u>	<u>340.2</u>	<u>19.8</u>	<u>111.8</u>	<u>9.25</u>	<u>cl</u>	<u>227.0</u>
<u>1447</u>	<u>95.32</u>	<u>7.85</u>	<u>337.7</u>	<u>19.8</u>	<u>107.9</u>	<u>9.25</u>	<u>cl</u>	<u>227.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>1500ml/min</u>	Sampling Flow Rate: <u>same - 1000ml/min</u>
Field Parameter Instrument: <u>YSI PRO Plus</u>	<u>1500ml/min</u>

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>delivery</u>	Field QC Sample Number: <u>←</u>

Well Integrity: OK

Remarks:

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number: <u>555-3820-004</u>	Date: <u>3/23/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>A Romsey</u>
<u>Richland, WA 99354</u>	Purged By: <u>A Romsey</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>70 76.46</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115</u>	Date Purged: <u>3/23/23</u>
Top of Screen (feet): <u>90</u>	Purge Time (from/to): <u>1313 - 1335</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1340</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>76.46</u>							
<u>1323</u>	<u>76.56</u>	<u>7.62</u>	<u>652</u>	<u>18.2</u>	<u>98.2</u>	<u>4.64</u>	<u>cl</u>	<u>193.0</u>
<u>1327</u>	<u>76.56</u>	<u>7.58</u>	<u>669</u>	<u>19.8</u>	<u>97.6</u>	<u>4.00</u>	<u>cl</u>	<u>193.0</u>
<u>1331</u>	<u>75.55</u>	<u>7.57</u>	<u>674</u>	<u>19.9</u>	<u>96.7</u>	<u>3.81</u>	<u>cl</u>	<u>193.0</u>
<u>1335</u>	<u>75.56</u>	<u>7.58</u>	<u>672</u>	<u>20.1</u>	<u>96.1</u>	<u>3.62</u>	<u>cl</u>	<u>193.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~400ml/min</u>	Sampling Flow Rate: <u>SAME - VENTS 150 ml/min</u>
Field Parameter Instrument: <u>YSI PRO PLUS</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>delivery</u>	Field QC Sample Number: <u>-</u>

Well Integrity: GOOD

Remarks:

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number:	555-3820-004	Date:	3/23/23
Project Name:	Horn Rapids Landfill	Client Name:	City of Richland
Project Address:	3102 Twin Bridges Road	Sampled By:	A. Romano
	Richland, WA 99354	Purged By:	A. Romano

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet):	83.55	Purge Flow Rate Measurement Method:	Graduated Cylinder
Depth of Well (feet):	101	Date Purged:	3/23/23
Top of Screen (feet):	91	Purge Time (from/to):	0820 - 0846
Reference Point (surveyor's notch, etc.):	N	Time Sampled:	0850

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	83.55							
0830	83.94	6.87	1096	18.8	81.0	0.94	cl	207.0
0834	83.95	6.82	1118	21.3	79.7	0.96	cl	207.0
0838	83.70	6.75	1155	22.7	81.4	0.65	cl	207.0
0842	83.67	6.76	1170	23.6	79.5	0.44	cl	207.0
0846	83.67	6.71	1169	23.4	80.5	0.41	cl	207.0

Purge Equipment:	Dedicated Submersible	Sampling Equipment:	Dedicated Submersible
Purge Flow Rate:	400 ml/min	Sampling Flow Rate:	SAME - VOA's 150 ml/min
Field Parameter Instrument	YSI PRO PWS		

Laboratory:	Eurofins Seattle	Date Sent to Lab:	3/23/23
	Energy Northwest (nitrate)		
Shipment Method:	delivery	Field QC Sample Number:	MW-21

Well Integrity: OK -

Remarks: NB22, Bollinger

Signature: [Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number:	555-3820-004	Date:	3/23/23
Project Name:	Horn Rapids Landfill	Client Name:	City of Richland
Project Address:	3102 Twin Bridges Road	Sampled By:	ARomney
	Richland, WA 99354	Purged By:	ARomney

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet):	98.01	Purge Flow Rate Measurement Method:	Graduated Cylinder
Depth of Well (feet):	116	Date Purged:	3/23/23
Top of Screen (feet):	106	Purge Time (from/to):	0925 - 0947
Reference Point (surveyor's notch, etc.):	N	Time Sampled:	0950

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	98.01							
0935	98.22	6.58	1117	20.7	59.9	0.62	cl w/ floaters	222.0
0939	98.20	6.61	1118	21.5	53.3	0.56		222.0
0943	98.20	6.61	1102	22.7	48.5	0.64		222.0
0947	98.20	6.62	1117	23.9	44.2	0.52		222.0

Purge Equipment:	Dedicated Submersible	Sampling Equipment:	Dedicated Submersible
Purge Flow Rate:	~ 500 ml/min	Sampling Flow Rate:	SAME ~ VOA 150 ml/min
Field Parameter Instrument	YSI PRO PWS		

Laboratory:	Eurofins Seattle	Date Sent to Lab:	3/24/23
	Energy Northwest (nitrate)		
Shipment Method:	delivered	Field QC Sample Number:	-

Well Integrity: OK

Remarks:

Signature: [Handwritten Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number:	555-3820-004	Date:	3/23/23
Project Name:	Horn Rapids Landfill	Client Name:	City of Richland
Project Address:	3102 Twin Bridges Road	Sampled By:	A. Romney
	Richland, WA 99354	Purged By:	A. Romney

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet):	89.74	Purge Flow Rate Measurement Method:	Graduated Cylinder
Depth of Well (feet):	102.5	Date Purged:	3/23/23
Top of Screen (feet):	87.5	Purge Time (from/to):	1218 - 1240
Reference Point (surveyor's notch, etc.):	N	Time Sampled:	1245

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	89.74					8.12		
1228	90.36	7.70	925	20.4	88.9	8.04	cl	225.0
1232	90.36	7.73	910	20.8	85.6	8.04	cl	225.0
1236	90.36	7.74	909	20.9	84.7	8.02	cl	225.0
1240	90.36	7.74	900	21.0	85.1	7.81	cl	225.0

Purge Equipment:	Dedicated Submersible	Sampling Equipment:	Dedicated Submersible
Purge Flow Rate:	~400ml/min	Sampling Flow Rate:	SAME - VOLS 150ml/min
Field Parameter Instrument	YSI PRO PHS		

Laboratory:	Eurofins Seattle	Date Sent to Lab:	3/24/23
	Energy Northwest (nitrate)		
Shipment Method:	delivered	Field QC Sample Number:	-

Well Integrity: OK

Remarks: MS/MSD

Signature: A. Romney

Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number: <u>555-3820-004</u>	Date: <u>3/23/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>ARMSTRONG</u>
<u>Richland, WA 99354</u>	Purged By: <u>ARMSTRONG</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>104.30</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115.5</u>	Date Purged: <u>3/23/23</u>
Top of Screen (feet) <u>100.5</u>	Purge Time (from/to): <u>1023 - 1049</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1100</u>

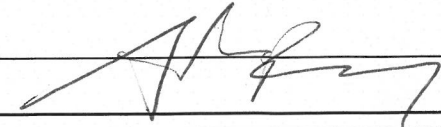
TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>104.30</u>							
<u>1033</u>	<u>104.39</u>	<u>6.92</u>	<u>1128</u>	<u>19.4</u>	<u>63.5</u>	<u>5.41</u>	<u>cl</u>	<u>227.0</u>
<u>1037</u>	<u>104.39</u>	<u>6.90</u>	<u>1127</u>	<u>21.3</u>	<u>64.5</u>	<u>4.95</u>	<u>cl</u>	<u>227.0</u>
<u>1041</u>	<u>104.39</u>	<u>6.91</u>	<u>1123</u>	<u>22.0</u>	<u>65.4</u>	<u>2.31</u>	<u>cl</u>	<u>227.0</u>
<u>1045</u>	<u>104.39</u>	<u>6.93</u>	<u>1128</u>	<u>22.3</u>	<u>64.9</u>	<u>2.28</u>	<u>cl</u>	<u>227.0</u>
<u>1049</u>	<u>104.39</u>	<u>6.93</u>	<u>1120</u>	<u>22.5</u>	<u>66.0</u>	<u>2.29</u>	<u>cl</u>	<u>227.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~ 360 ml/min</u>	Sampling Flow Rate: <u>same - 150 ml/min for vials</u>
Field Parameter Instrument: <u>YSI Pro Plus</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
<u>Energy Northwest (nitrate)</u>	_____
Shipment Method: <u>delivered</u>	Field QC Sample Number: _____

Well Integrity: OK

Remarks:

