

2021 Operations, Maintenance, and  
Monitoring Annual Report  
South Park Landfill  
Volume I

Prepared for



March 2022

Prepared by

**Parametrix**

*In Association with*



# 2021 Operations, Maintenance, and Monitoring Annual Report South Park Landfill

*Prepared for*

**Seattle Public Utilities**

700 Fifth Avenue, Suite 4900  
Seattle, WA 98124-4018

*Prepared by*

**Parametrix**

719 2nd Avenue, Suite 200  
Seattle, WA 98104  
T. 206.394.3700 F. 1.855.542.6353  
[www.parametrix.com](http://www.parametrix.com)

*In Association with*

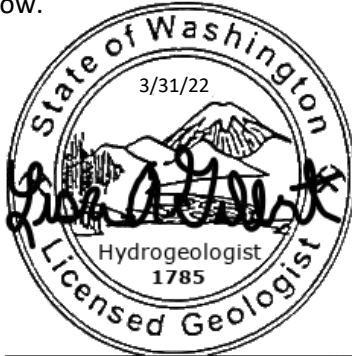


# CITATION

Parametrix and HWA GeoSciences, Inc., 2022. 2021 Operations,  
Maintenance, and Monitoring Annual Report  
South Park Landfill.  
Prepared by Parametrix, Seattle, Washington.  
March 2022.

# CERTIFICATION

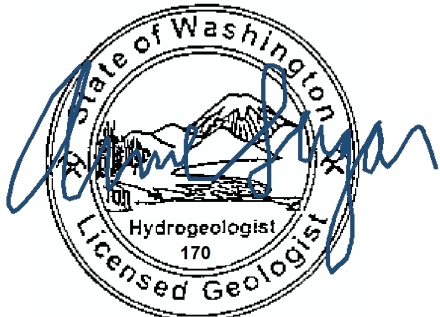
The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional hydrogeologist licensed to practice as such, is affixed below.



Lisa A. Gilbert

---

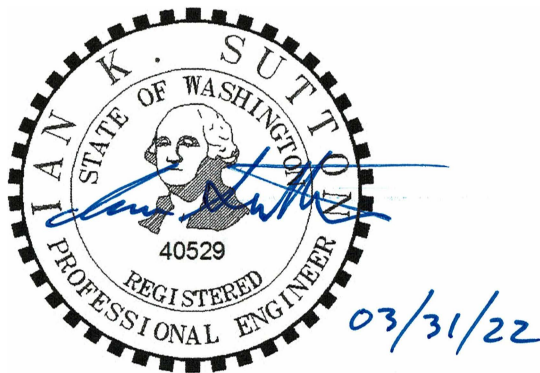
Prepared by Lisa Gilbert, LHG, Parametrix



Arnon Sugar

---

Checked by Arnie Sugar, LHG, HWA GeoSciences Inc.



---

Approved by Ian Sutton, P.E., Parametrix

# TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 Regulatory Status.....	1
1.2 Settlement Area Properties and Remedy Components .....	2
1.2.1 South Park Property Development Property.....	2
1.2.2 South Recycling and Disposal Station Property.....	2
1.3 Hydrogeologic Setting.....	3
1.4 Monitoring Program Overview .....	4
1.4.1 Annual Monitoring.....	4
1.4.2 Quarterly Monitoring .....	4
1.4.3 Unforeseen Emergency or Extreme Weather Events.....	4
<b>2. LANDFILL CAP SYSTEM .....</b>	<b>5</b>
2.1 Landfill Cap Inspection Methodology.....	5
2.2 Landfill Cap Inspection and Maintenance Events.....	7
2.2.1 January 2021 Weather Event Inspection.....	7
2.2.2 April 2021 Baseline Landfill Cap Inspection.....	7
2.2.3 October 2021 Follow Up Inspection .....	8
2.2.4 November Reinspection .....	8
2.2.5 Unforeseen Emergency or Extreme Weather Events.....	8
2.2.6 Landfill Cap Maintenance Completed .....	8
2.3 Activities Planned for the Next One-Year Period .....	9
<b>3. LANDFILL GAS SYSTEM.....</b>	<b>11</b>
3.1 Landfill Gas Monitoring Methodology.....	11
3.1.1 Gas Probe Monitoring .....	11
3.1.2 Landfill Gas Triggers and Contingency Actions.....	12
3.2 Landfill Gas Monitoring Activities and Results .....	12
3.2.1 Perimeter Probe Monitoring .....	12
3.2.2 Building Monitoring.....	13
3.2.3 Response to Fourth Quarter 2021 Landfill Gas Exceedance Event .....	13
3.2.4 Unforeseen Emergency or Extreme Weather Events.....	14
3.2.5 Gas Probe Maintenance Completed.....	15
3.3 Activities Planned for the Next One-Year Period .....	15
3.3.1 Landfill Gas Monitoring .....	15
3.3.2 Gas Probe Maintenance .....	15
3.3.3 Landfill Gas Exceedance Event Recommended Follow Up Actions.....	15

## TABLE OF CONTENTS (CONTINUED)

<b>4. GROUNDWATER MONITORING SYSTEM.....</b>	<b>17</b>
4.1 Groundwater Monitoring Methodology.....	17
4.1.1 Water Level Measurement.....	17
4.1.2 Sampling and Analysis .....	17
4.1.3 Groundwater Contingency Triggers and Actions.....	18
4.2 Groundwater Monitoring Activities and Results .....	19
4.2.1 Long-Term Groundwater Monitoring.....	19
4.2.2 Unforeseen Emergency or Extreme Weather Events.....	22
4.2.3 Monitoring Well Maintenance Completed.....	22
4.2.4 Purge Water Disposal .....	22
4.3 Activities Planned for the Next One-Year Period .....	23
4.3.1 Groundwater Monitoring .....	23
4.3.2 Monitoring Well Maintenance .....	23
4.3.3 Data Evaluation and Potential Reductions in Monitoring .....	23
4.3.4 Ongoing Access to Wells MW-10 and MW-25 (Encampment Area) .....	23
<b>5. CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>25</b>
5.1 Landfill Cap .....	25
5.2 Landfill Gas.....	25
5.3 Groundwater .....	25
<b>6. REFERENCES .....</b>	<b>27</b>

# TABLE OF CONTENTS (CONTINUED)

## LIST OF FIGURES

- 1 Site Vicinity Map
- 2 Site Property Map with Rights-of-Way
- 3 Perimeter Gas Probe Network
- 4 Flow Chart for Triggers and Contingent Actions for Perimeter Probe Monitoring
- 5 Groundwater Monitoring Well Network
- 6 Potentiometric Surface Map February 22, 2021
- 7 Potentiometric Surface Map May 17, 2021
- 8 Potentiometric Surface Map August 23, 2021
- 9 Potentiometric Surface Map November 15, 2021

## LIST OF TABLES

- 1 Project Contact Information
- 2 Methane in Perimeter Gas Probes
- 3 Methane in Bar Hole Probes
- 4 Groundwater Elevation Summary
- 5 Groundwater Vertical Gradients
- 6 Groundwater Flow Velocity
- 7 Groundwater Quality Data Summary
- 8 Summary of Vinyl Chloride Trend Analyses
- 9 Groundwater Monitoring Well Information

## TABLE OF CONTENTS (CONTINUED)

### APPENDICES

- A Annual Report Checklist
- B Landfill Cap Inspection and Maintenance
  - B1 Cap Inspections
    - B1-A April 2021 Annual Inspection (including January 15, 2021 Inspection)
    - B1-B October 2021 Follow Up Inspection
    - B1-C November 2021 Reinspection
  - B2 Cap Maintenance Documentation
    - B2-A Example Form
    - B2-B Completed Forms
- C Landfill Gas Monitoring
  - C1 Perimeter Probe Monitoring Field Forms
  - C2 On-Site Building Monitoring Forms
  - C3 Gas Exceedance Incident
    - C3-A Parametrix Incident Report
    - C3-B SPPD Corrective Action Report
- D Groundwater Monitoring
  - D1 Time-Series Plots
  - D2 Trend Analyses
  - D3 Groundwater Monitoring Well Data and Field Forms
  - D4 Laboratory Reports
  - D5 Data Validation Memoranda
  - D6 Purge Water Technical Memorandum



## ACRONYMS AND ABBREVIATIONS

CAP	Cleanup Action Plan
City	City of Seattle
COC	chemical of concern
CPOC	conditional point of compliance
County	King County
CUL	cleanup level
DCE	dichloroethene (three isomers: 1,1-DCE, <i>cis</i> -1,2-DCE, and <i>trans</i> -1,2-DCE)
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ft	feet
GPS	global positioning system
HHW	household hazardous waste
IA	Interim Action
IAWP	Interim Action Work Plan
IDW	investigative derived waste
KIP	Kenyon Industrial Park
LEL	lower explosive limit
LFG	landfill gas
µg/L	micrograms per liter
mg/L	milligrams per liter
MTCA	Model Toxics Control Act
NAVD 88	North American Vertical Datum of 1988
OMM	operations, maintenance, and monitoring
OMMP	Operations, Maintenance, and Monitoring Plan
ppm	parts per million
ppmv	parts per million by volume
PVC	polyvinyl chloride
redox	oxidation-reduction (potential)
RI/FS	Remedial Investigation/Feasibility Study
ROW	right-of-way
SPPD	South Park Property Development, LLC
SPU	Seattle Public Utilities
SR	State Route
SRDS	South Recycling and Disposal Station
WAC	Washington Administrative Code

# 1. INTRODUCTION

The South Park Landfill site (Site) is a former municipal solid waste landfill in the South Park neighborhood of Seattle, Washington, generally located at 8100 and 8200 2nd Avenue South, in Section 32 of Township 24 North, Range 4 East (Figure 1). Figure 2 shows the Site layout. The Edge of Refuse refers to that portion of the Site where landfill operations historically occurred and where solid waste was placed as interpreted by Floyd|Snider in the Remedial Investigation/Feasibility Study (RI/FS) (Floyd|Snider et al 2017).

The Settlement Area primarily consists of the two largest properties within the Edge of Refuse; the South Park Property Development (SPPD) and the South Recycling and Disposal Station (SRDS). The SPPD property owner is South Park Property Development, LLC and the SRDS property owner is the City. The Settlement Area also includes certain adjacent City of Seattle (City) and Washington State rights-of-way (ROWs). The other properties within the Edge of Refuse are the Kenyon Industrial Park (KIP) and the 7901 2nd Avenue South properties.

This report presents the results of the 2021 operations, maintenance, and monitoring (OMM) at the Site that was conducted in accordance with the Final Cleanup Action Plan (CAP) for the Settlement Area (Ecology 2018a). The required monitoring is described in the Post-Closure Operation, Maintenance, and Monitoring Plan (OMMP), presented as Appendix A of the CAP.

Site coordination and the preparation of this report is being performed for the Settlement Area under a 2019 Consent Decree with the Washington State Department of Ecology (Ecology). Parametrix has been designated by the City and their agency, Seattle Public Utilities (SPU), as the Site Coordinator to perform the long-term monitoring and reporting required under the CAP and the OMMP. Contact information for the responsible parties is presented in Table 1. Figures and Tables are appended at the end of the report.

The Kenyon Industrial Park (KIP) and the 7901 2nd Avenue South properties are expected to come to an agreement with Ecology and be added the Consent Decree at a later time.

## 1.1 Regulatory Status

The landfill received solid waste from the 1930s until 1966, when it was closed under the existing landfill closure laws at the time. Investigations of groundwater, surface water, soil, and landfill gas (LFG) began in the late 1980s. In February 2007, the Site was added to Ecology's Hazardous Sites List (Facility Site Identification No. 2180) based on concerns related to groundwater contamination and the presence of potentially flammable or explosive LFG.

In 2009, SPU and the SPPD entered into Agreed Order No. 6706 with Ecology to conduct a RI/FS and to complete a preliminary draft CAP. The Agreed Order was amended in 2013 to include an Interim Action (IA) to be conducted primarily on the portion of the Site owned by SPPD, and was amended again in 2015 to include an IA to be conducted primarily on the SRDS portion of the Site owned by SPU. The IAs included construction of a landfill cap, installing LFG and surface water control systems, establishing groundwater and LFG monitoring, and implementing institutional controls.

The South Park Landfill Final CAP (Ecology 2018a) was included as an attachment to the March 26, 2019, Consent Decree for the SPPD and SRDS properties. The selected cleanup action described in the CAP fulfills the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington, administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC), for the Settlement Area portion of the Site.

The CAP is currently in the process of being amended (draft Amended CAP; Ecology 2021) to address redevelopment plan modifications for the SRDS property. Until 2020, SPU planned to construct support

facilities for the adjacent South Transfer Station on the SRDS property in conjunction with implementation of the remedial action requirements. In 2020, SPU chose to reevaluate the best use of the SRDS property and decoupled the redevelopment elements from the remedial project. SPU will proceed with implementation of the required remedial action components defined in the CAP and will manage the SRDS property as a paved South Transfer Station support facility with minor operational improvements for SPU activities.

## 1.2 Settlement Area Properties and Remedy Components

The Settlement Area portion of the Site includes the SPPD and SRDS properties and certain adjacent City and Washington State ROWs. The locations of the properties are shown on Figure 2. Brief descriptions of each property and the completed, or planned, remedy components are provided in the following sections.

### 1.2.1 South Park Property Development Property

The SPPD property is King County (County) tax parcel No. 3224049005 and includes 21.0 acres of land purchased from the County in 2006. The property was previously purchased by the County in 1957 and leased to SPU from 1958 to 1978 for municipal solid waste disposal. After disposal operations ended in 1966, additional unclassified fill was added, and the property was graded (but not paved) as part of landfill closure. The County later leased portions of the property to a variety of tenants from the mid-1980s through the late 1990s, primarily for truck and equipment storage. In 2008, the property was largely cleared of vegetation and, in some areas, a layer of crushed concrete was added as ballast and the property was regraded.

In 2014 and 2015, the SPPD owner performed an IA for cleanup at the property in accordance with the 2013 Ecology-approved Interim Action Work Plan (IAWP; Farallon 2013) under Amendment No. 1 of Agreed Order No. DE 6706 for the Site. The IA was performed simultaneously with the redevelopment of the property. The property redevelopment included a modular building for employees and paved parking for employees and visitors. The IA work included regrading and capping the landfill surface, installing an engineered stormwater collection system, installing and operating an LFG control system, implementing institutional controls, and conducting monitoring.

### 1.2.2 South Recycling and Disposal Station Property

The SRDS property includes County tax parcel No. 7328400005, encompassing 10.55 acres, and was purchased by SPU in 1951. Two additional strips of land defined by County tax parcel No. 3224049110, 60 feet (ft) on the west of the SRDS property and 30 ft on the south, were incorporated into the property in 2003 by City Ordinance 121306. This additional land is in the process of being recorded by the County and brings the area to approximately 11 acres.

A transfer station for municipal solid waste and recyclable materials operated from 1966 to 2013 on the SRDS property. In Spring 2013, SPU opened a new solid waste transfer station (South Transfer Station) to the north, across South Kenyon Street, and the transfer station on the SRDS property became inactive, except for limited support activities. SPU operates a household hazardous waste (HHW) collection site on the northernmost portion of the SRDS property near South Kenyon Street and 5th Avenue South.

The SRDS facility includes the main waste disposal building, a small maintenance facility, a scale house, two vehicle-fueling systems, and several additional small buildings used for offices and HHW collection. The offices and HHW collection are the only regularly occupied/active facilities. The majority of the facility is paved, except for some landscaped areas along the eastern edge of the property adjacent to 5th Avenue South, a landscape strip along the south side of the property, a few landscape planter

islands along the western side of the property, and other small areas in the interior of the property (Figure 2).

Under Amendment No. 2 of Agreed Order No. DE 6706, an IA was implemented for the SRDS property between 2015 and 2020, as detailed in an IAWP (Herrera 2021). The IA included monitoring during maintenance activities, evaluation of a groundwater seep, and a Supplemental Groundwater Investigation.

As required under the draft Amended CAP, SPU will demolish existing structures; abandon inactive utilities; install asphalt, concrete, or geomembrane landfill cap systems; install LFG and surface water controls; implement institutional controls; and perform compliance monitoring. The LFG collection system will include horizontal (trench) collectors, conveyance piping, and vents to address areas covered by cap materials.

### 1.3 Hydrogeologic Setting

The Site is located within the Lower Duwamish Valley, near the western valley wall, as shown in Figure 1. The Site is at an elevation of approximately 15 to 30 ft above sea level. The southern portion (SPPD property) is generally graded at a higher elevation than the remainder of the Site. The Site has an overall shallow topographic gradient trending to the northeast towards the Duwamish Waterway. The Duwamish Waterway is approximately 1,700 to 2,000 ft northeast of the northeast landfill boundary.

The Duwamish Valley consists of a relatively thick sequence of historical channel, floodplain, and overbank alluvial deposits from the Duwamish River overlain by a relatively extensive layer of imported fill. The alluvial deposits range from 30 to 50 ft thick near the edge of the valley to more than 100 ft thick in the center of the valley (Hart Crowser 1998). Groundwater occurs throughout the alluvial deposits forming the Duwamish Valley Alluvial Aquifer. It is comprised of various zones of saturation and thickness occurring within the alluvial deposits. At the Site, there are three groundwater zones of interest; all are part of the upper portion of the Duwamish Valley Alluvial Aquifer system.

- The Perched Zone is a thin discontinuous layer of groundwater (mostly infiltrating rainwater) that exists above the Silt Overbank Deposit. In many places, the Perched Zone groundwater is in contact with solid waste and is conceptually equivalent to landfill leachate in those locations. The thickness of the Perched Zone may vary seasonally but is often only a few inches of water sitting on the hummocky surface of the Silt Overbank Deposit.
- The A-Zone of the Duwamish Valley Alluvial Aquifer is immediately beneath the Silt Overbank Deposit and is the critical zone where leachate (and perched water) can enter the groundwater system and move off-site. The A-Zone extends from the base of the Silt Overbank Deposit for approximately 15 to 20 ft (generally to -15 ft elevation North American Vertical Datum of 1988 [NAVD 88]).
- The B-Zone of the Duwamish Valley Alluvial Aquifer is the next deeper zone extending from approximately -15 ft elevation NAVD 88 to either the top of the estuarine/marine deposits or approximately -35 ft elevation NAVD 88, whichever is more shallow.

The solid waste deposited in the landfill extends into the top of the A-Zone with the depth of waste extending down approximately to sea level (Floyd|Snider et al 2017). The lower portion of solid waste in the landfill is saturated (i.e., occurring below the local water table).

## 1.4 Monitoring Program Overview

In accordance with the CAP, monitoring at the Site by the Site Coordinator consists of annual cap inspections, quarterly monitoring of LFG perimeter probes, and quarterly sampling and analysis of groundwater monitoring wells within the Settlement Area. Additional events may be triggered by groundwater monitoring results, LFG monitoring results at the perimeter probes, or by unforeseen emergency or extreme weather conditions, as summarized in the following sections. Monitoring by the property owners (SPU and SPPD) consists of continuous methane monitoring in on-site buildings as defined in the OMMP. The status of the 2021 monitoring is documented in the Annual Report Checklist presented in Appendix A.

Monitoring performed by the Site Coordinator is in addition to the monitoring requirements of property owners in accordance with the CAP and OMMP.

### 1.4.1 Annual Monitoring

Cap inspections are conducted annually as described in Section 2 of this report. Maintenance forms are completed by the property owner to document repairs conducted and re-inspections are conducted by the Site Coordinator. The 2021 annual cap inspection results are presented in Appendix B.

### 1.4.2 Quarterly Monitoring

Quarterly monitoring at LFG perimeter probes and sampling and analysis of groundwater from monitoring wells was conducted as described in Sections 3 and 4, respectively, of this report. In addition to quarterly LFG monitoring, continuous methane detection systems with alarms are required to be operating in occupied buildings in the Settlement Area, and provisions are in place that would initiate methane monitoring in off-site buildings if triggered by LFG detections above regulatory limits in perimeter gas probes.

### 1.4.3 Unforeseen Emergency or Extreme Weather Events

An unforeseen emergency or extreme weather event, such as an earthquake, fire, flood, or other natural or man-made disaster, will trigger a requirement for an immediate Settlement Area-wide inspection. Such unforeseen events could cause sudden differential settlement of the landfill contents and/or cap that could affect the integrity of the landfill cap and infrastructure, including LFG control systems, monitoring probes, and monitoring wells, and potentially result in exposure to methane gas or affect safe operation of the LFG control system. The following criteria for unforeseen events would trigger an immediate Settlement Area-wide inspection:

- An earthquake along the Seattle fault that registers 4.0 or greater on the Richter scale.
- An earthquake within 100 miles of Seattle that registers 5.0 or greater on the Richter scale.
- A major storm that produces greater than 3.0 inches of rainfall within a 24-hour period.
- Any fire that occurs on or below the cap.
- Any other damage in the Settlement Area observed by the property owners, facility workers, or the public, such as damage sustained by high winds, or facility or vehicular accident(s).

The monitoring program will document monitoring and inspection results, provide information on maintenance requirements, and document OMM activities performed during the previous year.

## 2. LANDFILL CAP SYSTEM

The CAP requires inspection and maintenance of the landfill cap, including pavement, roadways, surficial stormwater features, and vegetated areas. The purpose of the inspection and maintenance is to confirm that the landfill cap remedy is performing as intended by the CAP in a manner that protects human health and the environment.

The cleanup action requires a landfill cap covering all areas at the Settlement Area that contain solid waste. The primary goal of the landfill cap is to block access or exposure to the solid waste and soil; secondary goals are to limit stormwater infiltration and to facilitate the performance of the LFG systems.

The landfill cap consists of pavement, buildings, and geomembrane/soil layers that must be maintained in such a manner to prevent contact with the solid waste/soil beneath the cap, prevent “short-circuiting” of the LFG controls, and prevent interference with the stormwater controls. The cap is not required to entirely block the infiltration of stormwater. Existing or planned stormwater controls are described for each property as follows:

**SPPD Property.** Stormwater capture on the SPPD property is achieved with a system of paved surfaces and catch basins, and conveyance via overland flow on paved surfaces and piping to detention and treatment in one of two SPPD property bioswales. A small proportion of SPPD property stormwater runoff (e.g., from the access driveway off 5th Avenue South) is outside the capture area of the bioswales and flows to catch basins in ROWs.

**SRDS Property.** Stormwater management on the SRDS property is primarily pavement, catch basins, and conveyance pipes with collection into two systems. One system collects stormwater and liquids that may have come into contact with solid waste and directs them to the sanitary sewer. The other system collects stormwater from around the property and connects to the City’s storm drain system in 2nd Avenue South. This system ties into the storm drain system on State Route (SR) 509 that flows into the wetlands on the west side of SR 509. A series of roadside ditches and catch basins collect stormwater runoff from South Kenyon Street and 5th Avenue South. These stormwater systems also connect to the City’s storm drain system in 2nd Avenue South.

After redevelopment, in accordance with the draft Amended CAP, stormwater drainage will be collected across the SRDS property with flow and quality mitigation using an above-grade stormwater treatment tank, anticipated to be located on the northern portion of the SRDS property. Discharge from the stormwater vault is anticipated to drain to the northwest to the 30-inch-diameter storm pipe located in 2nd Avenue South.

### 2.1 Landfill Cap Inspection Methodology

Annual inspections consist of a visual survey of the accessible cap surface exterior to buildings, including drainage features and surface components of stormwater conveyance (i.e., catch basins, swales). The inspection documents signs of cap damage, failure, deterioration, or disturbance. Observations are noted on the field inspection form and via sketches or global positioning system (GPS) [for location] and photographs.

The following types of observations are documented for specific areas of the landfill cap.

- Asphaltic Concrete:
  - Cracking
  - Uneven settlement or potholes
  - Pooling or ponding

- Separation of pavement from curbs, gutters, or catch basins
- Sloughing or crumbling of edge materials
- Erosion
- Other signs of cap damage, failure or disturbance
- Low Permeability Membrane:
  - Erosion of cover soil
  - Exposed geotextile
  - Holes/signs of unauthorized digging
  - Poor vegetative cover
  - Exposed geomembrane
- Stormwater Management Facilities:
  - Signs of water infiltration below structure
  - Erosion of soil
  - Holes/signs of unauthorized digging
  - Invasive/deep-rooted plants
  - Poor vegetative cover
  - Proper flow direction as designed

If any of the above are identified during an inspection, the condition will be documented and a recommendation for repairs will be included on the Cap Inspection Form. Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action and the Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Inspection Form B (a blank sample is located in Appendix B2-A) and the Site Coordinator will provide observations in Part 2 of the form after reinspection.

The basis of determining the timeline for repairs comes from the OMMP. The OMMP has the following guidance for the timeline of maintenance/repairs:

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days. These areas are of highest concern due to the potential compromise of the landfill cap and need to be further inspected, repaired, and restored in accordance with the approved 2013 IAWP of the Agreed Order.
2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.
3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

## 2.2 Landfill Cap Inspection and Maintenance Events

In accordance with the Cap Inspection Work Plan (Parametrix 2020), a preliminary baseline cap inspection was conducted in September 2020 (Part 1) and a secondary “wet-weather” baseline event (Part 2) was conducted in April 2021. In addition to the Baseline Landfill Cap Inspection conducted in April 2021, three additional inspections were completed in 2021. These included a January 2021 weather event inspection, an October follow-up inspection, and a November 2021 reinspection. Maintenance and repairs conducted by the property owners were documented and re-inspections were conducted by the Site Coordinator.

### 2.2.1 January 2021 Weather Event Inspection

An inspection was conducted on January 15, 2021 in response to a January 12, 2021 weather event when 2.33 inches of rain and wind gusts up to 54 mph were recorded. The weather event did not exceed trigger requirements; however, it was deemed prudent. The findings of the inspection are included in the report for the April 2021 Baseline Landfill Cap Inspection presented in Appendix B1-A (Appendix B). While no issues were identified related to the weather event, one new location of concern was identified on the SPPD property related to invasive deep-rooted plants in the west swale. It was recommended that the willow and black cottonwood growing along the edge of the west bioswale be removed from the swale since they are deep-rooted species.

### 2.2.2 April 2021 Baseline Landfill Cap Inspection

The 2021 Baseline Landfill Cap Inspection was conducted on April 22, 2021 and included reinspection of identified concerns from the 2020 Baseline Landfill Cap Inspection performed on September 21, 2020. Previously identified concerns that remained in the same general or worse condition as observed in September 2020 were retained in the current list of concerns. The findings of the inspection are presented in the technical memorandum included as Appendix B1-A (Appendix B) and are summarized below.

**SPPD Property.** The thirty-two locations on the SPPD property identified in the 2020 Baseline Landfill Cap Inspection were reinspected. Thirteen locations on the SPPD property were identified as new or ongoing points of concern for one or more conditions. Additionally, there was a noted area of concern where stormwater runoff from the SPPD property was suspected to flow onto the SPU property from the northeast corner of the SPPD property. This area was reinspected during the October 2021 rain inspection as discussed in Section 2.2.3 and determined to not be an issue.

Seven of the locations were identified as high priority where the landfill cap geomembrane is exposed or the asphalt is penetrated (Point Locations #21-12, 21-13, 21-14, 21-15, 21-16, 21-17, and 21-18). Erosion of the soil cover between the swale and parking area (Point Location #21-9) was also identified as an area of high concern.

**SRDS Property.** The seven locations on the SRDS property identified in the 2020 Baseline Landfill Cap Inspection were reinspected. Six locations on the SRDS property were identified as new or ongoing points of concern, along with additional areas where minor pavement cracking or ponding were observed. One of the locations at a sinkhole through the asphalt was identified as a high priority item (Point Location #21-7).

**Right-of-Way.** One location within the Occidental Avenue South right-of-way was identified as a location of concern where cracks and ruts were identified (Point Location #21-20). This location was not identified as a high priority. The 5th Avenue South right-of-way was not reviewed.



### 2.2.3 October 2021 Follow Up Inspection

At the request of the SRDS property owner, an additional inspection was conducted on October 29, 2021. This was a follow up to the Baseline Landfill Cap Inspection that focused primarily on looking for damage and issues in the fenced area at the boundary between the two properties (the southwestern edge of SRDS and the northeastern edge of SPPD) after a period of rainfall. The findings are presented in a report included as Appendix B1-B (Appendix B) and are summarized below.

The area of focus between the two fenced properties did not show evidence of runoff leaving the SPPD property and flowing across the SRDS property. It does appear that there is a pathway for runoff to leave the SRDS parking lot and flow across the SPPD property in this location. However, there is a row of ecology blocks that may be preventing runoff from taking this path of travel.

While at the Site, the inspection team also reviewed other areas of the properties where concerns had previously been identified. The inspection identified the continuing presence of minor ponding, poor vegetative cover, exposed geomembrane, and deep-rooted plants that had been recognized previously in the April 2021 inspection.

### 2.2.4 November Reinspection

A reinspection to the Baseline Landfill Cap Inspection was conducted by the Site Coordinator on November 17, 2021 that focused on Point Locations #21-9 and #21-18. The findings are presented in a report included as Appendix B1-C (Appendix B) and are summarized below.

Erosion of cover soil and poor vegetative cover continue to be observed at Location #21-9, exposed geomembrane continues to be observed at Location #21-18, and it is recommended to work with the Site Coordinator to prepare a plan to reestablish cover over the geomembrane.

### 2.2.5 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2021 that triggered an inspection to the landfill cap, although a weather-related cap inspection for events that did not meet the threshold was conducted in January 2021 as described in Section 2.2.1.

### 2.2.6 Landfill Cap Maintenance Completed

Example forms to be used for documenting landfill cap maintenance are presented in Appendix B2-A of Appendix B. Cap maintenance completed during this reporting period is documented on Cap Maintenance Forms presented in Appendix B2-B, with Part 1 (Maintenance) completed by the property owner, and Part 2 (Observation/Review of Maintenance) completed by the Site Coordinator.

**SPPD Property.** On March 30, 2021, SPPD documented that vegetation had been reestablished in some of the locations of concern identified in the 2020 Baseline Landfill Cap Inspection. These landscaping activities were reviewed by the Site Coordinator during the 2021 Baseline Landfill Cap Inspection and correspond with the vicinity of Point Location #21-9.

On November 2, 2021, SPPD conducted additional repair and maintenance work. The repairs corresponded with some of the high priority locations identified in the 2021 Baseline Landfill Cap Inspection including the culvert inlet (#21-12) and areas along the fence line on the south side of the bus parking (#21-13 through 21-15). The Site Coordinator observed repairs being conducted on the exposed geomembrane near the southwest entrance of the SPPD property off Occidental Avenue South. The work was focused on the exposed geomembrane at the culvert headwall and the exposed

geomembrane at the interface with the pavement cap. The culvert headwall was repaired using quarry spalls. After corrective actions were conducted, no geomembrane was exposed, although no cushion material was installed to protect the underlying geomembrane. The other exposed geomembrane areas within the work area were covered with topsoil and erosion control measures were installed on the steep slopes. SPPD also indicated that the exposed geomembrane is not the cap barrier geomembrane. In discussions, SPPD indicated that the geomembrane termination is not as indicated in the design and that this exposed geomembrane is a folded over flap. The exposed geomembrane should be confirmed as sacrificial (non-barrier) by either exposing the leading edge or by excavating below the geomembrane and locating the barrier geomembrane.

The Site Coordinator noted there is additional work required to complete the actions recommended in the 2021 Baseline Landfill Cap Inspection.

On November 15, 2021, SPPD installed an electric fence surrounding the bus lot, consisting of 4-inch posts on all corners and mid-points of the fence line, and 1-inch posts in between the 4-inch posts. All posts are set in concrete in the ground.

On January 26, 2022, SPPD raised the well monuments to prevent water intrusion at well head V-7 located in the northwest portion of the property and well head H-5 located at the east main gate entrance. The Site Coordinator observed these repairs on February 9, 2022, as well as an additional repair in the area of a leaking water pipe in the fire suppression area.

**SRDS Property.** The sinkhole on the SRDS property was repaired by filling with gravel to preclude potential contact with refuse.

## 2.3 Activities Planned for the Next One-Year Period

The 2021 Baseline Landfill Cap Inspection conducted in April 2021, presented in Appendix B1-A, identified areas of concern within the Settlement Area. Additional work will be required in 2022 to complete and/or reinspect outstanding recommended repairs. The Site Coordinator will conduct an annual cap inspection in the Spring of 2022 which will include reinspection of previous areas of concern, review maintenance conducted, including the November 15, 2021 fence installations, and look for any new areas of concern.

The following previously identified locations of concern will be evaluated during the 2022 annual inspection.

**SPPD Property.** The areas of the exposed geomembrane repaired during 2021 should be revisited to confirm design requirements have been achieved for the area of the parking interface. Additional identified locations of concern that may not have been addressed include:

- Prepare a plan to reestablish a uniform slope and vegetation of the erosion of soil cover between the swale and parking area (#21-9).
- Regrading for positive drainage away from the fire hydrant (#21-11).
- Repair holes in asphalt (#21-15).
- Prepare a plan to reestablish cover over the geomembrane north of the west entrance, including an unbooted storm drain manhole (#21-18).
- Regrade west bioswale for drainage.
- Identify unknown open vertical pipes and if they are not functional, excavate and remove them, then seal the penetrations.
- Remove invasive/deep rooted plants from the edge of the west bioswale.

Minor surface cracks or ponding will be reinspected by the Site Coordinator to assess if the condition is worsening.

**SRDS Property.** Minor surface cracks and ponding will be reinspected by the Site Coordinator to assess if the condition is worsening. Repair of the sinkhole (#21-7) will also be reinspected. Additional identified locations of concern that may not have been addressed include:

- Repair concrete at catch basin (#21-3).

**Right-of-Way.** Cracks and ruts along Occidental Avenue South will be reinspected.

### 3. LANDFILL GAS SYSTEM

The LFG control system consists of property-specific solutions designed to operate separately but be compatible and synergistic in how they control LFG across the Settlement Area. Brief descriptions of the existing, or planned, LFG control systems for each property are provided below with the LFG monitoring discussed in the following sections.

- **SPPD Property.** An active LFG control system was installed at the SPPD property as part of the IA development in 2014 and 2015 (Farallon 2013). The LFG system was designed to protect buildings on the SPPD property and to control gas migration along the southern, western, and eastern perimeter of the Settlement Area. The system consists of a network of vertical gas collection wells and horizontal gas collection trenches. LFG is extracted under an applied vacuum and discharged out a vent stack in the surface component equipment enclosure, which is located on the northwest portion of the SPPD property. It is operated by the SPPD owner in accordance with an Ecology-approved LFG Collection and Control System OMMP (Farallon 2016).
- **SRDS Property.** The buildings that are currently on the property are either naturally ventilated or are elevated and skirted with porous siding; both are appropriate methods of LFG mitigation. As part of the draft Amended CAP, SPU will install an LFG control system at the SRDS property, intended to be operated passively, with an option to convert to active operation if necessary. The final design for the LFG system at the SRDS property will be described in an Engineering Design Report, which will be finalized by 2025 per the schedule outlined in the draft Amended CAP. This system will also influence the ROW associated with 5th Avenue South adjacent to this property.

#### 3.1 Landfill Gas Monitoring Methodology

The LFG monitoring includes quarterly monitoring of perimeter probes conducted by the Site Coordinator, continuous monitoring of on-site buildings using methane detectors and alarms conducted by individual property owners, and off-site building monitoring, if necessary. The primary goal of perimeter probe monitoring is to evaluate potential lateral off-site LFG migration, and the primary goal of building monitoring is to protect human health.

The perimeter gas probe network for the Settlement Area includes 17 probes installed at the locations shown on Figure 3. Procedures for perimeter gas probe monitoring are presented in the OMMP – Landfill Gas Monitoring and Contingency Plan.

##### 3.1.1 Gas Probe Monitoring

A Landtec GEM 5000 is used to measure barometric pressure at the beginning and end of each monitoring event, as well as static pressure and LFG concentrations in each gas probe. The barometric pressure status (rising, falling, steady) is reported on the field form.

At each probe, static pressure is measured prior to purging, and then one probe volume is purged prior to recording concentrations of methane, carbon dioxide, oxygen, and hydrogen sulfide. The purge time using the Landtec GEM is calculated for each probe based on its construction. The LFG meter is connected to LFG probes using Teflon tubing and a rubber stopper placed into probes without a valve. Teflon, silicone, and polyethylene tubing are utilized to connect to the LFG meter.

After monitoring the LFG, depth to groundwater is measured using an electric water level indicator to confirm that water is not above the top of the probe screen. If the measured water level is determined to be above the top of the probe screen, the LFG measurements are not used. For the three probes that have consistently exhibited water levels above the top of the screen (GP-13, GP-15, and GP-32), water levels are measured prior to conducting LFG measurements.

### 3.1.2 Landfill Gas Triggers and Contingency Actions

The flow chart for the LFG triggers and contingency actions is presented in Figure 4, developed to clarify the flow chart presented in Figure A.2.6 of the OMMP (Parametrix 2021a). Methane concentrations in soil at the landfill boundary must not exceed 5 percent by volume, the lower explosive limit (LEL) for methane. The threshold criteria that would trigger additional off-site building monitoring is 1.25 percent by volume (25 percent of the LEL) for all probes other than GP-27 and GP-29. At probes GP-27 and GP-29, since methane concentrations of up to 5 percent by volume have been shown to be protective, the criterion for additional off-site building monitoring is 5 percent by volume.

## 3.2 Landfill Gas Monitoring Activities and Results

### 3.2.1 Perimeter Probe Monitoring

Quarterly perimeter probe monitoring events were conducted in February, May, August, and November 2021. The results are summarized in Table 2 and included on the gas probe monitoring field forms presented in Appendix C1.

Five gas probes (GP-11, GP-13, GP-15, GP-31, and GP-32) were observed to be blocked (screened zones completely saturated) during one or more sampling events and data measured from blocked probes during those events were not used. Additionally, the screened zones of several other wells were at least partially blocked with water. Data from the partially blocked probes is considered valid for the purposes of the perimeter probe monitoring.

Gas probes GP-11 and GP-13, located west of the Site, were consistently blocked by water. Due to their location in the vicinity of off-site buildings, monitoring was conducted at three temporary bar hole probes installed near each of these probes during the Third Quarter of 2021. The results are presented in Table 3. No methane was detected in any of the bar hole probes.

Methane concentrations during quarterly monitoring events were less than the 1.25 percent by volume regulatory action limit except during the Fourth Quarter of 2021. During the Fourth Quarter, methane was detected at 4.5 percent by volume at GP-33 and at 6.9 percent by volume at GP-29, causing a trigger value exceedance. GP-29 and GP-33 are located along the perimeter of the SPPD property. The LFG control system was observed and found to be offline.

Due to these exceedances, corrective actions were taken as outlined in Figure 4 and described in Section 3.2.3 of this report. Actions taken in response to the LFG exceedance trigger event are summarized in Section 3.2.3 and detailed in the Incident Report Form provided in Appendix C3-A and the SPPD Property Landfill Gas Collection and Control Corrective Action Summary Report (Farallon 2022) provided in Appendix C3-B.

## 3.2.2 Building Monitoring

Building monitoring is required for occupied on-site buildings, unless the construction demonstrates effective LFG mitigation. Off-site building monitoring is required only if triggered by conditions in perimeter gas probes. During the Fourth Quarter 2021 monitoring of the LFG compliance perimeter probes, it was observed that two of the gas probes had trigger value exceedances: GP-29 at 6.9% by volume and GP-33 at 4.5% by volume. Due to these exceedances, off-site building monitoring was required as described in Section 3.2.3.3 of this report.

### 3.2.2.1 On-Site

All occupied buildings on the Settlement Area (on-site buildings) are required to have continuous (i.e., operate 24 hours per day, 7 days per week) methane detectors with alarms, with the exception of the current SRDS buildings which are naturally ventilated or elevated. Methane concentrations inside buildings and structures within the landfill boundary must not exceed 1.25 percent by volume, or 25 percent of the LEL; meters in buildings should be set with a low alarm warning at 10 percent of the LEL and the high alarm at 25 percent of the LEL. Quarterly inspections of these alarms are required by individual property owners in accordance with the manufacturer's recommendations to ensure proper operation and protection of human health. Inspection forms have been created and will be included in future reports.

**SPPD Property.** The SPPD property owner did not report any incidences of methane detections inside on-site buildings or structures during 2021.

**SRDS Property.** Continuous monitoring is not required until the property is redeveloped to include standard enclosed buildings and a new LFG system is installed.

### 3.2.2.2 Off-Site

Off-site building monitoring is required to be conducted by the SPPD and SRDS individual property owners when triggered by methane conditions measured in nearby perimeter probes, as indicated in Figure 4. Methane concentrations inside buildings and structures outside the landfill boundary must not exceed 100 parts per million by volume (ppmv), equivalent to 0.01 percent by volume or 0.2 percent of the LEL. These criteria are typically measured in the buildings/structures with either handheld or mounted equipment. Procedures for off-site building monitoring are detailed in the OMMP.

## 3.2.3 Response to Fourth Quarter 2021 Landfill Gas Exceedance Event

The November 15, 2021 methane exceedances at GP-29 and GP-33 triggered contingency actions that are outlined in Figure 4.

Confirmation probe monitoring on November 29th identified both GP-33 and GP-29 exceeded 5 percent methane by volume and that the LFG collection system on the SPPD property was observed off. Corrective actions were then initiated.

### 3.2.3.1 Corrective Actions Taken

The Site Coordinator notified Ecology, Health Department, and the property owners (SPPD and SRDS) of the situation. SPPD and their consultant Farallon Consulting LLC (Farallon) restarted the LFG collection system on November 30th, made adjustments to the LFG control system until protectiveness was reestablished on December 7th at PG-33 and December 27th at GP-29, and prepared a corrective action

plan (SPPD Property Landfill Gas Collection and Control Corrective Action Summary Report; Farallon 2022) that is presented in Appendix C3-B of this report.

### 3.2.3.2 Probe Monitoring

Daily LFG monitoring began on November 29, 2021 at both probes and continued until methane measurements were consistently below 5 percent by volume. Monitoring was then conducted on a weekly basis, finishing at GP-33 on December 29, 2021 and at GP-29 on January 19, 2022. Results are included in the Incident Report presented in Appendix C3-A.

### 3.2.3.3 Off-Site Building Monitoring

GP-33 is adjacent to a building owned by W.G. Clark Construction Co. at 7598 Occidental Avenue South (northwest of the Site between the KIP and SPPD properties). Methane concentrations in GP-33 were periodically above 5 percent by volume during the period between 2015 and 2016 (maximum detection was 22 percent). These detections were attributed to a temporary shutdown of the SPPD LFG control system. During this period, one indoor air measurement was made at the adjacent buildings and no methane was detected. However, the results were not sufficient to provide a relationship between methane in the probe and the indoor air in adjacent buildings to assess protectiveness.

Parametrix and SPU staff measured indoor air concentrations and performed slab and utility screening at the W.G. Clark Construction Co. facility on November 30, 2021 with a Landtec GEM 5000 LFG meter. The LFG meter has a detection level of 0.1 percent by volume which is equivalent to 1000 parts per million (ppm), or 10 times greater than the action levels defined in the CAP OMMP. No methane was detected during the November 30th screening. W.G. Clark Construction Co. staff noted that the main building occupied by site workers has a passive LFG collection system that distributes sub-slab vapors to the roof of the building to ensure worker safety.

The Site Coordinator completed monitoring adjacent to the foundation of the buildings and asphalt cover of the W.G. Clark Co. facility on December 3, 2021 with a TVA 2020 flame ionization detector (FID) capable of measuring methane to 0.5 ppm. The business was closed at the time and no indoor air monitoring was completed. However, monitoring was completed adjacent to the edge of the asphalt slab for the property. No measurable methane above background levels (1.5 ppm) was found south, west, and southeast of the property. Additionally, screening was completed adjacent to the asphalt near GP-11 and MW-12. No measurable methane was detected above background.

GP-29 is located adjacent to the building at 8250 5th Avenue South. SPPD purchased this property in January 2021. At the time of the LFG exceedance the building was unoccupied by tenants, had no power or utilities, and was undergoing renovations during this incident. Bar hole probe testing and LFG screening between GP-29 and the off-site building was conducted by Farallon on two occasions. Farallon reported that no LFG was observed in bar hole probes or other monitoring locations and there was no risk to the building. These results were similar to the previously established protectiveness at GP-29.

## 3.2.4 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2021 that triggered an inspection of the perimeter gas probes or the LFG system, other than the unplanned SPPD LFG system outage discussed above.

### 3.2.5 Gas Probe Maintenance Completed

During the 2021 gas monitoring events, maintenance of the gas probes was completed. Weeds, blackberries, and other vegetation were cut back to allow access to wells. The eye bolts at GP-32 were rethreaded prior to the Fourth Quarter 2021 monitoring event to allow the monument to be properly sealed.

## 3.3 Activities Planned for the Next One-Year Period

### 3.3.1 Landfill Gas Monitoring

Quarterly perimeter probe monitoring is planned during the months of February (completed), May, August, and November.

Monitoring records for on-site buildings will be provided by property owners on the form presented in Appendix C2.

### 3.3.2 Gas Probe Maintenance

Some additional future maintenance may be necessary related to asphalt erosion near gas probe GP-31. The roadway margin near the probe appears to be actively eroding due to heavy truck traffic. The condition of the probe will continue to be monitored to determine when actions are necessary to restore the asphalt near the probe.

### 3.3.3 Landfill Gas Exceedance Event Recommended Follow Up Actions

The following additional actions are planned to follow up on the landfill gas exceedance event that occurred during the Fourth Quarter of 2021.

Site Coordinator (Parametrix):

- The Project Manager and the Monitoring Program Manager will review quarterly monitoring field sheets within 24 hours of data collection.
- Work with Ecology to modify the flow chart for triggers and contingent actions for perimeter probe monitoring to include a response timeline for all actions. This may be documented in a technical memorandum and include roles and responsibilities.

Property Owner (SPPD/Farallon):

- Replace the alarm system with a telemetry system with cellular service and data-logging capabilities.
- Add additional alarm zones for reporting blower voltage present to the alarm zones. Blower voltage present will indicate if the blower is operational.
- With methane concentrations below the LEL in gas probe GP-29, rebalance LFG collection and control system to its steady-state operation to control LFG generated on the SPPD property. Rebalancing could include removal of portions of the air dilution intake modifications described in Section 2 of the Corrective Action Summary Report (Farallon 2022, provided in Appendix C3-B).
- Assess protocol of LFG system checks and documentation. Train staff performing system checks.



- Prepare and submit documentation of weekly system checks. Prepare and submit annual reports to Ecology documenting LFG collection and control system operation, maintenance, and monitoring as required in the SPPD property LFG Collection and Control System OMMP (Farallon 2016). Annual report should also be provided to the Site Coordinator.
- Document all actions taken to modify the system. Documentation should include a completed form or report and photographs in accordance with the Landfill Gas Monitoring and Contingency Plan (LFGMCP) as part of the CAP OMMP.

## 4. GROUNDWATER MONITORING SYSTEM

Long-term groundwater monitoring is being conducted to evaluate the effectiveness of cleanup actions at the Settlement Area on groundwater quality. The CAP requires long-term groundwater monitoring to continue until groundwater chemicals of concern (COCs) are in compliance at the conditional point of compliance (CPOC), which has been established at, or near, the downgradient Edge of Refuse. The monitoring program includes assessing current groundwater concentrations and monitoring trends to confirm that vinyl chloride, *cis*-1,2-dichloroethene (DCE), benzene, arsenic, iron, and manganese concentrations continue to decrease over time and in a reasonable restoration timeframe.

There are 14 groundwater monitoring wells included in the long-term groundwater monitoring program for the Settlement Area at the locations shown on Figure 5. In addition to the CPOC wells (MW-08, MW-10, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32, and MW-33), the monitoring well network also includes wells used to monitor upgradient groundwater conditions (MW-12, MW-14, and MW-29) and wells used to monitor downgradient groundwater conditions adjacent to the former Glitsa American, Inc. property (MW-30 and MW-31). All wells are completed in native material except MW-18, which is completed in refuse, and MW-32 and MW-33, which are completed beneath refuse at the edge of waste. Table 9 provides a summary of the well depths, screen intervals, type of pump, top of casing, and well completion elevations.

The monitoring wells are completed primarily in one of three groundwater zones (Perched Zone, A-Zone, or B-Zone), all of which are part of the Duwamish Valley Alluvial Aquifer. There are four well pairs downgradient of the landfill that are screened in two different zones: Perched Zone/A-Zone (MW-30/MW-31) and A- and B-Zones (MW-27/MW-8, MW-25/MW-10, and MW-26/MW-24).

### 4.1 Groundwater Monitoring Methodology

Groundwater monitoring includes measuring groundwater levels and sampling groundwater at the 14 monitoring wells and analyzing the samples for Site-specific COCs.

#### 4.1.1 Water Level Measurement

During each quarterly monitoring event, approximately time synchronous groundwater levels are measured with a precision of 0.01 foot using an electric water level indicator. Groundwater level measurements are made relative to the surveyed top of the polyvinyl chloride (PVC) well casing or other defined measuring point at the wellhead, typically the northern-most portion of the PVC casing stick-up.

#### 4.1.2 Sampling and Analysis

Groundwater samples are collected according to procedures outlined in the OMMP, using either a dedicated bladder pump and Teflon tubing or a peristaltic pump with disposable low-density polyethylene and silicon tubing. Details on which type of pump is used at each well are included in Table 9. The monitoring wells are purged using low-flow sampling procedures while field parameters (temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential [redox]) are measured to determine stabilization using a calibrated multiparameter probe with a flow-through cell. Turbidity is also measured in the field using a separate turbidity meter outside of the flow through cell.

Long-term groundwater monitoring includes analyzing samples for vinyl chloride, iron, and manganese; groundwater COCs that have exceeded cleanup levels (CULs) at the CPOC for the Settlement Area; and *cis*-1,2-DCE (the precursor for vinyl chloride). In addition, benzene is analyzed in samples from well

MW-25 to track a localized plume that appears to originate upgradient of the Settlement Area, and arsenic is analyzed in samples from wells MW-12, MW-08, MW-10, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32, and MW-33.

Groundwater samples are analyzed using the following methods:

- 1,2-DCE and benzene, U.S. Environmental Protection Agency (EPA) Method 8260D
- Vinyl chloride: EPA Method 8260D-SIM
- Iron and manganese: EPA Method 6020A
- Arsenic: EPA Method 6020A

### 4.1.3 Groundwater Contingency Triggers and Actions

The Site-specific CULs for groundwater at the Settlement Area as stated in the CAP, which are based on the protection of groundwater as a potential drinking water source, are as follows:

- Vinyl chloride 0.29 micrograms per liter ( $\mu\text{g/L}$ )
- Iron (Total) 27 milligrams per liter ( $\text{mg/L}$ ) (A-Zone); 31  $\text{mg/L}$  (B-Zone)
- Manganese (Total) 2.2  $\text{mg/L}$
- cis-1,2-DCE 16  $\mu\text{g/L}$
- Benzene 5.0  $\mu\text{g/L}$
- Arsenic (Dissolved) 5.0  $\mu\text{g/L}$  (background; note that MW-27 is not a CPOC well for arsenic).

Trigger conditions and contingency and actions for vinyl chloride are described in Section 4.1.3.1. Required actions for iron and manganese and arsenic are described in Sections 4.1.3.2 and 4.1.3.3.

#### 4.1.3.1 Vinyl Chloride

In accordance with the OMMP, the following two conditions will potentially trigger contingent actions based on monitoring in the existing compliance monitoring well network:

- **Condition 1.** Condition 1 (the concentration trigger) is based on groundwater concentrations. If concentrations in any downgradient well exceed 1.45  $\mu\text{g/L}$  (five times the CUL) for two consecutive sampling events, a contingent response is triggered. This trigger is not applied to MW-30 and MW-31, whose concentrations are affected by a non-landfill source in addition to the landfill.
- **Condition 2.** Condition 2 (the trend trigger) is based on a statistically significant increase in groundwater concentrations over time in the monitoring wells. The trend identification uses the nonparametric Mann-Kendall method and will be applied to downgradient wells where the concentration of vinyl chloride is greater than the CUL. The trend analysis will include MW-31 (which is screened in the alluvial aquifer) but not MW-30 (which is screened in the Silt Overbank Deposit).

#### 4.1.3.2 Iron and Manganese

In accordance with the OMMP, as long as the concentrations are stable or decreasing, no further action is required beyond monitoring. Once a dataset of eight quarterly events has been collected during long-term monitoring, Ecology may approve a decreased frequency of monitoring for iron and manganese.

### 4.1.3.3 Arsenic

There are known cement kiln dust deposits upgradient of the Edge of Refuse on the KIP property and downgradient of the Edge of Refuse east of 5th Avenue South (Floyd|Snider et al. 2017). MW-27, a downgradient A-Zone well across SR 99, has consistently been observed to have arsenic at concentrations greater than the CUL due to a cement kiln dust deposit that is across the street from the Settlement Area; this well is not a CPOC well for arsenic.

In accordance with the OMMP, as long as the concentrations of arsenic are stable or decreasing in downgradient wells MW-08, MW-10, MW-18, MW-24, MW-25, MW-26, MW-32, and MW-33, no further actions are required beyond monitoring. If arsenic remains in compliance with the CUL for eight quarterly events, arsenic analysis will be terminated.

## 4.2 Groundwater Monitoring Activities and Results

### 4.2.1 Long-Term Groundwater Monitoring

Quarterly long-term monitoring events were conducted in February, May, August, and November 2021. The measured groundwater levels, calculated gradients, interpreted flow directions, and groundwater quality results are presented in this section of the report.

No samples were collected at wells MW-10 and MW-25 during the Third Quarter 2021 due to encroachment of a homeless encampment into the well area presenting potential access and safety issues for sampling personnel. Ecology was made aware of the situation in advance of the sampling event. SPU subsequently took measures to clear access to these wells including involvement by City of Seattle Homeless Outreach and Provider Ecosystem (HOPE) team, resulting in successful sampling in the Fourth Quarter of 2021. Since the Fourth Quarter 2021 event, the encampment has been rebuilt and is presenting ongoing access issues. Further discussion of this ongoing access issue as it relates to future sampling events is provided in Section 4.3.

#### 4.2.1.1 Gradients and Flow Direction

Groundwater elevations calculated based on depth to groundwater measured in each well and the surveyed casing elevations are summarized in Table 4.

##### Horizontal Gradients

Groundwater gradient maps were prepared using data from all the A-Zone wells plus MW-18, as the A- and B-Zones are not separate aquifers or even hydraulically separated by any low permeability layers. Figures 6, 7, 8 and 9 show the interpreted gradients. The groundwater flow direction is generally to the east and northeast, toward the Lower Duwamish Waterway, with gradients ranging from 0.0085 to 0.0106 ft/ft in the northern region (calculated between MW-12 and MW-32) and 0.0087 to 0.0093 ft/ft in the southern region (calculated between MW-14 and MW-18). This is consistent with historical observations.

##### Vertical Gradients

Vertical groundwater gradients were calculated based on water level measurements collected in downgradient pairs completed in the Perched Zone/A-Zone of the Duwamish Valley Alluvial Aquifer (MW-30/MW-31) and the A- and B-Zones of the Duwamish Valley Alluvial Aquifer (MW-27/MW-8, MW-25/MW-10, and MW-26/MW-24). These data are presented in Table 5.

Boring logs show that the wells are mostly completed in the same alluvial aquifer, with some in the upper portions (A-Zone) and some in the lower (B-Zone), and no significant aquitards or low permeability layers in between the two zones. Vertical gradients measured in most of the well pairs during most of the sampling events were essentially neutral or within measurement error. Downward gradients were observed in well pair MW-30/MW-31 is consistent with data presented in the RI indicating that the Silt Overbank Deposit is likely acting as a low permeability aquitard in this area.

## Flow Velocity

Based on estimates of horizontal hydraulic conductivity and porosity determined in the remedial investigation (Floyd|Snider et al 2017) and the gradients measured in 2021, estimated horizontal groundwater flow velocities in the Duwamish Valley Alluvial Aquifer in the northern and southern regions of the Site are summarized in Table 6.

The two regions were identified in the remedial investigation as having differing groundwater flow directions, soil types, and hydraulic conductivity estimates. The northern region of the Site (SRDS property) is in the vicinity of MW-10/MW-25, with a northeasterly groundwater flow direction and slightly higher hydraulic conductivities. The southern region of the Site (SPPD property) is in the vicinity of MW-8/MW-27, with an easterly groundwater flow direction and slightly lower hydraulic conductivities due to siltier soils. These values are similar or higher than measured/estimated values during the remedial investigation, due to steeper measured and interpreted gradients.

The following formula was used to calculate groundwater flow velocities:

$V = Ki/ne$ , where:

$V$  = groundwater velocity (L/T)

$K$  = hydraulic conductivity (L/T)

$i$  = hydraulic gradient (L/L)

$ne$  = effective porosity (dimensionless)

Based on the observed gradients of 0.0085 to 0.0106 ft/ft in the northern region of the Site and 0.0087 to 0.0093 ft/ft in the southern region, the calculated flow velocity ranged from 4.74 to 8.46 ft/day in the northern region and 1.34 to 3.13 ft/day in the southern region of the Site.

### 4.2.1.2 Groundwater Quality Results

Groundwater samples were analyzed by Analytical Resources, Inc. in Tukwila, Washington. The quarterly groundwater quality data are summarized in Table 7. Field data sheets for each quarterly event are presented in Appendix D3. Laboratory reports and data validation memoranda are presented in Appendix D4 and D5, respectively.

The following is a summary of CUL exceedances in CPOC wells during 2021 monitoring events:

- Vinyl chloride concentrations exceeded the CUL of 0.29 µg/L in wells MW-25 (Q1, Q2, and Q4, with no measurement in Q3) and MW-32 (Q3 and Q4).
- Total iron concentrations exceeded the CUL of 27 mg/L in A-Zone well MW-25 (Q2 and Q4, with no measurement in Q3), and the CUL of 31 mg/L in B-Zone well MW-10 (Q2 and Q4, with no measurement in Q3).
- Total manganese concentrations exceeded the CUL of 2.2 mg/L in A-Zone well MW-25 (Q2 and Q4, with no measurement in Q3) and B-Zone well MW-10 (Q2 and Q4, with no measurement in Q3).

- There were no concentrations of cis-1,2-DCE exceeding the CUL of 16 µg/L.
- There were no concentrations of benzene at MW-25 exceeding the CUL of 5.0 µg/L.
- There were no concentrations of dissolved arsenic exceeding the CUL of 5.0 µg/L.

Time-series plots for all COCs, showing data for all historical events and post-Consent Decree sampling events (2021) organized separately for the A-/Perched Zone and the B-Zone, are presented in Appendix D1. Time-series plots show CULs for all COCs and the concentration trigger value for vinyl chloride (1.45 µg/L).

### Vinyl Chloride Trigger Evaluation and Trend Analyses

In 2021, vinyl chloride concentrations exceeded the CUL in CPOC downgradient A-Zone wells MW-25 and MW-32 during at least two quarters, but none of the concentrations exceeded the concentration trigger value.

Time-series plots of all historical data show overall stable or decreasing trends for vinyl chloride. For the 2021 data, the vinyl chloride time-series plots show slight apparent increases in some wells; however, the data are not sufficient to assess whether the apparent increases could be natural fluctuations due to factors such as precipitation, tidal, or seasonal variations.

Mann-Kendall trend analyses for vinyl chloride were conducted on the entire historical data set using the Excel-based program ProUCL (EPA 2015). The Mann-Kendall trend plots, calculations, and a summary of the approach used is provided in Appendix D2, and the results are summarized in Table 8.

Trends were evaluated for each well using the combined historical (1999 through 2014) and 2020 through 2021 data, resulting in a 6-year gap in the time-series data for all analytes and wells. Historic data coverage prior to 2020 for each well is summarized below.

- 1999-2014: MW-8, MW-10, MW-12, MW-14, MW-18, MW-24
- 2006-2014: MW-25, MW-26, MW-27
- 2013-2014: MW-29
- 2011-2014: MW-30, MW-31, MW-32, MW-33

The wells showed either statistically significant decreasing trends or no statistical trend, except for upgradient well MW-29 and downgradient well MW-18, which showed statistically significant increasing trends. However, both wells also had more than 50 percent non-detects and meaningful trends are difficult to determine due to the large number of censored and often repeated values. The data for MW-29 also had only a limited data set of eleven points with a 6-year gap preceding the 2020 data.

The two downgradient wells that had vinyl chloride concentrations above the CUL in 2021 (MW-25 and MW-32) had either a decreasing trend or no trend.

Although the Mann-Kendall test does not account for (i.e., is not sensitive to) time intervals, the trends should be evaluated with caution considering the gap in the data between 2014 to 2020. Evaluation and comparison of the entire data set is needed to interpret the results with respect to detecting potential releases from the landfill, as opposed to other factors which may influence concentration trends for individual parameters or wells. For example, one or several parameters increasing in a well may not necessarily indicate a release to groundwater from the landfill, if other parameters are decreasing, if increases are also measured in monitoring points not associated with the landfill, or if increases can be correlated to precipitation or groundwater levels.

Statistical evaluation of the post-Consent Decree (post-2020) data for trends will be conducted once a sufficient number of sampling events (at least eight) have been completed.

Since there were no wells that exceeded either or both of the contingency trigger conditions for vinyl chloride in 2021 (concentrations above the concentration trigger criteria for two consecutive sampling events and an increasing trend in a well where the concentration of vinyl chloride is greater than the CUL), no additional actions were required. Note the trend analysis is not a contingency trigger condition for well MW-30.

## Iron and Manganese

In 2021, iron and manganese concentrations exceeded the CUL during at least one quarter in downgradient well MW-25 (A-Zone) and downgradient well MW-10 (B-Zone). Time-series plots for iron and manganese show generally stable or decreasing trends for all wells over the history of monitoring. Well MW-25 appears to show a slight apparent (i.e., not statistically significant) increase during the post-Consent Decree sampling events, although more points are needed to evaluate whether this could represent natural fluctuations due to factors such as precipitation or seasonal variations. Following completion of eight quarterly monitoring events, if there are no statistically significant upward trends in iron and manganese, Ecology may approve a reduced frequency of monitoring.

## Arsenic

The time-series plots show generally stable or decreasing apparent trends for arsenic over the history of monitoring. Arsenic did not exceed the CUL in any wells except for MW-27, which is not a CPOC well for arsenic. MW-27 is in an area with elevated arsenic concentrations due to cement kiln dust fill deposits, and the exceedances do not appear related to the landfill. Following completion of eight quarterly events, arsenic analysis will be terminated if concentrations in CPOC wells remain in compliance with the CUL.

### 4.2.2 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2021 that triggered an inspection to the groundwater monitoring wells.

### 4.2.3 Monitoring Well Maintenance Completed

The groundwater discharge and air line tubing at MW-08 was replaced prior to the Fourth Quarter 2021 event. Previous sampling events showed consistent bubbles and air present within the discharge line. The discharge tubing was replaced with Teflon lined polyethylene tubing and the air line was replaced with polyethylene tubing.

### 4.2.4 Purge Water Disposal

A technical memorandum was prepared (Parametrix 2021b; presented in Appendix D6) requesting authorization to discharge groundwater generated during purging of monitoring wells at the Site into the King County sewer at the City of Seattle, Seattle Public Utilities South Recycling and Disposal Station. The purge water was tested and compared to Discharge Authorization limitations and it was concluded that adding the purge water to the discharge would not change the nature and volume of the existing discharge. The County approved the request to discharge the purge water generated from the monitoring wells to the sewer system at the SRDS facility under the existing Discharge Authorization.

Discharge to the manhole at the SRDS facility was authorized by the County, and purge water disposal into the manhole was implemented beginning with the Third Quarter 2021 monitoring event.

## 4.3 Activities Planned for the Next One-Year Period

### 4.3.1 Groundwater Monitoring

During the next one-year period, quarterly groundwater monitoring is planned during the months of February, May, August, and November. Attempts will be made to sample wells MW-10 and MW-25, although ongoing access challenges may occur that prevent sampling every quarter. Further discussion on the access to wells MW-10 and MW-25 is presented in Section 4.3.4.

### 4.3.2 Monitoring Well Maintenance

The bladder pump from MW-10 will be repaired or replaced to facilitate future groundwater monitoring. The well is currently sampled with a peristaltic pump using a special withdrawal protocol.

The locking lid for MW-27 should be repaired/rewelded to ensure well security.

Additional discharge and air lines may be replaced with Teflon lined and polyethylene tubing depending upon field observations.

### 4.3.3 Data Evaluation and Potential Reductions in Monitoring

Trends in vinyl chloride will continue to be evaluated using the full historical database. After at least eight data points from the long-term monitoring program are available, the more recent post-Consent Decree data may be evaluated separately.

The OMMP states that once a dataset of eight quarterly events has been collected, if there are no upward trends in iron and manganese, Ecology may approve a reduced frequency of monitoring. Therefore, trends in iron and manganese will be evaluated in 2022, and reductions in monitoring frequency may be recommended.

The OMMP states that arsenic analysis will be terminated if concentrations in CPOC wells remain in compliance with the CUL for eight quarterly events. Since there have not been any exceedances of the CUL in CPOC wells during the long-term monitoring, it is anticipated that termination of arsenic analyses will occur in 2022.

### 4.3.4 Ongoing Access to Wells MW-10 and MW-25 (Encampment Area)

Access to monitoring wells MW-10 and MW-25 became problematic beginning in the Third Quarter of 2021 due to the expanding presence of a homeless encampment immediately adjacent to the wells, preventing collection of samples in the Third Quarter 2021 due to safety concerns for staff and restricted access. Access to these wells is anticipated to be an ongoing issue. SPU is considering measures to improve access including fencing and providing security personnel during sampling.

MW-10 and MW-25 are CPOC wells located at the northeastern downgradient corner of the Site (Figure 5). Recent concentrations in well MW-25 have exceeded the CUL for vinyl chloride, and both wells exceeded CULs for iron and manganese. However, the concentrations of these parameters during the six quarterly events during 2020 and 2021 were observed to be in a relatively stable range and well below the maximum concentrations observed during historical monitoring (1999 to 2014 for MW-10; 2006-2014 for MW-25).

In particular, both wells have shown clear downward concentrations of vinyl chloride over the history of monitoring. Vinyl chloride concentrations in MW-25 during the six post-Consent Decree quarters were



only slightly greater than the CUL (highest concentration of 0.505 µg/L was less than twice the CUL of 0.29 µg/L, and about three times lower than the concentration trigger of 1.45 µg/L that would result in additional required actions).

Other nearby wells (within 250 ft) that have vinyl chloride concentrations above the CUL are MW-31 (further downgradient but not a CPOC well) and MW-32 (cross-gradient). In the future, these wells would continue to act as sentinel wells for unanticipated increases in concentrations in that area of the Site.

Due to the observed stability of the quarterly monitoring data observed since 2020 and the presence of other monitoring wells in the vicinity, a reduction in the frequency of monitoring at wells MW-10 and MW-25 is not likely to result in failure to detect concentration changes that would indicate a threat to human health or the environment. It is recommended that measures be put in place to ensure that MW-10 and MW-25 are available for monitoring at least on an annual basis. If this is not possible, other alternatives will be evaluated.

## 5. CONCLUSIONS AND RECOMMENDATIONS

No unforeseen emergency or extreme weather events occurred during 2021 at the Settlement Area that triggered additional monitoring requirements. However weather events may have been associated with the unplanned SPPD LFG system shutdown.

### 5.1 Landfill Cap

The 2021 Baseline Landfill Cap Inspection was conducted on April 22, 2021 and identified some areas requiring additional monitoring, maintenance, and repairs. SPPD conducted some of the recommended repairs during 2021, including reestablishing vegetation in March, and repairing exposed geomembrane at the culvert headwall and the exposed geomembrane at the interface with the pavement cap in November. These repairs were observed by the Site Coordinator. Additional work is required to complete the actions recommended in the 2021 Baseline Landfill Cap Inspection. SPPD also installed a fence surrounding the bus lot in November and provided maintenance at two well heads in January 2022.

The Site Coordinator will conduct an inspection in the Spring of 2022 during the rainy season that will include reinspection of areas identified during the 2021 baseline inspection and observation of the fence installation.

### 5.2 Landfill Gas

LFG monitoring throughout 2021 indicated that LFG remains present at the Site and that the LFG is being effectively controlled without offsite migration above regulatory thresholds. The only exception was when the SPPD LFG system was offline for an extended period of time.

During the Fourth Quarter 2021 monitoring event of the LFG compliance perimeter probes it was observed that two of the gas probes had trigger value exceedances: GP-29 at 6.9 percent by volume and GP-33 at 4.5 percent by volume GP-33 was later observed above 5 percent by volume. Due to these exceedances, contingency actions were taken as outlined in Figure 4. Contingency actions included restarting and adjusting the adjacent LFG system to increase LFG control, conducting off-site building monitoring and screening, and conducting gas probe monitoring daily until control was reestablished, followed by weekly LFG monitoring for 4 weeks to confirm protectiveness. Control of the LFG was established with GP-33 coming into compliance relatively quickly. Control of the LFG at GP-29 took additional time with multiple system adjustments implemented. The daily gas probe monitoring at GP-29 was reduced to weekly after December 29, 2021 and discontinued after January 19, 2022. Additional follow-up actions are planned in 2022 by the Site Coordinator and the SPPD property owner.

### 5.3 Groundwater

The groundwater flow direction indicated by 2021 groundwater monitoring was toward the northeast and generally consistent with historical measurements. Based on the observed gradients of 0.0085 to 0.0106 ft/ft in the northern region and 0.0087 to 0.0093 ft/ft in the southern region, the calculated flow velocity ranged from 4.74 to 8.46 ft/day in the northern region of the Site and 1.34 to 3.13 ft/day in the southern region of the Site.

Comparison of water levels in the shallow and deep wells show slightly downward vertical gradients (water levels are higher in the shallower wells) most predominant in the MW-30/MW-31 well pair off the Site to the northeast.

The following CPOC wells had at least one COC concentration that exceeded the CUL during 2021:

- Vinyl chloride: downgradient A-Zone wells MW-25 and MW-32
- Iron: downgradient wells MW-25 (A-Zone) and MW-10 (B-Zone)
- Manganese: downgradient wells MW-25 (A-Zone) and MW-10 (B-Zone)

None of the vinyl chloride groundwater monitoring results exceeded the concentration trigger (concentration greater than 1.45 µg/L). Statistically significant increasing vinyl chloride trends were observed for upgradient well MW-29 and downgradient well MW-18. However, both these wells have over 50 percent non-detected values and the calculations may not be meaningful. The two downgradient wells that had vinyl chloride concentrations above the CUL in 2021 (MW-25 and MW-32) had either a decreasing trend or no trend.

Since there were no wells that exceeded either or both of the contingency trigger conditions for vinyl chloride in 2021 (concentrations above the concentration trigger criteria for two consecutive sampling events and an increasing trend in a well where the concentration of vinyl chloride is greater than the CUL), no additional actions were required. Note the trend analysis is not a contingency trigger condition for well MW-30.

The time-series plots show generally stable or decreasing trends and parameters over the entire history of monitoring. There were no data collected between 2014 and 2020, and the data collected since 2020 are not sufficient to evaluate trends in the post-Consent Decree data. After completing eight quarterly monitoring events, the recent data will be analyzed to evaluate vinyl chloride trends and to assess whether the monitoring frequency for iron and manganese should be reduced. Following completion of eight quarterly events, arsenic analysis will be terminated if concentrations in CPOC wells remain in compliance with the CUL.

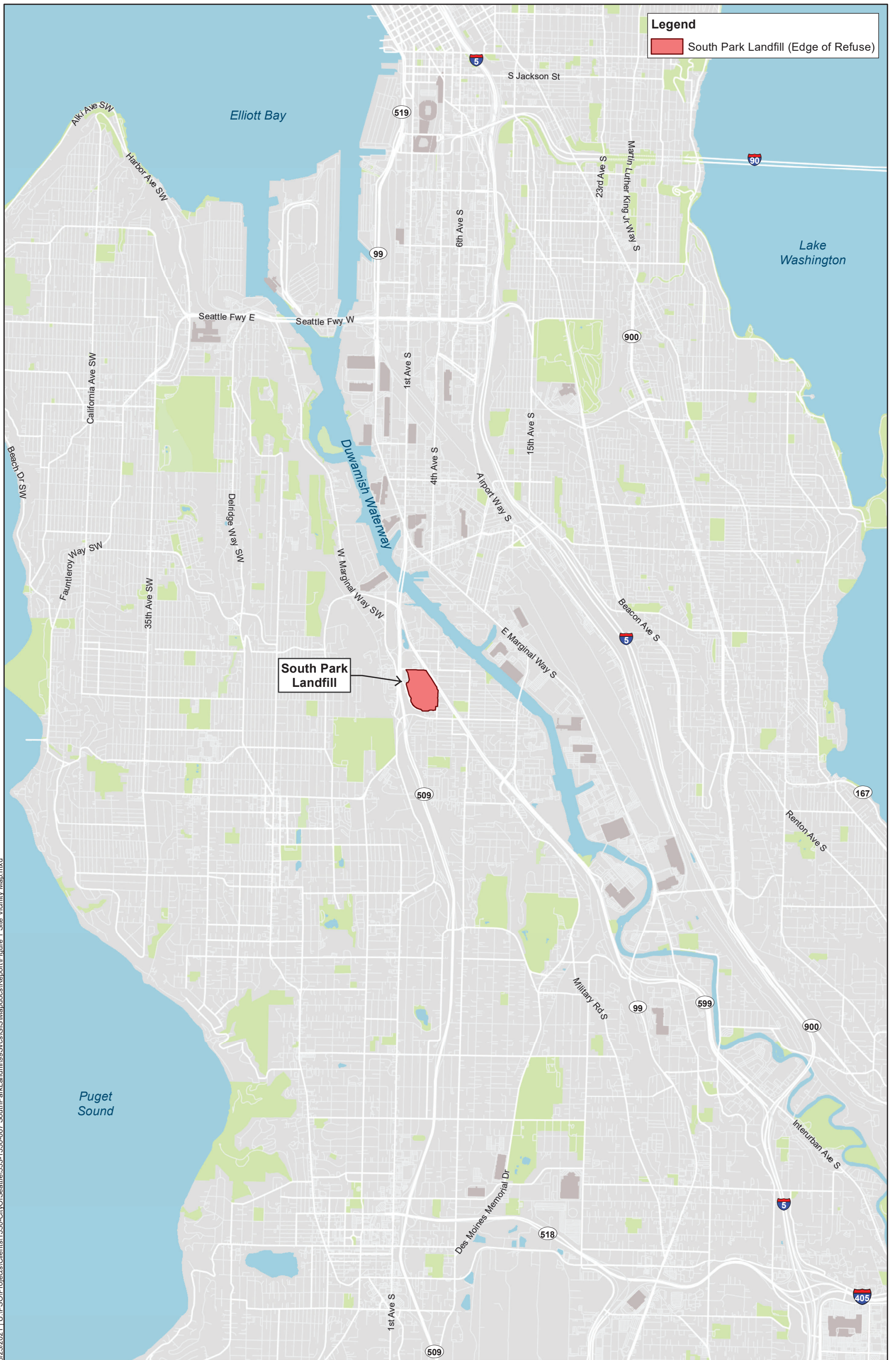
Monitoring wells MW-10 and MW-25 could not be sampled during the Third Quarter 2021 due to encroachment of the adjacent homeless encampment into the area near the wells. Although these wells were successfully sampled in the Fourth Quarter of 2021, it is anticipated that the presence of the encampment will continue to present an ongoing problem that may prevent regular quarterly monitoring. However, due to the relatively stable concentrations measured at these wells since the Consent Decree, continued monitoring at a reduced frequency is not likely to pose a threat to human health or the environment.

## 6. REFERENCES

- Ecology (Washington State Department of Ecology). 2005. Implementation Guidance for the Ground Water Quality Standards. Washington State Department of Ecology Publication #96-02. Olympia, WA.
- Ecology. 2018a. South Park Landfill Final Cleanup Action Plan. Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
- Ecology. 2018b. Guidance for Monitoring at Landfills and Other Facilities Regulated Under Chapters 173-304, 173-306, 173-350, and 173-351 WAC, Revised December 2018. Washington State Department of Ecology Publication no. 12-07-072. Olympia, WA.
- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
- EPA (U.S. Environmental Protection Agency). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530/R-09-007. U.S. Environmental Protection Agency Office of Resource and Recovery. Washington, D.C.
- EPA. 2015. ProUCL 5.0.00 User Guide (Draft): Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. EPA/600/R-07/041. U.S. Environmental Protection Agency Office of Research and Development. Washington, D.C.
- Farallon. 2013. Interim Action Work Plan, South Park Landfill Site, Seattle, Washington. Prepared for South Park Landfill Development, LLC. February 22, 2013. Seattle, WA.
- Farallon. 2016. SPPD Property Landfill Gas Collection and Control System Operation, Maintenance, and Monitoring Plan, South Park Landfill, Seattle, Washington. Prepared for South Park Property Development, L.L.C. c/o SEACON, L.L.C. June 2016.
- Farallon. 2022. SPPD Property Landfill Gas Collection and Control Corrective Action Summary Report, South Park Landfill, Seattle, Washington. Prepared for South Park Property Development, L.L.C. c/o SEACON, L.L.C. February 2022.
- Floyd|Snider, Aspect, BHC, and Herrera. 2017. Remedial Investigation/Feasibility Study. Prepared for City of Seattle South Park Property Development, LLC. July 2017. Seattle, WA.
- Hart Crowser. 1998. Duwamish Industrial Area Hydrogeologic Pathways Project: Duwamish Basin Groundwater Pathways Conceptual Model Report. Seattle, WA. 1 April.
- Herrera Environmental Consultants (Herrera). 2021. Draft Interim Action Work Plan – Amended 2021: South Recycling and Disposal Station. Seattle, WA. February.
- Parametrix 2020. Cap Inspection Work Plan, South Park Landfill. Technical Memorandum prepared for Jerome Cruz, Project Manager, Washington State Department of Ecology. August 5, 2020.
- Parametrix 2021a. 2020 Operations, Maintenance, and Monitoring Annual Report, South Park Landfill. Prepared for SPU. March.
- Parametrix Inc. 2021b. Groundwater Monitoring Well Purge Water Discharge to Sewer. Technical Memorandum prepared for Jeff Neuner at SPU. June 28, 2021.

## Figures





3/23/2021 11:01:50 AM \\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067-SouthParkLandfill\99\Svcs\GIS\Mapdocs\Report\Figure 1 Site Vicinity Map.mxd

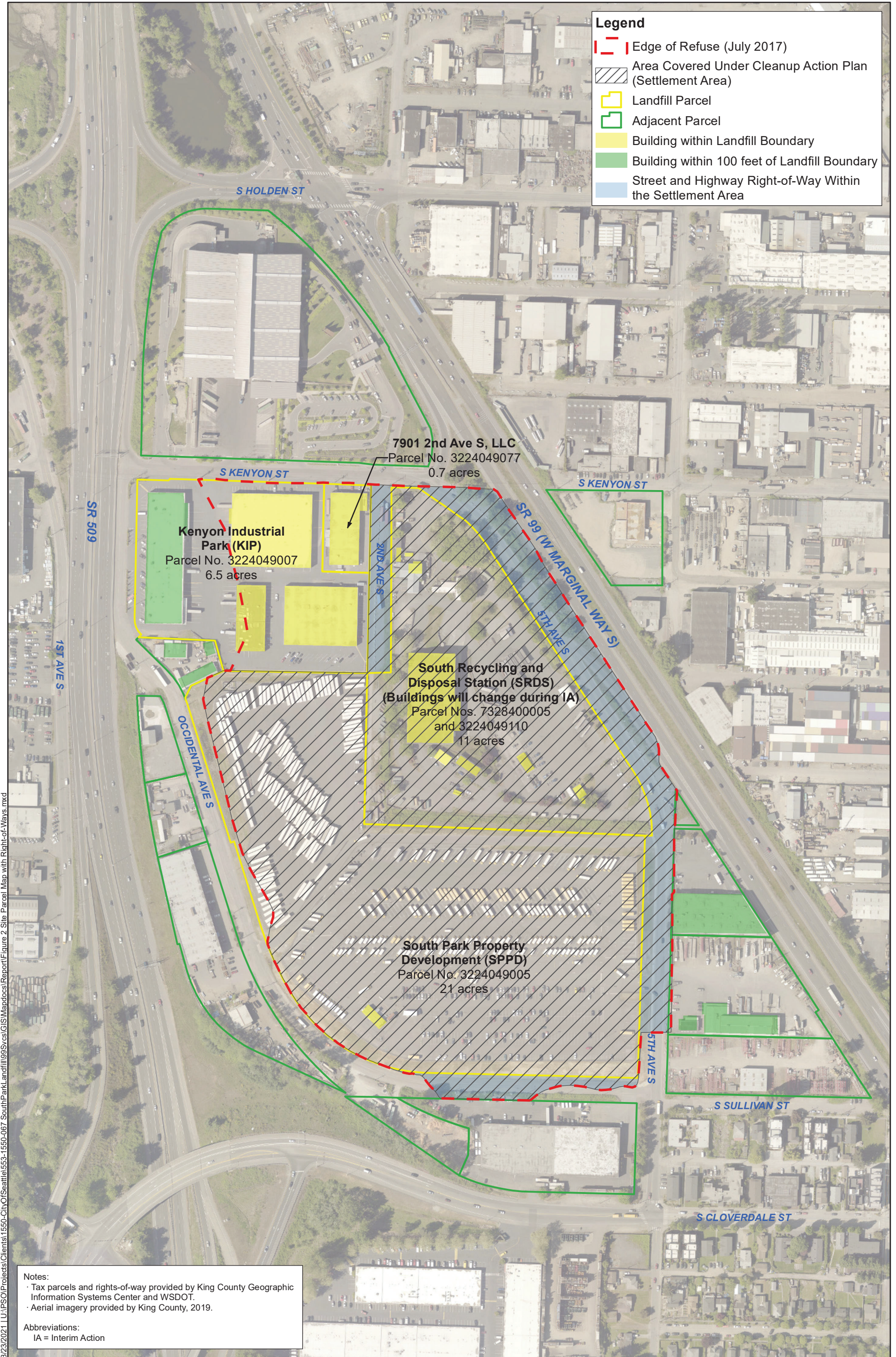
Source: © Mapbox, © OpenStreetMap

**Parametrix**



0 0.5 1 2 Miles

**Figure 1**  
**Site Vicinity Map**  
South Park Landfill



**Legend**

- - - Edge of Refuse (July 2017)
- Area Covered Under Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- Building within Landfill Boundary
- Building within 100 feet of Landfill Boundary
- Street and Highway Right-of-Way Within the Settlement Area

**Notes:**

- Tax parcels and rights-of-way provided by King County Geographic Information Systems Center and WSDOT.
- Aerial imagery provided by King County, 2019.