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number: <u>555-3820-004</u>	Date: <u>3/22/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>A Romney</u>
<u>Richland, WA 99354</u>	Purged By: <u>A Romney</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>76.26</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>87.5</u>	Date Purged: <u>3/22/23</u>
Top of Screen (feet): <u>72.5</u>	Purge Time (from/to): <u>1408 - 1430</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1435</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>76.26</u>							
<u>1418</u>	<u>76.90</u>	<u>6.65</u>	<u>1232</u>	<u>21.8</u>	<u>102.1</u>	<u>0.31</u>	<u>cl</u>	<u>195.0</u>
<u>1422</u>	<u>76.89</u>	<u>6.64</u>	<u>1282</u>	<u>23.5</u>	<u>101.3</u>	<u>0.26</u>	<u>cl</u>	<u>195.0</u>
<u>1426</u>	<u>76.89</u>	<u>6.63</u>	<u>1288</u>	<u>24.6</u>	<u>100.8</u>	<u>0.24</u>	<u>cl</u>	<u>195.0</u>
<u>1430</u>	<u>76.89</u>	<u>6.62</u>	<u>1288</u>	<u>24.9</u>	<u>101.0</u>	<u>0.24</u>	<u>cl</u>	<u>195.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>500 ml/min</u>	Sampling Flow Rate: <u>same - varies 150 ml/min</u>
Field Parameter Instrument: <u>YSI PRO Plus</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
<u>Energy Northwest (nitrate)</u>	<u>3/23/23</u>
Shipment Method: <u>delivered</u>	Field QC Sample Number: _____

Well Integrity: OK

Remarks: NEEDS Bollards

Signature: [Handwritten Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number: <u>555-3820-004</u>	Date: <u>3/22/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>A. Romsey</u>
<u>Richland, WA 99354</u>	Purged By: <u>A. Romsey</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>94.18</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>105</u>	Date Purged: <u>3/22/23</u>
Top of Screen (feet): <u>90</u>	Purge Time (from/to): <u>1258 - 1328</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1330</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>94.18</u>							
<u>1308</u>	<u>94.38</u>	<u>7.42</u>	<u>1863</u>	<u>20.5</u>	<u>84.1</u>	<u>8.35</u>	<u>cl</u>	<u>216.0</u>
<u>1320</u>	<u>94.38</u>	<u>7.42</u>	<u>1862</u>	<u>20.5</u>	<u>86.7</u>	<u>8.38</u>	<u>cl</u>	<u>216.0</u>
<u>1324</u>	<u>94.38</u>	<u>7.42</u>	<u>1861</u>	<u>20.5</u>	<u>89.2</u>	<u>8.32</u>	<u>cl</u>	<u>216.0</u>
<u>1328</u>	<u>94.38</u>	<u>7.41</u>	<u>1852</u>	<u>20.5</u>	<u>90.9</u>	<u>8.37</u>	<u>cl</u>	<u>216.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>500 ml/min</u>	Sampling Flow Rate: <u>same as purg 150 ml/min</u>
Field Parameter Instrument: <u>VSI pro plus</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>3/24/23</u>
<u>Energy Northwest (nitrate)</u>	<u>3/23/23</u>
Shipment Method: <u>delivered</u>	Field QC Sample Number: <u> </u>

Well Integrity: Good

Remarks:

Signature:

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number:	555-3820-004	Date:	3/23/23
Project Name:	Horn Rapids Landfill	Client Name:	City of Richland
Project Address:	3102 Twin Bridges Rod Richland, WA 99354	Sampled By:	A. Romney
		Purged By:	A. Romney

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet):	91.58	Purge Flow Rate Measurement Method:	Graduated Cylinder
Depth of Well (feet):	104	Date Purged:	3/23/23
Top of Screen (feet):	89	Purge Time (from/to):	1514-1536
Reference Point (surveyor's notch, etc.):	N	Time Sampled:	1545

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	91.58							
1524	91.62	7.64	480.1	19.4	116.3	5.08	sl turb	2150
1528	91.58	7.68	484.9	21.3	108.8	4.94	sl turb	215.0
1532	91.58	7.73	482.0	21.7	104.6	4.90	sl turb	215.0
1536	91.58	7.72	481.1	21.8	103.4	4.85	sl turb	215.0

Purge Equipment:	Dedicated Submersible	Sampling Equipment:	Dedicated Submersible
Purge Flow Rate:	~480ml/min	Sampling Flow Rate:	5mins vials 150 ml/min
Field Parameter Instrument	YSI PRO PWS		

Laboratory:	Eurofins Seattle	Date Sent to Lab:	3/24/23
	Energy Northwest (nitrate)		
Shipment Method:	delivered	Field QC Sample Number:	-

Well Integrity: Good

Remarks:

Signature: [Signature]

Groundwater Sampling Field Data Sheet

Well #: Leachate Pond

Project Number:	<u>555-3820-004</u>	Date:	<u>3/22/23</u>
Project Name:	<u>Horn Rapids Landfill</u>	Client Name:	<u>City of Richland</u>
Project Address:	<u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By:	<u>A. Roney</u>

TIME (2400 hr)	pH (units)	Ec (µmhos/cm 25°C)	TEMPERATURE °C	Redox (mv)	Dissolved Oxygen (mg/L)	TURBIDITY (visual)
<u>1115</u>	<u>8.36</u>	<u>3402</u>	<u>10.5</u>	<u>91.2</u>	<u>1.97</u>	<u>V. Turbid</u>

Laboratory:	<u>Eurofins Seattle</u>	Date Sent to Lab:	<u>3/24/23</u>
	<u>Energy Northwest (nitrate)</u>		<u>3/23/23</u>
Chain-of-Custody (yes/no):	<u>yes</u>	Field QC Sample Number:	<u>None</u>
Shipment Method:	<u>delivered</u>		<u>None</u>

Remarks:

Depth level 16.75' Feet Pond depth = 6.4'

Signature: A/R



Field Data Sheet

Well #: **Condensate Pond**

Project Number: <u>555-3820-004</u>	Date: <u>3/22/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Measured By: <u>A. ROMEY</u>

TIME (2400 hr)	Depth to Water (ft)	Estimated Depth of Water in Pond (ft)
<u>1000</u>	<u>25.58'</u>	<u>1.5'</u>

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

Signature: _____

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number: <u>555-3820-004</u>	Date: <u>6/14/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>A. Romney</u>
<u>Richland, WA 99354</u>	Purged By: <u>A. Romney</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>102.51</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>139</u>	Date Purged: <u>6/14/23</u>
Top of Screen (feet): <u>114</u>	Purge Time (from/to): <u>1517-1546</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1550</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>102.51</u>							
<u>1530</u>	<u>-</u>	<u>7.22</u>	<u>722</u>	<u>21.4</u>	<u>70.9</u>	<u>7.02</u>	<u>cl</u>	<u>220</u>
<u>1534</u>	<u>-</u>	<u>7.23</u>	<u>721</u>	<u>21.7</u>	<u>72.0</u>	<u>6.01</u>	<u>cl</u>	<u>220</u>
<u>1538</u>	<u>102.52</u>	<u>7.24</u>	<u>714</u>	<u>22.0</u>	<u>70.8</u>	<u>5.89</u>	<u>cl</u>	<u>220</u>
<u>1542</u>	<u>-</u>	<u>7.24</u>	<u>706</u>	<u>21.6</u>	<u>69.1</u>	<u>5.80</u>	<u>cl</u>	<u>220</u>
<u>1546</u>	<u>-</u>	<u>7.24</u>	<u>705</u>	<u>21.3</u>	<u>66.3</u>	<u>5.75</u>	<u>cl</u>	<u>220</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~500 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for vials</u>
Field Parameter Instrument: <u>YSI PRO</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>PROPERLY</u>	Field QC Sample Number: <u>MW21-0700</u>

Well Integrity: Good

Remarks: Issue with water level indicator, could only get two measurements.