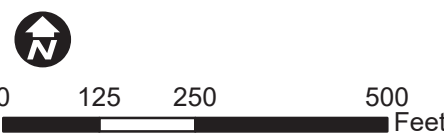
**Abbreviations:**

- IA = Interim Action

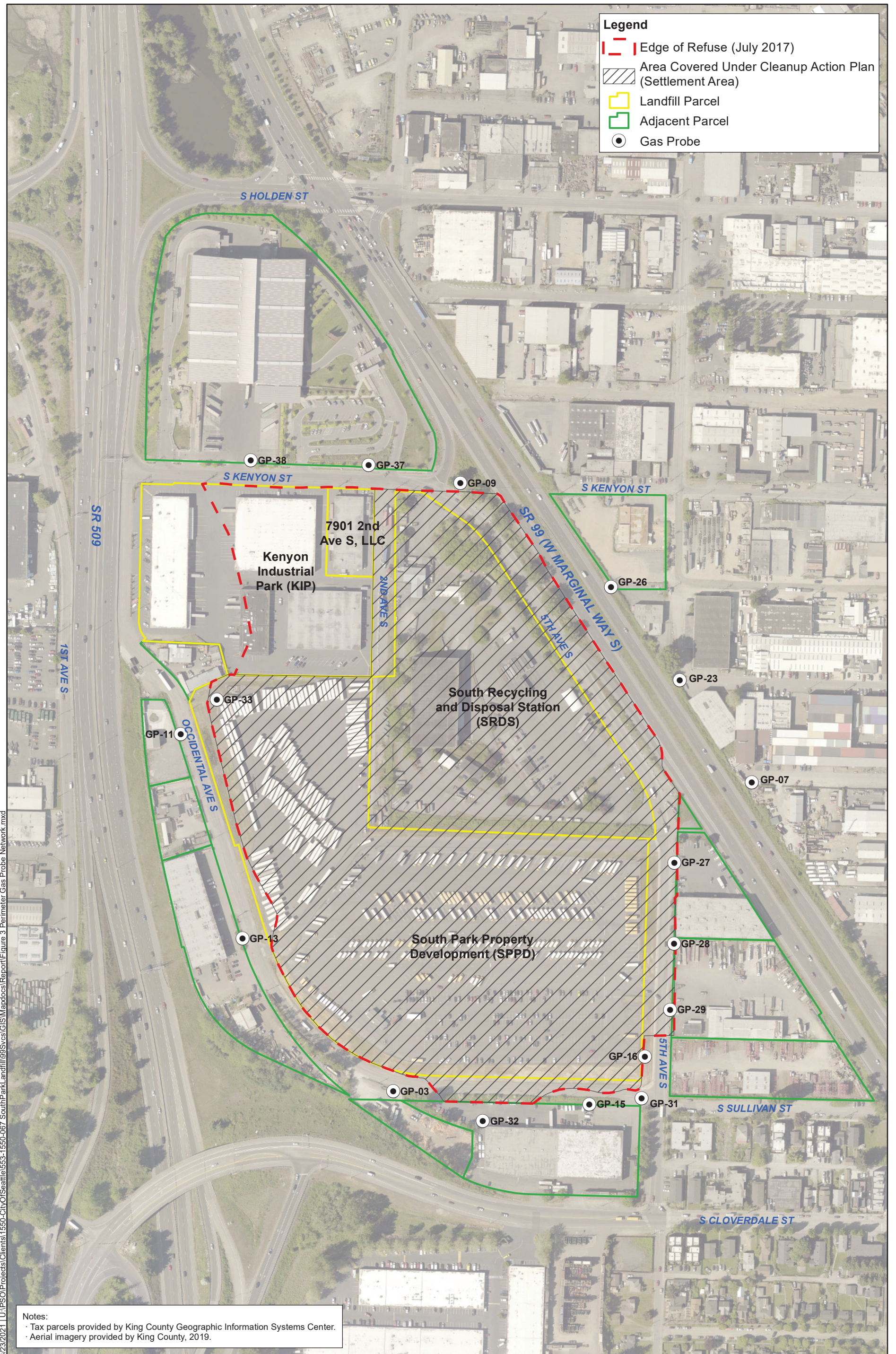
3/23/2021 11:01:50 AM C:\PSO\Projects\Clients\1550-CityOfSeattle\1550-067 SouthParkLandfill\99\Srcs\GIS\Mapdocs\Report\Figure 2 Site Parcel Map with Right-of-Ways.mxd

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**Figure 2**  
**Site Parcel Map**  
**with Rights-of-Way**  
**South Park Landfill**

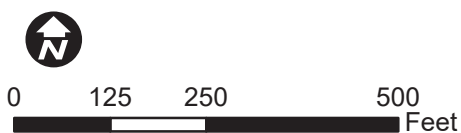


3/23/2021 1:U:\PSO\Projects\Clients\1550-CityOfSeattle\1550-067-SouthParkLandfill\99\Srcs\GIS\Mapdocs\Report\Figure 3 Perimeter Gas Probe Network.mxd

Notes:  
 · Tax parcels provided by King County Geographic Information Systems Center.  
 · Aerial imagery provided by King County, 2019.

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

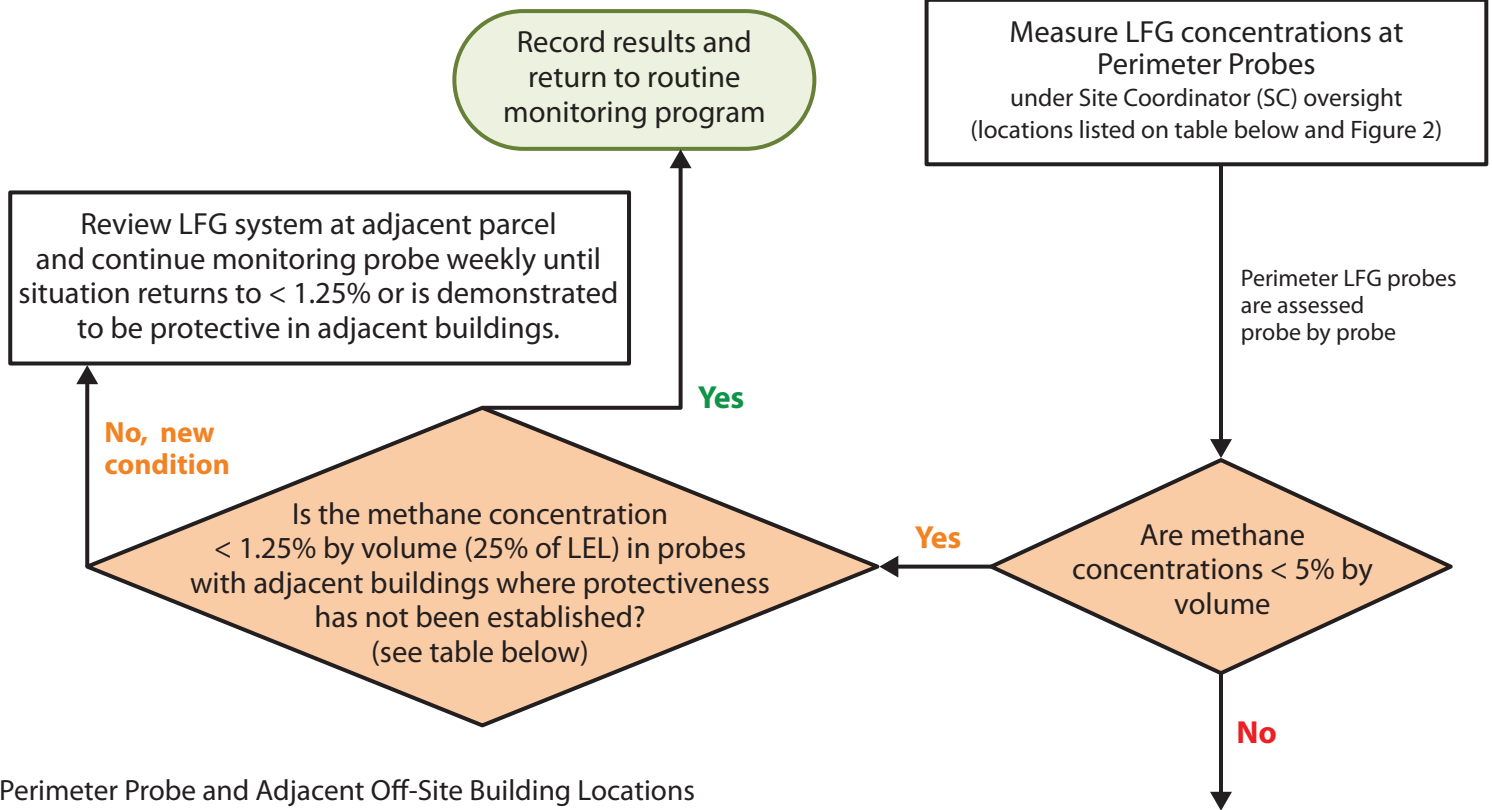
**Parametrix**



**Figure 3**  
**Perimeter Gas Probe Network**  
 South Park Landfill



**START HERE**  
**for Perimeter Probe Monitoring**



Perimeter Probe and Adjacent Off-Site Building Locations

Gas Probe	Adjacent LFG System	Adjacent Off-site Buildings within 100 ft <sup>1</sup>	Protectiveness Established*?
GP-03	SPPD	None	NA
GP-07	SRDS/SPPD	Eagle Eye Enterprises, LLC	No
GP-09	SRDS	None	NA
GP-11	SPPD	International Construction Equipment, Inc.	No
GP-13	SPPD	NorthStar Ice Equipment	No
GP-15	SPPD	Lenci/Emerson	No
GP-16	SPPD	None	NA
GP-23	SRDS	Bank of America (2 buildings)	No
GP-26	SRDS	Rick Larson Enterprises, Inc.	No
GP-27	SPPD	5th Avenue South	Yes
GP-28	SPPD	5th Avenue South	No
GP-29	SPPD	5th Avenue South	Yes
GP-31	SRDS	Emerson Power Products	No
GP-32	SRDS	Emerson Power Products	No
GP-33	SPPD	W.G. Clark Construction Co	No
GP-37	SRDS	None	NA
GP-38	None	None	NA

Notes:  
 1 Adjacent off-site buildings within 100 ft are shown on Figure 3.  
 \* Protectiveness established at methane concentrations up to 5 percent in adjacent probes.  
 Due to shallow groundwater, some probes are only measured when the water table is low enough for the probes to function.  
 NA - Not applicable.

Abbreviations: Ecology = Washington State Department of Ecology; LEL = Lower Explosive Limit; LFG = Landfill gas; OMMP = Operations, Maintenance, and Monitoring Plan; PLP = Potentially liable person; PM = Project manager; SPPD = South Park Property Development, LLC; SRDS = South Recycling and Disposal Station

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure OMMP.

**Contingent Action Triggered by Exceedance**

1. SC notifies the Ecology PM, Public Health - Seattle & King County, and the rest of the PLP Group.
2. Parcel staff adjust adjacent LFG system to increase control on LFG, and continue DAILY monitoring at probe until control is established (using criteria above) then weekly for 4 weeks.
3. SC arranges monitoring of indoor air for LFG in any off-site buildings within 100 feet of the Landfill boundary (Figure 3). Refer to OMMP Figure A.2.6 for triggers and actions based on indoor measurements.
4. SC notifies Ecology PM and Public Health - Seattle & King County of the actions taken and their effectiveness. If the adjustments to the adjacent gas system are not effective, then a plan must be prepared and submitted for approval.
5. SC reports exceedances and actions in Annual Report to Ecology.

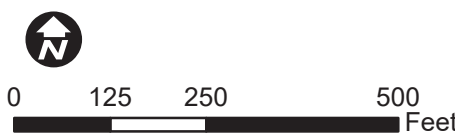


3/23/2021 I:\A\PSO\Projects\Clients\1550-CityOfSeattle\1550-067-SouthParkLandfill\99\Svcs\GIS\Mapdocs\Report\Figure 5 Groundwater Monitoring Well Network.mxd

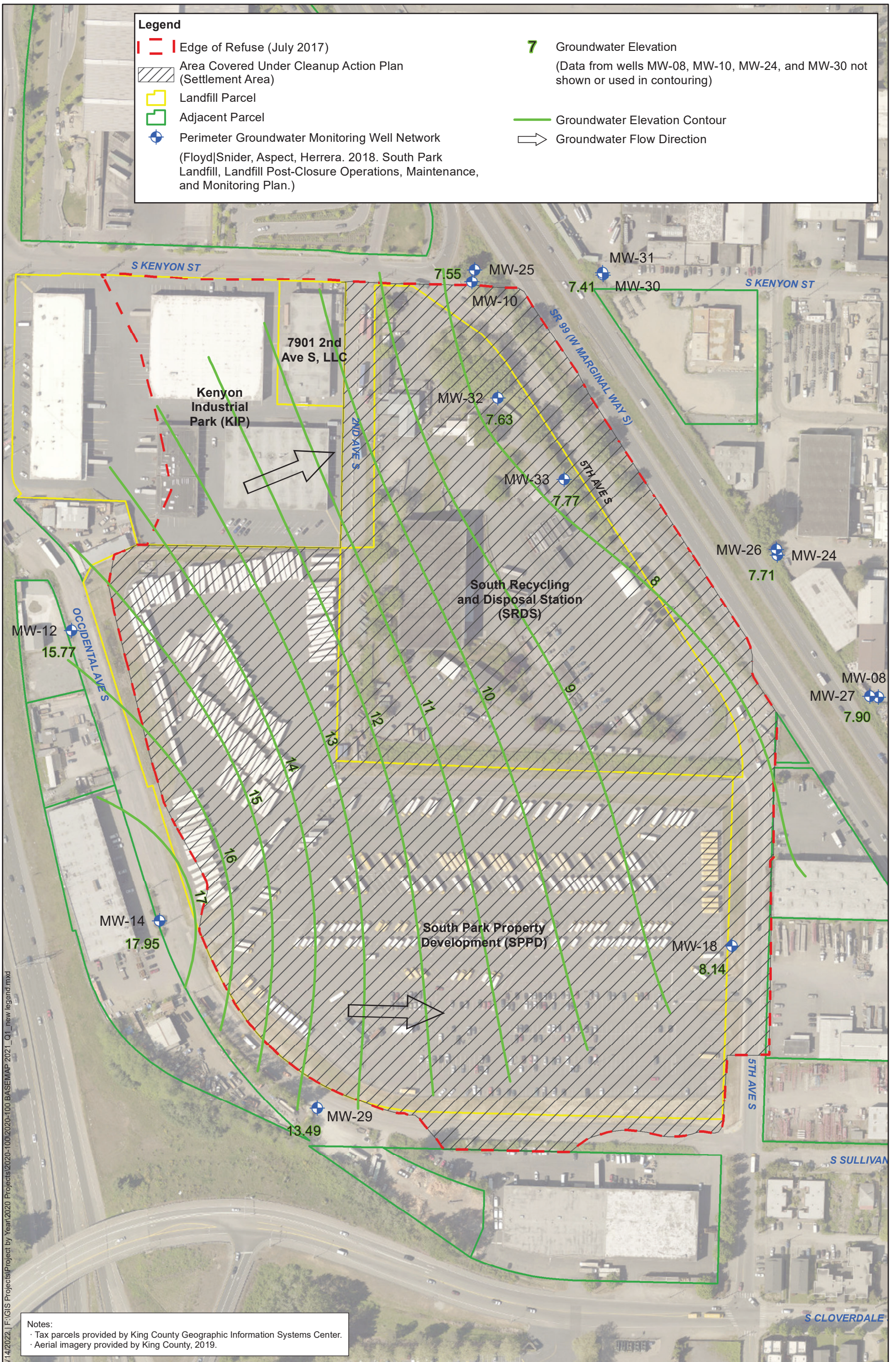
Notes:  
 • Tax parcels provided by King County Geographic Information Systems Center.  
 • Aerial imagery provided by King County, 2019.

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

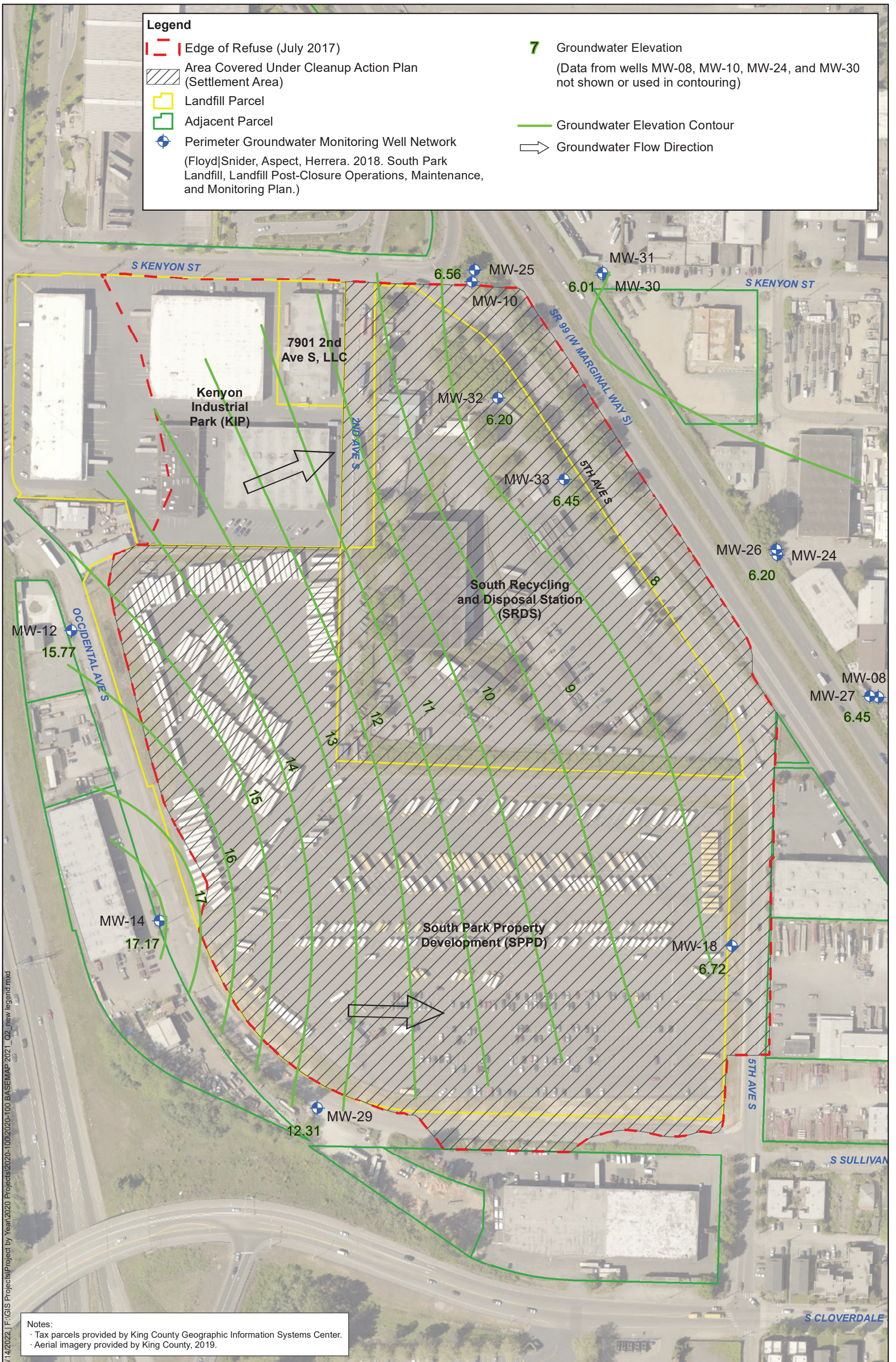
**Parametrix**



**Figure 5**  
**Groundwater Monitoring**  
**Well Network**  
 South Park Landfill



**Figure 6**  
**Potentiometric Surface Map**  
**February 22, 2021**  
**South Park Landfill**



**Figure 7**  
**Potentiometric Surface Map**  
 May 17, 2021  
 South Park Landfill

**Legend**

Edge of Refuse (July 2017)

Area Covered Under Cleanup Action Plan (Settlement Area)

Landfill Parcel

Adjacent Parcel

Perimeter Groundwater Monitoring Well Network  
(Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.)

**7** Groundwater Elevation  
(Data from wells MW-08, MW-10, MW-24, and MW-30 not shown or used in contouring)

Groundwater Elevation Contour

Groundwater Flow Direction



Notes:  
 · Tax parcels provided by King County Geographic Information Systems Center.  
 · Aerial imagery provided by King County, 2019.

**Figure 8**  
**Potentiometric Surface Map**  
**August 23, 2021**  
**South Park Landfill**

**Legend**

Edge of Refuse (July 2017)

Area Covered Under Cleanup Action Plan (Settlement Area)

Landfill Parcel

Adjacent Parcel

Perimeter Groundwater Monitoring Well Network

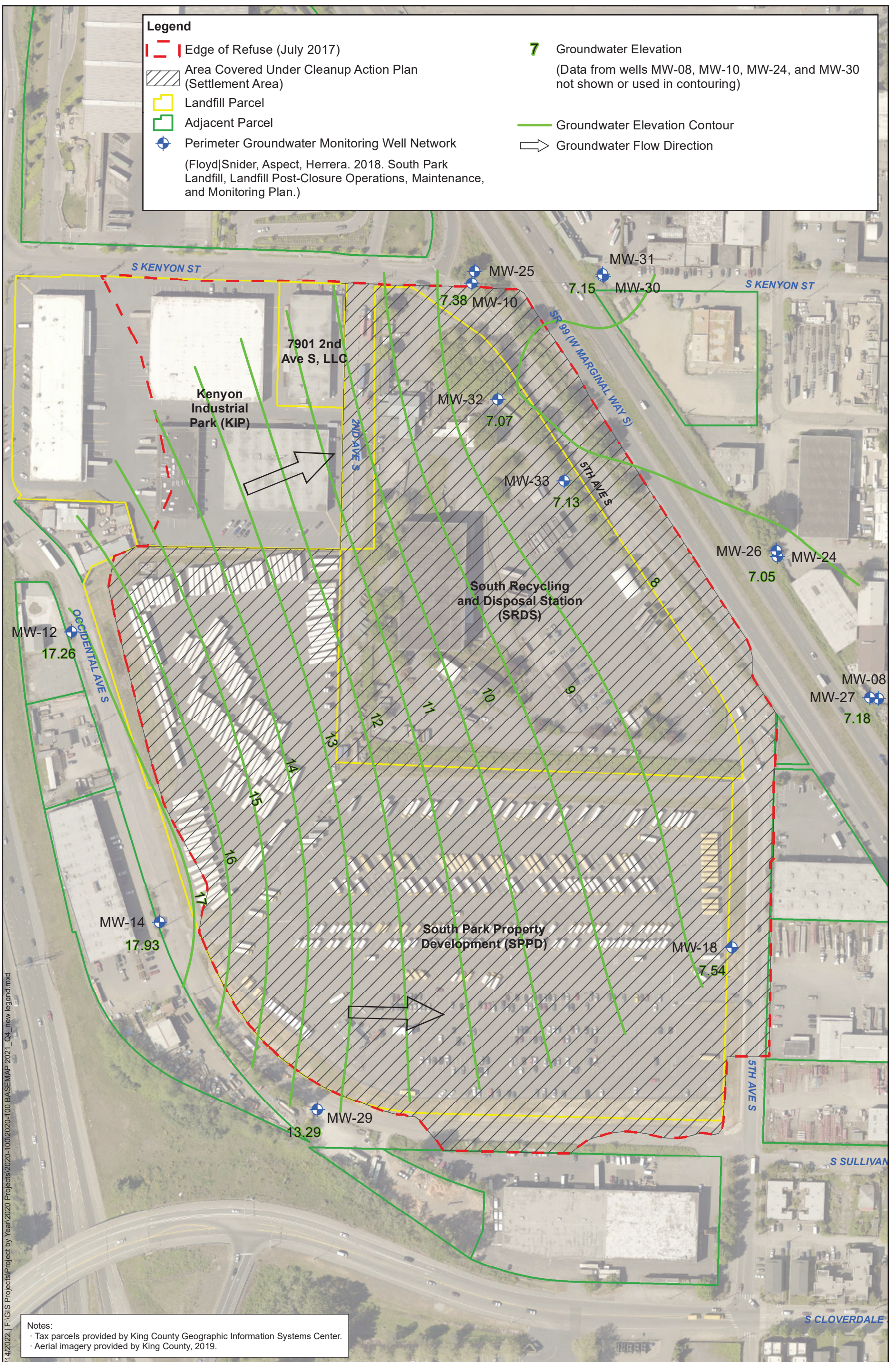
(Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.)

**7** Groundwater Elevation

(Data from wells MW-08, MW-10, MW-24, and MW-30 not shown or used in contouring)

Groundwater Elevation Contour

Groundwater Flow Direction



Notes:  
 · Tax parcels provided by King County Geographic Information Systems Center.  
 · Aerial imagery provided by King County, 2019.

**Figure 9**  
**Potentiometric Surface Map**  
 November 15, 2021  
 South Park Landfill

Tables



**Table 1. Project Contact Information, South Park Landfill**

<b>Contact</b>	<b>Title</b>	<b>Affiliation</b>	<b>Phone Number (s)</b>	<b>Mailing Address</b>	<b>Email Address</b>
Jerome Cruz	Ecology Site Manager	Ecology	425.649.7094 (W) 425.466.8732 (C)	Toxics Cleanup Program, Northwest Regional Office 3190 - 160th SE Bellevue, WA 98008	Jerome.Cruz@ecy.wa.gov
Jeff Neuner	Landfill Closure Program Manager	SPU	206.684.7693 (W) 206.369.1153 (C)	P.O. Box 34018 Seattle, WA 98124-4018	Jeff.Neuner@Seattle.gov
Rob Howie	SPPD Parcel Owner	SPPD	425.837.9720 (W) 425.652.2550 (C)	165 NE Juniper Street, Suite 100, Issaquah, WA 98027	rhowie@seaconllc.com
Laura Lee	Site Coordinator	Parametrix	206.394.3665 (W) 425.941.9409 (C)	719 2nd Avenue, Suite 200, Seattle, WA 98104	Lblee@parametrix.com



Table 2. Methane in Perimeter Gas Probes, 2021, South Park Landfill

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc) <sup>1</sup>	Purge Duration		Date Monitored	Time of Measurement	Depth to Water (ft - btoc)	Pressure (in W.C.)	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
				Purge rate = 550 ml/min	(min)								
GP-37	0.063	2.8 to 7.8	868	1.57	2/22/2021	11:12	Dry	0.00	0.0	1.5	19.6	0	
					5/17/2021	13:11	Obst	-0.01	0.0	9.9	6.7	0	
					8/23/2021	11:45	Obst	0.40	0.0	10.2	10.0	0	
					11/15/2021	10:30	7.66	0.00	0.3 <sup>2</sup>	9.4	5.0	0	
GP-09	0.063	6.62 to 10.62	899	1.63	2/22/2021	12:12	10.71	0.00	0.0	6.4	13.4	0	
					5/17/2021	13:31	11.12	0.02	0.0	6.3	14.0	0	
					8/23/2021	NA	Probe inaccessible						
					11/15/2021	12:00	Obst	0.00	0.3 <sup>2</sup>	8.1	12.8	0	
GP-26	0.063	4.62 to 9.62	868	1.57	2/22/2021	12:00	6.88	0.00	0.0	1.4	20.2	0	
					5/17/2021	14:16	7.57	0.02	0.0	2.2	18.2	0	
					8/23/2021	12:54	Dry	-0.02	0.0	2.2	16.5	0	
					11/15/2021	12:51	7.28	0.00	0.3 <sup>2</sup>	15.5	0.0	0	
GP-23	0.167	6.05 to 7.05	4,940	8.98	2/22/2021	11:48	6.34	0.00	0.0	0.2	21.4	0	
					5/17/2021	13:53	Dry	-0.02	0.1	6.4	13.5	0	
					8/23/2021	12:33	Dry	0.04	0.0	7.1	12.9	0	
					11/15/2021	12:28	6.50	0.00	0.3 <sup>2</sup>	0.4	21.5	0	
GP-07	0.063	5.75 to 6.25	519	0.94	2/22/2021	11:30	Dry	0.00	0.0	1.0	19.5	0	
					5/17/2021	14:37	Obst	0.02	0.0	1.9	18.3	0	
					8/23/2021	13:08	5.70	0.01	0.0	3.0	16.5	0	
					11/15/2021	13:02	Obst	0.00	0.3 <sup>2</sup>	2.6	16.2	0	
GP-27	0.063	8.57 to 13.57	1,216	2.21	2/22/2021	10:22	11.40	0.00	0.0	9.2	0.2	3	
					5/17/2021	12:02	12.14	-0.02	0.6	9.2	NA	6	
					8/23/2021	11:27	12.58	0.00	0.5	13.1	NA	9	
					11/15/2021	11:33	12.51	0.00	1.1 <sup>2</sup>	13.6	0.0	4	
GP-28	0.063	6.59 to 11.59	1,042	1.89	2/22/2021	10:10	9.10	0.00	0.0	1.1	14.6	0	
					5/17/2021	11:45	10.53	-0.01	0.0	3.6	10.6	0	
					8/23/2021	11:13	11.46	-0.02	0.0	11.0	4.6	0	
					11/15/2021	11:00	7.71	0.00	0.3 <sup>2</sup>	31.0	8.1	0	
GP-29	0.063	4.62 to 9.62	868	1.57	2/22/2021	9:34	7.01	0.00	2.0	7.3	6.1	0	
					5/17/2021	11:30	8.54	-0.02	1.6	14.1	NA	17	
					8/23/2021	11:00	9.27	-0.02	1.5	21.4	NA	18	
					11/15/2021	11:19	6.76	0.00	6.9 <sup>2</sup>	16.6	0.0	1.2	
					11/29/2021	13:01	NA	0.10	5.1	13.5	0.1	NA	
					11/30/2021	10:27	NA	0.03	5.2	13.4	0.2	NA	
					12/1/2021	9:00	NA	0.01	5.2	13.5	0.0	NA	
					12/2/2021	9:00	NA	-0.06	4.9	13.2	0.2	NA	
					12/3/2021	13:15	NA	NA	5.0	13.2	0.1	NA	
					12/4/2021	9:49	NA	-0.01	4.7	12.7	0.8	NA	
					12/6/2021	12:28	NA	-0.02	5.3	14.0	0.1	NA	
					12/7/2021	12:55	NA	0.01	5.3	14.0	0.1	NA	
					12/8/2021	11:07	NA	-0.02	5.2	13.9	0.1	NA	
					12/9/2021	10:42	NA	-0.03	5.4	14.1	0.1	NA	
					12/10/2021	13:20	NA	0.01	5.4	13.8	0.3	NA	
					12/13/2021	11:25	NA	0.03	5.2	13.9	0.1	NA	
					12/14/2021	8:15	NA	-0.01	5.3	13.9	0.3	NA	
					12/15/2021	9:39	NA	0.03	5.3	13.3	0.1	NA	
					12/16/2021	11:00	NA	-0.01	5.3	13.5	0.2	NA	
					12/17/2021	10:49	NA	0.00	5.4	12.9	0.2	NA	
					12/18/2021	10:27	NA	0.01	5.8	13.8	0.1	NA	
					12/19/2021	9:50	NA	0.00	5.8	13.7	0.2	NA	
					12/20/2021	11:16	NA	0.01	5.8	13.6	0.3	NA	
					12/21/2021	8:48	NA	-0.02	5.4	12.8	0.2	NA	
					12/22/2021	8:16	NA	-0.01	6.0	13.6	0.2	NA	
					12/23/2021	9:18	NA	-0.05	6.1	12.9	0.1	NA	
					12/24/2021	9:27	NA	0.01	6.2	12.8	0.1	NA	
12/27/2021	12:41	NA	0.01	1.8	12.0	0.2	NA						
12/29/2021	8:16	NA	-0.02	1.2	12.6	1.4	NA						
1/6/2022	9:05	NA	0.01	1.4	11.7	0.1	NA						
1/12/2022	10:45	NA	-0.03	1.2	11.0	0.3	NA						
1/19/2022	9:30	NA	-0.01	0.5	10.6	0.1	NA						
GP-16	0.167	6.60 to 9	5,867	10.67	2/22/2021	9:55	Obst	0.00	0.0	0.3	21.3	0	
					5/17/2021	10:59	Obst	-0.08	0.0	0.5	20.8	0	
					8/23/2021	10:42	Obst	-0.03	0.0	0.5	18.7	0	
					11/15/2021	9:56	Obst	0.00	0.3 <sup>2</sup>	0.4	21.2	0	
GP-31	0.063	4.64 to 9.64	868	1.57	2/22/2021	9:06	4.18	--	--	--	--	--	
					5/17/2021	10:48	5.06	0.02	0.0	7.1	11.4	0	
					8/23/2021	10:18	6.90	0.03	0.0	14.2	3.8	0	
					11/15/2021	9:25	4.50	--	--	--	--	--	
GP-15	0.167	6.62 to 8.62	5,558	10.11	2/22/2021	9:15	4.23	--	--	--	--	--	
					5/17/2021	10:21	2.20	--	--	--	--	--	
					8/23/2021	--	5.90	--	--	--	--	--	
					11/15/2021	9:40	3.34	--	--	--	--	--	

Table 2. Methane in Perimeter Gas Probes, 2021, South Park Landfill

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc) <sup>1</sup>	Purge Duration (min)		Date Monitored	Time of Measurement	Depth to Water (ft - btoc)	Pressure (in W.C.)	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)			
				Purge rate = 550 ml/min												
GP-32	0.063	4.72 to 9.72	868	1.57		2/22/2021	8:58	1.43	--	--	--	--	--			
						5/17/2021	9:52	2.34	--	--	--	--	--			
						8/23/2021	NA			Probe inaccessible						
						11/15/2021	9:49	1.02	--	--	--	--	--			
GP-03	0.063	6.73 to 8.63	725	1.32		2/22/2021	8:45	8.74	0.00	0.0	4.8	12.4	0			
						5/17/2021	9:39	Dry	-0.01	0.0	6.9	11.8	0			
						8/23/2021	9:33	Dry	-12.00	0.0	8.6	10.1	0			
						11/15/2021	9:13	Dry	0.00	0.3 <sup>2</sup>	5.9	8.7	0			
GP-13	0.167	4.91 to 5.41	4,014	7.29		2/22/2021	8:39	2.42	--	--	--	--	--			
						5/17/2021	NA	2.90	--	--	--	--	--			
						8/23/2021	NA	3.88	--	--	--	--	--			
						11/15/2021	NA	2.71 <sup>3</sup>	--	--	--	--	--			
GP-11	0.167	6.23 to 6.73	4,632	8.42		2/22/2021	8:28	4.88	--	--	--	--	--			
						5/17/2021	8:17	4.80	--	--	--	--	--			
						8/23/2021	8:26	6.50	0.0	0.0	0.6	19.1	0			
						11/15/2021	NA	3.28 <sup>3</sup>	--	--	--	--	--			
GP-38	0.063	3.8 to 8.8	882	1.6		2/22/2021	11:20	6.76	0.00	0.0	10.6	5.6	0			
						5/17/2021	13:03	8.59	-0.01	0.0	13.3	3.5	0			
						8/23/2021	12:02	Obst	-0.01	0.0	19.5	0.4	0			
						11/15/2021	10:45	8.42	0.00	0.3 <sup>2</sup>	16.2	1.0	0			
GP-33	0.063	8.2 to 13.2	1,165	2.12		2/22/2021	12:28	12.38	0.00	0.0	4.2	6.2	0			
						5/17/2021	16:45	13.59	-0.05	0.0	4.7	8.2	0			
						8/23/2021	9:56	Dry	10.74	0.0	8.3	6.0	0			
						11/15/2021	11:43	12.11	0.00	4.5 <sup>2</sup>	9.3	0.0	0			
						11/29/2021	13:19	NA	0.07	5.0	8.0	0.0	NA			
						11/30/2021	10:44	NA	-0.30	5.2	7.9	0.0	NA			
						12/1/2021	9:08	NA	0.03	4.9	8.0	0.0	NA			
						12/2/2021	9:05	NA	-0.09	2.4	8.0	0.0	NA			
						12/3/2021	13:25	NA	NA	1.7	8.2	0.1	NA			
						12/4/2021	10:00	NA	-0.02	0.9	8.5	0.0	NA			
						12/6/2021	12:40	NA	-0.01	0.6	9.5	0.0	NA			
						12/7/2021	13:07	NA	0.00	0.5	9.6	0.0	NA			
						12/10/2021	13:37	NA	0.00	0.4	10	0	NA			
						12/16/2021	11:17	NA	-0.02	0.0	9.4	2.1	NA			
	12/22/2021	8:27	NA	-0.01	0.0	9.2	5.2	NA								
	12/29/2021	8:27	NA	0.01	0.1	9.5	3.5	NA								

Notes:

Blue font Indicates entire screen is blocked by water

Red font Measurement exceeds 5% by volume = 100% lower explosive limit

<sup>1</sup> Purge volume assumes no water present within the probe screen

<sup>2</sup> Instrument ambient methane reading of 0.3 % volume

<sup>3</sup> Barhole study performed. See Table 3.

-- No measurement, screen blocked by water

Obst Groundwater not observed due to physical obstruction reported above the probe total depth. Screen likely not blocked therefore gas readings are considered valid.

Abbreviations:

btoc below top of casing

ppm parts per million

ft feet

cc cubic centimeter

W.C. Water Column

CH<sub>4</sub> Methane

CO<sub>2</sub> Carbon Dioxide

O<sub>2</sub> Oxygen

H<sub>2</sub>S Hydrogen Sulfide

NA Not Available

Table 3. Methane in Bar Hole Probes, South Park Landfill

Bar Hole Probe Location	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc) <sup>1</sup>	Purge Duration (min)		Date Monitored	Time of Measurement	Depth to Water (ft - btoc)	Pressure (in W.C.)	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
				Purge rate = 550 ml/min									
GP-13*	0.042	0.0 to 1.5	58	0.11	11/15/2021	8:44	Dry	NA	0.3 <sup>2</sup>	0.9	20.9	0.0	
							Dry	NA	0.3 <sup>2</sup>	0.5	21.0	0.0	
							Dry	NA	0.3 <sup>2</sup>	0.6	21.0	0.0	
GP-11*	0.042	0.0 to 2.0	77	0.14	11/15/2021	8:20	Dry	NA	0.3 <sup>2</sup>	0.3	21.1	0.0	
							Dry	NA	0.3 <sup>2</sup>	0.2	21.1	0.0	
							Dry	NA	0.3 <sup>2</sup>	0.2	21.2	0.0	

**Notes:**

<sup>1</sup> Purge volume assumes no water present within the probe screen

<sup>2</sup> Instrument ambient methane reading of 0.3 % volume

\* Temporary bar hole probes installed at three locations adjacent to blocked gas probe

NA Not available

**Abbreviations:**

btoc below top of casing

ppm parts per million

ft feet

cc cubic centimeter

W.C. Water Column

CH<sub>4</sub> Methane

CO<sub>2</sub> Carbon Dioxide

O<sub>2</sub> Oxygen

H<sub>2</sub>S Hydrogen Sulfide

NA Not Applicable

**Table 4. Groundwater Elevation Summary, 2021, South Park Landfill**

Well ID	TOC (ft NAVD 88)	Depth to Water (ft)				Groundwater Elevation (ft NAVD 88)			
		2/22/21	5/17/21	8/23/21	11/15/21	2/22/21	5/17/21	8/23/21	11/15/21
<b>Perched Zone</b>									
MW-30	17.07	8.85	10.34	11.04	9.68	8.22	6.73	6.03	7.39
<b>Shallow / A-Zone wells</b>									
MW-12	20.63	4.86	5.93	6.59	3.37	15.77	14.70	14.04	17.26
MW-14	19.85	1.90	2.68	3.61	1.92	17.95	17.17	16.24	17.93
MW-25	20.09	12.54	13.53	#N/A	12.71	7.55	6.56	#N/A	7.38
MW-26	15.94	8.21	9.74	10.41	8.89	7.73	6.20	5.53	7.05
MW-27	14.76	6.86	8.31	9.16	7.58	7.90	6.45	5.60	7.18
MW-29	19.16	5.67	6.85	8.51	5.87	13.49	12.31	10.65	13.29
MW-31	17.12	9.71	11.11	11.71	9.97	7.41	6.01	5.41	7.15
MW-32	17.07	9.44	10.87	11.54	10.00	7.63	6.20	5.53	7.07
MW-33	17.34	9.57	10.89	11.72	10.21	7.77	6.45	5.62	7.13
<b>Deep / B-Zone wells</b>									
MW-08	14.76	6.90	8.47	9.17	7.65	7.86	6.29	5.59	7.11
MW-10	19.35	11.75	13.20	#N/A	12.15	7.60	6.15	#N/A	7.20
MW-18	22.03	13.89	15.31	16.06	14.49	8.14	6.72	5.97	7.54
MW-24	15.13	7.42	8.90	9.67	8.15	7.71	6.23	5.46	6.98

**Abbreviations:**

TOC = Top of casing

ft = feet

NAVD 88 = North American Vertical Datum of 1988

#NA = Not available

**Table 5. Groundwater Vertical Gradients, 2021, South Park Landfill**

Well Pairs	Zone	Groundwater Elevation (ft NAVD 88)				Mid-screen Elevation (ft NAVD 88)	Mid-screen Elevation Difference (ft)	Vertical gradient (ft/ft)			
		2/22/21	5/17/21	8/23/21	11/15/21			2/22/21	5/17/21	8/23/21	11/15/21
MW-26	Shallow	7.73	6.20	5.53	7.05	-6.45	19.98	0.0010	-0.0015	0.0035	0.0035
MW-24	Deep	7.71	6.23	5.46	6.98	-26.43					
MW-27	Shallow	7.90	6.45	5.60	7.18	-2.28	25.44	0.0016	0.0063	0.0004	0.0028
MW-08	Deep	7.86	6.29	5.59	7.11	-27.72					
MW-25	Shallow	7.55	6.56	#N/A	7.38	-7.2	15.1	-0.0033	0.0272	#N/A	0.0119
MW-10	Deep	7.60	6.15	#N/A	7.20	-22.3					
MW-30	Perched	8.22	6.73	6.03	7.39	7.1	10.02	0.0808	0.0719	0.0619	0.0240
MW-31	Shallow	7.41	6.01	5.41	7.15	-2.92					

**Notes:** Positive vertical gradient represents downward hydraulic flow  
 Negative vertical gradient represents upward hydraulic flow

**Abbreviations:**

ft = feet

NAVD 88 = North American Vertical Datum of 1988

#NA = Not available

**Table 6. Groundwater Flow Velocity, South Park Landfill**

<b>Region</b>	<b>Horizontal Hydraulic Conductivity<sup>1</sup> (ft/day)</b>	<b>2021 Horizontal Hydraulic Gradient (ft/ft)</b>	<b>Effective Porosity<sup>1</sup></b>	<b>Horizontal Groundwater Velocity (ft/day)</b>
Northern Region <sup>2</sup>	145 to 167	0.0085 to 0.0106	0.21 to 0.26	4.74 to 8.46
Southern Region <sup>3</sup>	40 to 71	0.0087 to 0.0093	0.21 to 0.26	1.34 to 3.13

**Notes:**

<sup>1</sup> Hydraulic Conductivity and Effective Porosity as determined from the RI-FS (Floyd Snider, 2017).

<sup>2</sup> Horizontal gradients for the northern region are calculated between A-Zone wells MW-12 and MW-32.

<sup>3</sup> Horizontal gradients for the southern region are calculated between A-Zone well MW-14 and B-Zone well MW-18.

Table 7. Groundwater Quality Data Summary, 2021, South Park Landfill

Parameter			Upgradient Wells												
			A-Zone												
			MW-12	MW-12	MW-12	MW-12	MW-14	MW-14	MW-14	MW-14	MW-29	MW-60 (MW-29 Dup)	MW-29	MW-29	MW-29
Units	Cleanup Level	2/22/21	5/18/21	8/24/21	11/16/21	2/22/21	5/18/21	8/24/21	11/17/21	2/23/21	2/23/21	5/18/21	8/24/21	11/16/21	
<b>Field Parameters</b>															
Temperature	C		10.8	11.8	15.5	13.4	13.1	14.4	17.1	14.3	12.2	--	13.3	14.1	13.0
Dissolved Oxygen	mg/L		4.79	3.3 <sup>4</sup>	3.2	0.46	0.44	1.9 <sup>4</sup>	2.7	0.35	0.46	--	3 <sup>4</sup>	2.3	0.20
Specific Conductivity	µS/cm		558.6	362.4	505.3	384.1	453.8	422.2	555.6	522.5	777	--	774	795	635.6
pH	units		6.78	6.35	6.03	6.18	7.18	6.63	6.43	6.56	7.40	--	6.7	6.57	6.66
Redox	mv		266.7	50.3	68.1	110.5	4.2	-159.6	36.2	14.9	-79.7	--	-116.9	-39.8	-61.3
Turbidity	NTU		0.02	6.02	0.02	0.02	4.0	2.96	0.07	1.98	0.10	--	0.95	1.74	0.02
<b>Metals</b>															
Arsenic, Dissolved	µg/L	5.0	0.292	0.323	0.359	0.407	--	--	--	--	--	--	--	--	--
Iron, Total	mg/L	27 A-Zone 31 B-Zone	0.0661	1.66	0.800	0.810	4.01	4.26	3.09	3.06 J-	17.6	20.2	24.5	15.0	12.2
Manganese, Total	mg/L	2.2	0.0334	0.141	0.0780	0.0908	0.564	0.655	0.613	0.623	0.578	0.598	0.778	0.612	0.526
<b>Volatile Organic Compounds</b>															
Vinyl Chloride	µg/L	0.29	0.0200 U	0.020 U	0.0200 U	0.0200 U	0.0200 U	0.020 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.020 U	0.0200 U	0.0200 U
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 7. Groundwater Quality Data Summary, 2021, South Park Landfill

			Downgradient Wells															
			Perched Zone				A-Zone											
			MW-30 <sup>1</sup>	MW-30 <sup>1</sup>	MW-30 <sup>1</sup>	MW-30 <sup>1</sup>	MW-25	MW-25	MW-25	MW-26	MW-26	MW-26	MW-61 (MW-26 Dup)	MW-26	MW-27 <sup>2</sup>	MW-27 <sup>2</sup>	MW-27 <sup>2</sup>	MW-27 <sup>2</sup>
Parameter	Units	Cleanup Level	2/23/21	5/20/21	8/25/21	11/16/21	2/23/21	5/20/21	11/17/21	2/24/21	5/19/21	8/25/21	8/25/21	11/17/21	2/24/21	5/19/21	8/25/21	11/16/21
<b>Field Parameters</b>																		
Temperature	C		10.9	12.2	15.7	14.0	13.6	13.9	13.7	12.2	12.2	13.9	--	12.1	10.2	11.7	14.5	12.6
Dissolved Oxygen	mg/L		0.74	11 <sup>4</sup>	3.0	0.41	1.88	2.1 <sup>4</sup>	0.26	0.81	8.8 <sup>4</sup>	3.1	--	0.28	1.01	2.8 <sup>4</sup>	3.0	0.56
Specific Conductivity	µS/cm		473.1	457.6	605.3	392.4	986	948	1165	199.1	149	231.1	--	205.8	263.0	283.2	499.8	275.1
pH	units		6.78	6.21	6.01	6.24	7.21	6.52	6.55	6.54	6.03	5.70	--	5.87	6.91	6.43	6.23	6.10
Redox	mv		60.3	7.3	94.8	30.6	-51.5	-75.8	-65.9	63.6	23.5	58.7	--	46.2	61.8	-27.5	32.7	84.6
Turbidity	NTU		0.02	7.87	1.46	0.02	1.42	9.23	0.02	8.40	7.59	3.23	--	0.02	5.80	10.7	2.30	21.0
<b>Metals</b>																		
Arsenic, Dissolved	µg/L	5.0	--	--	--	--	0.295	0.342	0.278	0.712	0.682	0.813	0.868	0.822	0.823	6.39 <sup>2</sup>	16.7 <sup>2</sup>	1.00
Iron, Total	mg/L	27 A-Zone 31 B-Zone	1.50	2.32	5.46	2.51	26.8	<b>28.2</b>	<b>32.9 J-</b>	5.81	5.43	8.43	8.54	7.81 J-	1.86	8.7	18.5	2.08
Manganese, Total	mg/L	2.2	0.0617	0.0654	0.174	0.0666	2.12	<b>2.45</b>	<b>2.57</b>	0.0777	0.0744	0.127	0.127	0.103	0.125	0.386	0.655	0.0607
<b>Volatile Organic Compounds</b>																		
Vinyl Chloride	µg/L	0.29	0.0200 U	0.155	0.570 <sup>1</sup>	0.106	<b>0.463</b>	<b>0.451</b>	<b>0.455</b>	0.0620	0.020 U	0.0310 J	0.0294	0.0582	0.0200 U	0.0445	0.0870	0.0200 U
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.47	0.68	0.43	0.20 U	0.20 U	0.28	0.65	0.45	0.37	0.35	0.20	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	--	--	--	--	0.47	0.61	0.94	--	--	--	--	--	--	--	--	--



Table 7. Groundwater Quality Data Summary, 2021, South Park Landfill

			Downgradient Wells (cont.)														
			A-Zone (cont.)														
Parameter	Units	Cleanup Level	MW-31 <sup>1</sup>	MW-61 (MW-31 Dup)	MW-31 <sup>1</sup>	MW-31 <sup>1</sup>	MW-31 <sup>1</sup>	MW-32 <sup>3</sup>	MW-32 <sup>3</sup>	MW-32 <sup>3</sup>	MW-60 (MW-32 Dup)	MW-32 <sup>3</sup>	MW-33 <sup>3</sup>	MW-33 <sup>3</sup>	MW-33 <sup>3</sup>	MW-33 <sup>3</sup>	MW-60 (MW-33 Dup)
			2/23/21	2/23/21	5/20/21	8/25/21	11/16/21	2/23/21	5/18/21	8/24/21	8/24/21	11/16/21	2/24/21	5/20/21	8/24/21	11/17/21	11/17/21
<b>Field Parameters</b>																	
Temperature	C		13.1	--	13.1	14.3	14.1	13.6	14.5	14.4	--	14.3	14.9	14.9	15.7	15.1	--
Dissolved Oxygen	mg/L		0.62	--	2.3	3.5 <sup>4</sup>	0.19	0.44	2.1 <sup>4</sup>	3.6	--	0.24	0.40	1.8 <sup>4</sup>	2.8	0.19	--
Specific Conductivity	µS/cm		417.0	--	369.4	427.7	374.2	839	749	860	--	836	1330	1209	1420	1398	--
pH	units		6.98	--	6.26	5.96	6.31	7.37	6.71	6.44	--	6.7	7.31	6.69	6.52	6.67	--
Redox	mv		-28.8	--	-36.5	101.6	-32.5	-63.3	-124.4	-56.9	--	-79.3	-91.2	-95.4	-58.3	-79.6	--
Turbidity	NTU		5.88	--	10.7	5.48	2.19	1.34	2.65	0.97	--	0.02	3.80	8.01	3.07	1.12	--
<b>Metals</b>																	
Arsenic, Dissolved	µg/L	5.0	--	--	--	--	--	1.16	1.06	1.29	1.22	1.17	0.845	0.889	0.964	0.863	0.842
Iron, Total	mg/L	27 A-Zone 31 B-Zone	11.8	12.3	15.7	12.0	11.4	11.2	14.3	12.1	12.1	12.7	15.6	16.1	13.7	14.8 J-	14.5 J-
Manganese, Total	mg/L	2.2	0.537	0.513	0.601	0.605	0.665	1.37	1.5	1.43	1.44	1.61	1.55	1.77	1.85	1.83	1.82
<b>Volatile Organic Compounds</b>																	
Vinyl Chloride	µg/L	0.29	0.167 J	0.357 <sup>1</sup>	0.321 <sup>1</sup>	0.494 <sup>1</sup>	0.384 <sup>1</sup>	0.162	0.208	0.465	0.477	0.471	0.114	0.114	0.169	0.124	0.109
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.87	0.84	1.06	0.92	1.13	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 7. Groundwater Quality Data Summary, 2021, South Park Landfill

			Downgradient Wells (cont.)																		
			B-Zone																		
Parameter	Units	Cleanup Level	MW-08 2/24/21	MW-08 5/19/21	MW-08 8/25/21	MW-08 11/17/21	MW-61 (MW-08 Dup) 11/17/21	MW-10 2/23/21	MW-10 5/20/21	MW-10 11/17/21	MW-18 <sup>3</sup> 2/23/21	MW-18 <sup>3</sup> 5/18/21	MW-60 (MW-18 Dup) 5/18/21	MW-18 <sup>3</sup> 8/24/21	MW-18 <sup>3</sup> 11/17/21	MW-24 2/24/21	MW-24 5/19/21	MW-61 (MW-24 Dup) 5/19/21	MW-24 8/25/21	MW-24 11/17/21	
<b>Field Parameters</b>																					
Temperature	C		11.3	12.5	14.3	12.1	--	13.6	13.9	13.5	13.4	14.2	--	16.8	14.2	12.0	12.1	--	14.9	12.2	
Dissolved Oxygen	mg/L		1.10	79.10 <sup>4</sup>	6.6	0.19	--	0.44	2.6 <sup>4</sup>	0.23	0.47	36.3 <sup>4</sup>	--	3.7	0.21	0.93	3 <sup>4</sup>	--	6.7	0.18	
Specific Conductivity	µS/cm		1248	1053	1128	865	--	1482	1306	1510	1161	1006	--	1086	870	979	775	--	988	948	
pH	units		7.28	6.62	6.44	6.57	--	7.50	6.72	6.81	7.29	6.51	--	6.36	6.58	7.13	6.56	--	6.39	6.46	
Redox	mv		-56.6	-75.4	112.2	-69.4	--	-108.4	-106.1	-109.8	-52.1	-74.3	--	-10.2	-41.9	-41.5	-66.4	--	71.4	-41.3	
Turbidity	NTU		2.33	7.07	0.44	2.48	--	1.92	10.8	0.02	0.02	4.09	--	0.02	0.02	1.35	4.98	--	2.95	0.02	
<b>Metals</b>																					
Arsenic, Dissolved	µg/L	5.0	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.400 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Iron, Total	mg/L	27 A-Zone 31 B-Zone																			
			14.6	15.4	14.2	15.2 J-	14.8 J-	28.0	35.3	34.8 J-	24.2	22.6	23.9	14.8	13.8 J-	25.5	12.5	14.7	17.4	19.7 J-	
Manganese, Total	mg/L	2.2	1.09	1.27	1.11	0.991	0.991	2.08	2.44	2.68	1.30	1.33	1.4	1.21	0.918	1.48	0.913	0.91	1.39	1.34	
<b>Volatile Organic Compounds</b>																					
Vinyl Chloride	µg/L	0.29	0.0735	0.0754	0.0987	0.0863	0.0819	0.0755	0.0876	0.0745	0.0200 U	0.0459	0.0454	0.0540	0.0248	0.0226	0.0214	0.0255	0.051	0.0808	
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.29	1.17	1.36	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	
Benzene	µg/L	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 7. Groundwater Quality Data Summary, 2021, South Park Landfill

Parameter	Units	Cleanup Level	Trip Blanks							
			First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
			MW-80	MW-81	MW-80	MW-81	MW-80	MW-81	MW-80	MW-81
			2/22/21	2/24/21	5/19/21	5/20/21	8/24/21	8/25/21	11/16/21	11/17/21
<b>Field Parameters</b>										
Temperature	C		--	--	--	--	--	--	--	--
Dissolved Oxygen	mg/L		--	--	--	--	--	--	--	--
Specific Conductivity	µS/cm		--	--	--	--	--	--	--	--
pH	units		--	--	--	--	--	--	--	--
Redox	mv		--	--	--	--	--	--	--	--
Turbidity	NTU		--	--	--	--	--	--	--	--
<b>Metals</b>										
Arsenic, Dissolved	µg/L	5.0	--	--	--	--	--	--	--	--
Iron, Total	mg/L	27 A-Zone	--	--	--	--	--	--	--	--
		31 B-Zone	--	--	--	--	--	--	--	--
Manganese, Total	mg/L	2.2	--	--	--	--	--	--	--	--
<b>Volatile Organic Compounds</b>										
Vinyl Chloride	µg/L	0.29	0.0200 U	0.0200 U	0.020 U	0.020 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U

**Notes:**

- <sup>1</sup> MW-30 and MW-31 monitor the former Glitsa property and are not CPOC wells.
  - <sup>2</sup> MW-27, a downgradient A-Zone well across SR 99 consistently has arsenic at concentrations greater than the CUL due to a cement kiln dust deposit that is across the street from the Settlement Area. MW-27 is not a CPOC well for arsenic.
  - <sup>3</sup> MW-18 is completed in refuse along the downgradient edge of the Landfill; MW-32 and MW-33 are completed beneath refuse along the downgradient edge.
  - <sup>4</sup> Dissolved Oxygen readings for the second quarter were not reliable and potentially related to a faulty sensor
- = Exceeds cleanup level for CPOC wells  
 -- = Not sampled  
 U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.  
 J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.  
 J - = The result is an estimated quantity, but the result may be biased low. The associated numerical value is the approximate concentration of the analyte in the sample.

**Abbreviations:**

- µg/L Micrograms per liter
- mg/L Milligrams per liter
- µS/cm Microsiemens per centimeter
- NTU Nephelometric Turbidity unit
- CPOC Conditional point of compliance

**Table 8. Summary of Vinyl Chloride Trend Analyses, South Park Landfill**

Well ID	# Samples	# ND's	% ND's	MK S Value <sup>1</sup>	Significance Level <sup>2</sup>	Trend <sup>2</sup>
<b>Upgradient Wells</b>						
<b>A-Zone</b>						
MW-12	45	7	16	-400	<0.0001	decreasing
MW-14	43	43	100	NA	NA	NA
MW-29	11	8	73	27	0.0215	increasing*
<b>Downgradient Wells</b>						
<b>Perched Zone</b>						
MW-30	11	1	9	-13	0.1751	no trend
<b>A-Zone</b>						
<b>MW-25</b>	<b>20</b>	<b>1</b>	<b>5</b>	<b>-84</b>	<b>0.0035</b>	<b>decreasing</b>
MW-26	18	7	39	-63	0.0094	decreasing
MW-27	17	6	35	-84	0.0003	decreasing
MW-31	11	0	0	-27	0.0215	decreasing
<b>MW-32</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>0.0495</b>	<b>no trend</b>
MW-33	11	0	0	-10	0.2411	no trend
<b>B-Zone</b>						
MW-08	44	4	9	-681	<0.0001	decreasing
MW-10	45	2	4	-700	<0.0001	decreasing
MW-18	42	23	55	160	0.0424	increasing*
MW-24	34	7	21	-341	<0.0001	decreasing

**Notes:**

All ND's were replaced with estimated values using the ROS (Regression on Order Statistics) meth

ND = Non-detected value

NA = Not applicable

**Bold** = Downgradient well where the vinyl chloride concentration is greater than the CUL

<sup>1</sup> The Mann-Kendall test statistic, S, is based on pair-wise differences between each concentration and all earlier concentrations. A positive S value indicates an increasing trend, a zero value indicates no trend, and a negative value indicates a decreasing trend. The null hypothesis for this test is no trend. For a positive S value, the alternative hypothesis is an increasing trend. For a negative S value, the alternative hypothesis is a decreasing trend.

<sup>2</sup> Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated.

\* Because of limited data, including a 6-year gap between 2014 and 2020, and more than 50% ND's, the trend may not be meaningful.

Table 9. Groundwater Monitoring Well Information, South Park Landfill

Well ID	Latitude (NAD 83) <sup>1</sup>	Longitude (NAD 83) <sup>1</sup>	Well Information from RI <sup>2</sup>										Pump Information			
			WASPN North (ft NAD 83)	WASPN East (ft NAD 83)	Ground Elevation (ft NAVD 88)	Casing Elevation (ft NAVD 88)	Stickup (ft)	Total Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)	Screen Top Elevation (ft NAVD 88)	Screen Bottom Elevation (ft NAVD 88)	Aquifer	Pump Type	Intake or Top of Pump (ft btoc)	Date Measured
MW-08	47.529801	-122.3273	196834.57	1271362.27	12.88	14.76	1.88	45.59	35.6	45.6	-22.72	-32.72	B-Zone	Bladder	Pump at approx. 39.5 ft btoc	11/10/2021 <sup>3</sup>
MW-10	47.531977	-122.3306	197659.19	1270559.83	17.7	19.35	1.65	45	35	45	-17.3	-27.3	B-Zone	Peristaltic	Dedicated intake at 30 ft btoc	5/26/2020
MW-12	47.530062	-122.3337	196964.43	1269792.64	19.11	20.63	1.52	15.3	10	15	9.11	4.11	A-Zone	Bladder	Pump at 12.24 ft btoc	5/26/2020
MW-14	47.528523	-122.3329	196399.9	1269963.70	19.05	19.85	0.8	21.8	11.50	21.5	7.55	-2.45	A-Zone	Bladder	Pump at 16.63 ft btoc	5/26/2020
MW-18	47.528449	-122.3284	196350.26	1271077.67	20.78	22.03	1.25	40.4	30	40	-9.22	-19.22	B-Zone	Bladder	Pump at 33.70 ft btoc	5/26/2020
MW-24	47.530515	-122.3281	197110.02	1271165.6	13.57	15.13	1.56	45.3	35	45	-21.43	-31.43	B-Zone	Bladder	Pump at 39.80 ft btoc	5/26/2020
MW-25	47.532033	-122.3305	197657.49	1270566.75	17.3	20.09	2.79	27	22	27	-4.7	-9.7	A-Zone	Bladder	Pump at 25.30 ft btoc	5/26/2020
MW-26	47.53057	-122.3281	197121.60	1271164.4	13.55	15.94	2.39	25	15	25	-1.45	-11.45	A-Zone	Bladder	Pump at 20.09 ft btoc	5/26/2020
MW-27	47.529792	-122.3273	196835.06	1271357.64	12.72	14.76	2.04	20	10	20	2.72	-7.28	A-Zone	Bladder	Pump at 14.97 ft btoc	5/26/2020
MW-29	47.527537	-122.3316	196034.29	1270270.91	19.45	19.16	-0.29	30	20	30	-0.55	-10.55	A-Zone	Peristaltic	Intake placed at 25 feet bgs	5/26/2020
MW-30	47.532014	-122.3295	197655.77	1270826.64	17.6	17.07	-0.53	13	8	13	9.6	4.6	Perched	Peristaltic	Intake placed at 10.5 feet bgs	5/26/2020
MW-31	47.532027	-122.3295	197660.37	1270825.71	17.58	17.12	-0.46	23	18	23	-0.42	-5.42	A-Zone	Bladder	Pump at 18.24 ft btoc	5/26/2020
MW-32	47.531347	-122.3303	197416.52	1270622.16	17.51	17.07	-0.44	24	19	24	-1.49	-6.49	A-Zone	Peristaltic	Intake placed at 21.5 feet bgs	5/26/2020
MW-33	47.53092	-122.3298	197257.91	1270751.02	17.81	17.34	-0.47	25	20	25	-2.19	-7.19	A-Zone	Peristaltic	Intake placed at 22.5 feet bgs	5/26/2020

- Notes:**
- <sup>1</sup> Converted from Washington State plane data.
  - <sup>2</sup> Well information sourced from the RI Table 5.4 (Floyd Snider, 2017).
  - <sup>3</sup> Will be validated during the 2022 second quarter monitoring event.

- Abbreviations:**
- NAD 83 = North American Datum of 1983
  - NAVD 88 = North American Vertical Datum of 1988
  - ft = feet
  - bgs = below ground surface
  - btoc = below top of casing
  - WASPN = Washington State Plane North - 4601

Appendix A  
Annual Report Checklist



## SOUTH PARK LANDFILL ANNUAL REPORT CHECKLIST

DUE TO ECOLOGY March 31 of each calendar year (includes January 1 through December 31 of the previous year)

### 1. Landfill Cap Inspections and Maintenance

	Type of Activity	Date Completed	Form Completed	Comments
<input checked="" type="checkbox"/>	Annual	April 22, 2021	<input checked="" type="checkbox"/>	Baseline inspection
<input checked="" type="checkbox"/>	Maintenance	March 30, 2021	<input checked="" type="checkbox"/>	SPPD landscaping
		November 2, 2021	<input checked="" type="checkbox"/>	SPPD repair of exposed geomembrane and landscaping in areas of erosion
		January 26, 2022	<input checked="" type="checkbox"/>	Two gas monitoring well heads were raised to provide better access. New asphalt was added around the wells.
<input checked="" type="checkbox"/>	Inspection	January 15, 2021	<input checked="" type="checkbox"/>	Weather event inspection
		October 29, 2021	<input checked="" type="checkbox"/>	Rain event inspection.

### 2. Quarterly LFG Perimeter Probe Monitoring

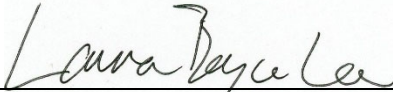
		Date Completed	Field Forms	Comments
<input checked="" type="checkbox"/>	Q1	February 22, 2021	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Q2	May 17, 2021	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Q3	August 23, 2021	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Q4	November 15, 2021	<input checked="" type="checkbox"/>	

### 3. Owner-reported Quarterly Inspection of On-site Building Methane Detectors and Alarms

		Date Completed	
		SPPD	SRDS
<input type="checkbox"/>	Q1	No records received from property owner	Not required until redevelopment
<input type="checkbox"/>	Q2		
<input type="checkbox"/>	Q3		
<input type="checkbox"/>	Q4		
Off-site building monitoring conducted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Off-site buildings were monitored during the gas exceedance incident at GP-33 on November 30, 2021, and December 3, 2021. Details are included in an incident report (Appendix C3).			

**4. Quarterly Groundwater Monitoring**

		<b>Date Completed</b>	<b>Field Forms</b>	<b>Uploaded into EIM</b>
<input checked="" type="checkbox"/>	Q1	February 22 through 24, 2021	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Q2	May 18 through 20, 2021	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Q3	August 24 through 25, 2021	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Q4	November 16 through 17, 2021	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Site Coordinator Signature

March 31, 2022

Date

Source: South Park Landfill Final Cleanup Action Plan.  
Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.  
Prepared by Washington State Department of Ecology 2018.



# Appendix B

## Landfill Cap Inspection and Maintenance



**B1**

Landfill Cap Inspections



**B1-A**

April 2021 Baseline Landfill Cap Inspection



## TECHNICAL MEMORANDUM

**DATE:** June 25, 2021  
**TO:** Jeff Neuner, Seattle Public Utilities  
Rob Howie, South Park Property Development  
**FROM:** Laura Lee; Rhiannon Sayles, PE; Ian Sutton, PE; and Lisa Gilbert, LHG  
**SUBJECT:** 2021 Baseline Landfill Cap Inspection  
**CC:** Jerome Cruz, Ecology  
**PROJECT NUMBER:** 553-1550-067  
**PROJECT NAME:** South Park Landfill Site Coordination

---

The purpose of this Technical Memorandum is to summarize the findings of the 2021 Baseline Landfill Cap Inspection at South Park Landfill including the reinspection of identified concerns from the 2020 Baseline Landfill Cap Inspection performed on September 21, 2020. Additionally, the field inspection report and photos from the January 15, 2021, inspection are included in this document as Attachment F. The January 15, 2021, field inspection was performed after a large rain event. There is one immediate repair that was identified during that inspection and that is to cut the deep-rooted plants in the swale adjacent to Occidental Avenue. This repair item has been combined with the repairs required from the 2021 Baseline Landfill Cap inspection in Table 4.

The 2021 Baseline Landfill Cap inspection was performed on April 22, 2021, by three Parametrix staff members (Rhiannon Sayles, PE; Ian Sutton, PE; and Lisa Gilbert, LHG). The baseline inspection satisfies the requirements of the Cleanup Action Plan (CAP) which fulfills a requirement of the Consent Decree that was signed on March 26, 2019. The primary objective of this inspection was to reinspect issues identified during the 2020 Baseline Landfill Cap Inspection, document current status, and complete a second inspection of the landfill cap to identify areas that may be compromised and need maintenance. The inspection also included observing areas noted in the January 15, 2021, inspection conducted as a result of a storm event.

The inspection took place on April 22, 2021, from approximately 9:30 AM to 1:15 PM. The weather was cloudy, and the temperature was 55°F. The last substantial rain event was twelve days prior (Saturday, April 10) when approximately 0.01 inches of rain fell. The inspection started on the northern portion of the site at the South Recycling and Disposal Station (SRDS) property and progressed south to the South Park Property Development (SPPD) property and the surrounding right-of-way. Two accompanying cap inspection figures are included in Attachment C. Photographs were taken, and global information system (GIS) points were collected using a Trimble Geo7X handheld data collector at each location where a potential issue or concern was observed. The photographs are numbered and included in Attachment D with numbers mapped on the Attachment C figures. The Cap Inspection Form A was completed for both parcels and the right-of-way and are included as Attachment B. The following inspection results are presented in accordance with the associated property and respective responsible party.

All repairs shall be documented on a Cap Maintenance Form B and are included in Attachment G.

The basis of determining the timeline for repairs shown in the tables in this report comes from the Landfill Post-Closure Operations, Maintenance, and Monitoring Plan (OMMP). The OMMP has the following guidance for the timeline of maintenance/repairs:

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days.
2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.

3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

Corrective actions proposed by the property owners should be coordinated with Parametrix prior to taking action. Parametrix should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. Parametrix shall perform a reinspection in October or November of 2021. The next regular annual inspection shall occur in the first quarter of 2022. The property owner should document any repairs or maintenance in Part 1 of the Cap Inspection Form B (a blank sample is located in Attachment G) and Parametrix will provide observations in Part 2 of the form after reinspection.

## SRDS PARCEL

### Reinspection of Identified Concerns from September 2020 Cap Inspection

There were 7 locations on the SRDS property identified in the 2020 Baseline Landfill Cap Inspection that were reinspected during this site visit for minor pavement cracking and ponding. Locations are shown in Attachment A which includes the 2020 Baseline Landfill Cap Inspection site plan. Table 1 lists the 7 items identified. Previous concerns identified remain in the same general condition as observed in September 2020 and have been added to the current list of concerns in Table 2.

**Table 1. Status of Identified Locations of Concern on the SRDS Parcel, September 21, 2020, Inspection**

	Description	Recommended Action on September 21, 2020	Status on April 22, 2021
20-27	Minor pavement cracking	Follow-up inspection in 6 months	No Change
20-28	Minor pavement cracking	Follow-up inspection in 6 months	No Change
20-29	Ponding	Follow-up inspection in 6 months	No Change
20-30	Ponding	Follow-up inspection in 6 months	No Change
20-31	Ponding	Follow-up inspection in 6 months	No Change
20-32	Minor pavement cracking	Follow-up inspection in 6 months	No Change
20-39	Minor pavement cracking	Follow-up inspection in 6 months	No Change

### April 2021 Inspection and Identification of Current Concerns

The general parcel condition was good. Pavement cracks and ponding areas remain the primary concerns; however, with the planned redevelopment of the parcel, temporary pavement restoration is not recommended based on conditions at this time. There were 6 new locations identified as points of concern for one or more conditions. Each new location of concern is identified by number on Attachment C and corresponding photographs are in Attachment D. There are also 4 locations identified as points of concern identified during the September 21, 2020, inspection that will continue to be monitored.

Table 2 briefly describes the issue or concern at each location on the SRDS parcel, indicates a recommended action, and proposes a timeline for repairs, maintenance, and/or reinspection. Parametrix will perform a reinspection in October or November 2021.

There is one item recommended for immediate repair on the SRDS parcel at this time. That is to repair the sinkhole location at point #21-7. There is one item that is recommended for repair by the end of the calendar year and that is the concrete cracking around the catch basin at point #21-3.

Table 2. Identified Locations of Concern on the SRDS Parcel, April 22, 2021, Inspection

2021 Point #	2020 Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
21-2	20-28 20-39	Minor pavement cracking	Follow-up inspection	6 months	Parametrix
21-3	-	Concrete cracking at catch basin	Repair concrete at catch basin.	No later than end of calendar year.	SPU
21-4	20-27 20-29	Minor pavement cracking and ponding	Follow-up inspection	6 months	Parametrix
21-5	-	Minor pavement cracking	Follow-up inspection	6 months	Parametrix
21-6	-	Ponding	Follow-up inspection	6 months	Parametrix
21-7	-	Sinkhole through asphalt	Immediate repair	60 days	SPU
-	20-26	Ponding	Follow-up inspection	6 months	Parametrix
-	20-30	Ponding	Follow-up inspection	6 months	Parametrix
-	20-31	Ponding	Follow-up inspection	6 months	Parametrix
-	20-32	Minor pavement cracking	Follow-up inspection	6 months	Parametrix

The Cap Inspection Form A was completed for the SRDS parcel and is included in Attachment B.

## SPPD PARCEL

### Reinspection of Identified Concerns from September 2020 Cap Inspection

There were 32 locations on the SPPD parcel identified in the 2020 Baseline Landfill Cap Inspection that were reinspected during this site visit for one or more conditions. Locations are shown in Attachment A which includes the 2020 Baseline Landfill Cap Inspection site plan. Table 3 lists the 32 items identified. Previous concerns identified that remain in the same general or worse condition as observed in September 2020 have been added to the current list of concerns in Table 4.

### April 2021 Inspection and Identification of Current Concerns

The general parcel condition was good. The paved area is in good condition; though, ponding remains a concern. Vegetated slopes are uniform and generally in good condition; however, there are two primary concerns of exposed geomembrane at the slope and parking area interface, and exposed geomembrane near the sidewalk along 5th Avenue S. There were 13 locations on the SPPD parcel identified during the April 2021 and previous inspections, as points of concern for one or more conditions. Each new location of concern is identified by number on Attachment C and corresponding photographs are in Attachment D.

Table 4 briefly describes the issue or concern at each location on the SPPD parcel, indicates a recommended action, and proposes a timeline for repairs, maintenance, and/or reinspection. Items identified for repair will be reinspected as part of the regular Annual Inspection.

Additionally, there is a noted area of concern where stormwater runoff from the SPPD Property flows onto the SPU property from the northeast corner of the SPPD property. Parametrix was unable to visit the site during or after a large rain event to observe this condition. A reinspection will be scheduled in October or November during a rain event to observe the area of concern.

Table 3. Status of Identified Locations of Concern on the SPPD Parcel, September 21, 2020, Inspection

2020 Point #	Description	Recommended Action on September 21, 2020	Status on April 22, 2021
20-1	Standing water in west bioswale	Regrade for drainage within 12 months	No Change
20-2	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)
20-3	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)
20-4	Exposed geomembrane	Expose geomembrane until the 18" cover requirement is satisfied to determine the extent of erosion. Inspect geomembrane, repair as needed, and restore the 18" cover in accordance with the Interim Action Work Plan (IAWP) within 3 months	Exposed geomembrane was reported by SPPD to be a loose piece of material and not part of the cap. The area had been regraded and vegetation reestablished
20-5	Exposed geomembrane	Expose geomembrane until the 18" cover requirement is satisfied to determine the extent of erosion. Inspection geomembrane, repair as needed, and restore the 18" cover in accordance with the IAWP within 3 months	Exposed geomembrane was reported by SPPD to be a loose piece of material and not part of the cap. The area had been regraded and vegetation reestablished
20-6	Ponding at Fire Hydrant	Regrade for drainage within 12 months	No Change
20-7	Exposed geomembrane	Expose geomembrane until the 18" cover requirement is satisfied to determine the extent of erosion. Inspection geomembrane, repair as needed, and restore the 18" cover in accordance with the IAWP within 3 months	No Change
20-8	Potholes/pavement cracking	Follow-up inspection within 6 months	No Change. Reassigned to the Right-of-Way.
20-9	Exposed geomembrane	Expose geomembrane until the 18" cover requirement is satisfied to determine the extent of erosion. Inspection geomembrane, repair as needed, and restore the 18" cover in accordance with the IAWP within 3 months	No Change
20-10	Unknown open vertical pipes	If pipes are not functional, excavate and remove. Determine relation to the landfill cap and repair as required in accordance with the IAWP within 3 months	No change. One conduit appeared broken at the level of surrounding vegetation.
20-11	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)
20-12	Exposed geotextile	Reestablish vegetation within 6 months	Inspection needed to verify vegetation reestablished
20-13	Ponding	Follow-up inspection in 6 months	No Change
20-14	Ponding	Follow-up inspection in 6 months	No Change
20-15	Ponding	Follow-up inspection in 6 months	No Change
20-16	Ponding above LFG Collector Control Box V4	Confirm no infiltration into the control box. Raise control box and surrounding grade to prevent ponding within 6 months	Reinspection needed after a substantial rain event.

Table 3. Status of Identified Locations of Concern on the SPPD Parcel, September 21, 2020, Inspection (continued)

2020 Point #	Description	Recommended Action on September 21, 2020	Status on April 22, 2021
20-17	Ponding	Follow-up inspection in 6 months	No Change
20-18	Ponding	Follow-up inspection in 6 months	No Change
20-19	Ponding	Follow-up inspection in 6 months	No Change
20-20	Ponding	Follow-up inspection in 6 months	No Change
20-21	Water flowing from asphalt	Determine source of water and take corrective action immediately. Restore the area in accordance with the IAWP. Monitor the area for settlement impacts as a result of the water.	Broken water pipe identified and repaired. Asphalt patched. (see maintenance form in Attachment G)
20-22	Ponding above Sanitary Cleanout	Confirm no infiltration into or around the cleanout. Raise cleanout and surrounding grade to prevent ponding within 6 months	No Change
20-23	Ponding	Follow-up inspection in 6 months	No Change
20-24	Ponding	Follow-up inspection in 6 months	No Change
20-25	Ponding	Follow-up inspection in 6 months	No Change
20-26	Minor pavement cracking/ponding	Follow-up inspection in 6 months	No Change
20-33	Exposed geotextile	Reestablish vegetation within 6 months	No Change. The ditch bottom has been restored; however, the south side slope adjacent to the parking area remains an erosion issue.
20-34	Exposed geotextile	Reestablish vegetation within 6 months	Inspection needed to verify vegetation reestablished
20-35	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)
20-36	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)
20-37	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)
20-38	Exposed geotextile	Reestablish vegetation within 6 months	Vegetation reestablished (see maintenance form in Attachment G)



Table 4. Current Identified Locations of Concern on the SPPD Parcel, April 22, 2021, Inspection

2021 Point #	2020 Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
21-9	20-33	Erosion of soil cover between the swale and parking area. Erosion may be a result of a low point in the curb channelizing parking lot runoff at this location. This issue was identified during January 2021 storm event inspection. See Attachment F.	Work with Parametrix to prepare a plan to reestablish a uniform slope and vegetate. The team shall investigate source of erosion, identify possible solutions and take corrective action. Additionally, this area shall be inspected after heavy persistent rain.	No later than end of calendar year	SPPD Property Owner will work in coordination with Parametrix to establish a solution
21-11	20-6	Ponding at fire hydrant	Regrade for positive drainage away from fire hydrant.	No later than end of calendar year	SPPD Property Owner
21-12	20-7	Exposed geomembrane at the culvert headwall	Work with Parametrix to prepare a plan to reestablish cover over the geomembrane. Potential solutions may include adding rock on top of the geomembrane. However, if this is done a cushion material should be provided to protect the geomembrane.	60 days	SPPD Property Owner will work in coordination with Parametrix to establish a solution
21-13	-	Exposed and damaged geomembrane at the parking area interface	The configuration of the geomembrane and cover at the interface of the parking area does not appear to be in accordance with Figure 5 of the Interim Action Work Plan (IAWP) included as Attachment E. The geomembrane appears to be directly below the asphalt with no drainage layer or surfacing layer in between. Some locations show evidence of geomembrane damage. Along with Parametrix, prepare a plan to reestablish cover over the geomembrane. Most likely, the area should be exposed, and the geomembrane tested for damage before repairs should be made. The crest of slope should then be provided cover to the maximum extent possible considering the existing asphalt and curb configuration.	60 days	SPPD Property Owner will work in coordination with Parametrix to establish a solution
21-14	-	Exposed and damaged geomembrane at the parking area interface	See Point #21-13 recommendations.	60 days	SPPD Property Owner will work in coordination with Parametrix to establish a solution
21-15	-	Exposed and damaged geomembrane at the parking area interface	See Point #21-13 recommendations.	60 days	SPPD Property Owner will work in coordination with Parametrix to establish a solution

Table4. Current Identified Locations of Concern on the SPPD Parcel, April 22, 2021, Inspection (continued)

2021 Point #	2020 Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
21-16	-	Asphalt cap penetrations exist	Repair holes.	60 days	SPPD Property Owner
21-17	-	Exposed and damaged geomembrane at the parking area interface	See Point #21-13 recommendations.	60 days	SPPD Property Owner will work in coordination with Parametrix to establish a solution
21-18	20-9	Exposed and damaged geomembrane north of the east entrance, including an unbooted storm drain manhole	Work with Parametrix to prepare a plan to reestablish cover over the geomembrane. The geomembrane should be exposed and inspected. Based on the visible geomembrane at the manhole, the original cap installation did not adequately depress the geomembrane, nor provide adequate cover. Other visibly damaged geomembrane appears to be the result of the shallow cover and landscaping activities.	60 days	SPPD Property Owner will work in coordination with Parametrix to establish a solution
-	20-1	Standing water in west bioswale	Regrade for drainage within 12 months. See 2020 baseline inspection for details and photos.	No later than end of calendar year	SPPD Property Owner
-	20-10	Unknown open vertical pipes	If pipes are not functional, excavate and remove. Determine relation to the landfill cap and repair as required in accordance with the IAWP. See 2020 baseline inspection for details and photos.	No later than end of calendar year	SPPD Property Owner
-	20-13	Ponding	Follow-up inspection. See 2020 baseline inspection for details and photos.	6 months	Parametrix
-	Jan Event 1	Invasive/Deep Rooted Plants	The willow (salix sp.) and black cottonwood (populus balsamifera) growing along the edge of the west bioswale are native but deep-rooted species that shall be removed from the swale. See Appendix F for details and photos.	No later than end of calendar year	SPPD Property Owner

Of these 15 locations, 8 are recommended as high priority. The high priority items include seven locations where the landfill cap geomembrane is exposed or the asphalt is penetrated (Point Locations # 21-12, 21-13, 21-14, 21-15, 21-16, 21-17, and 21-18). These areas are of highest concern due to the potential compromise of the landfill cap and need to be further inspected, repaired, and restored in accordance with the approved 2013 IAWP of the Agreed Order. There is one other location where other cover maintenance is required (Point Location #21-9). This area is of next highest concern. Attachment E includes a schematic cross-section of a vegetated slope area. Refer to the Agreed Order for complete requirements.