Signature: [Handwritten Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number: <u>555-3820-004</u>	Date: <u>6/13/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>A ROMEY</u>
	Purged By: <u>A ROMEY</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>83.71</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>123</u>	Date Purged: <u>6/13/23</u>
Top of Screen (feet): <u>98</u>	Purge Time (from/to): <u>1554 - 1606^{ARC} 1627</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1607*</u>

* mistake

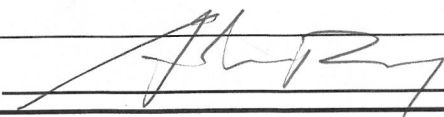
TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>83.71</u>							
<u>1607</u>	<u>83.76</u>	<u>7.76</u>	<u>501</u>	<u>21.2</u>	<u>44.0</u>	<u>6.76</u>	<u>Clear</u>	<u>200.0</u>
<u>1611</u>	<u>83.76</u>	<u>7.75</u>	<u>497</u>	<u>21.5</u>	<u>48.0</u>	<u>6.67</u>	<u>Clear</u>	<u>200.0</u>
<u>1615</u>	<u>83.76</u>	<u>7.73</u>	<u>494.8</u>	<u>22.0</u>	<u>50.6</u>	<u>6.91</u>	<u>cl</u>	<u>200.0</u>
<u>1619</u>	<u>83.76</u>	<u>7.64</u>	<u>492.8</u>	<u>23.2</u>	<u>52.0</u>	<u>6.79</u>	<u>Clear</u>	<u>200.0</u>
<u>1623</u>	<u>83.76</u>	<u>7.58</u>	<u>494.0</u>	<u>24.3</u>	<u>52.0</u>	<u>6.70</u>	<u>Clear</u>	<u>200.0</u>
<u>1627</u>	<u>83.76</u>	<u>7.55</u>	<u>494.5</u>	<u>25.3</u>	<u>51.7</u>	<u>6.60</u>	<u>Clear</u>	<u>200.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>375 ml/min</u>	Sampling Flow Rate: <u>~200ml/min for VOA's</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>Drip off</u>	Field QC Sample Number: <u> </u>

Well Integrity: OK

Remarks:

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number: <u>555-3820-004</u>	Date: <u>6/14/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>A. Romey</u> Purged By: <u>A. Romey</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>95.32</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>136</u>	Date Purged: <u>6/14/23</u>
Top of Screen (feet): <u>111</u>	Purge Time (from/to): <u>1322 - 1351</u>
Reference Point (surveyor's notch, etc.): <u>-</u>	Time Sampled: <u>1356</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>95.32</u>							
<u>1335</u>	<u>-</u>	<u>7.97</u>	<u>317</u>	<u>20.1</u>	<u>60.3</u>	<u>9.08</u>	<u>cl</u>	<u>215</u>
<u>1339</u>	<u>-</u>	<u>7.97</u>	<u>317.9</u>	<u>21.1</u>	<u>61.1</u>	<u>8.97</u>	<u>cl</u>	<u>215</u>
<u>1343</u>	<u>-</u>	<u>7.96</u>	<u>317.9</u>	<u>21.4</u>	<u>62.4</u>	<u>8.96</u>	<u>cl</u>	<u>215</u>
<u>1347</u>	<u>-</u>	<u>7.96</u>	<u>317.7</u>	<u>21.6</u>	<u>61.2</u>	<u>8.92</u>	<u>cl</u>	<u>215</u>
<u>1351</u>	<u>95.32</u>	<u>7.96</u>	<u>317.7</u>	<u>22.0</u>	<u>58.9</u>	<u>8.86</u>	<u>cl</u>	<u>215</u>
<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>415 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOAS</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>Drop off</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good

Remarks: Issue with water level indicator, could only get first and last reading.
- Needs Protection

Signature: [Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number: <u>555-3820-004</u>	Date: <u>6/14/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>ARomey</u> Purged By: <u>ARomey</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>76.63</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115</u>	Date Purged: <u>6/14/23</u>
Top of Screen (feet): <u>90</u>	Purge Time (from/to): <u>1227 - 1256</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1300</u>

REV
76.46
193

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>76.63</u>							
<u>1240</u>	<u>76.65</u>	<u>7.70</u>	<u>605</u>	<u>20.6</u>	<u>54.6</u>	<u>4.43</u>	<u>cl</u>	<u>195</u>
<u>1244</u>	<u>76.68</u>	<u>7.69</u>	<u>608</u>	<u>20.7</u>	<u>55.7</u>	<u>4.30</u>	<u>cl</u>	<u>195</u>
<u>1248</u>	<u>76.67</u>	<u>7.69</u>	<u>610</u>	<u>20.7</u>	<u>56.9</u>	<u>4.14</u>	<u>cl</u>	<u>195</u>
<u>1252</u>	<u>76.76</u>	<u>7.69</u>	<u>609</u>	<u>20.8</u>	<u>57.4</u>	<u>4.12</u>	<u>cl</u>	<u>192</u>
<u>1256</u>	<u>76.70</u>	<u>7.69</u>	<u>605</u>	<u>21.1</u>	<u>57.0</u>	<u>4.10</u>	<u>cl</u>	<u>192</u>
1300								

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>500 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min Per VOA3</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
	<u>Energy Northwest (nitrate)</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good

Remarks:

Signature: [Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number: <u>555-3820-004</u>	Date: <u>6/13/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>AROMEY</u> Purged By: <u>AROMEY</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>83.61</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>101</u>	Date Purged: <u>6/13/23</u>
Top of Screen (feet): <u>91</u>	Purge Time (from/to): <u>1443 - 1516</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1520</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>83.61</u>							
<u>1456</u>	<u>83.70</u>	<u>6.74</u>	<u>1054</u>	<u>23.2</u>	<u>-83.2</u>	<u>1.14</u>	<u>clear</u>	<u>207.0</u>
<u>1500</u>	<u>83.70</u>	<u>6.73</u>	<u>1076</u>	<u>24.3</u>	<u>-85.4</u>	<u>1.01</u>	<u>clear</u>	<u>207.0</u>
<u>1504</u>	<u>83.70</u>	<u>6.73</u>	<u>1087</u>	<u>24.7</u>	<u>-85.6</u>	<u>0.98</u>	<u>clear</u>	<u>207.0</u>
<u>1508</u>	<u>83.70</u>	<u>6.73</u>	<u>1087</u>	<u>24.9</u>	<u>-83.4</u>	<u>0.82</u>	<u>clear</u>	<u>207.0</u>
<u>1512</u>	<u>83.70</u>	<u>6.73</u>	<u>1088</u>	<u>25.2</u>	<u>-81.6</u>	<u>0.77</u>	<u>clear</u>	<u>207.0</u>
<u>1516</u>	<u>83.70</u>	<u>6.73</u>	<u>1083</u>	<u>25.4</u>	<u>-77.0</u>	<u>0.76</u>	<u>clear</u>	<u>207.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>400ml/min</u>	Sampling Flow Rate: <u>~200ml/min for VOA</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
<u>Energy Northwest (nitrate)</u>	<u>6/14/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: OK

Remarks: Needs protection

Signature: [Handwritten Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number: 555-3820-004	Date: 6/14/23
Project Name: Horn Rapids Landfill	Client Name: City of Richland
Project Address: 3102 Twin Bridges Road	Sampled By: A. Romey
Richland, WA 99354	Purged By: A. Romey

Casing Diameter: 2" x 4" - 6" _____ Other _____

Initial Depth to Water (feet): 98.32	Purge Flow Rate Measurement Method: Graduated Cylinder
Depth of Well (feet): 116	Date Purged: 6/14/23
Top of Screen (feet): 106	Purge Time (from/to): 0812 - 0836
Reference Point (surveyor's notch, etc.): _____	Time Sampled: 0840

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	98.32							
0820	98.54	6.69	1017	21.9	-115.8	1.27	cl	222.0
0824	98.54	6.69	1017	22.1	-122.1	1.21	cl	222.0
0828	98.40	6.69	1018	22.2	-128.7	1.16	cl	222.0
0832	98.42	6.69	1019	22.9	-132.6	1.11	cl	222.0
0836	98.42	6.69	1019	23.8	-137.9	1.04	cl	222.0

Purge Equipment: Dedicated Submersible	Sampling Equipment: Dedicated Submersible
Purge Flow Rate: 275 ml/min	Sampling Flow Rate: Same
Field Parameter Instrument: YSI Pro	

Laboratory: Eurofins Seattle	Date Sent to Lab: 6/15/23
Energy Northwest (nitrate)	6/14/23
Shipment Method: Drop	Field QC Sample Number: _____

Well Integrity: Good

Remarks: Gate around well inaccessible due to dirt mound.
Strong sulfur odor

Signature: A. Romey

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number: 555-3820-004	Date: 6/14/23
Project Name: Horn Rapids Landfill	Client Name: City of Richland
Project Address: 3102 Twin Bridges Road	Sampled By: A. Romney
Richland, WA 99354	Purged By: A. Romney

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): 90.45	Purge Flow Rate Measurement Method: Graduated Cylinder
Depth of Well (feet): 102.5	Date Purged: 6/14/23
Top of Screen (feet): 87.5	Purge Time (from/to): 1018 - 1040
Reference Point (surveyor's notch, etc.): N	Time Sampled: 1045

FRV
89.74
225

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	90.45							
1028	90.45	7.71	1043	20.0	26.2	8.71	cl	210
1032	90.40	7.71	1027	21.4	25.2	8.62	cl	210
1036	90.40	7.72	1015	22.6	27.6	8.54	cl	210
1040	90.40	7.72	1009	22.9	30.3	8.56	cl	210
1044 1155	90.40	7.76	997	18.5	50.5	9.18	cl	212
1159	90.40	7.74	972	21.3	40.2	8.72	cl	212
1203	90.40	7.74	989	23.4	35.9	8.50	cl	212
1207								

2nd purge

Purge Equipment: Dedicated Submersible	Sampling Equipment: Dedicated Submersible
Purge Flow Rate: 400 ml/min	Sampling Flow Rate: ~200ml/min for VOAs
Field Parameter Instrument: YSI PRO	

Laboratory: Eurofins Seattle	Date Sent to Lab: 6/15/23
Energy Northwest (nitrate)	6/14/23
Shipment Method: Drop	Field QC Sample Number: -

Well Integrity: Good

Remarks: GENERATOR ran out of gas at beginning of sampling - will return after fueling. SAMPLES collected after 12pm (ALL BUT NO₃) were given same sample time of 1045 for consistency.