The Cap Inspection Form A was completed for the SPPD parcel which is included in Attachment B.

**RIGHT-OF-WAY**

There was one location within the Occidental Avenue S right-of-way identified as a location of concern. The 5th Avenue S right-of-way was not reviewed. The locations of concern are identified by number on Attachment C and corresponding photographs are in Attachment D.

Table 5 briefly describes the issue of concern within the Occidental Avenue S right-of-way, indicates a recommended action, and proposes a timeline for repairs, maintenance, and/or reinspection.

**Table 5. Current Identified Locations of Concern within the Right-of-Way, April 22, 2021, Inspection**

2021 Point #	2020 Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
21-20	20-8	Cracks/Ruts	A portion of the asphalt appears to be marked for repair. However, the marked portion does not include the entire area that should be repaired. SPU should coordinate with WSDOT to expand the limits of repair. Ultimately the asphalt needs to be repaired.	No later than end of calendar year.	SPU to coordinate with WSDOT

**ATTACHMENTS**

- A September 2020 Landfill Cap Inspection Site Plan
- B April 2021 Cap Inspection Forms
- C April 2021 Landfill Cap Inspection Figures 1 & 2
- D April 2021 Photographs
- E 2013 Interim Action Work Plan – Figure 5
- F January 15, 2021, Storm Event Inspection
- G Landfill Cap Maintenance
  - G1. Blank Sample Maintenance Form B
  - G2. Maintenance Activities Completed September 2020 through April 2021

**Attachment A**  
**September 2020 Landfill Cap Inspection Site Plan**



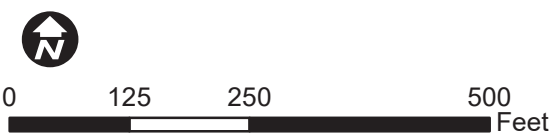
Edge of Refuse (July 2017)  
 Area Covered Under This Cleanup Action Plan (Settlement Area)  
 Landfill Parcel  
 Adjacent Parcel  
 Gas Probe  
 Identified Concern Point (Point #1-32)  
 Identified Concern Line (Point #33-39)\*  
 \*Number corresponds with photo in Attachment C



**Notes:**  
 · Tax parcels provided by King County Geographic Information Systems Center.  
 · Aerial imagery provided by King County, 2019.  
  
**Abbreviation:**  
 OMMP = Operation, Maintenance, and Monitoring Plan

Source: City of Seattle, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**Attachment A**  
**September 21, 2020 Landfill Cap Inspection**  
**Site Plan**  
 South Park Landfill  
 Seattle, WA

6/22/2021 1:11:50 PM C:\PSD\Projects\Clients\1550-CityOfSeattle\1550-067 South Park Landfill\999svcs\GIS\Mapdocs\Attachment B Landfill Cap Inspection - Site Plan Sept 2020.mxd

**Attachment B**  
April 2021 Cap Inspection Forms



## SOUTH PARK LANDFILL CAP INSPECTION FORM A

**Date:** April 22, 2021  
**Inspector(s):** Rhiannon Sayles, Ian Sutton, Lisa Gilbert

**Parcel Owner:**  SPPD  
 SRDS  
 Right-of-Way

**Type of Inspection:**  Annual  
 Non-Routine Reason: \_\_\_\_\_

**Last Rain Event before Inspection:** April 10<sup>th</sup>, 2021, 0.01 inches of rain

### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Locations #21-2, 21-4, and 21-5. Minor asphalt cracking. Most likely due to age of pavement. No concerns at this time. Continue to monitor for further deterioration.
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location #21-6, Visible ponding near vehicle wash area. Low spot in pavement is not centered on the nearest storm drain. Ponding depth is less than a few inches. No concerns at this time.
Separation of pavement from curbs, gutters, or catch basins	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-3, Cracking in concrete slab around catch basin needs to be repaired.
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**VISUAL INSPECTION CHECKLIST (continued)**

<b>Asphalt Concrete</b>				
	Yes	No	Needs Repair	If yes, describe:
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sinkhole	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-7, Sinkhole that has been marked by owner with a cone. Approximately 1 foot diameter hole that is several feet deep. There is concern about the integrity of the adjacent pavement. Sinkhole should be repaired.
Recent Maintenance Activity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Security fence was installed which required puncturing asphaltic landfill cover. The first hole that was drilled for fence post exposed utilities, so a second hole was drilled in the same vicinity.
<p><b>Recommended Maintenance or Repair Type/Location:</b></p> <p>There were six locations identified during the site inspection that either need further monitoring or immediate repair.</p> <p>Location #21-7 is a sinkhole that needs to be repaired/filled. This sudden sinking of pavement into an empty underground space is concerning. If left unmitigated, the sinkhole will continue to allow runoff to seep below the asphaltic cap which could lead to water ponding underneath the cap. Runoff in this area should be reaching the next downstream catch basin instead of entering the sinkhole.</p> <p>Location #21-3 where there is cracking concrete at a catch basin needs to be repaired by the end of the calendar year.</p>				



### VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to SRDS site because there is no low-permeability geomembrane
Exposed geotextile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to SRDS site.
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to SRDS site.
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to SRDS site.
Exposed geomembrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to SRDS site.
<b>Recommended Maintenance or Repair Type/Location:</b>				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Proper flow direction as designed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

Attach necessary documentation such as photographs, sketches, and additional notes.

See figures and inspection photos in the cap inspection report.

## SOUTH PARK LANDFILL CAP INSPECTION FORM A

**Date:** April 22, 2021  
**Inspector(s):** Rhiannon Sayles, Ian Sutton, Lisa Gilbert

**Parcel Owner:**  SPPD  
 SRDS  
 Right-of-Way

**Type of Inspection:**  Annual  
 Non-Routine Reason: \_\_\_\_\_

**Last Rain Event before Inspection:** April 10<sup>th</sup>, 2021, 0.01 inches of rain

### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location #21-11 shows ponding around a fire hydrant. This location needs to be regraded to avoid ponding.
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location #21-16 is a puncture in the asphaltic concrete cap.
<b>Recommended Maintenance or Repair Type/Location:</b> Location #21-16 requires repair within 60 days.				

**VISUAL INSPECTION CHECKLIST (continued)**

<b>Low-Permeability Geomembrane</b>				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-9 is on the north side of the property between the edge of the parking lot and the stormwater swale. There is evidence of erosion by runoff that is attributed to the curb cut reflected in the Location #10 photos. Runoff is eroding the slope and causing rutting. This area needs to be revegetated and protected from further erosion.
Exposed geotextile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-9 is a place of poor vegetative cover due to a curb cut in the asphalt parking lot that directs runoff down the side of the swale in this location. This area needs to be revegetated and protected from further erosion.
Exposed geomembrane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations #21-12, 21-13, 21-14, 21-15, 21-17, and 21-18 need immediate attention. The black geomembrane is exposed in all of these locations. The membrane needs to be covered with 18" of topsoil in accordance with the Interim Action Work Plan (IAWP).
<p><b>Recommended Maintenance or Repair Type/Location:</b> Location #21-9 needs to be covered with topsoil, restabilized, and protected from further erosion. Locations #21-12, 21-13, 21-14, 21-15, 21-17 and 21-18 need to be covered with 18" of topsoil (and stabilized) in accordance with the Interim Action Work Plan (IAWP).</p>				

### VISUAL INSPECTION CHECKLIST (continued)

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	As identified in the January 2021 Rain Event inspection, the swale adjacent to Occidental Avenue South has willow and black cottonwood growing along the edge of the structure. These are native but deep-rooted species and should be removed.
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Proper flow direction as designed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<p><b>Recommended Maintenance or Repair Type/Location:</b></p> <p>The willow and black cottonwood shrubs located within the west swale are deep-rooted plants and should be cut down and maintained. The swale should be evaluated to determine if dredging and removal of herbaceous species would improve water conveyance.</p>				

**Attach necessary documentation such as photographs, sketches, and additional notes.**

See figures and inspection photos in the cap inspection report.

## SOUTH PARK LANDFILL CAP INSPECTION FORM A

**Date:** April 22, 2021  
**Inspector(s):** Rhiannon Sayles, Ian Sutton, Lisa Gilbert

**Parcel Owner:**  SPPD  
 SRDS  
 Right-of-Way

**Type of Inspection:**  Annual  
 Non-Routine Reason: \_\_\_\_\_

**Last Rain Event before Inspection:** April 10<sup>th</sup>, 2021, 0.01 inches of rain

### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Open cracks/ruts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-20 needs repair. There are large open cracks and ruts in the asphalt pavement. As shown in Figure 2, this area contains asphaltic concrete landfill cap and must be maintained in good condition.
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<p><b>Recommended Maintenance or Repair Type/Location:</b> Repair to the asphalt areas identified at location #21-20 is needed by replacing the pavement. There are paint marks at location #21-20 that potentially identify WSDOT plans to repair the pavement, but these marks do not include the entire area that needs replacing as shown in the attached photos.</p>				

### VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Exposed geotextile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Exposed geomembrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
<b>Recommended Maintenance or Repair Type/Location:</b>				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Erosion of soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Exposed geotextile membrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Invasive/deep-rooted plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
Proper flow direction as designed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW.
<b>Recommended Maintenance or Repair Type/Location:</b>				

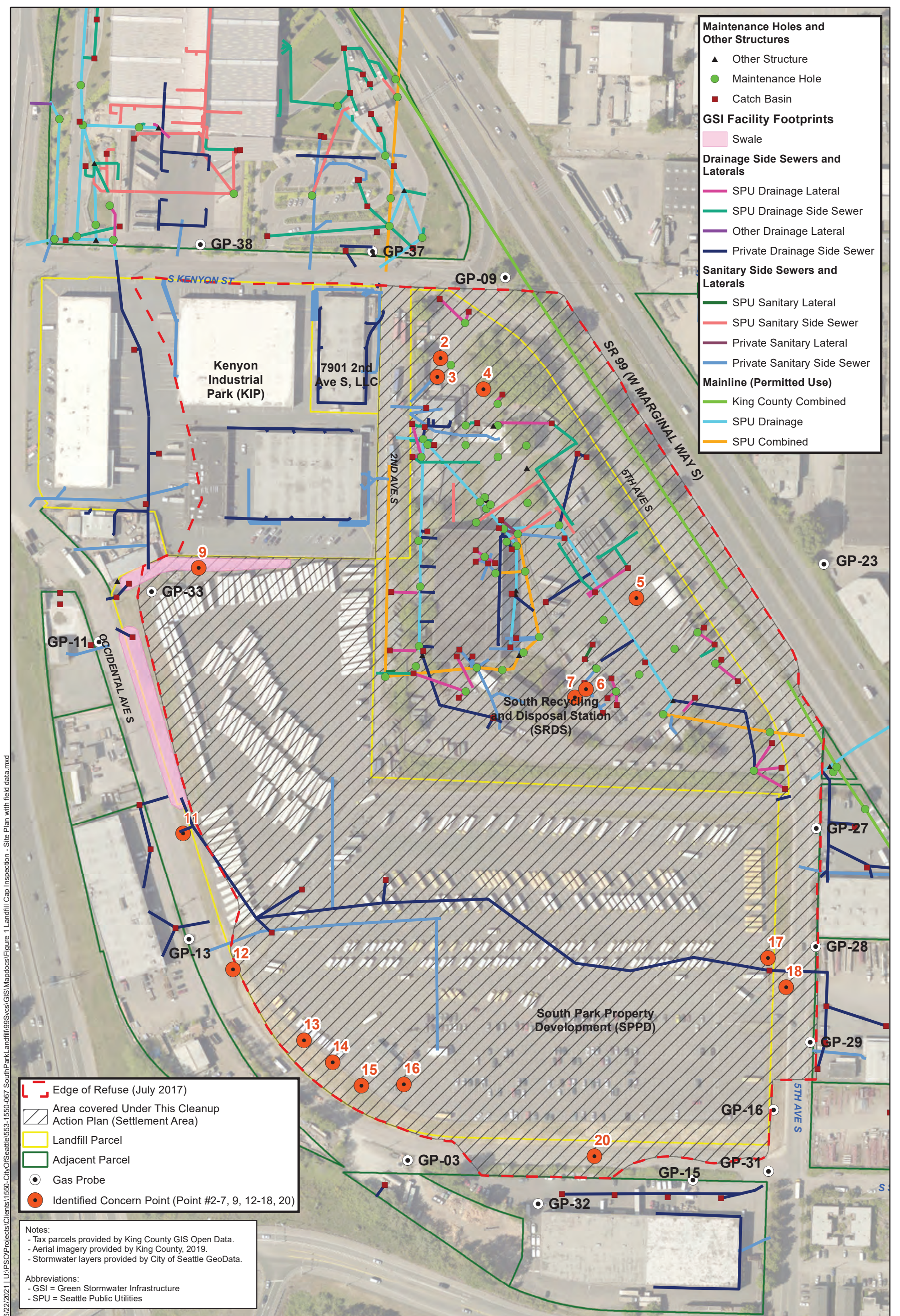
Attach necessary documentation such as photographs, sketches, and additional notes.

See figures and inspection photos in the cap inspection report.

## Attachment C

April 2021 Landfill Cap Inspection Figures 1 & 2

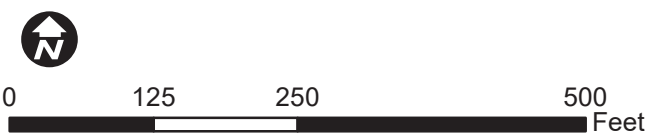




6/22/2021 1:01:50 PM C:\Users\CityGIS\Documents\GIS\Mapbooks\Figure 1 Landfill Cap Inspection - Site Plan with field data.mxd

Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

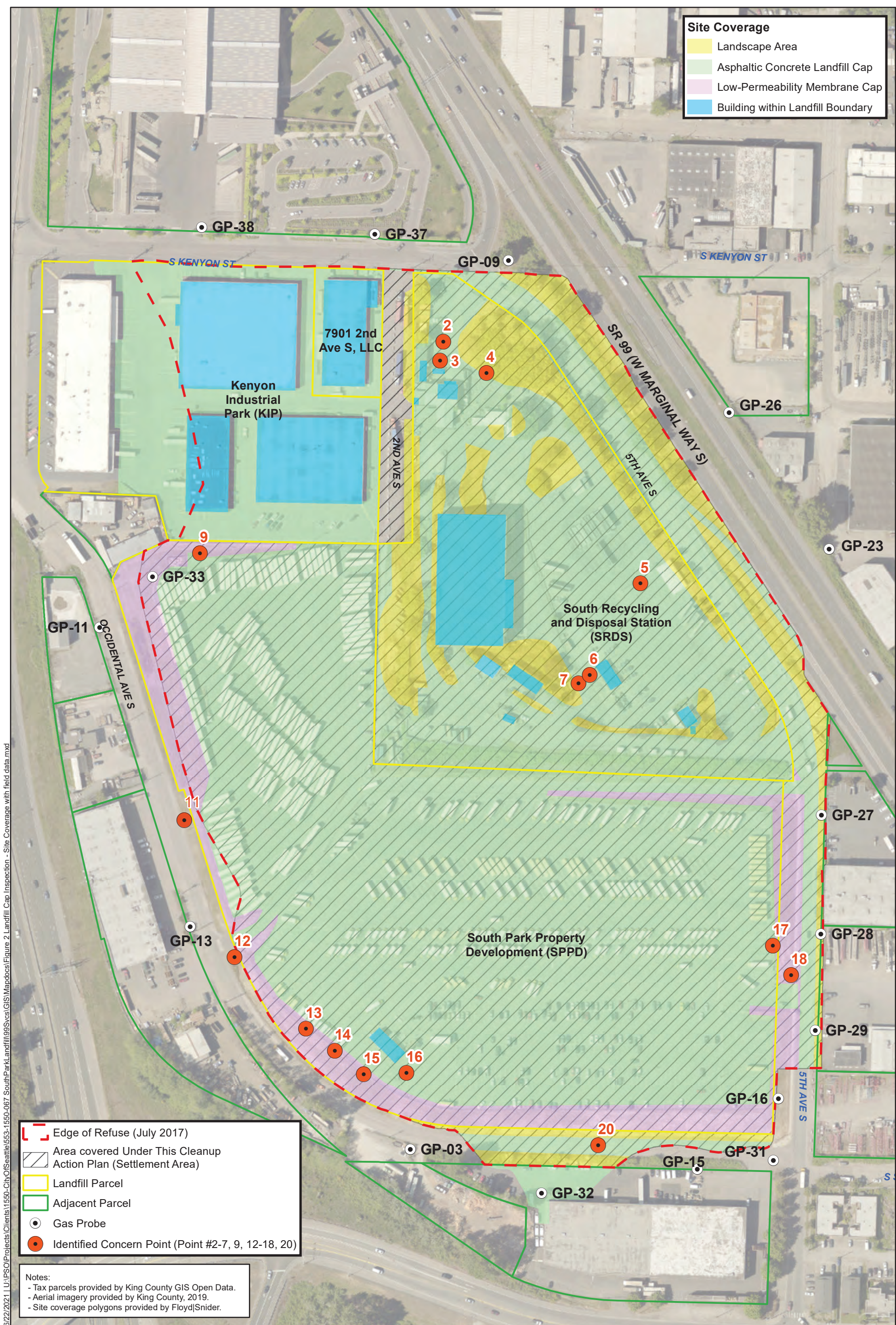
**Parametrix**



**Figure 1**  
**April 22, 2021, Landfill Cap Inspection**  
**Site Plan**  
**South Park Landfill**

Seattle, WA





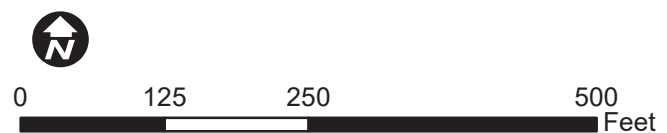
6/22/2021 1:11:50 PM C:\Users\CityOfSeattle\1550-CityOfSeattle\1550-067 SouthParkLandfill\99S\GIS\MapDocs\Figure 2 Landfill Cap Inspection - Site Coverage with field data.mxd

- Edge of Refuse (July 2017)
- Area covered Under This Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- Gas Probe
- Identified Concern Point (Point #2-7, 9, 12-18, 20)

**Notes:**  
 - Tax parcels provided by King County GIS Open Data.  
 - Aerial imagery provided by King County, 2019.  
 - Site coverage polygons provided by Floyd|Snider.

Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**Figure 2**  
**April 22, 2021, Landfill Cap Inspection**  
**Site Coverage**  
 South Park Landfill

Seattle, WA

Attachment D  
April 2021 Photographs



### SRDS Photographs – April 22, 2021



Location 21- 1. Recent Maintenance Activity



Location 21- 2. Minor Cracking



Location 21- 3. Concrete Cracking at Catch Basin



Location 21- 4. Minor Cracking



Location 21- 5. Minor Cracking



Location 21- 6. Ponding



Location 21- 6. Ponding



Location 21- 7. Sinkhole



Location 21- 7. Sinkhole



Location 21- 7. Sinkhole

### SPPD Photographs – April 22, 2021



Location 21- 9. Erosion of Soil Cover



Location 21- 9. Erosion of Soil Cover



Location 21- 9. Erosion of Soil Cover



Location 21- 9. Poor Vegetative Cover



Location 21- 9. Poor Vegetative Cover



Location 21- 9. Poor Vegetative Cover



Location 21- 11. Ponding at Fire Hydrant



Location 21- 12. Exposed Geomembrane



Location 21- 12. Exposed Geomembrane



Location 21- 12. Exposed Geomembrane



Location 21- 12. Exposed Geomembrane



Location 21- 13. Exposed & Damaged Geomembrane



Location 21- 13. Exposed & Damaged Geomembrane



Location 21- 14. Exposed Geomembrane



Location 21- 14. Exposed Geomembrane



Location 21- 15. Exposed Geomembrane





Location 21- 16. Cap Disturbance ( Hole drilled into asphalt to secure tent)

Location 21- 16. Cap Disturbance ( Hole drilled into asphalt to secure tent)



Location 21- 17. Exposed Geomembrane



Location 21- 18. Exposed Geomembrane at storm drain structure



Location 21- 18. Exposed Geomembrane at storm drain structure



Location 21- 18. Exposed & Damaged Geomembrane



Location 21- 18. Exposed & Damaged Geomembrane



Location 21- 18. Exposed & Damaged Geomembrane

## Right-of-Way Photographs – April 22, 2021



Location 21-20. Open Cracks/Ruts



Location 21-20. Open Cracks/Ruts



Location 21-20. Open Cracks/Ruts

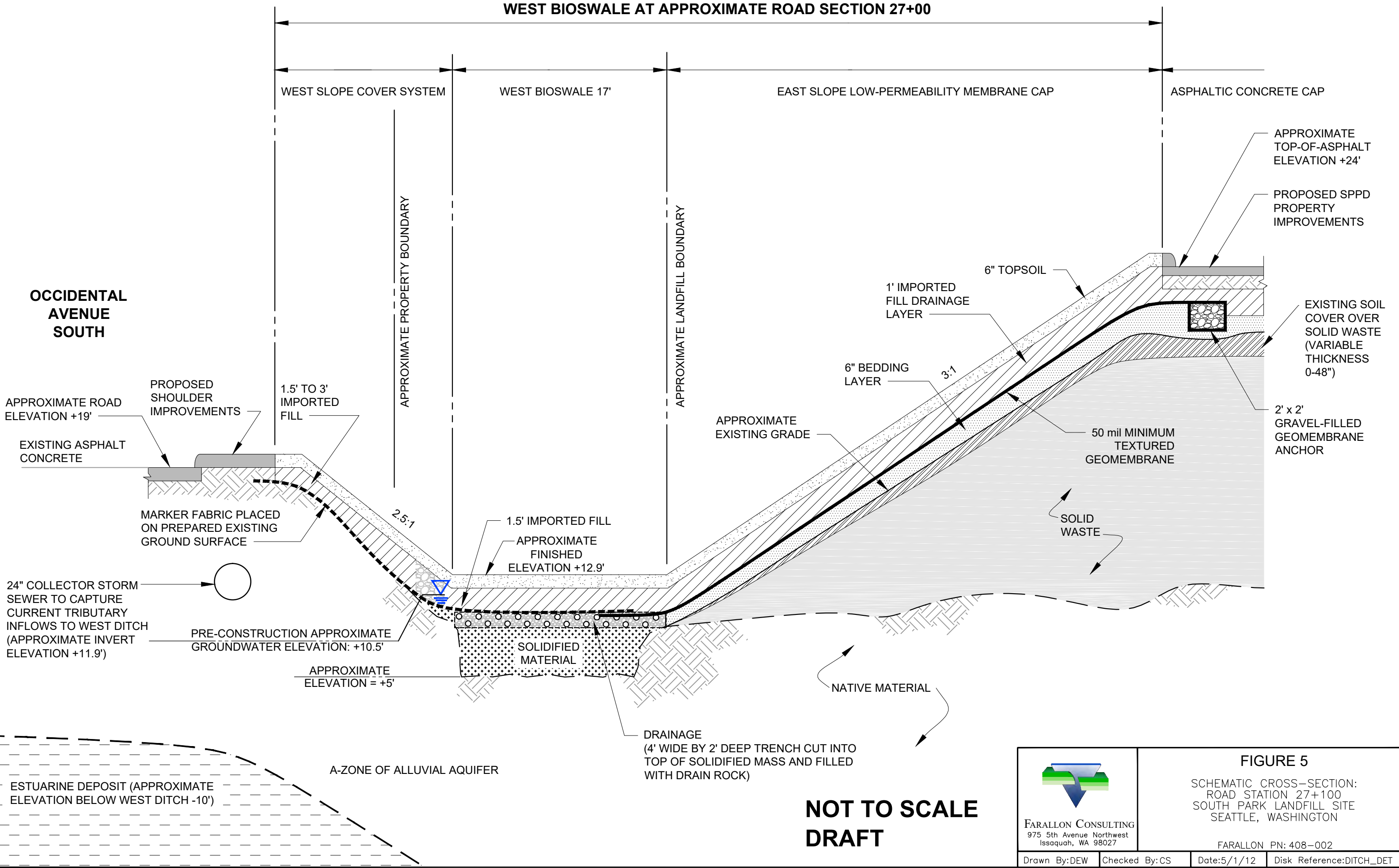


Location 21-20. Open Cracks/Ruts


Attachment E  
2013 Interim Action Work Plan – Figure 5



WEST BIOSWALE AT APPROXIMATE ROAD SECTION 27+00



**NOT TO SCALE  
DRAFT**

 <b>FARALLON CONSULTING</b> 975 5th Avenue Northwest Issaquah, WA 98027	<b>FIGURE 5</b> SCHEMATIC CROSS-SECTION: ROAD STATION 27+100 SOUTH PARK LANDFILL SITE SEATTLE, WASHINGTON		
	FARALLON PN: 408-002		
Drawn By: DEW	Checked By: CS	Date: 5/1/12	Disk Reference: DITCH_DET

P:\Projects\408 South Park Prop Dev\408002 SPPD Property Specific Work\Drawings\_Plots\DITCH-DETAIL.dwg, 5/1/2012 11:08:17 AM

Attachment F  
January 15, 2021, Storm Event Inspection



## SOUTH PARK LANDFILL CAP INSPECTION FORM A

**Date:** January 15, 2021; 15:10 – 16:20      **Location/Parcel:** SRDS  
**Inspector(s):** Trey Parry      **Owner:** \_\_\_\_\_  
**Type of Inspection:**       Annual  
     Non-Routine      **Reason:** January 12, 2021 Storm Event  
**Last Rain Event before Inspection:** 2.33" on January 12, 2021 with wind gusts up to 54 mph

### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See 2020 Annual Report.
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

### VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geomembrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

### VISUAL INSPECTION CHECKLIST (continued)

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Proper flow direction as designed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

Attach necessary documentation such as photographs, sketches, and additional notes.



## SOUTH PARK LANDFILL CAP INSPECTION FORM A

**Date:** January 15, 2021; 15:10 – 16:20      **Location/Parcel:** SPPD  
**Inspector(s):** Trey Parry      **Owner:** \_\_\_\_\_  
**Type of Inspection:**       Annual  
     Non-Routine      **Reason:** January 12, 2021 Storm Event  
**Last Rain Event before Inspection:** 2.33" on January 12, 2021 with wind gusts up to 54 mph

### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See 2020 Annual Report.
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Small ponding areas (generally less than 100 sf with 2 larger areas great than 300 sf). One ponding location is directly above landfill gas collector control box V4.
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

**VISUAL INSPECTION CHECKLIST (continued)**

<b>Low-Permeability Geomembrane</b>				
	<b>Yes</b>	<b>No</b>	<b>Needs Repair</b>	<b>If yes, describe:</b>
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Poor vegetative cover on the slopes outside of the fence on the SPPD property. The recent aeration of the grass has resulted in reduced vegetative cover.
Exposed geomembrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

### VISUAL INSPECTION CHECKLIST (continued)

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	North bioswale has erosion on the side slopes as well as defined channel (approximately 6" wide) running through the bottom. The recent rain did not exacerbate the erosion.
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The swale adjacent to Occidental Avenue South has willow ( <i>Salix</i> sp.) and black cottonwood ( <i>Populus balsamifera</i> ) growing along the edge of structure. These are native but deep-rooted species and should be removed.
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	North bioswale is forming a defined channel and is poorly vegetated.
Proper flow direction as designed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All swales and conveyance structures appear to be flowing as designed. West bioswale has some standing water after end of last storm event and has capacity for more water storage. This swale is densely vegetated and should be dredged in the future to maintain water conveyance.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<p><b>Recommended Maintenance or Repair Type/Location:</b> The willow and black cottonwood shrubs located within the west swale are deep-rooted plants and should be cut down and maintained. This swale should be evaluated to determine if dredging and removal of herbaceous species would improve water conveyance.</p>				

Attach necessary documentation such as photographs, sketches, and additional notes.

**These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - <http://www.ncdc.noaa.gov>.**

**Climatological Report (Daily)**

783  
 CDUS46 KSEW 130928  
 CLISEA

CLIMATE REPORT  
 NATIONAL WEATHER SERVICE SEATTLE  
 128 AM PST WED JAN 13 2021

.....  
 ...THE SEATTLE-TACOMA WA AIRPORT CLIMATE SUMMARY FOR JANUARY 12 2021...

CLIMATE NORMAL PERIOD 1981 TO 2010  
 CLIMATE RECORD PERIOD 1945 TO 2021

WEATHER ITEM	OBSERVED VALUE	TIME (LST)	RECORD VALUE	YEAR	NORMAL VALUE	DEPARTURE FROM NORMAL	LAST YEAR
.....							
TEMPERATURE (F)							
YESTERDAY							
MAXIMUM	57	1156 PM	59	1986	47	10	45
				2019			
MINIMUM	47	115 AM	13	1963	37	10	33
AVERAGE	52				42	10	39
PRECIPITATION (IN)							
YESTERDAY	2.33R		1.58	1975	0.19	2.14	0.18
MONTH TO DATE	7.45				2.27	5.18	3.18
SINCE OCT 1	22.26				17.67	4.59	16.52
SINCE JAN 1	7.45				2.27	5.18	3.18
SNOWFALL (IN)							
YESTERDAY	0.0		1.8	1969			T
MONTH TO DATE	0.0						T
SINCE OCT 1	0.5						T
SINCE JUL 1	0.5						T
SNOW DEPTH	MM						
DEGREE DAYS							
HEATING							
YESTERDAY	13				23	-10	26
MONTH TO DATE	233				284	-51	248
SINCE DEC 1	866				1039	-173	878
SINCE JUL 1	1827				2222	-395	1955
COOLING							
YESTERDAY	0				0	0	0
MONTH TO DATE	0				0	0	0
SINCE DEC 1	0				0	0	0
SINCE JAN 1	0				0	0	0
.....							

WIND (MPH)

RESULTANT WIND SPEED	10	RESULTANT WIND DIRECTION	S (170)
HIGHEST WIND SPEED	36	HIGHEST WIND DIRECTION	SW (230)
HIGHEST GUST SPEED	54	HIGHEST GUST DIRECTION	SW (220)
AVERAGE WIND SPEED	11.5		

SKY COVER

AVERAGE SKY COVER 1.0

WEATHER CONDITIONS

THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.

RAIN  
 LIGHT RAIN  
 FOG

RELATIVE HUMIDITY (PERCENT)

HIGHEST	100	500 AM
LOWEST	87	200 PM
AVERAGE	94	

THE SEATTLE-TACOMA WA AIRPORT CLIMATE NORMALS FOR TODAY

	NORMAL	RECORD	YEAR
MAXIMUM TEMPERATURE (F)	47	58	2018
MINIMUM TEMPERATURE (F)	37	11	1950

SUNRISE AND SUNSET

JANUARY 13 2021.....	SUNRISE	753 AM PST	SUNSET	443 PM PST
JANUARY 14 2021.....	SUNRISE	752 AM PST	SUNSET	445 PM PST

- INDICATES NEGATIVE NUMBERS.
- R INDICATES RECORD WAS SET OR TIED.
- MM INDICATES DATA IS MISSING.
- T INDICATES TRACE AMOUNT.

---

The U.S. Naval Observatory (USNO) data is currently unavailable. The links provided are from other US Government sources. When USNO data is returned to service, the links will be updated.

## SPPD Property – Photos from January 15, 2021 Site Visit



Extensive ponding located near GP-11 and MW-12.  
This area is likely ponds after minor rain, too.  
Photographed facing to the north.



Extensive ponding located near GP-11 and MW-12.  
This area is likely ponds after minor rain, too.  
Photographed facing to the north.



Extensive ponding extending to the north of GP-11  
and MW-12. This area is likely ponds after minor rain,  
too. Photographed facing south.



Extensive ponding extending to the north of GP-11  
and MW-12. This area is likely ponds after minor rain,  
too. Photographed facing south.



Evidence of swales and conveyance structures flowing as designed. This stormwater feature is experiencing minor erosion and downcutting. Photographed to the east of GP-11 and MW-12.



Evidence of swales and conveyance structures flowing as designed. This stormwater feature is experiencing minor erosion and downcutting. Photographed to the east of GP-11 and MW-12.



Revegetation on exposed cap area near the stormwater structure to the east of GP-11 and MW-12.



Sparse vegetation as a result of plug aerator



Evidence of swales and conveyance structures flowing as designed. Dredging and removal of sediment accumulation may be recommended. Photographed to the east of GP-11 and MW-12.



Shallow ponding photographed near 47.5291218, - 122.3298498.



Shallow ponding photographed near at 47.5291218, - 122.3298498.



Shallow ponding photographed near 47.5292943, - 122.3321924.



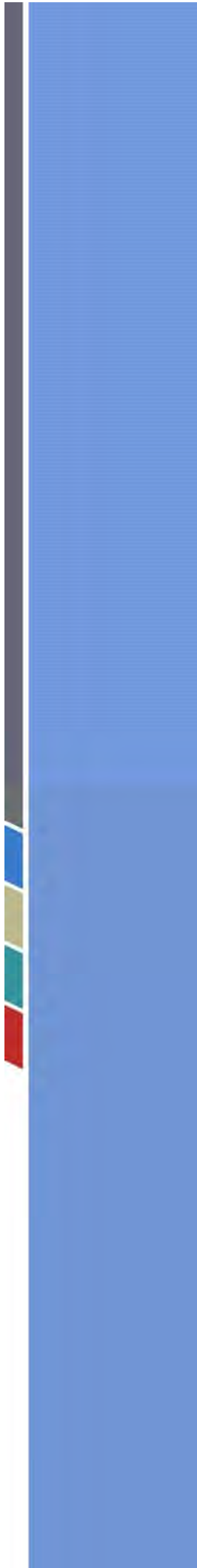


Shallow ponding photographed near 47.5292943, -  
122.3321924.

Attachment G  
Landfill Cap Maintenance



**Attachment G1**  
**Blank Sample Maintenance Form B**



## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

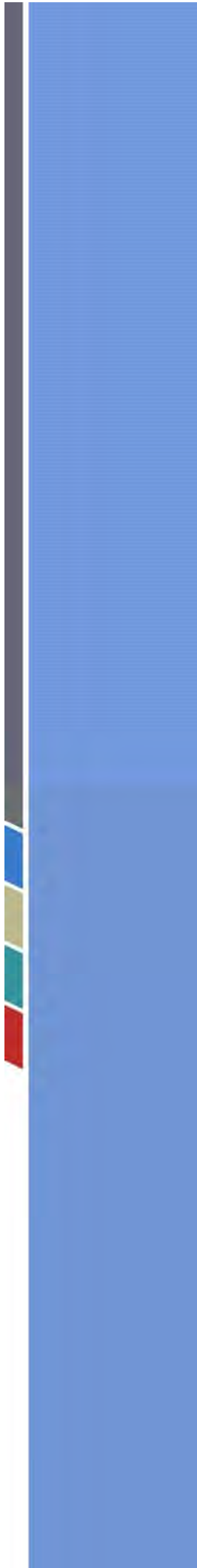
Location/Parcel: \_\_\_\_\_ Owner Contact: \_\_\_\_\_

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b>	<b>Repaired by:</b>
<b>Reason for Maintenance:</b>	
<b>Describe Maintenance Location (attach sketch and photos):</b>	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b>	
<b>Is the maintenance activity complete?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>If no, explain:</b>	
<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <b>Property Owner Signature</b>	<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <b>Date</b>
<small>All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.</small>	

<b>Part 2: Observation/Review of Maintenance</b> (Completed by Site Coordinator)	
<b>Date of Observation/Review:</b>	<b>Inspector(s):</b>
<b>Observation Notes (attach photos):</b>	
_____	_____
Site Coordinator/Inspector Signature	Date

## Attachment G2

Maintenance Activities Completed  
September 2020 through April 2021



## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

**Location/Parcel:** SPPD Parcel      **Owner Contact:** Rob Howie

**Part 1: Maintenance**  
**(Completed by Property Owner)**

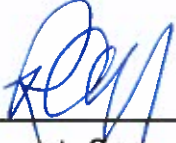
<b>Date of Repair/ Maintenance:</b>	<b>Repaired by:</b>
-------------------------------------	---------------------

**Reason for Maintenance:**  
Water coming up through asphalt.

**Describe Maintenance Location (attach sketch and photos):**  
Bus parking area

**Describe Maintenance or Repair Performed (attach photos and documentation as necessary):**  
A joint in the fire line came apart. The repair was made and the asphalt repaired.

**Is the maintenance activity complete?**       Yes       No  
**If no, explain:**

 _____ Property Owner Signature	<u>3/31/21</u> _____ Date
--	---------------------------------

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

**Part 2: Observation/Review of Maintenance**  
(Completed by Site Coordinator)

**Date of Observation/Review:** November 11, 2020

**Inspector(s):** Austin York, HWA Geosciences

**Observation Notes (attach photos):**

The water line repair was inspected during the 4<sup>th</sup> quarter monitoring event. The patch looked good and asphalt surrounding the patch appeared solid and intact.

**Is the maintenance activity complete?**       Yes       No

**If no, explain:**

*Laura Bayula*

Site Coordinator Signature

March 31, 2021

Date





## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Location/Parcel: SPPD Parcel Owner Contact: Rob Howie

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
Date of Repair/ Maintenance: <u>3/30/21</u>	Repaired by
Reason for Maintenance: Maintaining landscaping around property.	
Describe Maintenance Location (attach sketch and photos): Grass is being maintained around the perimeter of the property.	
	



**Describe Maintenance or Repair Performed (attach photos and documentation as necessary):**

Added topsoil and seed as well as planted plants at basin of swale. In the picture below, plant will begin growing at the base of the ditch.



**Is the maintenance activity complete?**

Yes  No

**If no, explain:**

\_\_\_\_\_  
Property Owner Signature

3/30/21  
\_\_\_\_\_  
Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

**Date of Observation/Review:** 4/22/21

**Inspector(s):** Rhiannon Sayles

**Observation Notes (attach photos):**

During the site visit on April 22, 2021 the forementioned landscaping activities were observed. We can confirm that the grass is being maintained in the areas shown in the photos above and that the owner added topsoil, seeded and planted plants at basin of the north swale.



Site Inspector Signature

4/22/21

Date

**B1-B**

October 2021 Follow Up Event



## SOUTH PARK LANDFILL CAP INSPECTION FORM A

<b>Date:</b> October 29, 2021 <b>Inspector(s):</b> Rhiannon Sayles, Colin Phang	<b>Parcel Owner:</b> <input checked="" type="checkbox"/> SPPD <input type="checkbox"/> SRDS <input type="checkbox"/> Right-of-Way																						
<b>Type of Inspection:</b> <input type="checkbox"/> Annual <input checked="" type="checkbox"/> Non-Routine Reason: Inspection after prolonged period of rain (9 days)																							
<b>Last Rain Event before Inspection:</b> Per NOAA ( <a href="https://www.weather.gov/wrh/climate?wfo=sew">https://www.weather.gov/wrh/climate?wfo=sew</a> ), the observed daily rainfall total for the 9 days leading up to this inspection event are as follows:																							
<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Date</th> <th style="padding: 2px;">10/20</th> <th style="padding: 2px;">10/21</th> <th style="padding: 2px;">10/22</th> <th style="padding: 2px;">10/23</th> <th style="padding: 2px;">10/24</th> <th style="padding: 2px;">10/25</th> <th style="padding: 2px;">10/26</th> <th style="padding: 2px;">10/27</th> <th style="padding: 2px;">10/28</th> <th style="padding: 2px;">10/29</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Rainfall (in)</td> <td style="padding: 2px;">0.29</td> <td style="padding: 2px;">0.54</td> <td style="padding: 2px;">0.06</td> <td style="padding: 2px;">0.15</td> <td style="padding: 2px;">0.32</td> <td style="padding: 2px;">0.16</td> <td style="padding: 2px;">0.38</td> <td style="padding: 2px;">0.12</td> <td style="padding: 2px;">1.99</td> <td style="padding: 2px;">0.57</td> </tr> </tbody> </table>		Date	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28	10/29	Rainfall (in)	0.29	0.54	0.06	0.15	0.32	0.16	0.38	0.12	1.99	0.57
Date	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28	10/29													
Rainfall (in)	0.29	0.54	0.06	0.15	0.32	0.16	0.38	0.12	1.99	0.57													
<b>Purpose</b> The purpose of this rain event inspection was to observe the effects of multiple days of continuous rainfall on the properties. The inspection team looked for damage and issues regarding rainfall runoff only. This inspection event was not for the purpose of assessing other damage or re-inspecting previously discovered maintenance concerns. The SRDS owner requested that the inspection team take a careful look at the fenced area between the two properties along the north boundary. This area is technically SRDS property, but it falls outside of the fence of both properties.																							

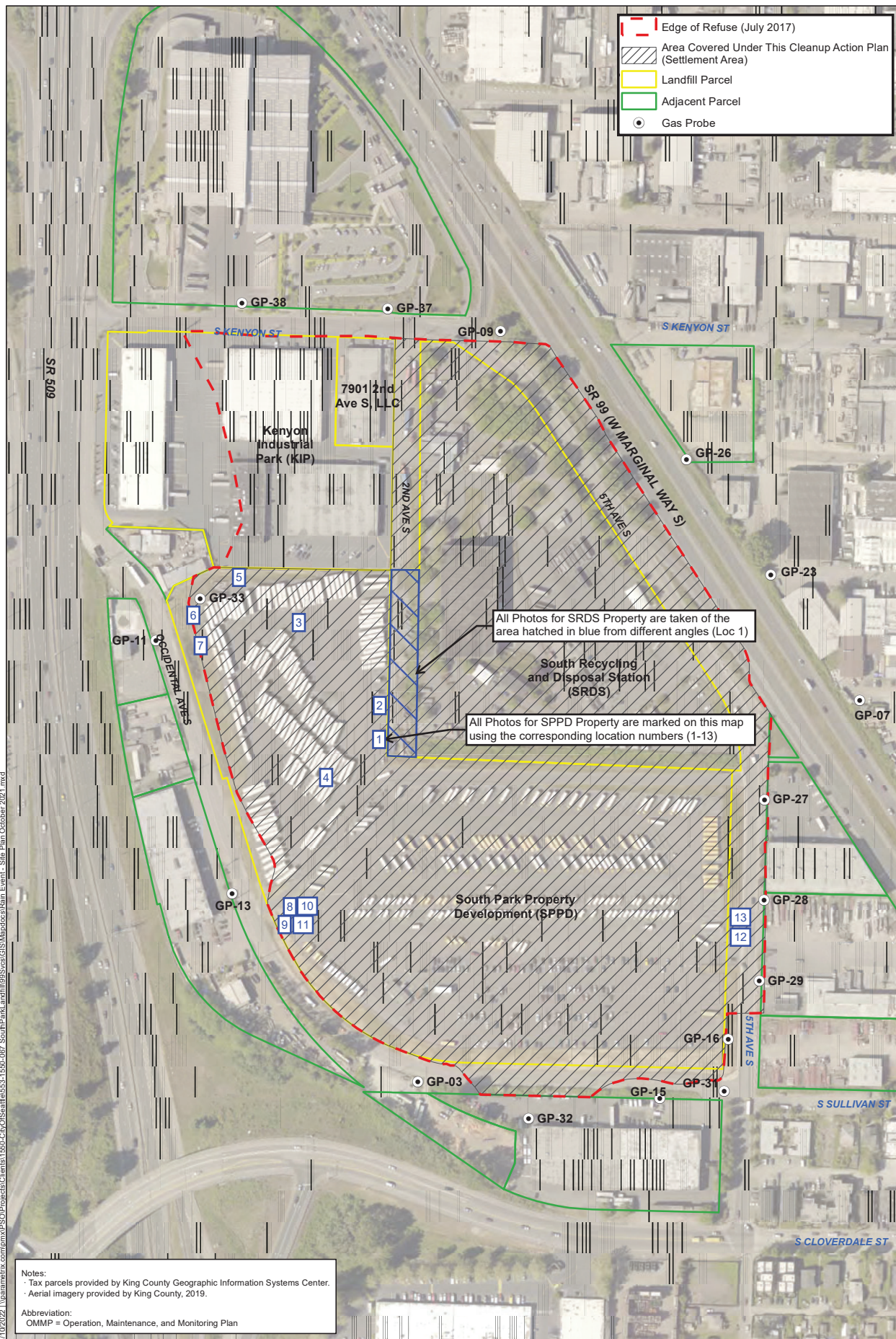
### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Locations 1-4 in photos and on map
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b> There are a few locations on the SPPD property where minor ponding occurs on the asphalt concrete (less than 1"). These ponding locations appear to be minor and a result of accuracy in asphalt paving techniques. They are causing no harm to the pavement and due to their shallow depths are most likely evaporating within 24-48 hours. No immediate maintenance is required.				

### VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 5 in photos and on map
Exposed geomembrane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Locations 6-13 in photos and on map
<b>Recommended Maintenance or Repair Type/Location:</b>				
There are locations of poor vegetative cover and exposed geomembrane however this inspection was not to focus on those items. They are maintenance issues that have already been recognized in the April 2021 annual inspection and they will be reinspected during the 2022 annual inspection.				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Proper flow direction as designed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				
The poor vegetative cover and deep-rooted plants were not a part of this inspection however the inspection team did observe these conditions during their site walk.				



**Legend**

- Edge of Refuse (July 2017)
- Area Covered Under This Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- Gas Probe

All Photos for SRDS Property are taken of the area hatched in blue from different angles (Loc 1)

All Photos for SPPD Property are marked on this map using the corresponding location numbers (1-13)

3/10/2021 \\parametrix.com\mx\PSD\Projects\Clients\150-CKC\Sanfill\653-150-1067\_SouthPark\_Landfill\98\Sites\GIS\Measures\Rain\_Event\_Site\_Plan\_October\_2021.mxd

**Notes:**  
 · Tax parcels provided by King County Geographic Information Systems Center.  
 · Aerial imagery provided by King County, 2019.

**Abbreviation:**  
 OMMP = Operation, Maintenance, and Monitoring Plan

Source: City of Seattle, Floyd/Snyder, Aspect, Herrera, 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**October 29, 2021 Rain Event Inspection  
 Site Plan  
 South Park Landfill  
 Seattle, WA**

SPPD Photographs – October 29, 2021



Location 1-1. Pooling/Ponding on Asphalt Concrete  
View looking East near fenced area with SRDS ahead



Location 2-1. Pooling/Ponding on Asphalt Concrete  
View looking North along fenced area, SRDS to right



Location 3-1. Pooling/Ponding on Asphalt Concrete  
View looking North-West from SPPD north swale



Location 4-1. Pooling/Ponding on Asphalt Concrete  
View looking South-West from SPPD towards bus lot





Location 4-2. Pooling/Ponding on Asphalt Concrete  
View looking South-West from SPPD towards bus lot



Location 5-1. Poor vegetative cover  
View looking North-East in vicinity of North swale



Location 5-2. Poor vegetative cover  
Zoomed in view of North swale



Location 5-3. Poor vegetative cover  
Zoomed in view of North swale



Location 6-1. Exposed Geomembrane



Location 7-1. Exposed Geomembrane



Location 8-1. Exposed Geomembrane



Location 9-1. Exposed Geomembrane



Location 10-1. Exposed Geomembrane



Location 11-1. Exposed Geomembrane



Location 12-1. Exposed Geomembrane



Location 13-1. Exposed Geomembrane

## SOUTH PARK LANDFILL CAP INSPECTION FORM A

<b>Date:</b> October 29, 2021 <b>Inspector(s):</b> Rhiannon Sayles, Colin Phang	<b>Parcel Owner:</b> <input type="checkbox"/> SPPD <input checked="" type="checkbox"/> SRDS <input type="checkbox"/> Right-of-Way																						
<b>Type of Inspection:</b> <input type="checkbox"/> Annual <input checked="" type="checkbox"/> Non-Routine      Reason: Inspection after prolonged period of rain (9 days)																							
<b>Last Rain Event before Inspection:</b> Per NOAA ( <a href="https://www.weather.gov/wrh/climate?wfo=sew">https://www.weather.gov/wrh/climate?wfo=sew</a> ), the observed daily rainfall total for the 9 days leading up to this inspection event are as follows:																							
<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Date</th> <th style="padding: 2px;">10/20</th> <th style="padding: 2px;">10/21</th> <th style="padding: 2px;">10/22</th> <th style="padding: 2px;">10/23</th> <th style="padding: 2px;">10/24</th> <th style="padding: 2px;">10/25</th> <th style="padding: 2px;">10/26</th> <th style="padding: 2px;">10/27</th> <th style="padding: 2px;">10/28</th> <th style="padding: 2px;">10/29</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Rainfall (in)</td> <td style="padding: 2px;">0.29</td> <td style="padding: 2px;">0.54</td> <td style="padding: 2px;">0.06</td> <td style="padding: 2px;">0.15</td> <td style="padding: 2px;">0.32</td> <td style="padding: 2px;">0.16</td> <td style="padding: 2px;">0.38</td> <td style="padding: 2px;">0.12</td> <td style="padding: 2px;">1.99</td> <td style="padding: 2px;">0.57</td> </tr> </tbody> </table>		Date	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28	10/29	Rainfall (in)	0.29	0.54	0.06	0.15	0.32	0.16	0.38	0.12	1.99	0.57
Date	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28	10/29													
Rainfall (in)	0.29	0.54	0.06	0.15	0.32	0.16	0.38	0.12	1.99	0.57													
<b>Purpose</b> The purpose of this rain event inspection was to observe the effects of multiple days of continuous rainfall on the properties. The inspection team looked for damage and issues regarding rainfall runoff only. This inspection event was not for the purpose of assessing other damage or re-inspecting previously discovered maintenance concerns. The SRDS owner requested that the inspection team take a careful look at the fenced area between the two properties along the north boundary. This area is technically SRDS property, but it falls outside of the fence of both properties.																							

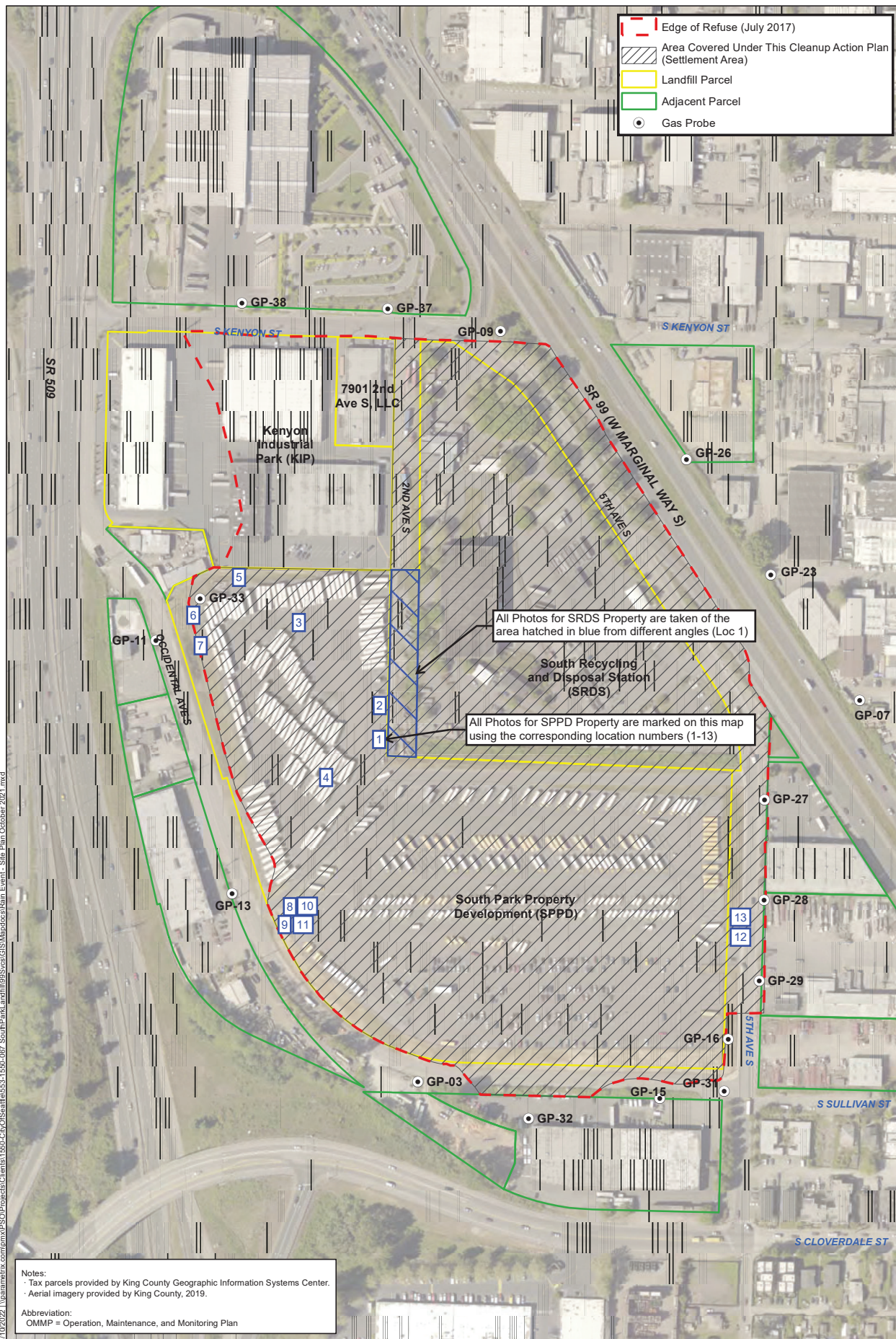
### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b> The area of focus (between the two fenced properties) did not show evidence of runoff leaving the SPPD site and flowing across the SRDS site. At the time of the inspection event, it was not raining. It does appear that there is a pathway for runoff to leave the SRDS parking lot and flow across the SPPD site in this location. However, there is a row of ecology blocks that may be preventing runoff from taking this path of travel. Without sustained rainfall during the inspection, we are unable to tell if runoff sheetflows across the SRDS property that comes directly from the SPPD site. The attached photos are all looking at the same location from different angles.				

**VISUAL INSPECTION CHECKLIST (continued)**

<b>Low-Permeability Geomembrane</b>				
	<b>Yes</b>	<b>No</b>	<b>Needs Repair</b>	<b>If yes, describe:</b>
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geomembrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				

<b>Stormwater Management Facilities</b>				
	<b>Yes</b>	<b>No</b>	<b>Needs Repair</b>	<b>If yes, describe:</b>
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Proper flow direction as designed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Ponding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b>				



- - - Edge of Refuse (July 2017)  
/ / / / Area Covered Under This Cleanup Action Plan (Settlement Area)  
  Landfill Parcel  
  Adjacent Parcel  
● Gas Probe

All Photos for SRDS Property are taken of the area hatched in blue from different angles (Loc 1)

All Photos for SPPD Property are marked on this map using the corresponding location numbers (1-13)

3/10/2021 \\parametrix.com\mx\PSD\Projects\Clients\150-CKC\Sanfil\653-150-1067\_SouthPark\_Landfill\98\Sites\GIS\Measures\Rain\_Event\_Site\_Plan\_October\_2021.mxd

**Notes:**  
 · Tax parcels provided by King County Geographic Information Systems Center.  
 · Aerial imagery provided by King County, 2019.  
  
**Abbreviation:**  
 OMMP = Operation, Maintenance, and Monitoring Plan

Source: City of Seattle, Floyd/Snyder, Aspect, Herrera, 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



0 125 250 500 Feet

**October 29, 2021 Rain Event Inspection Site Plan**  
 South Park Landfill

Seattle, WA

SRDS Photographs – October 29, 2021



Location 1-1. Fenced area between two parcels  
View looking North – SPPD on left, SRDS on right



Location 1-2. Fenced area between two parcels  
Ecology block wall on SPPD side



Location 1-3. Fenced area between two parcels  
View looking East from SPPD towards SRDS



Location 1-4. Fenced area between two parcels  
View looking South from SPPD – SRDS on left



Location 1-5. Fenced area between two parcels  
View looking North from SPPD – SRDS on right



Location 1-6. Fenced area between two parcels  
View looking North-East from SPPD – SRDS ahead



Location 1-7. Fenced area between two parcels  
View looking East from SPPD – SRDS straight ahead



Location 1-8. Fenced area between two parcels  
View looking South from SPPD – SRDS on left



B1-C

November 2021 Reinspection



## SOUTH PARK LANDFILL CAP INSPECTION FORM A

<b>Date:</b> November 17, 2021 <b>Inspector(s):</b> Trey Parry	<b>Parcel Owner:</b> <input checked="" type="checkbox"/> SPPD <input type="checkbox"/> SRDS <input type="checkbox"/> Right-of-Way																
<b>Type of Inspection:</b> <input type="checkbox"/> Annual <input checked="" type="checkbox"/> Non-Routine Reason: Reinspect Location 9 and 18 from the 2021 annual inspection																	
<b>Last Rain Event before Inspection:</b> Daily precipitation observations from Seattle-Tacoma International Airport Station:																	
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black;"></td> <td style="border-bottom: 1px solid black; text-align: center;">11/11/21</td> <td style="border-bottom: 1px solid black; text-align: center;">11/12/21</td> <td style="border-bottom: 1px solid black; text-align: center;">11/13/21</td> <td style="border-bottom: 1px solid black; text-align: center;">11/14/21</td> <td style="border-bottom: 1px solid black; text-align: center;">11/15/21</td> <td style="border-bottom: 1px solid black; text-align: center;">11/16/21</td> <td style="border-bottom: 1px solid black; text-align: center;">11/17/21</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Precipitation (in)</td> <td style="border-bottom: 1px solid black; text-align: center;">0.13</td> <td style="border-bottom: 1px solid black; text-align: center;">1.50</td> <td style="border-bottom: 1px solid black; text-align: center;">0.37</td> <td style="border-bottom: 1px solid black; text-align: center;">1.26</td> <td style="border-bottom: 1px solid black; text-align: center;">0.58</td> <td style="border-bottom: 1px solid black; text-align: center;">0.20</td> <td style="border-bottom: 1px solid black; text-align: center;">0.00</td> </tr> </table>			11/11/21	11/12/21	11/13/21	11/14/21	11/15/21	11/16/21	11/17/21	Precipitation (in)	0.13	1.50	0.37	1.26	0.58	0.20	0.00
	11/11/21	11/12/21	11/13/21	11/14/21	11/15/21	11/16/21	11/17/21										
Precipitation (in)	0.13	1.50	0.37	1.26	0.58	0.20	0.00										

### VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Open cracks/ruts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Recommended Maintenance or Repair Type/Location:</b> Not included in this reinspection				

### VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-9 is on the north side of the property between the edge of the parking lot and the stormwater swale. There is evidence of erosion of cover soil on the slopes.
Exposed geotextile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	At Location #21-9 there is evidence of poor vegetative cover on the slopes.
Exposed geomembrane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location #21-18: There is no standing water in the SE corner. There are no changes in conditions in this area from previous observations. The scrap wood is still covering the geomembrane cover and there is evidence (detached and shredded/cut membrane) nearby.
<p><b>Recommended Maintenance or Repair Type/Location:</b></p> <p>Location #21-9: Work with Parametrix to prepare a plan to reestablish a uniform slope and vegetate. The team shall investigate source of erosion, identify possible solutions and take corrective action. Additionally, this area shall be inspected after heavy persistent rain.</p> <p>Location #21-18: Work with Parametrix to prepare a plan to reestablish cover over the geomembrane. The geomembrane should be exposed and inspected. Based on the visible geomembrane at the manhole, the original cap installation did not adequately depress the geomembrane, nor provide adequate cover. Other visibly damaged geomembrane appears to be the result of the shallow cover and landscaping activities.</p>				

**VISUAL INSPECTION CHECKLIST (continued)**

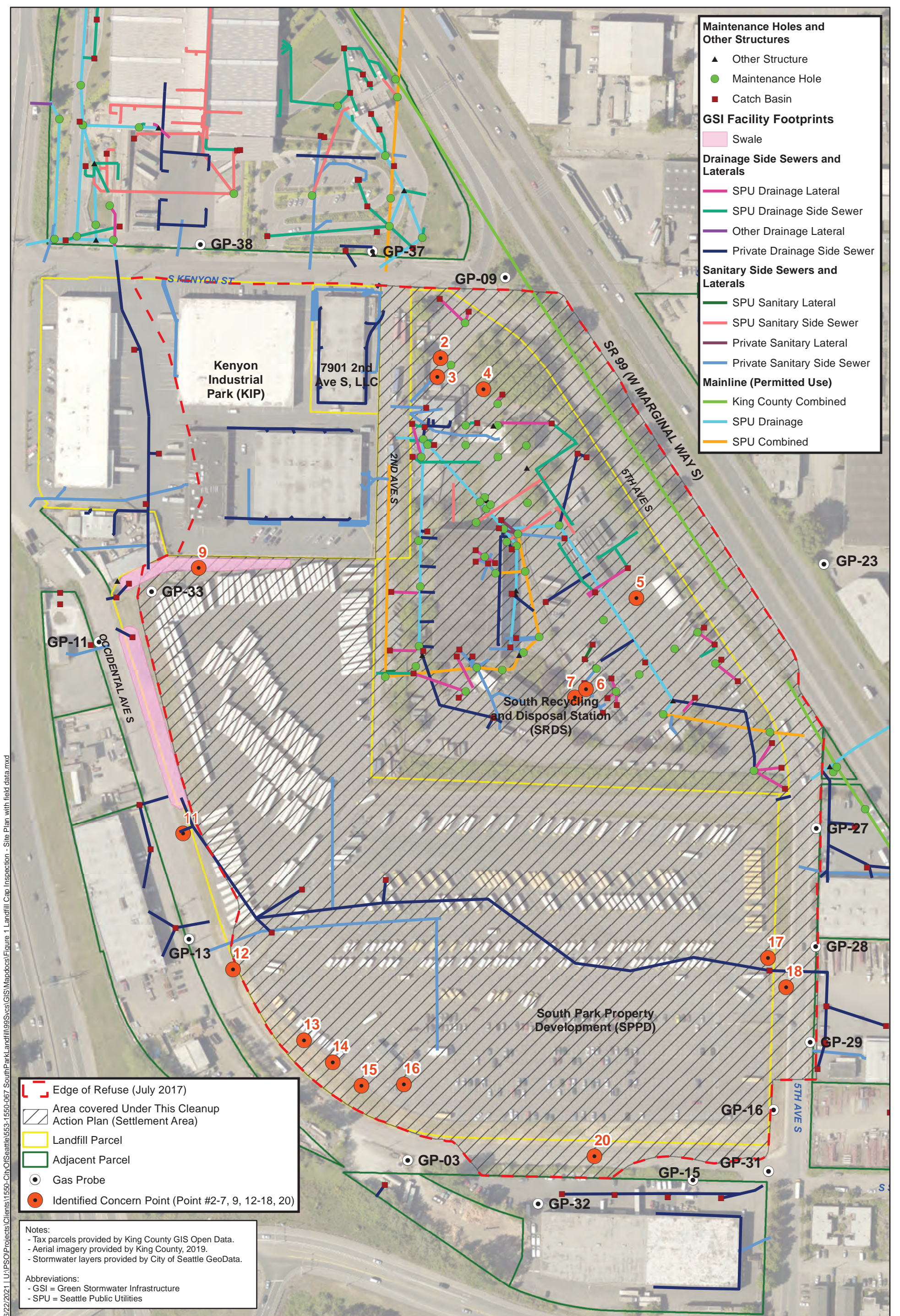
<b>Stormwater Management Facilities</b>				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location #21-9 is on the north side of the property between the edge of the parking lot and the stormwater swale. There was no evidence of erosion or scour above the water line in this area, although there are sparsely vegetated areas where tufts of grass appear to have been dragged downslope (see comment under Low Permeability Membrane section).
Exposed geotextile membrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Proper flow direction as designed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	At Location #21-9 there was ponded water within the constructed swale in the northwest corner. The water was slowly flowing from in the east to west.
<b>Recommended Maintenance or Repair Type/Location:</b>				
See recommendations in previous section.				



Location #21-9.



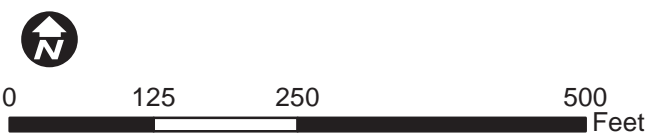
Location #21-18.



6/22/2021 1:01:50 PM C:\PSD\Projects\Clients\1550-CityOfSeattle\1550-067 SouthPark\landfill\99S\GIS\MapDocs\Figure 1 Landfill Cap Inspection - Site Plan with field data.mxd

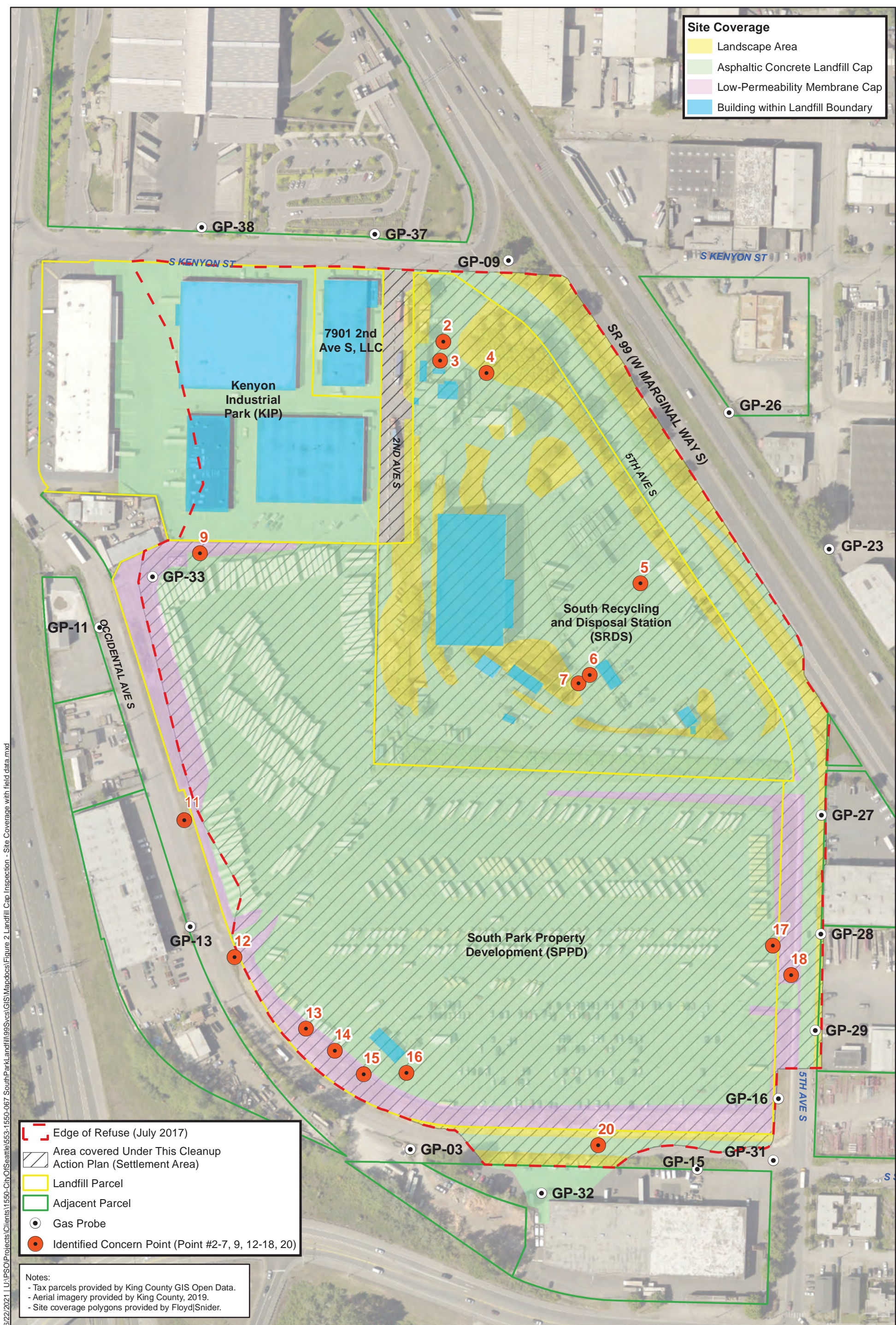
Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**Figure 1**  
**April 22, 2021, Landfill Cap Inspection**  
**Site Plan**  
**South Park Landfill**

Seattle, WA



**Site Coverage**

- Landscape Area
- Asphaltic Concrete Landfill Cap
- Low-Permeability Membrane Cap
- Building within Landfill Boundary

**Legend**

- Edge of Refuse (July 2017)
- Area covered Under This Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- Gas Probe
- Identified Concern Point (Point #2-7, 9, 12-18, 20)

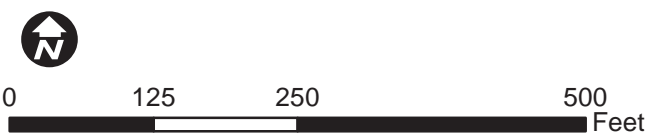
**Notes:**

- Tax parcels provided by King County GIS Open Data.
- Aerial imagery provided by King County, 2019.
- Site coverage polygons provided by Floyd|Snider.

6/22/2021 1:11:50 PM C:\PSDP\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99S\GIS\MapDocs\Figure 2 Landfill Cap Inspection - Site Coverage with field data.mxd

Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**Figure 2**  
**April 22, 2021, Landfill Cap Inspection**  
**Site Coverage**  
**South Park Landfill**

Seattle, WA

B2

Cap Maintenance Documentation



B2-A

Example Form





## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner:       SPPD  
                               SRDS

Owner Contact: \_\_\_\_\_

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b>	<b>Repaired by:</b>
<b>Reason for Maintenance:</b>	
<b>Describe Maintenance Location (attach sketch and photos):</b>	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b>	
<b>Is the maintenance activity complete?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No  <b>If no, explain:</b>	
<div style="display: flex; justify-content: space-between; border-top: 1px solid black; margin-top: 10px;"> <span style="width: 45%; border-bottom: 1px solid black;"></span> <span style="width: 45%; border-bottom: 1px solid black;"></span> </div>	
Property Owner Signature <span style="float: right;">Date</span>	
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	

**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

**Date of Observation/Review:**

**Inspector(s):**

**Observation Notes (attach photos):**

\_\_\_\_\_  
Site Coordinator/Inspector Signature

\_\_\_\_\_  
Date

**B2-B**

Completed Forms



## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Location/Parcel: SPPD Parcel Owner Contact: Rob Howie

### Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 3/30/21 Repaired by \_\_\_\_\_

Reason for Maintenance:  
Maintaining landscaping around property.

Describe Maintenance Location (attach sketch and photos):  
Grass is being maintained around the perimeter of the property.



**Describe Maintenance or Repair Performed (attach photos and documentation as necessary):**

Added topsoil and seed as well as planted plants at basin of swale. In the picture below, plant will begin growing at the base of the ditch.



**Is the maintenance activity complete?**

Yes  No

**If no, explain:**

\_\_\_\_\_  
Property Owner Signature

3/30/21  
\_\_\_\_\_  
Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

**Date of Observation/Review:** 4/22/21

**Inspector(s):** Rhiannon Sayles

**Observation Notes (attach photos):**

During the site visit on April 22, 2021, the forementioned landscaping activities were observed. We confirmed that the grass was maintained in the areas shown in the photos from the site owner (see photos in Part 1) and that topsoil and seed were added and plants were planted plants at basin of the north swale.




4/22/21

Site Inspector Signature

Date


## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

**Location/Parcel:** 8249 5<sup>th</sup> Ave. S.      **Owner Contact:** Rob Howie – (425) 652-2550

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b> 11/2/21	<b>Repaired by:</b>
<b>Reason for Maintenance:</b> Covert inlet showed erosion. Repairs needed.	
<b>Describe Maintenance Location (attach sketch and photos):</b> West side of property, along 4 <sup>th</sup> Ave. S.	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b> The culvert was repaired using 2" x 4" rock spread over existing rock around area. No geomembrane was exposed at the time of the repaired area.	
<b>Is the maintenance activity complete?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <b>If no, explain:</b>	
 _____ Property Owner Signature	11/2/21 _____ Date
<small>All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.</small>	

## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

**Location/Parcel:** 8249 5<sup>th</sup> Ave. S.      **Owner Contact:** Rob Howie – (425) 652-2550

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b> 11/2/21	<b>Repaired by:</b>
<b>Reason for Maintenance:</b> Grass areas along fence line on south side of bus parking showed erosion.	
<b>Describe Maintenance Location (attach sketch and photos):</b> Top of the hill of landscape area along fence line, west side of bus parking.	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b> Topsoil, 60/40 mix, was placed using wheelbarrow and rakes. Over the eroded areas, the soil was seeded with sunshade grass seed, and jute netting was placed over seeded areas.	
<b>Is the maintenance activity complete?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>If no, explain:</b>	
 _____ Property Owner Signature	_____ 11/2/21 Date
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	



**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

<b>Date of Observation/Review:</b>	11/02/21	<b>Inspector(s):</b>	Trey Parry
------------------------------------	----------	----------------------	------------

**Observation Notes (attach photos):**

A crew of 2 landscapers were on site to address the exposed geomembrane near the southwest entrance of the SPPD Parcel off Occidental Avenue South. The crew reestablished cover over exposed patches of geomembrane and completed approximately 300 linear feet of the perimeter from 47.5283933, -122.33262199 to 47.5279849, -122.3319600. The work was focused on the exposed geomembrane at the culvert headwall and the exposed geomembrane at the interface with the pavement cap.

The culvert headwall was repaired using angular rock. There was no geomembrane exposed following the corrective action (Photographs 1, 2, and 6). However, no cushion material was installed to protect the underlying geomembrane as recommended in the 2021 Baseline Landfill Cap Inspection technical memorandum.

All other exposed geomembrane areas within the work area were covered with 2-to-3-inches of unconsolidated topsoil consisting of a 60/40 mix (Photographs 3, 4, and 5). A total of 2 cubic yards was deposited during the workday and was transported throughout the site using low impact methods (wheelbarrow). The topsoil was then heavily seeded using Top Choice Sun & Sade premium grass seed (Lot No. M6-21-HTCSS-10; Photograph 3). Erosion control measures, which included Jute netting and secured with 6-inch staples, were installed on the steep slopes but not at the top of the hill adjacent to the paved cap (Photograph 6).

Work receipts detailing materials were documented and are available upon request.

There is additional work required to complete the recommended actions in the 2021 Baseline Landfill Cap Inspection technical memorandum. The work area should be revisited until design specifications are achieved. This approach should be applied to the southeast and to the northeast (47.528481, -122.332362) of their work area to cover other exposed geomembrane areas.



Photograph 1.



Photograph 2.



Photograph 3.



Photograph 4.



Photograph 5.



Photograph 6.

Trey Parry


Site Coordinator/Inspector Signature

11/02/2021

Date

## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

**Location/Parcel:** SPPD                      **Owner Contact:** Rob Howie 421-837-9720

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b> 11-15-21	<b>Repaired by:</b> First student
<b>Reason for Maintenance:</b> Installed electric fence for safety concerns	
<b>Describe Maintenance Location (attach sketch and photos):</b> The electric fence surrounds the bus lot completely	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b> 4inch post are installed on all corners and mid ways along the fence line, and 1 inch post are installed in-between the 4inch posts along the fence. All post are concreted in the ground. ( see pics )	
<b>Is the maintenance activity complete?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>If no, explain:</b>	
 _____ Property Owner Signature	2-20-22 _____ Date
<small>All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.</small>	





**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

**Date of Observation/Review:**

**Inspector(s):**

**Observation Notes (attach photos):**

Site Coordinator was not informed of this maintenance until February 23, 2022 by Ecology. Observation will happen during the 2022 annual cap inspection.

\_\_\_\_\_  
Site Coordinator/Inspector Signature

\_\_\_\_\_  
Date

## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Location/Parcel: \_\_\_\_\_ Owner Contact: Rob Howie 425-837-9720

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance: 1-26-22</b>	<b>Repaired by:</b> Eagle Asphalt
<b>Reason for Maintenance:</b> Well head V-7 low area water collects around and in the well	
<b>Describe Maintenance Location (attach sketch and photos):</b> Well head V-7 is at the NW or the property	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b> Raised well lid and ring approx. 2 inches and placed new asphalt around it. No longer water gets in the well.	
<b>Is the maintenance activity complete?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <b>If no, explain:</b>	



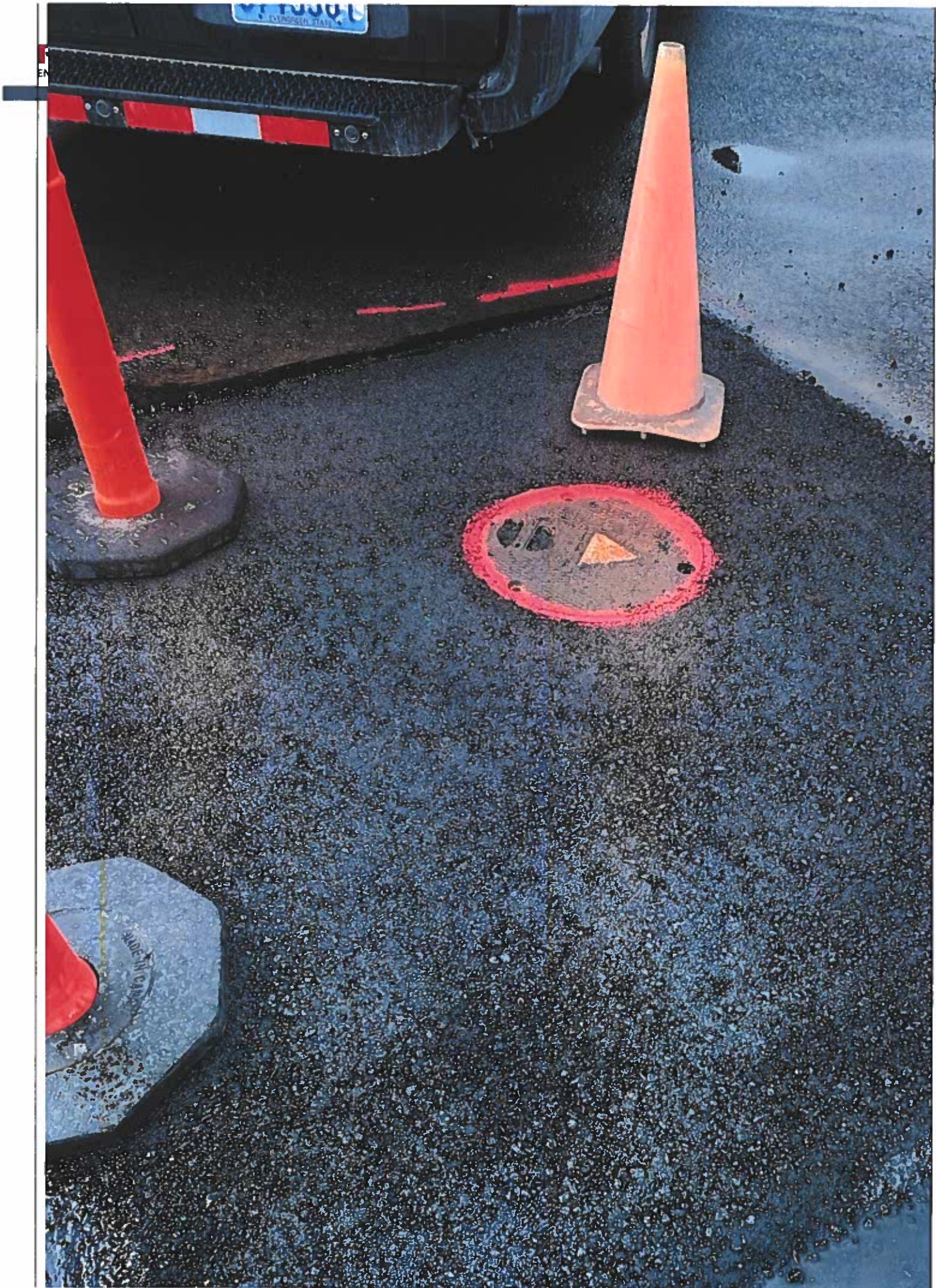
2-15-22

Property Owner Signature

Date


All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.





## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Location/Parcel: \_\_\_\_\_ Owner Contact: Rob Howie 425-837-9720

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b> 1/26/22	<b>Repaired by:</b> Eagle Asphalt
<b>Reason for Maintenance:</b> Well head H-5 was taking in water on the driveway slope	
<b>Describe Maintenance Location (attach sketch and photos):</b> Well head H-5 East Main gate entrance	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b> The well box H-5 was raised approx. 2 inches above actual asphalt grade and new asphalt was laid around it to prevent water getting inside.	
<b>Is the maintenance activity complete?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>If no, explain:</b>	
 _____ Property Owner Signature	2-15-22 _____ Date
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	



**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

**Date of Observation/Review:** February 9, 2022

**Inspector(s):** Laura Lee, Mike Brady, Erika Beyer

**Observation Notes (attach photos):**

Three areas were observed on SPPD property that appeared to have recent repairs to the asphalt landfill cap.

1. A crack in a water access pipe was observed in the fire suppression area that was allowing for a low flow but steady stream of water to be released on SPDD property on the landfill cap (Photograph 1). A bollard had been removed and replaced. There was a fresh asphalt edging around the original patch around the bollard (Photograph2). The area of the leaking pipe also had fresh asphalt edging patch around the original patch.
2. A gas extraction well in the NW area of the property appeared to have recent repairs or maintenance to the landfill cap. Safety cones and fresh asphalt were observed at this location (Photograph 4).
3. A gas extraction well in the driveway on the eastern border of the property appeared to have recent repairs or maintenance to the landfill cap. Safety cones and fresh asphalt were observed at this location (Photograph 5).



Photograph 1



Photograph 2



Photograph 3



Photograph 4

*Laura Boyce Lee*

Site Coordinator/Inspector Signature

February 9, 2022

Date

## SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner:     SPPD  
                           SRDS

Owner Contact:    Jeff Neuner 206 369 1153

<b>Part 1: Maintenance</b> (Completed by Property Owner)	
<b>Date of Repair/ Maintenance:</b>	<b>Repaired by:</b>
<b>Reason for Maintenance:</b> Small sinkhole in paving	
<b>Describe Maintenance Location (attach sketch and photos):</b> Directly west of the truck washing area at SRDS as shown in the 2021 cover inspection.	
<b>Describe Maintenance or Repair Performed (attach photos and documentation as necessary):</b> We filled the hole with gravel to eliminate potential contact with refuse and it was also a fall hazard. Since this is not in a drive lane this repair will be adequate until 2024 when the site is redeveloped.	
<b>Is the maintenance activity complete?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>If no, explain:</b>	
<u>Jeff Neuner, SPU</u> Property Owner Signature	<u>3/18/21</u> Date
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	

**Part 2: Observation/Review of Maintenance**  
**(Completed by Site Coordinator)**

**Date of Observation/Review:** February 9, 2022

**Inspector(s):** Laura Lee

**Observation Notes (attach photos):**

Location of sinkhole was observed. The sink was filled with gravel. We recommend ongoing observations during annual cap inspections until the site is redeveloped in 2024 to verify if the fill remains adequate.



*Laura Boyce Lee*

Site Coordinator/Inspector Signature

March 18, 2022

Date

# Appendix C

## Landfill Gas Monitoring





C1

Perimeter Probe Monitoring Field Forms



# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553-1550-067

Date: 2/22/2021

Field Personnel: J. Pham + C. Bourgeois

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min (min)	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	1.57	-	0.0	11:12	0.0	1.5	19.6	0
GP-09	.063	6.62 to 10.62	899	1.63	10.71	0.0	12:12	0.0	6.4	13.4	0
GP-26	.063	4.62 to 9.62	868	1.57	<del>6.88</del>	0.0	12:00	0.0	1.4	20.1	0
GP-23	.167	6.05 to 7.05	4,940	8.98	6.34	0.0	11:48	0.0	0.2	21.4	0
GP-07	.063	5.75 to 6.25	519	0.94	Bottom	0.0	11:30	0.0	1.0	19.5	0
GP-27	.063	8.57 to 13.57	1,216	2.21	11.40	0.0	10:22	0.0	9.2	0.2	3
GP-28	.063	6.59 to 11.59	1,042	1.89	9.10	0.0	10:10	0.0	1.1	19.6	0
GP-29	.063	4.62 to 9.62	868	1.57	7.01	0.0	9:34	2.0	7.3	6.1	0
GP-16	.167	6.60 to 9	5,867	10.67	4.22	0.0	9:55	0.0	0.3	21.3	0
GP-31	.063	4.64 to 9.64	868	1.57	4.18	-	9:06	-	-	-	-
GP-15	.167	6.62 to 8.62	5,558	10.11	4.23	0	9:15	-	-	-	-
GP-32	.063	4.72 to 9.72	868	1.57	1.43	-	8:58	-	-	-	-
GP-03	.063	6.73 to 8.63	725	1.32	8.74	0.0	8:45	0.0	4.8	12.4	0
GP-13	.167	4.91 to 5.41	4,014	7.29	2.42	-	8:39	-	-	-	-
GP-11	.167	6.23 to 6.73	4,632	8.42	4.88	-	8:28	-	-	-	-
GP-38	.063	3.8 to 8.8	882	1.6	6.76	0.0	11:20	0.0	10.6	5.6	0
GP-33	.063	8.2 to 13.2	1,165	2.12	12.38	0.0	12:28	0.0	4.2	6.2	0

Comments: \_\_\_\_\_

Barometer ("Hg) (Start): 30.15

Barometer ("Hg) (Finish): 30.10

Temperature: \_\_\_\_\_

Weather: Overcast w/ light rain.

Equipment Used: GEM 500

Notes: Boots in GP-09 Page 1 of 1

from DOBA, Methane, or ALKs

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix 5/17/21

Project Number: 553-1550-067

Date: 5/17/21

Field Personnel: C. Bourgeois A. Thom

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min (min)	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	1.57 <sup>2.68</sup>	DRY	-0.01	1311	0	9.9	6.7	0
GP-09	.063	6.62 to 10.62	899	1.63	11.12	+0.02	1331	0	6.3	14.0	0
GP-26	.063	4.62 to 9.62	868	1.57 <sup>2.57</sup>	<del>11.95</del>	+0.02	1416	0	2.2	18.2	0
GP-23	.167	6.05 to 7.05	4,940	8.98 <sup>2.5</sup>	DRY	-0.02	1353	0.1	6.7	13.5	0
GP-07	.063	5.75 to 6.25	519	0.94 <sup>6.15</sup>	DRY	+0.02	1437	0	11.9	18.3	0
GP-27	.063	8.57 to 13.57	1,216	2.21	12.14	-0.02	1242	0.6	9.2	4444	6
GP-28	.063	6.59 to 11.59	1,042	1.89	10.53	-0.01	1145	0	3.6	10.6	0
GP-29	.063	4.62 to 9.62	868	1.57	8.54	-0.02	1130	1.6	14.1	4444	17
GP-16	.167	6.60 to 9	5,867	10.67 <sup>4.47</sup>	DRY	-0.08	1059	0	0.5	20.8	0
GP-31	.063	4.64 to 9.64	868	1.57	5.06	+0.02	1648	0	7.1	11.4	0
GP-15	.167	6.62 to 8.62	5,558	10.11	2.20	+0.22	1021	0	5.5	7.7	0
GP-32	.063	4.72 to 9.72	868	1.57	2.34	-1.26	0952				
GP-03	.063	6.73 to 8.63	725	1.32 <sup>9.1</sup>	DRY	-0.01	0989	0.0	6.9	11.8	0.0
GP-13	.167	4.91 to 5.41	4,014	7.29	2.90	-3.86					
GP-11	.167	6.23 to 6.73	4,632	8.42	4.80	-0.23	8:17	0	1.3	20.5	0
GP-38	.063	3.8 to 8.8	882	1.6	8.59	-0.01	1303	0	13.3	3.5	0
GP-33	.063	8.2 to 13.2	1,165	2.12	13.59	-0.05	1645	0	4.7	8.2	0

- pump faster after 400s  
- water came up after 21 min  
- water came up after 2 min

Comments:

Barometer ("Hg) (Start): 29.89 @ 8:10

Barometer ("Hg) (Finish): 29.85 @ 1447

Temperature: 51° F

Weather: overcast

Equipment Used: Coen 5000+

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: \_\_\_\_\_

Date: 8-23-2021

Field Personnel: Chris B., Mary Alice B.

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min (min)	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)	
GP-37	.063	2.8 to 7.8	868	1.57	Dry to 7.55' (could not get deeper)	+0.4	1145	0.0	10.2	10.0	0.0	
GP-09	.063	6.62 to 10.62	899	1.63	Camp still in place				Not Sampling			
GP-26	.063	4.62 to 9.62	868	1.57	Dry	-0.02	1254 0.0	0.0 2.2	2.2 16.5	16.5	0	Sec. bolt tight mud on WLM
GP-23	.167	6.05 to 7.05	4,940	8.98	Dry	+0.04	1233	0.0	7.1	12.9	0.0	20 for CO
GP-07	.063	5.75 to 6.25	519	0.94	5.7	0.01	1308	0.0	3.0	16.5	0	
GP-27	.063	8.57 to 13.57	1,216	2.21	12.58	0.0	1127	0.5	13.1	16.5	9.0	Sec. bolt slightly elevated
GP-28	.063	6.59 to 11.59	1,042	1.89	11.46	-0.02	1113	0.0	11.0	4.6 0.0	0.0	well Good
GP-29	.063	4.62 to 9.62	868	1.57	9.27	-0.02	1160	1.5	21.4	16.5	18	Tickity Boe well
GP-16	.167	6.60 to 9	5,867	10.67	4.15' well pumpically blocked	-0.03	1042	0.0	0.5	18.7	0.0	Per. stabilize well before purge
GP-31	.063	4.64 to 9.64	868	1.57	6.9	+0.03	1018	0.0	14.2	3.8	0.0	Pro in measurement tamper bolt inserted fully thread
GP-15	.167	6.62 to 8.62	5,558	10.11	5.90	-	-	-	-	-	-	Lock in ok shape, not great
GP-32	.063	4.72 to 9.72	868	1.57	-	-	-	-	-	-	-	Bolt sheared in 2 Sec. Bolt stripped
GP-03	.063	6.73 to 8.63	725	1.32	Dry	-12	0933	0.0	8.6	10.1	0.0	Level cuttings pile in front
GP-13	.167	4.91 to 5.41	4,014	7.29	3.88'	-	-	-	-	-	-	Lock heavily Carr. still wants
GP-11	.167	6.23 to 6.73	4,632	8.42	6.5'	-	0826	0.0	0.6	19.1	0.0	opened well, w/o static meas.
GP-38	.063	3.8 to 8.8	882	1.6	Dry to 5.00' (could not get deeper)	-0.01	1202	0.0	19.5	0.4	0.0	
GP-33	.063	8.2 to 13.2	1,165	2.12	Dry	+10.74	0956	0.0	8.3	6.0	0.0	Good well

Comments: \_\_\_\_\_

Barometer ("Hg) (Start): 0.04 (tb20)

Barometer ("Hg) (Finish): ~~0.04~~ (tb20)

Temperature: 56°

Weather: 56° overcast

Equipment Used: Solinst water level meter model 101, Landtec GEM 5000  
SN 377444 SN not readable

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: \_\_\_\_\_

Date: 11/15/21

Field Personnel: T. Parry

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds	7.66	0.0	10:30	0.3	9.4	5.0	0
GP-09	.063	6.62 to 10.62	899	98 seconds	7.27(dry)	0.0	12:06	0.3	8.1	12.8	0
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds	<del>7.28</del> 12.51	0.0	<del>12:51</del> 11:23	0.3	<del>13.6</del> 15.5	0.0	40
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec	6.50	0.0	12:28	0.3	0.4	21.5	0
GP-07	.063	5.75 to 6.25	519	56 seconds	6.00(dry)	0.0	13:02	0.3	2.6	16.2	0
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds	12.51	0.0	11:33	1.1	13.6	0.0	4
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds	7.71	0.0	11:00	0.3	3.1	8.1	0
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	6.76	0.0	11:19	6.9	16.6	0.0	1.2
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec	4.72(dry?)	0.0	9:56	0.3	0.4	21.2	0
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds	4.50	0.0	9:25	0.3	7.5	4.8	0
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)	3.34	-	9:40	-	-	-	-
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)	1.02	-	9:49	-	-	-	-
GP-03	.063	6.73 to 8.63	725	79 seconds	8.75(dry)	0.0	9:13	0.3	5.9	8.7	0
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)	2.71	0.0	8:44	0.3	0.9	20.9	0
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)	3.28	0.0	8:51	0.3	0.5	21.0	0
GP-38	.063	3.8 to 8.8	882*	96 seconds	8.42	0.0	8:56	0.3	0.6	31.0	0
GP-33	.063	8.2 to 13.2	1,165*	127 seconds	12.11	0.0	8:27	0.3	0.2	21.1	0
						0.0	8:30	0.3	0.2	21.2	0
						0.0	10:45	0.6	16.2	1.0	0
						0.0	11:43	4.5	9.3	0.0	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

Comments: likely calibration error w/ GEM 5000 (see CH<sub>4</sub>)

Equipment Used: CIEM 5000

Barometer ("Hg) (Start): 29.55

Barometer ("Hg) (Finish): 29.50

Temperature: 56°F

Weather: Overcast w/ scattered showers to begin. Heavy rain at the end.

GP-11 was sampled from a 2 foot bar hole. These values were the same as the atmospheric values.  
 GP-13 was sampled from a 1/8 inch bar hole.

C2

Building Monitoring Forms



SOUTH PARK LANDFILL  
SPPD ON-SITE BUILDING  
METHANE ALARM INSPECTION CHECKLIST

**Building Location:** \_\_\_\_\_

**Make and Model of Detector:** \_\_\_\_\_

<b>Monthly Check</b>		
Press test button and confirm indicator light is illuminated.		
Pass	Date	Initials
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

<b>Quarterly Test</b>		
Direct gas from unlighted butane lighter into the detector through one of the vent holes and hold for several seconds. Confirm that red light and alarm activated.		
Pass	Date	Initials
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

C3

Gas Exceedance Incident





C3-A

Incidence Response Form



# SOUTH PARK LANDFILL INCIDENT REPORT FORM

<b>Date of Report:</b>	March 8, 2022	<b>Prepared by:</b>	Laura Lee, Site Coordinator, Parametrix
<b>Incident Type:</b>	LFG Exceedance in Perimeter Compliance Gas Probes		
<b>Report Type:</b>	<input type="checkbox"/> Original <input type="checkbox"/> Supplemental <input checked="" type="checkbox"/> Final	<b>Property Owner:</b>	<input checked="" type="checkbox"/> SPPD <input type="checkbox"/> SPU

## Incident Description

The fourth quarter monitoring of the landfill gas (LFG) compliance perimeter probes was conducted on November 15, 2021, (results are attached). During QC review of the monitoring field sheets two gas probes were identified with trigger value exceedances: GP-29 at 6.9% by volume and GP-33 at 4.5% by volume. The Cleanup Action Plan Operations, Maintenance, and Monitoring Plan (CAP OMMP) states that the LFG control system must meet the criteria under the Minimum Functional Standards (MFS) as defined in Washington Administrative Code (WAC) 173-304-460 and King County Board of Health Title 10 regulations:

- **On-Site Structures.** Methane concentrations inside buildings and structures within the landfill boundary must not exceed 1.25 percent by volume, or 25 percent of the lower explosive limit (LEL). This criterion is typically measured in the buildings/structures with either calibrated hand-held monitors or installed building monitors/alarms.
- **Perimeter Gas Probes.** Methane concentrations in soil at the landfill boundary must not exceed 5 percent by volume, the LEL for methane. This criterion is typically measured by LFG probes along the landfill boundary.
- **Off-Site Structures.** Methane concentrations inside buildings and structures outside the landfill boundary must not exceed 100 parts per million by volume (ppmv). This criterion is typically measured in the buildings/structures with either calibrated hand-held monitors with detection limits below 100 ppm or permanently installed building monitors/alarms with higher detection limits.

GP-29 and GP-33 are located along the perimeter of the South Park Property Development, LLC (SPPD) parcel (CAP OMMP Figure A.2.3). The LFG control system at the SPPD parcel has been designed to protect buildings on the SPPD parcel and to control gas migration along the southern, western, and eastern perimeter of the Settlement Area. This includes sections of 5th Avenue South, Occidental Avenue South, and South Sullivan Street that are adjacent to the SPPD parcel.

The LFG system owned by SPPD was activated in December 2014 as part of the SPPD Interim Action. SPPD or their delegated LFG OMM professional are required to operate the system in accordance with a Landfill Gas Collection and Control System OMMP (Farallon 2016), which was prepared by Farallon Consulting, LLC, approved by Ecology, and is on file at Ecology.

Parametrix is the Site Coordinator for the landfill and completes the compliance monitoring and coordinates execution of the cleanup action plan (CAP) with Ecology and the property owners.

The November 15, 2021, exceedances at GP-29 and GP-33 triggered contingency actions that are outlined in the attached flow chart (Figure A.2.4 from the CAP OMMP). The following actions are to be taken if a probe measurement is 5.0% or greater by volume:

1. The Site Coordinator notifies the Ecology PM, Public Health – Seattle & King County (Health Department), and the rest of the PLP Group.
2. Parcel staff adjust adjacent LFG system to increase control on LFG and continue daily monitoring at probe until control is established then weekly for 4 weeks.
3. Site Coordinator arranges monitoring of indoor air for LFG in any off-site buildings within 100 feet of the Landfill boundary (CAP OMMP Figure A.2.2). Refer to CAP OMMP Figure A.2.6 for triggers and actions based on indoor measurements.
4. Site Coordinator notifies Ecology PM and Health Department of the actions taken and their effectiveness. If the adjustments to the adjacent gas system are not effective, then a plan must be prepared, submitted for approval, and executed.
5. Site Coordinator reports exceedances and actions in Annual Report to Ecology.

The following actions are to be taken if a probe measurement is between 1.25% and 5% by volume:

1. The Site Coordinator reviews protectiveness of gas probe, if not previously identified as protective of nearby structures, it is a new condition.
2. Review LFG system at adjacent parcel and continue monitoring probe weekly until situation returns to < 1.25% or is demonstrated to be protective in adjacent buildings.

## Contingency Actions Taken

November 15, 2021

- Quarterly monitoring at the perimeter gas probes was conducted by the Site Coordinator field team. An exceedance of the LEL at GP-29 and an exceedance of twenty-five percent of the LEL at GP-33 were recorded on the field sheet.

November 29, 2021

- The Site Coordinator notified SPU and SPPD of the exceedance at GP-29 and near exceedance of the LEL at GP-33. SPPD was informed of the triggers and contingent actions and were asked to verify if their LFG control system was running. SPPD indicated that the gas system was inspected weekly, and they were not aware of any outages.

- SPU and Parametrix field staff measured GP-29 and GP-33 to confirm the fourth quarter results. The LFG control system was observed to be offline, and the overload alarm was lit (photographs attached). No audible noise was heard from the flare. Measurements at both probes equaled or exceeded the LEL (GP-29, 5.1% by volume; GP-33 5.0% by volume).
- SPPD, SPU, and the Site Coordinator met via Teams after the monitoring was complete to review the results and discuss the next steps. Parametrix shared field observations, including the photos indicating that the system was not running, and the overload alarm light was on. SPPD was informed of the urgency to have their engineer (Farallon) on site as quickly as possible to assess the system and make adjustments as needed.
- SPPD indicated LFG field staff would be onsite the next morning to make system adjustments.
- The Site Coordinator sent an email notifying Ecology and the Health Department of the LFG exceedances.
- The quarterly LFG compliance monitoring field forms were modified adding a statement to call the Parametrix project manager immediately if methane is above 5% by volume at a gas probe.

November 30, 2021, through December 27, 2021

- SPPD informed the Site Coordinator that their LFG field staff observed the system off and turned the LFG control system back on. SPPD reported that their LFG field staff check the blowers every Tuesday.
- The Site Coordinator screened indoor air at the off-site buildings near GP-33 (W.G. Clark Construction Co.). No measurable methane (<0.1% methane by volume) was found in the indoor air screening of the W.G. Clark Construction Co. buildings.

November 30, 2021, through December 27, 2021

- Without action from SPPD to continue the required daily LFG monitoring, the Site Coordinator and/or SPU field staff took daily gas probe measurements at GP-33 through December 7, 2021, and at GP-29 through December 27, 2021.
- The Site Coordinator sent updates to Ecology, the Health Department, and the PLP group reporting on actions taken, daily gas measurement results, and observations of the gas system.

December 1, 2021

- Farallon, SPPD's Professional LFG Engineer, indicated that adjustments were made to the LFG extraction wells near GP-33. They were unable to make adjustments at the extraction well (H5) influencing GP-29 as the well vault was flooded with water and needed pumping prior to making well adjustments.
- The Site Coordinator and SPU met with Ecology via Teams to report daily measurements and to discuss field observations from the Site Coordinator field staff, as well as limited reports of conditions from SPPD.

December 3, 2021

- The Site Coordinator field staff collected measurements with a flame ionization detector (FID) outside of the W.G. Clark Construction Co. parcel adjacent to GP-33. The FID is capable of reading less than 100 ppmv as required by the CAP OMMP. No measurable methane above background was recorded surrounding the facility. No indoor air screening could be completed as the business was closed.
- Site Coordinator field staff were notified about the updated LFG field forms and requirement to contact the project manager immediately if exceedances are observed in the future.

December 6, 2021

- Farallon confirmed that adjustments would be made on December 7.

December 7, 2021, through December 29, 2021

- Methane was measured at GP-33 on a weekly basis until completion on December 29, 2021.

December 9, 2021

Ecology requested the following actions be implemented immediately:

1. Daily monitoring of gas probe GP-29, which continues to exceed the 5% methane threshold requirement for methane concentrations along the landfill perimeter as required in the CAP.
2. Site Coordinator will send daily methane measurement results to Farallon no later than 1pm each day to allow SPPD time to make adjustments that day if necessary. An email to Ecology, Health Department, and PLP team will continue to be sent with the daily update by the Site Coordinator.
3. A period of observation of 2 weeks from the adjustments to the LFG system conducted on December 1, 2021, are allotted to observe if the LFG system adjustments are effective in decreasing the methane concentration in GP-29 below the 5% LEL. If exceedances persist after December 15, 2021, a corrective action plan (see #4) shall be implemented by Farallon/SPPD.
4. SPPD shall submit in a timely manner a corrective action plan prepared by Farallon for review and comment from Ecology, Health Department, SPU, and the Site Coordinator. Ecology shall approve the final plan. Once LFG is controlled and there are no further exceedances, an incident response investigation shall be completed by SPPD and overseen by Farallon to determine the cause of the outage including investigation and verification of alarm systems. Based on those results, a second corrective action plan shall be submitted by SPPD (prepared by Farallon) to prevent similar situations from occurring again and approved by Ecology.
5. By Friday December 10, 2021, if the daily methane measurement remains at 5% or above, methane monitoring will be conducted by Farallon east of GP-29 (i.e., between GP-29 and the nearby 1<sup>st</sup> Student Maintenance Building which is currently unoccupied). Methane concentrations will be monitored in existing monitoring wells on the 1<sup>st</sup> Student Maintenance Building Property (if it is confirmed that the wells have exposed screens) or through bar hole(s). The bar hole or monitoring well measurement functions as an additional monitoring point to assess extent of methane migration towards the building, demonstrate protectiveness, and a data point to compare with GP-29 for consistency and possibly verify representativeness of

methane concentrations around GP-29. Farallon shall submit the results to Ecology, Health Department, Site Coordinator, and PLP team by the end of the day.

6. Farallon shall submit to the Site Coordinator and Ecology the daily records of measurements, O&M activities, and system adjustments made during the time the exceedances were first measured on November 15, 2021.

December 27, 2021, through January 19, 2022

- Weekly monitoring began at GP-29 and concluded on January 19, 2022.
- The Site Coordinator sent updates to Ecology, the Health Department, and the PLP group to report updated field measurements after each day of monitoring.

Actions taken by SPPD, or their representatives are recorded in the Corrective Action Summary Report prepared by Farallon Consulting (Farallon 2022).

## Monitoring Result Summary

### Gas Probe GP-29

Quarterly monitoring under the consent decree began in the second quarter of 2020 by the Site Coordinator. Until the recent exceedance, GP-29 typically had low levels of gas ranging from 1.4% to 2.9% which did not trigger a response due to the previously established protectiveness at adjacent buildings (discussed below). The methane level at GP-29 was recorded at 6.9% during the 2021 fourth quarter monitoring event triggering contingent actions due to exceedances. Daily monitoring began November 29, 2021, and continued until methane was measured below 5% by volume on December 27, 2021. Monitoring resumed on a weekly basis ending on January 19, 2022. Results are presented in the attached table and time series plot.

### *Indoor Air Monitoring at Adjacent Off-Site Building*

Protectiveness was established in 2011 when GP-29 had elevated methane concentrations up to 8.5% by volume (Farallon 2019). In response, an indoor air study was conducted at the adjacent building (within 100 ft) located east of 5th Avenue South and the SPPD parcel to establish a baseline of methane gas monitoring data across the seasons and to support the existing safety of people and structures. No methane was detected in indoor air in the building at that time.

SPPD has since purchased the building adjacent to GP-29. The building was unoccupied by tenants, had no power or utilities, and was undergoing renovations during this incident. Ecology determined that indoor air monitoring was not required at this building due to the established previous protectiveness and the current building status.

### Gas Probe GP-33

Methane was not detected during quarterly compliance monitoring completed by the Site Coordinator at GP-33 from May 2020 through August 2021. Methane was detected at 4.5% during the 2021 fourth quarter monitoring event indicative of a new condition. Daily monitoring began on November 29<sup>th</sup>. Results are presented in the attached table and time series plot.

## *Indoor Air Monitoring at Adjacent Off-Site Building*

GP-33 is adjacent to a building owned by W.G. Clark Construction Co. Methane concentrations in GP-33 were periodically above 5 percent during the period between 2015 and 2016 (maximum detection was 22%). These detections were attributed to a temporary shutdown of the SPPD LFG control system. During this period, one indoor air measurement was made at the adjacent buildings and no methane was detected. However, the results were not sufficient to provide a relationship between methane in the probe and the indoor air in adjacent buildings to assess protectiveness.

Parametrix and SPU staff measured indoor air concentrations and performed slab and utility screening at the W.G. Clark Construction Co. facility on November 30, 2021, with a Landtec GEM 5000 landfill gas meter. The landfill gas meter has a detection level of 0.1% by volume which is equivalent to 1000 parts per million, or 10 times greater than the action levels defined in the CAP OMMP.

Parametrix completed monitoring adjacent to the foundation of the buildings and asphalt cover of the W.G. Clark Co. facility on December 3, 2021, with a TVA 2020 flame ionization detector (FID) capable of measuring methane to 0.5 ppm. The business was closed at the time and no indoor air monitoring was completed. No measurable methane above background levels (1.5 parts per million) was found south, west, and southeast of the property. Additionally, screening was completed adjacent to the asphalt near GP-11 and MW-12. No measurable methane was detected above background.

## Incident Resolution Summary

GP-29 and GP-33 are along the perimeter of SPPD property. The Site Coordinator field staff was onsite November 29, 2021, to confirm the fourth quarter results. No audible noise was coming from the LFG blower system near GP-33. The position of the blower control panel showed the system set to automatic having a red overload alarm activated (see attached photos). The light indicating if blower No. 2 was running was not lit.

On November 30, 2021, Parametrix and SPU observed that the system was operating. Audible noise was coming from the LFG blower system and the position of the panel switches was identical to the previous observations except no alarms were triggered and the green light indicating if blower No. 2 was running was lit.

The system has been observed running every day since it was reactivated on November 30, 2021.

Observations indicate that the system shut down most likely occurred prior to the quarterly monitoring, possibly as a result of a power outage or overload to the pumps from storms that brought significant power outages throughout the region. It is unclear why the phone system connected to the alarm system did not call SPPD when the blowers went into overload, nor why the outage was not observed during weekly checks by SPPD.

## Recommendations

### Recommended Follow Up Actions:

- Site Coordinator (Parametrix):
  - The Project Manager and the Monitoring Program Manager will review quarterly monitoring field sheets within 24 hours of data collection for all future monitoring events.
  - Work with Ecology to modify the flow chart for triggers and contingent actions for perimeter probe monitoring to include a response timeline for all actions. This may be documented in a TM and include roles and responsibilities.
- Property Owner (SPPD/Farallon):
  - Replace the alarm system with a telemetry system with cellular service and data-logging capabilities.
  - Add additional alarm zones for reporting blower voltage present to the alarm zones. Blower voltage present will be an indicator of if the blower is operational.
  - With methane concentrations below the LEL in gas probe GP-29, rebalance LFGCCS to its steady-state operation to control LFG generated on the SPPD Property. Rebalancing could include removal of portions of the air dilution intake modifications described in Section 2 of the Corrective Action Summary Report (Farallon 2022).
  - Assess protocol of gas system checks and documentation. Train staff performing system checks.
  - Prepare and submit documentation of weekly system checks. Prepare and submit annual reports to Ecology documenting LFGCCS operation, maintenance, and monitoring as required in the SPPD Property LFG Collection and Control System OMMP (Farallon). Annual report should also be provided to the Site Coordinator.
  - Document all actions taken to modify the system. Documentation should include a completed form or report and photographs in accordance with the Landfill Gas Monitoring and Contingency Plan (LFGMCP) as part of the CAP OMMP.



## References

- Ecology (Washington State Department of Ecology). 2018. South Park Landfill Final Cleanup Action Plan. Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.
- Floyd|Snider, Aspect, BHC, Herrera. 2017. Remedial Investigation/Feasibility Study. Prepared for City of Seattle South Park Property Development, LLC. July 2017.
- Farallon. 2016. SPPD Property Landfill Gas Collection and Control System Operation, Maintenance, and Monitoring Plan, South Park Landfill, Seattle, Washington. Prepared for South Park Property Development, L.L.C. c/o SEACON, L.L.C. June 2016.
- Farallon. 2019. Landfill Gas Collection and Control System Interim Action Progress Report—2018, SPPD Property, South Park Landfill Site, Seattle, Washington. Prepared for Ecology. July 2019.
- Farallon. 2022. SPPD Property Landfill Gas Collection and Control Corrective Action Summary Report, South Park Landfill, Seattle, Washington. Prepared for South Park Property Development, L.L.C. c/o SEACON, L.L.C. February 2022.

## Figures

1. Landfill Gas Controls (CAP OMMP Figure A.2.1)
2. Buildings within the Landfill and within 100 ft of the Landfill Boundary (CAP OMMP Figure A.2.2)
3. Perimeter Landfill Gas Probe Network (CAP OMMP Figure A.2.3)
4. Flow Chart for Triggers and Contingent Actions for Perimeter Probe Monitoring (CAP OMMP Figure A.2.4)
5. Flow Chart for Triggers and Contingent Actions for LFG Monitoring in Off-Site Buildings (CAP OMMP Figure A.2.6)
6. Historical Perimeter Probe Monitoring Data (Farallon 2018 annual report Figure 3)
7. South Park Landfill Blower Panel As Built

## Attachments

- A. Gas Exceedance Data Summary Table
- B. Methane Exceedance Trigger Monitoring Time Series Plot
- C. Fourth Quarter LFG Field Data Sheet
- D. Exceedance Monitoring Field Data Sheets
- E. Indoor Air Monitoring Field Sheets
- F. Photographs

## Figures





**Legend**

- Edge of Refuse (July 2017)
- Area Covered Under This Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- Building within Landfill Boundary
- Building within 100 feet of Landfill Boundary

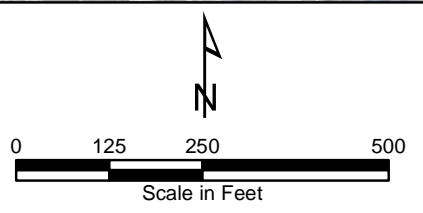


**Notes:**

- Tax parcels provided by King County Geographic Information Systems Center.
- Orthoimagery provided by NearMap, September 27, 2015.

**Abbreviations:**

- IA = Interim Action
- OMMP = Operation, Maintenance, and Monitoring Plan



**FLOYD | SNIDER**  
strategy • science • engineering






**Aspect CONSULTING** **HERRERA**

**Cleanup Action Plan  
OMMP  
South Park Landfill  
Seattle, Washington**

Attachment A.2: Landfill Gas Monitoring and Contingency Plan  
**Figure A.2.2**  
Buildings within the Landfill and within 100 feet of the Landfill Boundary

I:\GIS\Projects\COS-SPARK\MXD\CAP\2017 CAP-FEB18\OMMP\LGMCPI\Figure A.2.2 Buildings within 100 feet of the Landfill Boundary.mxd  
2/13/2018

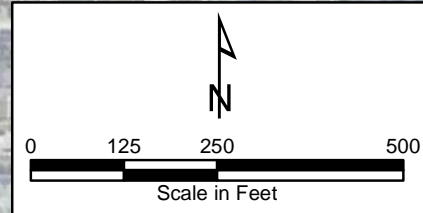
**Legend**

-  Edge of Refuse (July 2017)
-  Area Covered Under This Cleanup Action Plan (Settlement Area)
-  Landfill Parcel
-  Adjacent Parcel
-  Gas Probe



Notes:  
 • Tax parcels provided by King County Geographic Information Systems Center.  
 • Orthoimagery provided by NearMap, September 27, 2015.

Abbreviation:  
 OMMP = Operation, Maintenance, and Monitoring Plan



**FLOYD | SNIDER**  
 strategy • science • engineering

**Aspect** CONSULTING

**HERRERA**

**Cleanup Action Plan  
 OMMP  
 South Park Landfill  
 Seattle, Washington**

Attachment A.2: Landfill Gas Monitoring  
 and Contingency Plan  
**Figure A.2.3  
 Perimeter Gas Probe Network**

I:\GIS\Projects\COS-SPARK\MXD\CAP\2017 CAP-FEB18\OMMPLGMCP\Figure A.2.3 Perimeter Gas Probe Network.mxd  
 2/12/2018

Gas Incident Report Figure 3

**START HERE**  
**for Perimeter Probe Monitoring**

Measure LFG concentrations at Perimeter Probes under Site Coordinator (SC) oversight (locations listed on table below and Figure A.2.3)

Perimeter LFG probes are assessed probe by probe

Is the methane concentration < 1.25% by volume (25% of LEL)

Yes

Record results and return to routine monitoring program.

No

Are methane concentrations < 5% by volume

Yes

Concentrations are between 1.25 and 5%.

No

**Contingent Action Triggered by Exceedance**

1. SC notifies the Ecology PM, Public Health – Seattle & King County, and the rest of the PLP Group.
2. Parcel staff adjust adjacent LFG system to increase control on LFG, and continue DAILY monitoring at probe until control is established (using criteria above) then weekly for 4 weeks.
2. SC arranges monitoring of indoor air for LFG in any off-site buildings within 100 feet of the Landfill boundary (Figure A.2.2). Refer to Figure A.2.6 for triggers and actions based on indoor measurements.
3. SC notifies Ecology PM and Public Health – Seattle & King County of the actions taken and their effectiveness. If the adjustments to the adjacent gas system are not effective, then a plan must be prepared and submitted for approval.
4. SC reports exceedances and actions in Annual Report to Ecology.

Review LFG system at adjacent parcel and continue monitoring probe weekly until situation returns to < 1.25% or is demonstrated to be protective in adjacent buildings.

No, new condition

Has this LFG level been shown to be protective previously? (see table)

Yes

**Perimeter Probe Locations**

Perimeter Probe	Adjacent LFG System	Adjacent Off-site Buildings <sup>1</sup>
GP-37	SRDS	No
GP-09	SRDS	No
GP-26	SRDS	Yes
GP-23	SRDS	Yes
GP-07	SRDS/SPPD	Yes
GP-27	SPPD	Yes, 5 <sup>th</sup> Avenue South
GP-28	SPPD	Yes, 5 <sup>th</sup> Avenue South
GP-29	SPPD	Yes, 5 <sup>th</sup> Avenue South
GP-16 <sup>2</sup>	SPPD	No
GP-31 <sup>2</sup>	SPPD	Yes
GP-15	SPPD	Yes, Lenci/Emerson
GP-32 <sup>2</sup>	SPPD	Yes
GP-03 <sup>2</sup>	SPPD	No
GP-13	SPPD	Yes
GP-11	SPPD	Yes
GP-38	None	No
GP-33	SPPD	Yes

Notes:  
1 Adjacent off-site buildings within 100 feet are shown on Figure A.2.2.  
2 Due to shallow groundwater, these probes are only measured when the water table is low enough for the probes to function.