Signature: [Signature]

Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number: <u>555-3820-004</u>	Date: <u>6/14/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>A. Romo</u>
	Purged By: <u>A. Romo</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>104.58</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115.5</u>	Date Purged: <u>6/14/23</u>
Top of Screen (feet) <u>100.5</u>	Purge Time (from/to): <u>0920 - 0948</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0950</u>

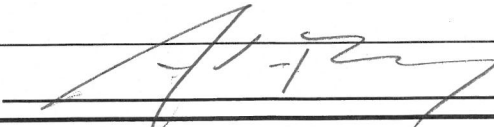
TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>104.58</u>							
<u>0930</u>	<u>104.62</u>	<u>7.06</u>	<u>1000</u>	<u>19.5</u>	<u>38.3</u>	<u>4.59</u>	<u>CI</u>	<u>227.0</u>
<u>0934</u>	<u>104.60</u>	<u>7.05</u>	<u>993</u>	<u>21.4</u>	<u>46.3</u>	<u>4.40</u>	<u>CI</u>	<u>227.0</u>
<u>0938</u>	<u>104.60</u>	<u>7.05</u>	<u>996</u>	<u>22.7</u>	<u>49.9</u>	<u>4.25</u>	<u>CI</u>	<u>227.0</u>
<u>0942</u>	<u>104.60</u>	<u>7.04</u>	<u>1003</u>	<u>23.3</u>	<u>52.0</u>	<u>4.12</u>	<u>CI</u>	<u>227.0</u>
<u>0946</u>	<u>104.60</u>	<u>7.04</u>	<u>995</u>	<u>23.5</u>	<u>53.6</u>	<u>4.00</u>	<u>CI</u>	<u>227.0</u>
<u>0950</u>	<u>104.60</u>						<u>CI</u>	<u>227.0</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>500 ml/min</u>	Sampling Flow Rate: <u>~200ml/min for VOA5</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
<u>Energy Northwest (nitrate)</u>	<u>6/14/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good

Remarks:

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number: 555-3820-004	Date: 6/13/23
Project Name: Horn Rapids Landfill	Client Name: City of Richland
Project Address: 3102 Twin Bridges Road	Sampled By: A. Romney
Richland, WA 99354	Purged By: A. Romney

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): 76.84	Purge Flow Rate Measurement Method: Graduated Cylinder
Depth of Well (feet): 87.5	Date Purged: 6/13/23
Top of Screen (feet): 72.5	Purge Time (from/to): 1337-1408
Reference Point (surveyor's notch, etc.):	Time Sampled: 1415

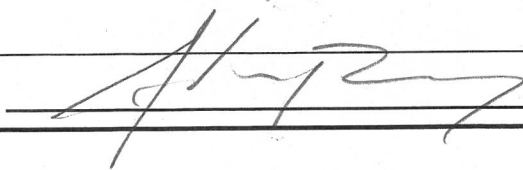
TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	76.84							
1347	76.92	6.70	1154	23.3	-9.4	0.56	clear	195.0
1351	76.92	6.70	1153	24.4	17.6	0.57	clear	195.0
1355	76.92	6.70	1161	25.9	16.3	0.55	clear	195.0
1359	76.92	6.69	1165	26.8	23.2	0.54	clear	195.0
1403	76.92	6.70	1164	27.2	26.7	0.53	clear	195.0
1407	76.92	6.69	1165	27.2	29.1	0.53	clear	195.0

Purge Equipment: Dedicated Submersible	Sampling Equipment: Dedicated Submersible
Purge Flow Rate: 350 ml/min	Sampling Flow Rate: ~200ml/min for VOAS
Field Parameter Instrument: YSI 700	

Laboratory: Eurofins Seattle	Date Sent to Lab: 6/15/23
Energy Northwest (nitrate)	6/14/23
Shipment Method: Drop	Field QC Sample Number: -

Well Integrity: OK

Remarks: Needs protection

Signature: 

Groundwater Sampling Field Data Sheet

MW-11
Well #: MW-03

Project Number: 555-3820-004	Date: 6/13/23
Project Name: Horn Rapids Landfill	Client Name: City of Richland
Project Address: 3102 Twin Bridges Road Richland, WA 99354	Sampled By: A. Thom ROMEY Purged By: A. Thom ROMEY

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): 94.02	Purge Flow Rate Measurement Method: Graduated Cylinder
Depth of Well (feet): 106 105	Date Purged: 6/13/23
Top of Screen (feet): 1190	Purge Time (from/to): 1229 - 1255
Reference Point (surveyor's notch, etc.): N	Time Sampled: 1300

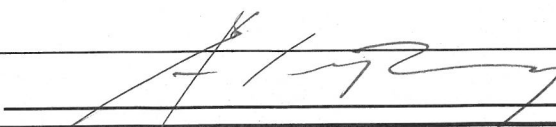
TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	94.14							
1239	94.14	7.38	1494	20.5	0.0	8.0	Clear	213.0
1243	94.15	7.40	1493	21.8	22.0	8.38	Clear	
1247	94.15	7.41	1485	22.0	29.6	8.29	Clear	
1251	94.15	7.42	1488	22.3	32.5	8.31	Clear	
1255	94.15	7.42	1487	22.5	34.5	8.33	Clear	↓
1259								
1303								
1307								

Purge Equipment: Dedicated Submersible	Sampling Equipment: Dedicated Submersible
Purge Flow Rate: 400ml/min	Sampling Flow Rate: 200ml/min for VOA's
Field Parameter Instrument: YSI 700	

Laboratory: Eurofins Seattle	Date Sent to Lab: 6/15/23
Energy Northwest (nitrate)	6/14/23
Shipment Method: Drop	Field QC Sample Number: -

Well Integrity: (good)

Remarks:

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number: <u>555-3820-004</u>	Date: <u>6/14/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Rod</u>	Sampled By: <u>A. Roney</u>
<u>Richland, WA 99354</u>	Purged By: <u>A. Roney</u>

Casing Diameter: 2" x 4" - 6" _____ Other _____

Initial Depth to Water (feet): <u>91.92</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>104</u>	Date Purged: <u>6/14/23</u>
Top of Screen (feet): <u>89</u>	Purge Time (from/to): <u>1627-1653</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1655</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>91.92</u>							
<u>1637</u>	<u>91.90</u>	<u>7.88</u>	<u>395.7</u>	<u>19.2</u>	<u>56.6</u>	<u>7.70</u>	<u>cl</u>	<u>212</u>
<u>1641</u>	<u>91.91</u>	<u>7.86</u>	<u>394.5</u>	<u>20.5</u>	<u>55.3</u>	<u>7.70</u>	<u>cl</u>	<u>212</u>
<u>1645</u>	<u>91.91</u>	<u>7.86</u>	<u>393.9</u>	<u>22.4</u>	<u>55.0</u>	<u>7.68</u>	<u>cl</u>	<u>212</u>
<u>1649</u>	<u>91.91</u>	<u>7.86</u>	<u>399.5</u>	<u>23.2</u>	<u>54.6</u>	<u>7.55</u>	<u>cl</u>	<u>212</u>
<u>1653</u>	<u>91.91</u>	<u>7.86</u>	<u>400.9</u>	<u>23.6</u>	<u>54.7</u>	<u>7.53</u>	<u>cl</u>	<u>212</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>325 ml/min</u>	Sampling Flow Rate: <u>same</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>6/15/23</u>
<u>Energy Northwest (nitrate)</u>	
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u> </u>

Well Integrity: Good

Remarks:

Signature: 

RV
91.88
215

Field Data Sheet

Well #: Leachate Pond

Project Number:	<u>555-3820-004</u>	Date:	<u>6/14/23</u>
Project Name:	<u>Horn Rapids Landfill</u>	Client Name:	<u>City of Richland</u>
Project Address:	<u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Measured By:	<u>A. Romay</u>

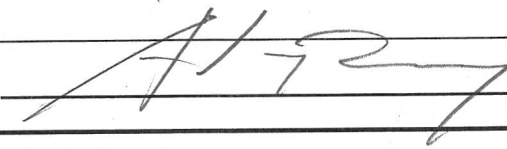
TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
<u>1450</u>	<u>19.1'</u>	<u>5.4'</u>

Remarks:

Top 404 ft, bottom 396 ft; approximate length of pipe 25 ft (3:1)

Some issues with WL indicators, though the measurement seemed accurate.

Signature: _____



Field Data Sheet

Well #: **Condensate Pond**

Project Number: 555-3820-004	Date: 6/14/23
Project Name: Horn Rapids Landfill	Client Name: City of Richland
Project Address: 3102 Twin Bridges Road Richland, WA 99354	Measured By: AROMET

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1430	25.55	0'

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

↑ APPROXIMATE END OF PIPE

Signature: 

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>102.95</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>139</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>114</u>	Purge Time (from/to): <u>1526 - 1554</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1600</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>102.95</u>							
<u>1538</u>	<u>102.95</u>	<u>7.39</u>	<u>541</u>	<u>20.4</u>	<u>61.7</u>	<u>6.51</u>	<u>C1</u>	<u>216</u>
<u>1542</u>	<u>102.4</u>	<u>7.35</u>	<u>540</u>	<u>20.6</u>	<u>70.0</u>	<u>6.43</u>	<u>C1</u>	<u>↓</u>
<u>1546</u>	<u>102.4</u>	<u>7.35</u>	<u>536</u>	<u>21.0</u>	<u>74.5</u>	<u>6.31</u>	<u>C1</u>	<u>↓</u>
<u>1550</u>	<u>102.5</u>	<u>7.35</u>	<u>535</u>	<u>21.3</u>	<u>75.8</u>	<u>6.26</u>	<u>C1</u>	<u>↓</u>
<u>1554</u>	<u>102.5</u>	<u>7.34</u>	<u>532</u>	<u>21.5</u>	<u>75.8</u>	<u>6.18</u>	<u>C1</u>	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~ 475 ml/min</u>	Sampling Flow Rate: <u>200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>for VOAs</u>
Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/27/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good.

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>84.1</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>123</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>98</u>	Purge Time (from/to): <u>0553-0616</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0617</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>84.1</u>							
<u>0600</u>	<u>84.1</u>	<u>7.67</u>	<u>395</u>	<u>17.9</u>	<u>102.3</u>	<u>7.69</u>	<u>cl</u>	<u>200.0</u>
<u>0604</u>	<u>83.9</u>	<u>7.46</u>	<u>395</u>	<u>17.9</u>	<u>69.7</u>	<u>7.48</u>	<u>cl</u>	<u> </u>
<u>0608</u>	<u>83.8</u>	<u>7.87</u>	<u>394</u>	<u>18.4</u>	<u>47.7</u>	<u>7.28</u>	<u>cl</u>	<u> </u>
<u>0612</u>	<u>83.8</u>	<u>7.87</u>	<u>395</u>	<u>19.7</u>	<u>41.5</u>	<u>7.01</u>	<u>cl</u>	<u> </u>
<u>0616</u>	<u>83.8</u>	<u>7.87</u>	<u>396.1</u>	<u>20.4</u>	<u>41.9</u>	<u>6.88</u>	<u>cl</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~325 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>For VOAs</u>

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/26/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good

Remarks: OK.

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: <u>2" x</u> <u>4" _</u> <u>6" _____</u> Other _____	
Initial Depth to Water (feet): <u>95.45</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>136</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>111</u>	Purge Time (from/to): <u>0950 - 1008</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1010</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>95.45</u>							
<u>0956</u>	<u>95.44</u>	<u>8.10</u>	<u>252.2</u>	<u>17.7</u>	<u>33.9</u>	<u>9.13</u>	<u>cl</u>	<u>215</u>
<u>1000</u>	<u>95.60</u>	<u>8.06</u>	<u>250.7</u>	<u>17.8</u>	<u>38.4</u>	<u>9.09</u>	<u>cl</u>	<u> </u>
<u>1004</u>	<u>95.45</u>	<u>8.04</u>	<u>250.4</u>	<u>19.0</u>	<u>37.1</u>	<u>8.98</u>	<u>cl</u>	<u> </u>
<u>1008</u>	<u>95.45</u>	<u>8.04</u>	<u>251.2</u>	<u>20.1</u>	<u>37.8</u>	<u>8.93</u>	<u>cl</u>	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____	_____	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~415 ml/min</u>	Sampling Flow Rate: <u>200 ml/min for</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>VOAs</u>
Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/27/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good

Remarks: Missing enclosure. No lock on well.

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" 6" Other

Initial Depth to Water (feet): <u>76.75</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet) <u>90</u>	Purge Time (from/to): <u>0902 - 0924</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0925</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>76.75</u>							
<u>0908</u>	<u>76.75</u>	<u>7.71</u>	<u>489.3</u>	<u>19.5</u>	<u>45.1</u>	<u>4.21</u>	<u>C1</u>	<u>195</u>
<u>0912</u>	<u>77.81</u>	<u>7.72</u>	<u>495.1</u>	<u>19.9</u>	<u>44.8</u>	<u>4.12</u>	<u>C1</u>	<u> </u>
<u>0916</u>	<u>77.81</u>	<u>7.72</u>	<u>491.0</u>	<u>20.0</u>	<u>45.2</u>	<u>4.05</u>	<u>C1</u>	<u> </u>
<u>0920</u>	<u>77.80</u>	<u>7.72</u>	<u>496.9</u>	<u>20.0</u>	<u>46.1</u>	<u>4.02</u>	<u>C1</u>	<u> </u>
<u>0924</u>	<u>77.80</u>	<u>7.72</u>	<u>489.9</u>	<u>20.1</u>	<u>46.9</u>	<u>4.01</u>	<u>C1</u>	<u> </u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~325 ml/min</u>	Sampling Flow Rate: <u>200 ml/min for VOA</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/27/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u> </u>

Well Integrity: Good

Remarks: ~~Missing enclosure. NO lock on well collar.~~
↑ referring to MW-3

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number: <u>555-3820-004</u>	Date: <u>9/25/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>83.52</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>101</u>	Date Purged: <u>9/25/23</u>
Top of Screen (feet): <u>91</u>	Purge Time (from/to): <u>1720-1746</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1750</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>83.52</u>							
<u>1730</u>	<u>83.80</u>	<u>6.89</u>	<u>807</u>	<u>20.9</u>	<u>-51.2</u>	<u>1.48</u>	<u>CI</u>	<u>207.0</u>
<u>1734</u>	<u>83.70</u>	<u>6.87</u>	<u>818</u>	<u>22.5</u>	<u>-48.4</u>	<u>1.29</u>	<u>CI</u>	<u> </u>
<u>1738</u>	<u>83.70</u>	<u>6.86</u>	<u>842</u>	<u>24.0</u>	<u>-43.0</u>	<u>1.12</u>	<u>CI</u>	<u> </u>
<u>1742</u>	<u>83.70</u>	<u>6.85</u>	<u>852</u>	<u>24.4</u>	<u>-40.3</u>	<u>1.04</u>	<u>CI</u>	<u> </u>
<u>1746</u>	<u>83.70</u>	<u>6.85</u>	<u>859</u>	<u>24.7</u>	<u>-37.0</u>	<u>0.96</u>	<u>CI</u>	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~375 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>for VOAs</u>
Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/26/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good

Remarks: Needs protection.

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number: <u>555-3820-004</u>	Date: <u>9/25/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>98.36</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>116</u>	Date Purged: <u>9/25/23</u>
Top of Screen (feet): <u>106</u>	Purge Time (from/to): <u>1835 - 1900</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1900</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>98.36</u>							
<u>1840</u>	<u>98.40</u>	<u>6.70</u>	<u>801</u>	<u>22.4</u>	<u>-109.4</u>	<u>1.19</u>	<u>cl</u>	<u>222</u>
<u>1844</u>	<u>98.40</u>	<u>6.71</u>	<u>805</u>	<u>22.8</u>	<u>-118.8</u>	<u>1.15</u>	<u>cl</u>	<u> </u>
<u>1848</u>	<u>98.39</u>	<u>6.71</u>	<u>805</u>	<u>23.1</u>	<u>-121.9</u>	<u>1.15</u>	<u>cl</u>	<u> </u>
<u>1852</u>	<u>98.39</u>	<u>6.71</u>	<u>807</u>	<u>24.1</u>	<u>-126.9</u>	<u>0.94</u>	<u>cl</u>	<u> </u>
<u>1856</u>	<u>98.39</u>	<u>6.71</u>	<u>807</u>	<u>25.4</u>	<u>-138.8</u>	<u>0.84</u>	<u>cl</u>	<u> </u>
<u>1900</u>	<u>98.39</u>	<u>6.72</u>	<u>810</u>	<u>26.6</u>	<u>-142.9</u>	<u>0.93</u>	<u>cl</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>300 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>VOAs</u>
Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/26/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good

Remarks: Gate around well causes accessibility issues. Slightly sulfur odor to the water.
*Update 9/26/23: well enclosure has been cleared of debris.

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _ Other _

Initial Depth to Water (feet): <u>90.55</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>102.5</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>87.5</u>	Purge Time (from/to): <u>1630 - 1656</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1700</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>90.55</u>							
<u>1640</u>	<u>90.55</u>	<u>7.89</u>	<u>459.5</u>	<u>20.9</u>	<u>52.2</u>	<u>7.86</u>	<u>C1</u>	<u>210</u>
<u>1644</u>	<u>90.55</u>	<u>7.90</u>	<u>469.5</u>	<u>22.7</u>	<u>47.0</u>	<u>7.67</u>	<u>C1</u>	<u> </u>
<u>1648</u>	<u>90.55</u>	<u>7.90</u>	<u>476.5</u>	<u>23.0</u>	<u>43.1</u>	<u>7.53</u>	<u>C1</u>	<u> </u>
<u>1652</u>	<u>90.55</u>	<u>7.89</u>	<u>484.9</u>	<u>23.2</u>	<u>42.2</u>	<u>7.43</u>	<u>C1</u>	<u> </u>
<u>1656</u>	<u>90.55</u>	<u>7.88</u>	<u>490.3</u>	<u>23.3</u>	<u>41.2</u>	<u>7.33</u>	<u>C1</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~385 ml/min</u>	Sampling Flow Rate: <u>200 ml/min Por</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>VOAs</u>
Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/27/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>MW 21-1300</u>

Well Integrity: Good

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>104.65</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115.5</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>100.5</u>	Purge Time (from/to): <u>1106-1132</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1135</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>104.65</u>							
<u>1116</u>	<u>104.75</u>	<u>6.98</u>	<u>738</u>	<u>20.8</u>	<u>122.5</u>	<u>3.04</u>	<u>C1</u>	<u>225</u>
<u>1120</u>	<u>104.80</u>	<u>7.02</u>	<u>747</u>	<u>21.4</u>	<u>91.9</u>	<u>2.90</u>	<u>C1</u>	<u> </u>
<u>1124</u>	<u>104.80</u>	<u>7.03</u>	<u>746</u>	<u>21.6</u>	<u>74.1</u>	<u>2.86</u>	<u>C1</u>	<u> </u>
<u>1128</u>	<u>104.80</u>	<u>7.04</u>	<u>749</u>	<u>22.1</u>	<u>68.2</u>	<u>2.91</u>	<u>C1</u>	<u> </u>
<u>1132</u>	<u>104.80</u>	<u>7.04</u>	<u>750</u>	<u>22.4</u>	<u>65.8</u>	<u>2.88</u>	<u>C1</u>	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>440 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>For VOAs</u>

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/27/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" X 4" 6" Other

Initial Depth to Water (feet): <u>77.2</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>87.5</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>72.5</u>	Purge Time (from/to): <u>1400 - 1430</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1435 1432</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>77.20</u>							
<u>1414</u>	<u>77.15</u>	<u>6.78</u>	<u>877</u>	<u>24.1</u>	<u>101.4</u>	<u>0.88</u>	<u>C1</u>	<u>208</u>
<u>1418</u>	<u>77.20</u>	<u>6.78</u>	<u>887</u>	<u>27.5</u>	<u>72.1</u>	<u>0.58</u>	<u>C1</u>	<u>↑</u>
<u>1422</u>	<u>77.16</u>	<u>6.79</u>	<u>885</u>	<u>26.4</u>	<u>63.4</u>	<u>0.55</u>	<u>C1</u>	<u>↓</u>
<u>1426</u>	<u>77.15</u>	<u>6.79</u>	<u>880</u>	<u>26.0</u>	<u>58.0</u>	<u>0.55</u>	<u>C1</u>	<u>↓</u>
<u>1430</u>	<u>77.15</u>	<u>6.79</u>	<u>879</u>	<u>26.0</u>	<u>55.7</u>	<u>0.56</u>	<u>C1</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~335 ml/min</u>	Sampling Flow Rate: <u>200 ml/min for VOAs</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/27/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u> </u>

Well Integrity: Good

Remarks: No evidence around well MW-10

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number: <u>555-3820-004</u>	Date: <u>9/25/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: <u>2" x</u> <u>4" _</u> <u>6" _____</u> Other _____	
Initial Depth to Water (feet): <u>93.08</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>105</u>	Date Purged: <u>9/25/23</u>
Top of Screen (feet): <u>90</u>	Purge Time (from/to): <u>1537-1600</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1605</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>93.08</u>							
<u>1540</u>	<u>94.25</u>	<u>7.41</u>	<u>1272</u>	<u>21.7</u>	<u>8.1</u>	<u>8.65</u>	<u>cl</u>	<u>213</u>
<u>1544</u>	<u>94.25</u>	<u>7.44</u>	<u>1273</u>	<u>22.0</u>	<u>18.7</u>	<u>8.67</u>	<u>cl</u>	
<u>1548</u>	<u>93.95</u>	<u>7.45</u>	<u>1270</u>	<u>21.7</u>	<u>26.6</u>	<u>8.67</u>	<u>cl</u>	
<u>1552</u>	<u>93.95</u>	<u>7.46</u>	<u>1272</u>	<u>21.7</u>	<u>29.6</u>	<u>8.68</u>	<u>cl</u>	
<u>1556</u>	<u>93.95</u>	<u>7.46</u>	<u>1266</u>	<u>21.5</u>	<u>33.8</u>	<u>8.65</u>	<u>cl</u>	
<u>1600</u>	<u>93.95</u>	<u>7.46</u>	<u>1256</u>	<u>21.4</u>	<u>33.8</u>	<u>8.63</u>	<u>cl</u>	<u>✓</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~400 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>for VOAs</u>
Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/26/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Rod</u> <u>Richland, WA 99354</u>	Sampled By: <u>Darby Scanlon</u> Purged By: <u>Darby Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>92.1</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>104</u>	Date Purged: <u>9/26/23</u>
Top of Screen (feet): <u>89</u>	Purge Time (from/to): <u>06046 - 0706</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0708</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>92.1</u>							
<u>0654</u>	<u>92.1</u>	<u>7.92</u>	<u>353.2</u>	<u>18</u>	<u>59.3</u>	<u>5.74</u>	<u>cl</u>	<u>212</u>
<u>0658</u>	<u>91.8</u>	<u>7.89</u>	<u>351.6</u>	<u>18.4</u>	<u>42.4</u>	<u>5.83</u>	<u>cl</u>	<u> </u>
<u>0702</u>	<u>91.8</u>	<u>7.89</u>	<u>352.1</u>	<u>18</u>	<u>40.4</u>	<u>5.86</u>	<u>cl</u>	<u> </u>
<u>0706</u>	<u>91.8</u>	<u>7.89</u>	<u>352.2</u>	<u>17.5</u>	<u>37.8</u>	<u>5.87</u>	<u>cl</u>	<u>↓</u>
<u>0710</u>	<u>91.8</u>							

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~250 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument	<u>for VOAs</u>

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
<u>Energy Northwest (nitrate)</u>	<u>9/26/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: Leachate Port

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>D. Scanlon</u> <u>A. Thom</u>
<u>Richland, WA 99354</u>	

TIME (2400 hr)	pH (units)	Ec (µmhos/cm 25°C)	TEMPERATURE °C	Redox (mv)	Dissolved Oxygen (mg/L)	TURBIDITY (visual)
<u>~1422</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>murky</u>

Laboratory: <u>Eurofins Seattle</u>	Date Sent to Lab: <u>9/27/23</u>
Chain-of-Custody (yes/no): <u>yes</u>	Field QC Sample Number: <u>None</u>
Shipment Method: <u>Drop</u>	<u>None</u>

Remarks:

Depth level — Feet

Port # 2 had minimal leachate.

Port #4 filled the VOA vial.

Signature: Dave Scanlon

Field Data Sheet

Well #: Leachate Pond

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>	
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>	
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Measured By: <u>Darby Scanlon</u>	
TIME (2400 hr) <u>1224</u>	Depth to Water from top of Pipe (ft) <u>24.55</u>	Estimated Depth of Water in Pond (ft) <u>11.75</u>
Remarks: <i>Top 404 ft, bottom 396 ft; approximate length of pipe 25 ft (3:1)</i>		
Signature: <u>Darby Scanlon</u>		

Field Data Sheet

Well #: Condensate Pond

Project Number: <u>555-3820-004</u>	Date: <u>9/26/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Measured By: <u>Darby Scanlon</u>

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
<u>1256</u>	<u>26</u>	<u>~0.15</u>

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number: <u>555-3820-004</u>	Date: <u>12/6/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>D. Scanlon</u>
<u>Richland, WA 99354</u>	Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>102.5</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>139</u>	Date Purged: <u>12/6/23</u>
Top of Screen (feet) <u>114</u>	Purge Time (from/to): <u>1104 - 1122</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1125</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>102.5</u>							
<u>1110</u>	<u>102.3</u>	<u>7.20</u>	<u>555</u>	<u>16.2</u>	<u>62.7</u>	<u>7.92</u>	<u>C1</u>	<u>226</u>
<u>1114</u>	<u>102.4</u>	<u>7.22</u>	<u>573</u>	<u>19.6</u>	<u>58.2</u>	<u>6.91</u>	<u> </u>	<u> </u>
<u>1118</u>	<u>102.4</u>	<u>7.23</u>	<u>590</u>	<u>20.4</u>	<u>60.1</u>	<u>6.55</u>	<u> </u>	<u> </u>
<u>1122</u>	<u>102.4</u>	<u>7.23</u>	<u>594</u>	<u>20.2</u>	<u>60.9</u>	<u>6.38</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>300 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOAs</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle ^{Portland} Seattle</u>	Date Sent to Lab: <u>12/7/23</u>
<u>Energy Northwest (nitrate)</u>	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good.

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number: <u>555-3820-004</u>	Date: <u>12/6/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>83.9</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>123</u>	Date Purged: <u>12/6/23</u>
Top of Screen (feet) <u>98</u>	Purge Time (from/to): <u>1223-1240</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1244</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>83.9</u>							
<u>1228</u>	<u>84.2</u>	<u>7.67</u>	<u>484.2</u>	<u>16.5</u>	<u>7.9</u>	<u>7.64</u>	<u>CI</u>	<u>200</u>
<u>1232</u>	<u>84.2</u>	<u>7.69</u>	<u>483</u>	<u>16.6</u>	<u>11.7</u>	<u>7.52</u>	<u> </u>	<u> </u>
<u>1236</u>	<u>84.2</u>	<u>7.69</u>	<u>483</u>	<u>17.5</u>	<u>17.9</u>	<u>7.33</u>	<u> </u>	<u> </u>
<u>1240</u>	<u>84.2</u>	<u>7.70</u>	<u>484</u>	<u>18.1</u>	<u>22.7</u>	<u>7.18</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>420 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOA's</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u> ^{Portland} <u>Seattle</u>	Date Sent to Lab: <u>12/7/23</u>
	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good.

Remarks:

Signature: Daryl Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number: <u>555-3820-004</u>	Date: <u>12/6/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>A. Thom</u> <u>D. Scanlon</u>
	Purged By: <u>A. Thom</u> <u>D. Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>95</u>	Purge Flow Rate: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>136</u>	Measurement Method: <u>_____</u>
Top of Screen (feet): <u>111</u>	Date Purged: <u>12/6/23</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Purge Time (from/to): <u>1006 - 1026</u>
	Time Sampled: <u>1028</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>95</u>							
<u>1014</u>	<u>95.2</u>	<u>7.97</u>	<u>281</u>	<u>16.5</u>	<u>27.3</u>	<u>9.00</u>	<u>C1</u>	<u>212</u>
<u>1018</u>	<u>95.2</u>	<u>7.95</u>	<u>276.6</u>	<u>16.6</u>	<u>29.5</u>	<u>8.93</u>	<u> </u>	<u> </u>
<u>1022</u>	<u>95.2</u>	<u>7.94</u>	<u>276.3</u>	<u>17.0</u>	<u>31.4</u>	<u>8.89</u>	<u> </u>	<u> </u>
<u>1026</u>	<u>95.2</u>	<u>7.93</u>	<u>276.2</u>	<u>17.5</u>	<u>33.6</u>	<u>8.83</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>390 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOAs</u>
Field Parameter Instrument: <u>VSI Pro</u>	

Laboratory: <u>Eurofins Seattle ^{Hortland} Seattle</u>	Date Sent to Lab: <u>12/7/23</u>
<u>Energy Northwest (nitrate)</u>	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: OK.

Remarks: Needs well protection. No lock on well.

Signature: Daryl Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number: <u>555-3820-004</u>	Date: <u>12/6/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>76.42</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115</u>	Date Purged: <u>12/6/23</u>
Top of Screen (feet) <u>90</u>	Purge Time (from/to): <u>0923 - 0938</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0940</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>76.42</u>							
<u>0926</u>	<u>76.6</u>	<u>7.59</u>	<u>548</u>	<u>17.5</u>	<u>41.5</u>	<u>5.11</u>	<u>Cl</u>	<u>192</u>
<u>0930</u>	<u>76.5</u>	<u>7.59</u>	<u>569</u>	<u>18.8</u>	<u>29.5</u>	<u>4.61</u>	<u> </u>	<u> </u>
<u>0934</u>	<u>76.5</u>	<u>7.60</u>	<u>560</u>	<u>19.5</u>	<u>29.6</u>	<u>4.45</u>	<u> </u>	<u> </u>
<u>0938</u>	<u>76.5</u>	<u>7.59</u>	<u>568</u>	<u>19.9</u>	<u>32.5</u>	<u>4.34</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~500 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VDA</u>
Field Parameter Instrument: <u>YSI Pro</u>	
Laboratory: <u>Eurofins Seattle ^{Portland} Seattle</u>	Date Sent to Lab: <u>12/7/23</u> <u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good.

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u>	Sampled By: <u>D. Scanlon</u>
<u>Richland, WA 99354</u>	Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>83.65</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>101</u>	Date Purged: <u>12/5/23</u>
Top of Screen (feet): <u>91</u>	Purge Time (from/to): <u>1112-1140</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1145</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>83.65</u>							
<u>1120</u>	<u>83.65</u>	<u>7.03</u>	<u>910</u>	<u>18.9</u>	<u>-25.7</u>	<u>1.34</u>	<u>cl</u>	<u>205</u>
<u>1124</u>	<u>83.64</u>	<u>7.03</u>	<u>910</u>	<u>19.6</u>	<u>-23.1</u>	<u>1.26</u>		
<u>1128</u>	<u>83.64</u>	<u>7.02</u>	<u>927</u>	<u>21.0</u>	<u>-21.7</u>	<u>1.17</u>		
<u>1132</u>	<u>83.64</u>	<u>7.02</u>	<u>936</u>	<u>22.2</u>	<u>-27.2</u>	<u>1.07</u>		
<u>1136</u>	<u>83.64</u>	<u>7.01</u>	<u>957</u>	<u>23.5</u>	<u>-24.4</u>	<u>0.97</u>		
<u>1140</u>	<u>83.65</u>	<u>7.00</u>	<u>966</u>	<u>24.1</u>	<u>-16.1</u>	<u>0.91</u>	↓	↓
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Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~270 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>for VOA</u>

Laboratory: <u>Eurofins Seattle ^{Portland} Seattle</u>	Date Sent to Lab: <u>12/7/23</u>
<u>Energy Northwest (nitrate)</u>	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: OK

Remarks: Needs protection.

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>98.1</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>116</u>	Date Purged: <u>12/5/23</u>
Top of Screen (feet): <u>106</u>	Purge Time (from/to): <u>1219-1248</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1250</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>98.1</u>							
<u>1232</u>	<u>98.2</u>	<u>6.32</u>	<u>883</u>	<u>19.3</u>	<u>-111</u>	<u>1.64</u>	<u>C1</u>	<u>220</u>
<u>1236</u>	<u>98.2</u>	<u>6.44</u>	<u>912</u>	<u>18.9</u>	<u>-128.9</u>	<u>1.66</u>	<u> </u>	<u> </u>
<u>1240</u>	<u>98.2</u>	<u>6.50</u>	<u>946</u>	<u>18</u>	<u>-131.6</u>	<u>1.77</u>	<u> </u>	<u> </u>
<u>1244</u>	<u>98.2</u>	<u>6.51</u>	<u>913</u>	<u>22.7</u>	<u>-142.8</u>	<u>1.21</u>	<u> </u>	<u> </u>
<u>1248</u>	<u>98.2</u>	<u>6.54</u>	<u>920</u>	<u>23.6</u>	<u>-152</u>	<u>1.02</u>	<u> </u>	<u> </u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~300 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOA's</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle ^{Portland} Seattle</u>	Date Sent to Lab: <u>12/7/23</u>
<u>Energy Northwest (nitrate)</u>	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good.

Remarks: Dirt removed from well enclosure still appears to be a temporary fix. How to make permanent?

Signature: Daryl Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number: <u>555-3820-004</u>	Date: <u>12/6/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet): <u>90.3</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>102.5</u>	Date Purged: <u>12/6/23</u>
Top of Screen (feet): <u>87.5</u>	Purge Time (from/to): <u>0820 - 0842</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0845</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>90.3</u>							
<u>0830</u>	<u>90.2</u>	<u>7.62</u>	<u>463.2</u>	<u>20.1</u>	<u>72.6</u>	<u>6.54</u>	<u>cl</u>	<u>210</u>
<u>0834</u>	<u>90.2</u>	<u>7.68</u>	<u>462.6</u>	<u>20.8</u>	<u>50.4</u>	<u>6.42</u>	<u>↓</u>	<u>↓</u>
<u>0838</u>	<u>90.2</u>	<u>7.10</u>	<u>461.9</u>	<u>21.2</u>	<u>43.6</u>	<u>6.30</u>	<u>↓</u>	<u>↓</u>
<u>0842</u>	<u>90.2</u>	<u>7.72</u>	<u>460.9</u>	<u>20.9</u>	<u>42.5</u>	<u>6.23</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>390 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOAs</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u> ^{Portland} <u>Seattle</u> →	Date Sent to Lab: <u>12/7/23</u>
	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: Good

Remarks:

Signature: Daryl Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>104.35</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>115.5</u>	Date Purged: <u>12/5/23</u>
Top of Screen (feet): <u>100.5</u>	Purge Time (from/to): <u>1358 - 1426</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1428</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>104.35</u>							
<u>1410</u>	<u>104.5</u>	<u>6.94</u>	<u>844</u>	<u>17.4</u>	<u>1.3</u>	<u>3.35</u>	<u>CI</u>	<u>224</u>
<u>1414</u>	<u>104.6</u>	<u>6.95</u>	<u>844</u>	<u>18.1</u>	<u>-6.6</u>	<u>3.17</u>		
<u>1418</u>	<u>104.6</u>	<u>6.95</u>	<u>846</u>	<u>19</u>	<u>-8.9</u>	<u>3.10</u>		
<u>1422</u>	<u>104.6</u>	<u>6.96</u>	<u>847</u>	<u>19.7</u>	<u>-8.4</u>	<u>3.09</u>		
<u>1426</u>	<u>104.6</u>	<u>6.96</u>	<u>849</u>	<u>20.5</u>	<u>-5.8</u>	<u>3.14</u>	✓	✓

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~300 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VAS</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle ^{Portland} Seattle</u>	Date Sent to Lab: <u>12/7/23</u>
<u>Energy Northwest (nitrate)</u>	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>MW21-0700</u>

Well Integrity: Good

Remarks:

Signature: Daryl Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>76.8</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>87.5</u>	Date Purged: <u>12/5/23</u>
Top of Screen (feet) <u>72.5</u>	Purge Time (from/to): <u>1016-1042</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>1045</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	<u>76.8</u>							
<u>1030</u>	<u>76.9</u>	<u>6.96</u>	<u>1017</u>	<u>21.3</u>	<u>40.4</u>	<u>0.96</u>	<u>C1</u>	<u>192</u>
<u>1034</u>	<u>76.9</u>	<u>6.96</u>	<u>1015</u>	<u>22.1</u>	<u>46.6</u>	<u>0.87</u>	<u>↓</u>	<u>↓</u>
<u>1038</u>	<u>76.9</u>	<u>6.96</u>	<u>1017</u>	<u>22.7</u>	<u>48.3</u>	<u>0.83</u>	<u>↓</u>	<u>↓</u>
<u>1042</u>	<u>76.9</u>	<u>6.96</u>	<u>1017</u>	<u>23.1</u>	<u>47.4</u>	<u>0.82</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~360 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u> <u>for VOAs</u>
Field Parameter Instrument: <u>YSI Pro</u>	
Laboratory: <u>Eurofins Seattle</u> ^{Portland} <u>Seattle</u> →	Date Sent to Lab: <u>12/7/23</u> <u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: OK.

Remarks: Needs protection. No well enclosure present.

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" x 4" - 6" - Other -

Initial Depth to Water (feet): <u>94.1</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>105</u>	Date Purged: <u>12/5/23</u>
Top of Screen (feet) <u>90</u>	Purge Time (from/to): <u>0900 - 0939</u>
Reference Point (surveyor's notch, etc.): <u>N</u>	Time Sampled: <u>0940</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>94.1</u>							
<u>0915</u>	<u>94.2</u>	<u>7.29</u>	<u>1529</u>	<u>19.4</u>	<u>8.6</u>	<u>7.77</u>	<u>cl</u>	<u>225</u>
<u>0919</u>	<u>94.2</u>	<u>7.35</u>	<u>1545</u>	<u>22.4</u>	<u>2.5</u>	<u>8.62</u>		
<u>0923</u>	<u>94.2</u>	<u>7.42</u>	<u>1549</u>	<u>21.4</u>	<u>32.3</u>	<u>8.66</u>		
<u>0927</u>	<u>94.2</u>	<u>7.46</u>	<u>1547</u>	<u>20.7</u>	<u>46.5</u>	<u>8.70</u>		
<u>0931</u>	<u>94.2</u>	<u>7.48</u>	<u>1546</u>	<u>20.6</u>	<u>9.1</u>	<u>8.73</u>		
<u>0935</u>	<u>94.2</u>	<u>7.50</u>	<u>1538</u>	<u>20.7</u>	<u>27.0</u>	<u>8.73</u>		
<u>0939</u>	<u>94.2</u>	<u>7.51</u>	<u>1530</u>	<u>20.5</u>	<u>35.8</u>	<u>8.69</u>	↓	↓

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~300 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min</u>
Field Parameter Instrument: <u>YSI Pro</u>	<u>for VOA's</u>
Laboratory: <u>Eurofins Seattle</u> ^{Portland} Seattle →	Date Sent to Lab: <u>12/7/23</u>
<u>Energy Northwest (nitrate)</u>	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>-</u>

Well Integrity: Good.

Remarks:

Signature: Darby Scanlon

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number: <u>555-3820-004</u>	Date: <u>12/6/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Rod</u> <u>Richland, WA 99354</u>	Sampled By: <u>D. Scanlon</u> Purged By: <u>D. Scanlon</u>

Casing Diameter: 2" 4" 6" Other

Initial Depth to Water (feet): <u>91.45</u>	Purge Flow Rate Measurement Method: <u>Graduated Cylinder</u>
Depth of Well (feet): <u>104</u>	Date Purged: <u>12/6/23</u>
Top of Screen (feet): <u>89</u>	Purge Time (from/to): <u>1314 - 1332</u>
Reference Point (surveyor's notch, etc.): _____	Time Sampled: <u>1335</u>

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
<u>Initial</u>	<u>91.45</u>							
<u>1320</u>	<u>91.5</u>	<u>7.77</u>	<u>437.3</u>	<u>16.2</u>	<u>62.1</u>	<u>6.57</u>	<u>CL</u>	<u>215</u>
<u>1324</u>	<u>91.5</u>	<u>7.73</u>	<u>437.6</u>	<u>18.7</u>	<u>31.6</u>	<u>6.49</u>	<u>↓</u>	<u>↓</u>
<u>1328</u>	<u>91.5</u>	<u>7.74</u>	<u>441.3</u>	<u>21.5</u>	<u>22.6</u>	<u>6.21</u>	<u>↓</u>	<u>↓</u>
<u>1332</u>	<u>91.5</u>	<u>7.75</u>	<u>440</u>	<u>20.7</u>	<u>20.7</u>	<u>6.12</u>	<u>↓</u>	<u>↓</u>

Purge Equipment: <u>Dedicated Submersible</u>	Sampling Equipment: <u>Dedicated Submersible</u>
Purge Flow Rate: <u>~330 ml/min</u>	Sampling Flow Rate: <u>~200 ml/min for VOAs</u>
Field Parameter Instrument: <u>YSI Pro</u>	

Laboratory: <u>Eurofins Seattle</u> ^{Portland} Seattle →	Date Sent to Lab: <u>12/7/23</u>
	<u>12/6/23</u>
Shipment Method: <u>Drop</u>	Field QC Sample Number: <u>—</u>

Well Integrity: OK

Remarks: Needs well protection.

Signature: Darby Scanlon

Field Data Sheet

Well #: Condensate Pond

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Measured By: <u>Darby Scanlon</u>

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
<u>1523</u>	<u>~25.1</u>	<u>~15</u>

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

Signature: Darby Scanlon

Field Data Sheet

Well #: Leachate Pond

Project Number: <u>555-3820-004</u>	Date: <u>12/5/23</u>
Project Name: <u>Horn Rapids Landfill</u>	Client Name: <u>City of Richland</u>
Project Address: <u>3102 Twin Bridges Road</u> <u>Richland, WA 99354</u>	Measured By: <u>Darby Scanlon</u>

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
<u>1507</u>	<u>23</u>	<u>~15</u>

Remarks:

Top 404 ft, bottom 396 ft; approximate length of pipe 25 ft (3:1)

Signature: Darby Scanlon