Abbreviations: Ecology = Washington State Department of Ecology; LEL = Lower Explosive Limit; LFG = Landfill gas; OMMP = Operations, Maintenance, and Monitoring Plan; PLP = Potentially liable person; PM = Project manager; SPPD = South Park Property Development, LLC; SRDS = South Recycling and Disposal Station

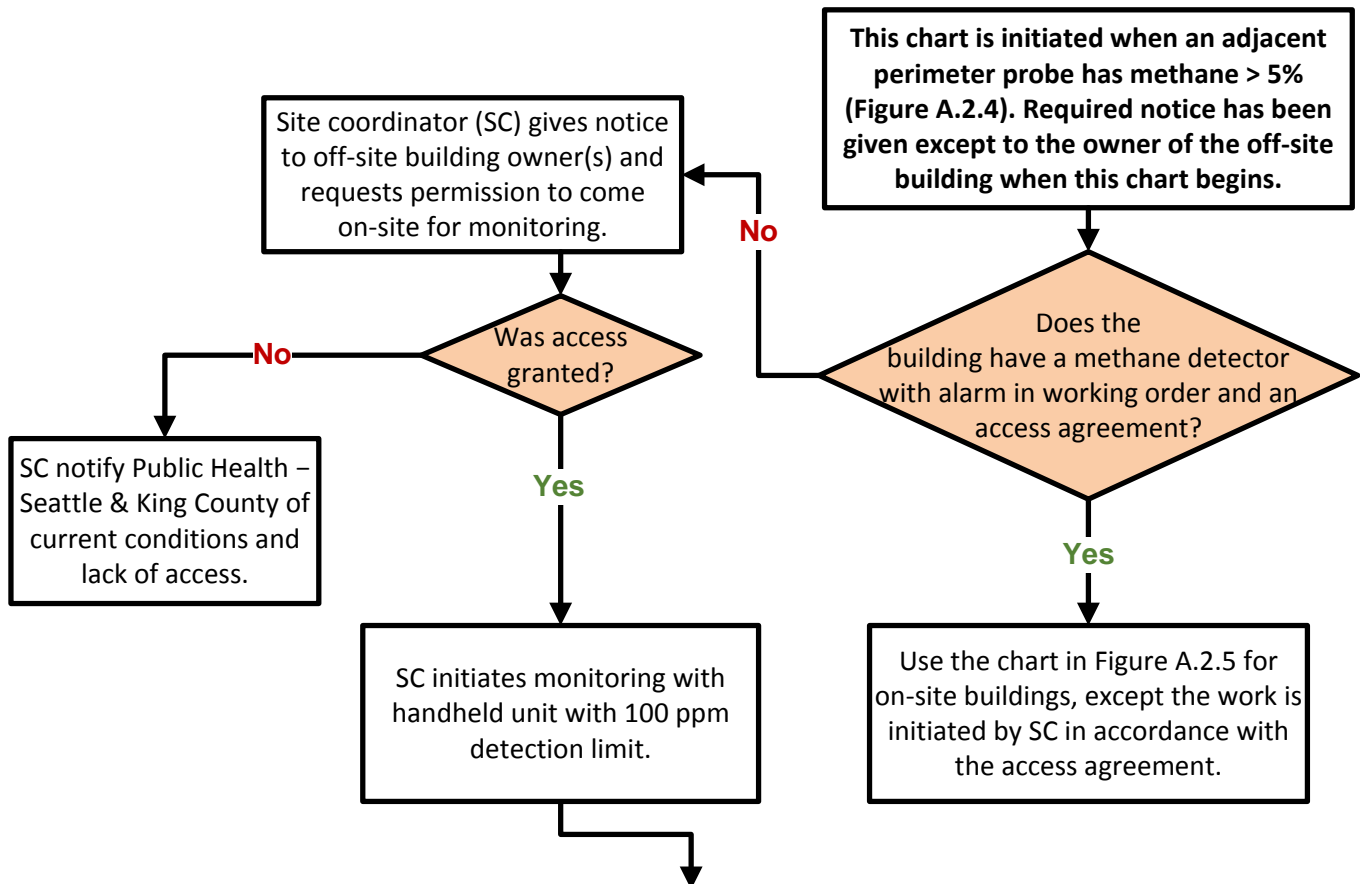
**FLOYD | SNIDER**  
strategy • science • engineering

**Aspect CONSULTING** **HERRERA**

**Cleanup Action Plan  
OMMP  
South Park Landfill  
Seattle, Washington**

Attachment A.2: Landfill Gas Monitoring and Contingency Plan  
**Figure A.2.4**  
**Flow Chart for Triggers and Contingent Actions for Perimeter Probe Monitoring**

**START HERE**  
**for Off-Site Building Monitoring**



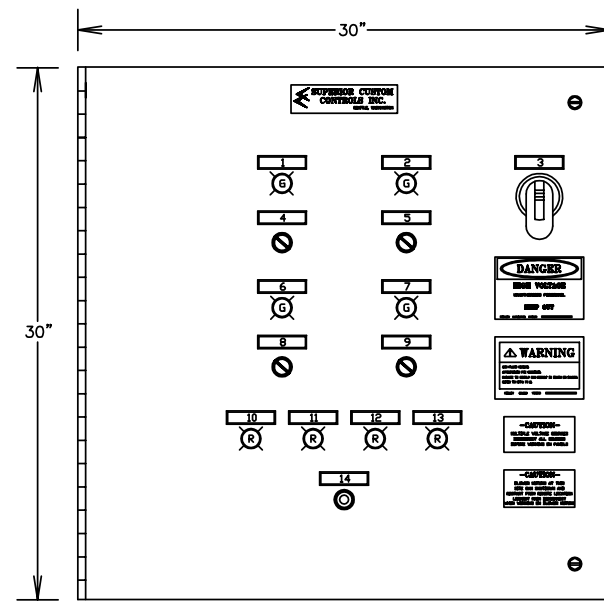
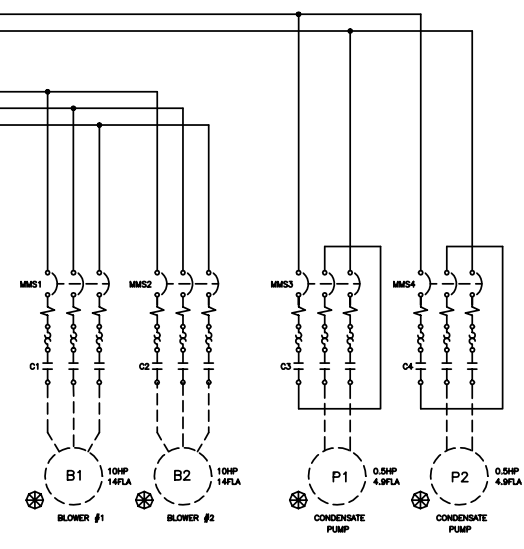
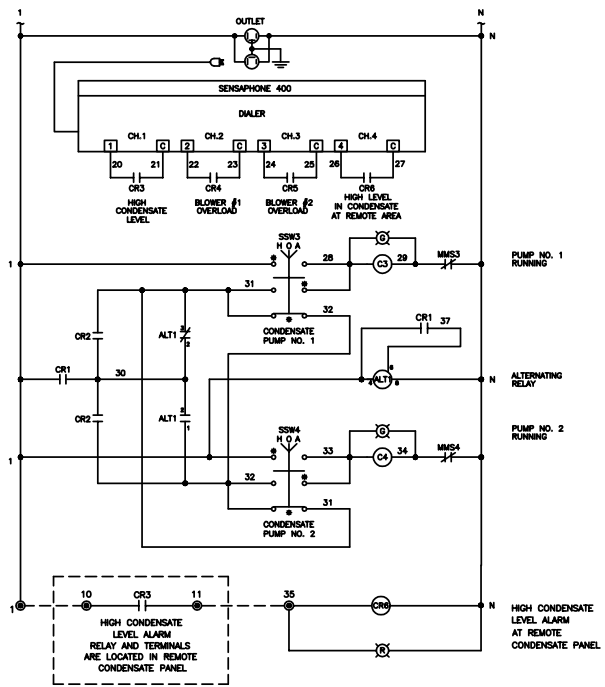
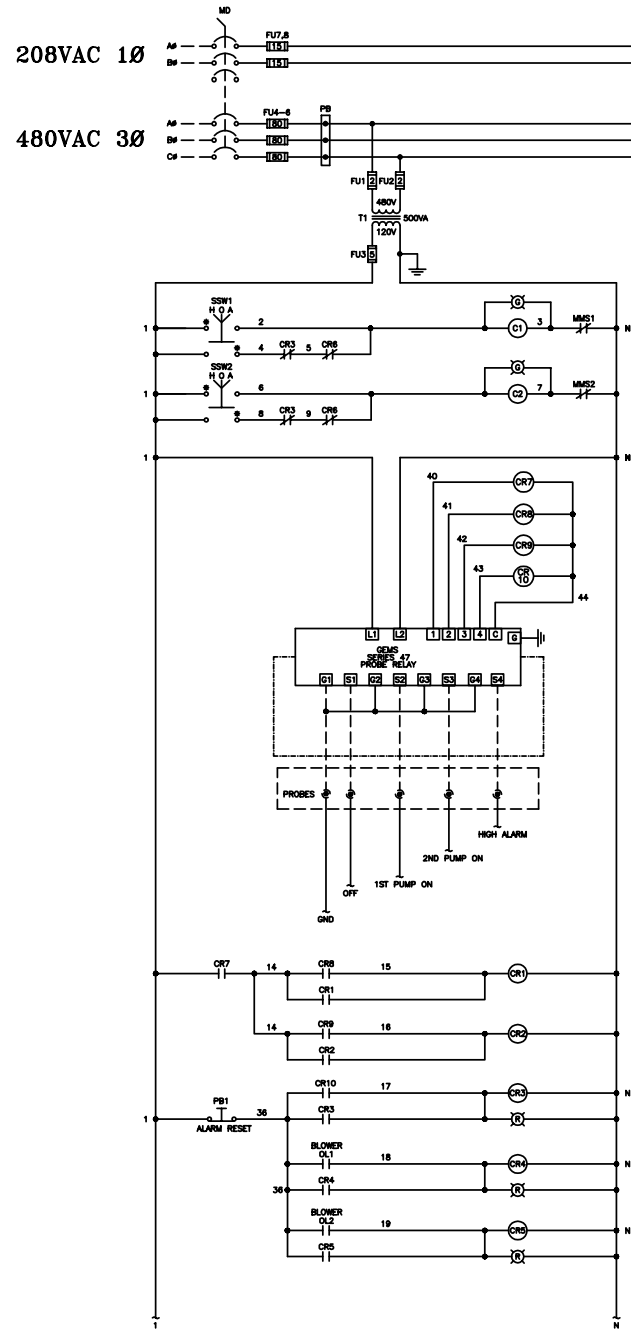
< 100 ppm Methane (by volume)	100 ppm < Methane < 1.25% (by volume)		> 1.25% Methane (by volume)
<div style="border: 1px solid green; border-radius: 50%; padding: 10px; display: inline-block;">           Record results and return to routine monitoring program.         </div>	Methane between 100 and 5,000 ppm	Methane between 5,000 ppm and 1.25%	<ul style="list-style-type: none"> <li>• Evacuate building</li> <li>• ID source or entry point</li> </ul>
	<ul style="list-style-type: none"> <li>• Monitor daily</li> </ul>	<ul style="list-style-type: none"> <li>• Evacuate building</li> <li>• ID source or entry point</li> </ul>	
	<b>Verify methane concentrations with second meter</b>		
	<b>Notifications and Reporting</b>		
	<ul style="list-style-type: none"> <li>• PLP Group</li> <li>• Owner already notified</li> </ul>		
<b>Potential Corrective Measures</b>			
<ul style="list-style-type: none"> <li>• Seal cracks</li> <li>• Increase ventilation</li> <li>• Install methane detector with alarm</li> <li>• Perform active collection</li> <li>• Modify adjacent LFG system</li> </ul>			

Abbreviations: Ecology = Washington State Department of Ecology; LFG = Landfill gas; OMMP = Operations, Maintenance, and Monitoring Plan; PLP = Potentially liable person; PM = Project Manager; ppm = Parts per million

<p><b>FLOYD   SNIDER</b> strategy ■ science ■ engineering</p> <p><b>Aspect</b> CONSULTING</p> <p><b>HERRERA</b></p>	<p><b>Cleanup Action Plan</b> <b>OMMP</b> <b>South Park Landfill</b> <b>Seattle, Washington</b></p>	<p>Attachment A.2: Landfill Gas Monitoring and Contingency Plan <b>Figure A.2.6</b> <b>Flow Chart for Triggers and Contingent Actions for LFG Monitoring in Off-Site Buildings</b></p>
---	---	--







### LIST OF MATERIALS

ITEM	QTY	DESCRIPTION	MPFR.
1	1	ENCLOSURE 30X30	CSD30308 HOFFMAN
1	1	PAN	CP3030 HOFFMAN
1	1	FOOT KIT	CMFK HOFFMAN
MD	1	MAIN DISCONNECT 80A	DTBDF3 ABB
1	1	HANDLE	CHBESJUS ABB
1	1	SHAFT	DYP6X210 ABB
FU1,2	2	PRIMARY FUSES	2A FNOR-2 BUSS
FU3	1	SECONDARY FUSE	5A FNM-5 BUSS
FU4-6	3	FUSES	80A LPJ80SP BUSS
FU1-3	1	FUSE BLOCK	3P BC6032PQ BUSS
FU4-6	1	FUSE BLOCK	3P J80100-3CR BUSS
MMS1,2	2	MANUAL MOTOR STARTERS	14A GV2P16 SQUARE D
CT1,2	2	CONTACTORS	18A LC1D18G7 SQUARE D
2	2	AUXILIARY CONTACTS	GVAN11 SQUARE D
SSW1,2	2	HOA SWITCHES	3 POS. HW1S-3TF20 IDEC
2	2	INDICATOR LIGHTS	GREEN HW1P-1FQD-G-120V IDEC
DIALER	1	AUTODIALER	SENSAPHONE 400 + BATS SENSAPHONE
3	3	INDICATOR LIGHTS	RED HW1P-1FQD-R-120V IDEC
T1	1	TRANSFORMER	500VA PHS00MQMJ HAMMOND
20	20	TERMINALS	50A 3044131 PHOENIX
PR1	1	PROBE RELAY	4 CH. 47X1BDM4 GEMS
PB	1	POWER BLOCK	1423570 MARATHON
CR4,5	2	CONTROL RELAYS	3P RH3B-ULAC120V IDEC
3	3	RELAY BASES	SR3B-05 IDEC
OUTLET	1	DUPLEX RECEPTACLE	7599-1 LEVITON
PB1	1	PUSH BUTTON	HW1B-M1-F11-B IDEC
ALT1	1	ALTERNATING RELAY	ARA120ADA DIVERSIFIED
1	1	SOCKET	SR2P-06 IDEC
1	1	END PLATE	3047028 PHOENIX
2	2	END CLAMPS	080086 PHOENIX
CR7-10	4	CONTROL RELAYS	1P PLC-RSC-120UC/21 PHOENIX

### CONDENSOR CONTROL DEVICES

ITEM	QTY	DESCRIPTION	MPFR.
FU7,8	2	FUSES	15A LPCC-15 BUSS
FU7,8	1	FUSE BLOCK	2P BC6032PQ BUSS
MMS3,4	2	MANUAL MOTOR STARTERS	4-8A GV2P10 SQUARE D
C3,4	2	CONTACTORS	9A LC1D09G7 SQUARE D
2	2	AUXILIARY CONTACTS	GVAN11 SQUARE D
SSW3,4	2	HOA SWITCHES	3 POS. HW1S-3TF20 IDEC
2	2	INDICATOR LIGHTS	GREEN HW1P-1FQD-G-120V IDEC
1	1	INDICATOR LIGHT	RED HW1P-1FQD-R-120V IDEC
CR1,2,6	3	CONTROL RELAY	3P RH3B-ULAC120V IDEC
3	3	RELAY BASE	SR3B-05 IDEC
CR3	1	CONTROL RELAY	4P RH4B-ULAC120V IDEC
1	1	RELAY BASE	SR4B-05 IDEC

### NAMEPLATE SCHEDULE-

- 1- BLOWER NO. 1 RUNNING
- 2- BLOWER NO. 2 RUNNING
- 3- MAIN DISCONNECT
- 4- BLOWER NO. 1 CONTROL HAND OFF AUTO
- 5- BLOWER NO. 2 CONTROL HAND OFF AUTO
- 6- PUMP NO. 1 RUNNING
- 7- PUMP NO. 2 RUNNING
- 8- PUMP NO. 1 CONTROL HAND OFF AUTO
- 9- PUMP NO. 2 CONTROL HAND OFF AUTO
- 10- LOCAL HIGH CONDENSATE LEVEL
- 11- BLOWER NO. 1 OVERLOAD
- 12- BLOWER NO. 2 OVERLOAD
- 13- REMOTE HIGH CONDENSATE LEVEL
- 14- ALARM RESET

**NOTICE**  
 THE DRAWING IS THE PROPERTY OF SUPERIOR CUSTOM CONTROLS. THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE TO BE USED ONLY FOR THE PROJECT FOR WHICH THE DRAWING IS SPECIFICALLY PREPARED. ANY REUSE OR MODIFICATION OF THIS DRAWING WITHOUT THE WRITTEN PERMISSION OF SUPERIOR CUSTOM CONTROLS IS PROHIBITED. ALL PATENT RIGHTS ARE RESERVED WHERE THEY ARE SPECIFICALLY REFERRED TO IN THE DRAWING.

- ### NOTES
- ⊗ NOT SUPPLIED BY SUPERIOR CUSTOM CONTROLS.
  - ⊙ DENOTES TERMINALS INTERNAL TO PANEL.
  - ⊗ DENOTES INTRINSICALLY SAFE TERMINAL.
  - DENOTES WIRING EXTERNAL TO PANEL.
  - DENOTES WIRING INTERNAL TO PANEL.
  - ⊞ DENOTES COMPONENTS AND CIRCUITRY ARE LOCATED INSIDE AN INTRINSICALLY SAFE AREA.

AS-BUILT

**GLACIER ENVIRONMENTAL**  
 SUPERIOR CUSTOM CONTROLS  
 12544 27th AVE. N.E. SEATTLE, WA 98125  
 SCALE: NONE PREV. REV: 21JUL2014 DRAWN BY: WR  
 DATE: 24NOV2014 PAGE: 1 OF 2 REVISED: 11NOV2014  
 SOUTH PARK LANDFILL BLOWER PANEL  
 SCHEMATIC DIAGRAM AND DOOR LAYOUT DRAWING: 3817-1

Attachment A  
Gas Exceedance Data Summary Table



**Methane in Perimeter Gas Probes GP-29 and GP-33, 2021**  
**Gas Probe Exceedance Contingency Monitoring, South Park Landfill**

Gas Probe	Date Monitored	Time of Measurement	Pressure (in W.C.)	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	Barometer
GP-29	5/14/2020	NA	0.00	1.4	11.8	3.0	29.97 ↑
	8/24/2020	11:19	0.00	1.8	14.8	2.0	30.03 ↓
	11/9/2020	9:48	0.00	2.9	14.3	1.6	30.05 ↔
	2/22/2021	9:34	0.00	2.0	7.3	6.1	30.15 ↓
	5/17/2021	11:30	-0.02	1.6	14.1		29.89 ↓
	8/23/2021	11:00	-0.02	1.5	21.4		29.66 ↑
	11/15/2021	11:19	0.00	<b>6.9</b>	16.6	0.0	29.55 ↓
	11/29/2021	13:01	0.10	<b>5.1</b>	13.5	0.1	30.24 ↑
	11/30/2021	10:27	0.03	<b>5.2</b>	13.4	0.2	30.23 ↔
	12/1/2021	9:00	0.01	<b>5.2</b>	13.5	0.0	30.16 ↔
	12/2/2021	9:00	-0.06	4.9	13.2	0.2	30.27 ↑
	12/3/2021	13:15		<b>5.0</b>	13.2	0.1	30.32 ↔
	12/4/2021	9:49	-0.01	4.7	12.7	0.8	30.14 ↓
	12/6/2021	12:28	-0.02	<b>5.3</b>	14.0	0.1	29.99 ↑
	12/7/2021	12:55	0.01	<b>5.3</b>	14.0	0.1	29.58 ↓
	12/8/2021	11:07	-0.02	<b>5.2</b>	13.9	0.1	29.61 ↓ to ↔
	12/9/2021	10:42	-0.03	<b>5.4</b>	14.1	0.1	29.89 ↔
	12/10/2021	13:20	0.01	<b>5.4</b>	13.8	0.3	30.07 ↓
	12/13/2021	11:25	0.03	<b>5.2</b>	13.9	0.1	29.4 ↓
	12/14/2021	8:15	-0.01	<b>5.3</b>	13.9	0.3	29.32 ↑
	12/15/2021	9:39	0.03	<b>5.3</b>	13.3	0.1	29.73 ↔
	12/16/2021	11:00	-0.01	<b>5.3</b>	13.5	0.2	29.59 ↑
	12/17/2021	10:49	0.00	<b>5.4</b>	12.9	0.2	30.35 ↑
	12/18/2021	10:27	0.01	<b>5.8</b>	13.8	0.1	29.75 ↓
	12/19/2021	9:50	0.00	<b>5.8</b>	13.7	0.2	29.97 ↔
	12/20/2021	11:16	0.01	<b>5.8</b>	13.6	0.3	30.06 ↔
	12/21/2021	8:48	-0.02	<b>5.4</b>	12.8	0.2	29.65 ↔
	12/22/2021	8:16	-0.01	<b>6.0</b>	13.6	0.2	29.71 ↓
	12/23/2021	9:18	-0.05	<b>6.1</b>	12.9	0.1	29.47 ↓
	12/24/2021	9:27	0.01	<b>6.2</b>	12.8	0.1	29.27 ↓
12/27/2021	12:41	0.01	1.8	12.0	0.2	29.85 ↑	
12/29/2021	8:16	-0.02	1.2	12.6	1.4	29.91 ↑	
1/6/2022	9:05	0.01	1.4	11.7	0.1	29.7 ↓	
1/12/2022	10:45	-0.03	1.2	11.0	0.3	29.72 ↓ to ↔	
1/19/2022	9:30	-0.01	0.5	10.6	0.1	30.31 ↔	

**Methane in Perimeter Gas Probes GP-29 and GP-33, 2021**  
**Gas Probe Exceedance Contingency Monitoring, South Park Landfill**

Gas Probe	Date Monitored	Time of Measurement	Pressure (in W.C.)	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	Barometer
GP-33	5/14/2020	NA	0.00	0.0	5.5	8.0	29.97 ↑
	8/24/2020	12:55	0.00	0.0	6.7	9.5	30.03 ↓
	11/9/2020	12:44	0.00	0.0	4.9	13.5	30.05 ↔
	2/22/2021	12:38	0.00	0.0	4.2	6.2	30.15 ↓
	5/17/2021	16:45	-0.05	0.0	4.7	8.2	29.89 ↓
	8/23/2021	9:56	10.74	0.0	8.3	6.0	29.66 ↑
	11/15/2021	11:43	0.00	4.5	9.3	0.0	29.55 ↓
	11/29/2021	13:19	0.07	<b>5.0</b>	8.0	0.0	30.24 ↑
	11/30/2021	10:44	-0.30	<b>5.2</b>	7.9	0.0	30.23 ↔
	12/1/2021	9:08	0.03	4.9	8.0	0.0	30.16 ↔
	12/2/2021	9:05	-0.09	2.4	8.0	0.0	30.27 ↑
	12/3/2021	13:25		1.7	8.2	0.1	30.32 ↔
	12/4/2021	10:00	-0.02	0.9	8.5	0.0	30.14 ↓
	12/6/2021	12:40	-0.01	0.6	9.5	0.0	29.99 ↑
	12/7/2021	13:07	0.00	0.5	9.6	0.0	29.58 ↓
	12/10/2021	13:37	0.00	0.4	10	0	30.07 ↓
	12/16/2021	11:17	-0.02	0.0	9.4	2.1	29.59 ↑
	12/22/2021	8:27	-0.01	0.0	9.2	5.2	29.71 ↓
	12/29/2021	8:27	0.01	0.1	9.5	3.5	29.91 ↑

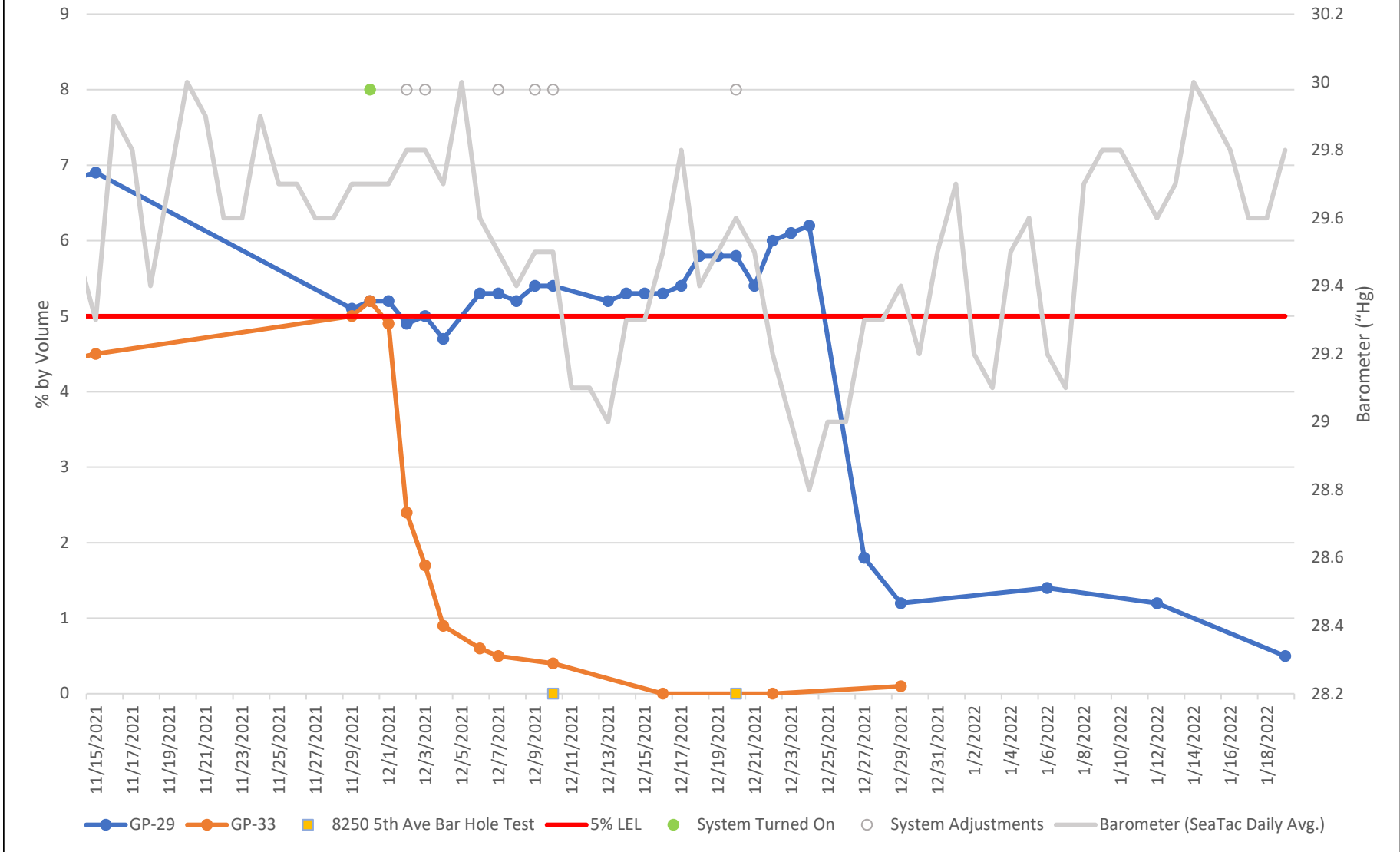
Values in **red** exceed the LEL % by volume  
 ↓ ↑ ↔ Arrows indicate falling, rising, or steady barometer

# Attachment B

Methane Exceedance Trigger Monitoring Time Series Plot



### Methane Exceedance Trigger Monitoring South Park Landfill



# Attachment C

## Fourth Quarter LFG Field Data Sheet



# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: \_\_\_\_\_

Date: 11/15/21

Field Personnel: T. Parry

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds	7.66	0.0	10:30	0.3	9.4	5.0	0
GP-09	.063	6.62 to 10.62	899	98 seconds	7.27(dry)	0.0	12:06	0.3	8.1	12.8	0
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds	<del>7.28</del> 12.51	0.0	<del>12:51</del> 11:23	0.3	<del>13.6</del> 13.6	0.0	40
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec	6.50	0.0	12:28	0.3	0.4	21.5	0
GP-07	.063	5.75 to 6.25	519	56 seconds	6.00(dry)	0.0	13:02	0.3	2.6	16.2	0
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds	12.51	0.0	11:33	1.1	13.6	0.0	4
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds	7.71	0.0	11:00	0.3	3.1	8.1	0
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	6.76	0.0	11:19	6.9	16.6	0.0	1.2
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec	4.72(dry?)	0.0	9:56	0.3	0.4	21.2	0
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds	4.50	0.0	9:25	0.3	7.5	4.8	0
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)	3.34	-	9:40	-	-	-	-
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)	1.02	-	9:49	-	-	-	-
GP-03	.063	6.73 to 8.63	725	79 seconds	8.75(dry)	0.0	9:13	0.3	5.9	8.7	0
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)	2.71	0.0	8:44	0.3	0.9	20.9	0
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)	3.28	0.0	8:51	0.3	0.5	21.0	0
							8:56	0.3	0.6	31.0	0
GP-38	.063	3.8 to 8.8	882*	96 seconds	8.42	0.0	8:27	0.3	0.2	21.1	0
							8:30	0.3	0.2	21.2	0
GP-33	.063	8.2 to 13.2	1,165*	127 seconds	12.11	0.0	10:45	0.6	16.2	1.0	0
							11:43	4.5	9.3	0.0	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

Comments: likely calibration error w/ GEM 5000 (see CH<sub>4</sub>)

Equipment Used: CIEM 5000

Barometer ("Hg) (Start): 29.55

Barometer ("Hg) (Finish): 29.50

Temperature: 56°F

Weather: Overcast w/ scattered showers to begin. Heavy rain at the end.

GP-11 was sampled from a 2 foot bar hole. These values were the same as the atmospheric values.  
 GP-13 was sampled from a 18 inch bar hole.



Attachment D  
Exceedance Monitoring Field Data Sheets



# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix / SPU  
 Date: 11/29/2021

Project Number: 553-1550-067  
 Field Personnel: Brady / Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds		0.0	1310	0.7	11.7	0.0	—
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.1	1301	5.1	13.5	0.1	—
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		0.07	1319	5.0	8.0	0.0	—

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

Comments: LFG SYSTEM IS OFF/QUIET

Equipment Used: \_\_\_\_\_

Barometer ("Hg) (Start): 30.24 (SeaTac)

Barometer ("Hg) (Finish): 30.23

Temperature: 58° F

Weather: Sunny

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix / SPU  
 Date: 11/30/2021

Project Number: 553-1550-067  
 Field Personnel: Brady & Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds		-0.03	1036	0.8	11.8	0.0	—
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.03	1027	5.2	13.4	0.2	—
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		-0.3	1044	5.2	7.9	0.0	—

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: Gas System is ON  
 Barometer ("Hg) (Start): 5  
 Temperature: 50's

Equipment Used:  
 Barometer ("Hg) (Finish): 30.23 seatac  
 Weather: Cloudy/Drizzle

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix / SPU

Project Number: 553-1550-067

Date: 12/1/21

Field Personnel: Brady & Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.01	900	5.2	13.5	0.0	—
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		0.03	9:08 MPB	4.9	8.0	0.0	—

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used:

Barometer ("Hg) (Start):

Barometer ("Hg) (Finish): 30.16

Temperature: 50°

Weather: Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix / SPO

Project Number: 553-1550-067

Date: 12/2/2021

Field Personnel: Brady & Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.06	900	4.9	13.2	0.2	-
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		-0.09	905	2.4	8.0	0.0	-

\* occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is ON

Equipment Used: \_\_\_\_\_

Barometer ("Hg) (Start): 30.27

Barometer ("Hg) (Finish): \_\_\_\_\_

Temperature: 45

Weather: Rainy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553-1550-067

Date: 12/3/2021

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration <small>Purge rate = 550 ml/min</small>	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
<b>GP-29</b>	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	—	—	1315	5.0	13.2	0.1	5
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
<b>GP-33</b>	.063	8.2 to 13.2	1,165*	127 seconds	—	—	1325	1.7	8.2	0.1	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is ON

Equipment Used: Rental GEM

Barometer ("Hg) (Start): 1300 30.32

Barometer ("Hg) (Finish): \_\_\_\_\_

Temperature: 44

Weather: Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553-1550-067

Date: 12/4/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
<u>GP-29</u>	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.01	949	4.7	12.7	0.8	0
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
<u>GP-33</u>	.063	8.2 to 13.2	1,165*	127 seconds		-0.02	1000	0.9	8.5	0.0	0

\* - occasional water in probe    C - water consistently present in probe

B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental GCM

Barometer ("Hg) (Start): 30.14

Barometer ("Hg) (Finish): 30.15

Temperature: 39

Weather: Rainy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553-1550-067

Date: 12/6/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.02	1228	5.3	14.0	0.1	0
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		-0.01	1240	0.6	9.5	0.0	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is ON

Equipment Used:

Barometer ("Hg) (Start): 29.99

Barometer ("Hg) (Finish): 30.12

Temperature: F

Weather: 44° Drizzle



# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553-1550-067

Date: 12/7/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds		-0.01	1319	0.7	11.8	0.0	5
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
<b>GP-29</b>	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.01	1255	5.3	14.0	0.1	8
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (418 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (15 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (237 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
<b>GP-33</b>	.063	8.2 to 13.2	1,165*	127 seconds		-0.00	1307	0.5	9.6	0.0	0

occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is ON

Equipment Used: Rental GEM

Barometer ("Hg) (Start): 29.58

Barometer ("Hg) (Finish):

Temperature: 47

Weather: Drizzle

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix Project Number: 553-1550-067  
 Date: 12/8/21 Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.02	1107	5.2	13.9	0.1	7
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on Equipment Used: Rental Gem  
 Barometer ("Hg) (Start): 29.61 ↓ to ← Barometer ("Hg) (Finish): \_\_\_\_\_  
 Temperature: 42° Weather: Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/9/2021

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
<u>GP-29</u>	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	7.21	-0.03	1042	5.4	14.1	0.1	7
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental GCM

Barometer ("Hg) (Start): 29.89

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↔

Temperature: 40

Weather: Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametric / Farallon

Project Number: 553 - 1550-067

Date: 12/10/21

Field Personnel: Brady / Luiten

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.01	13:20	5.4	13.8	0.3	2
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		0.00	13:37	0.4	10.0	0.0	0

\* - occasional water in probe

C - water consistently present in probe

B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental Gen

Barometer ("Hg) (Start): 30.07

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↓

Temperature: 39

Weather: Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/13/2021

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.03	11:25	5.2	13.1	0.1	6
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

Comments: System is on

Equipment Used: Rental GGM

**IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY**

Barometer ("Hg) (Start): 29.40

Barometer ("Hg) (Finish): \_\_\_\_\_

Barometric Trend: ↓

Temperature: 40°

Weather: Drizzle

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/14/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.01	8:15	5.3	13.9	0.3	6
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: \_\_\_\_\_

Equipment Used: Rental GCM

Barometer ("Hg) (Start): 29.32

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↑

Temperature: \_\_\_\_\_

Weather: \_\_\_\_\_

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: SPU

Project Number: 553 - 1550-067

Date: 12/15/21

Field Personnel: S. Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	N/A	0.03	0939	5.3	13.3	0.1	—
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe

C - water consistently present in probe

B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: \_\_\_\_\_

Equipment Used: Gem 5020

Barometer ("Hg) (Start): 29.73

Barometer ("Hg) (Finish): 29.73 Barometric Trend: \_\_\_\_\_

Temperature: 42°

Weather: Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/16/2021

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.01	1100	5.3	13.5	0.2	1
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		-0.02	1117	0.0	9.4	2.1	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental Gem

Barometer ("Hg) (Start): 29.59

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↑

Temperature: 41

Weather: Cloudy



# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/17/2021

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.00	1049	5.4	12.9	0.2	1
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Ranfal GPM

Barometer ("Hg) (Start): 30.35

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↑

Temperature: 39°

Weather: Sunny

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/18/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.01	1027	5.8	13.8	0.1	6
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: gas is on    Equipment Used: Rental Gfm

Barometer ("Hg) (Start): 29.75    Barometer ("Hg) (Finish): \_\_\_\_\_    Barometric Trend: ↓

Temperature: 46°    Weather: Rain

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Paramatrix

Project Number: 553 - 1550-067

Date: 12/19/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.00	950	5.8	13.7	0.2	5
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe

C - water consistently present in probe

B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental GEM

Barometer ("Hg) (Start): 29.97

Barometer ("Hg) (Finish): 29.97

Barometric Trend: →

Temperature: 40

Weather: Sunny

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/20/2021

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.61	1116	5.8	3.6	0.3	4
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental Gsm

Barometer ("Hg) (Start): 30.06

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↔

Temperature: 38

Weather: snow/rain

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix  
 Date: 12/21/2021

Project Number: 553 - 1550-067  
 Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.02	848	5.4	12.8	0.2	3
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental GEN

Barometer ("Hg) (Start): 29.05

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↔

Temperature: 38°

Weather: Cold

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/22/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min*	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.01	816	6.0	13.6	0.2	4
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		-0.01	827	0.0	9.2	5.2	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental Gem

Barometer ("Hg) (Start): 29.68

Barometer ("Hg) (Finish): 29.71    Barometric Trend: ↓

Temperature: 45

Weather: cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: SPU Project Number: 553-1550-067  
 Date: 12/23/2021 Field Personnel: Shannon Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds			5.0918	6.1	12.9	0.1	
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe C - water consistently present in probe B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY  
 Laura Lee 425-941-9409

Comments: \_\_\_\_\_  
 Barometer ("Hg) (Start): 29.47  
 Temperature: 43°

Equipment Used: Gem 5000  
 Barometer ("Hg) (Finish): 29.47 Barometric Trend: \_\_\_\_\_  
 Weather: Overcast

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: SPO

Project Number: 553-1550-067

Date: 12/24/21

Field Personnel: S. Straws

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	—	0.01	0927	6.2	12.8	0.1	—
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\*- occasional water in probe C - water consistently present in probe B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Laura Lee 425-941-9409

Comments: Blow down 4/10/22

Equipment Used: Gem 5000

Barometer ("Hg) (Start): 29.270

Barometer ("Hg) (Finish): 29.27 Barometric Trend: \_\_\_\_\_

Temperature: 38°F

Weather: Overcast



# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: SPU Project Number: 553-1550-067  
 Date: 12/27/21 Field Personnel: S. Straws T. Steimel

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	/	0.01	1241	1.8	12.0	0.2	/
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe C - water consistently present in probe B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY  
 Laura Lee 425-941-9409

Comments: Show Blower running  
 Barometer ("Hg) (Start): 29.85  
 Temperature: 27°F

Equipment Used: Com 5000  
 Barometer ("Hg) (Finish): 29.85 Barometric Trend: \_\_\_\_\_  
 Weather: Part Cloudy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 12/29/21

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.02	816	1.2	12.6	1.4	0
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		0.01	827	0.1	9.5	3.5	0

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental GEM

Barometer ("Hg) (Start): 29.91

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↑

Temperature: 23°

Weather: Sunny

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 1/6/22

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft - btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min.59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		0.01	9:05	1.4	11.7	0.1	1
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds		0.03	9:14	0.0	4.6	1.3	0

\* - occasional water in probe C - water consistently present in probe B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is on

Equipment Used: Rental Gem 5k

Barometer ("Hg) (Start): 29.70

Barometer ("Hg) (Finish):

Barometric Trend: ↓

Temperature: 45

Weather: Rainy

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553 - 1550-067

Date: 1/12/2022

Field Personnel: Brady

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds		-0.03	1045	1.2	11.0	0.3	3
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe    IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY

Comments: System is OK

Equipment Used: Rental GOM

Barometer ("Hg) (Start): 29.72

Barometer ("Hg) (Finish): \_\_\_\_\_ Barometric Trend: ↓ to →

Temperature: 54

Weather: Drizzle

# South Park Landfill

## GAS PROBE MONITORING FIELD FORM

Sampling Organization: SPU

Project Number: 553-1550-067

Date: 1/19/22

Field Personnel: SS WY

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)	Purge Duration Purge rate = 550 ml/min	Depth to Water (ft - btoc)	Pressure (in W.C.)	Time	CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)	H <sub>2</sub> S (ppm)
GP-37	.063	2.8 to 7.8	868	94 seconds							
GP-09	.063	6.62 to 10.62	899	98 seconds							
GP-26	.063	4.62 to 9.62	768 <sup>C</sup>	83 seconds							
GP-23	.167	6.05 to 7.05	4,940*	8 min 59 sec							
GP-07	.063	5.75 to 6.25	519	56 seconds							
GP-27	.063	8.57 to 13.57	1,089 <sup>C</sup>	119 seconds							
GP-28	.063	6.59 to 11.59	1,010 <sup>C</sup>	110 seconds							
GP-29	.063	4.62 to 9.62	814 <sup>C</sup>	89 seconds	—	-0.01	9:30	0.5	10.6	0.1	—
GP-16	.167	6.60 to 9	5,867*	10 min 18 sec							
GP-31	.063	4.64 to 9.64	548 <sup>C</sup>	60 seconds							
GP-15	.167	6.62 to 8.62	4,103 <sup>B</sup>	Check for H <sub>2</sub> O (448 sec if open)							
GP-32	.063	4.72 to 9.72	416 <sup>B</sup>	Check for H <sub>2</sub> O (45 sec if open)							
GP-03	.063	6.73 to 8.63	725	79 seconds							
GP-13	.167	4.91 to 5.41	3,043 <sup>B</sup>	Check for H <sub>2</sub> O (332 sec if open)							
GP-11	.167	6.23 to 6.73	3,862 <sup>B</sup>	Check for H <sub>2</sub> O (420 sec if open)							
GP-38	.063	3.8 to 8.8	882*	96 seconds							
GP-33	.063	8.2 to 13.2	1,165*	127 seconds							

\* - occasional water in probe    C - water consistently present in probe    B - water typically blocks probe

IF CH<sub>4</sub> IS ABOVE 5% CALL PROJECT MANAGER IMMEDIATELY  
Laura Lee 425-941-9409

Comments: Blower running

Equipment Used: Gem #1

Barometer ("Hg) (Start): 30.31

Barometer ("Hg) (Finish): 30.31      Barometric Trend: \_\_\_\_\_

Temperature: 43°

Weather: Part Cloudy

# Attachment E

## Indoor Air Monitoring Field Sheets



# South Park Landfill

## Off-Site Building Monitoring

Date: 11/30/2021

Location: 7958 OCCIDENTAL

Inspector: BRADY / STRAWS

Owner: WG CLARK

Reason for Monitoring: GP-33 Exceedance

Meet w/ Jeff Franks 206-793-4792 from  
WG Clark

Instrument Used: LANDTEC GEM 5000 Det limit 0.1% BU

Describe monitoring; include locations, building type, cracks in foundation or floors, etc.:

WG Clark noted they have a LFG mitigation system discharges  
from pipe on north side roof. Measured LFG at following locations:

- N side exterior pipe 0.0
- Repair bldg crack in foundation 0.0
- Main bldg garage door area 0.0
- slab / asphalt connection 0.0
- Power conduit west side of bldg 0.0
- NW side drain conduit next to slab 0.0

# South Park Landfill

## Off-Site Building Monitoring

Date: 12/3/21

Location: 7958 OCCIDENTAL

Inspector: Brady

Owner: WG CLARK

Reason for Monitoring: GP-33 Exceedance

Arrive 1500, WG Clark closed

Instrument Used: TVA 2020 FID PPM DET LIMIT

Describe monitoring; include locations, building type, cracks in foundation or floors, etc.:

WG Clark is closed for day. collect  
measurements from exterior w/ FID.

- BACKGROUND 1.5 PPM START UP
- SOUTH OF BLDG 1.3 PPM (edge of asphalt slab)
- WEST OF BLDG 1.2 PPM (" " )
- SOUTH EAST 1.0 PPM (" " )
- AT GP-11 / MW-12 0.8 ppm



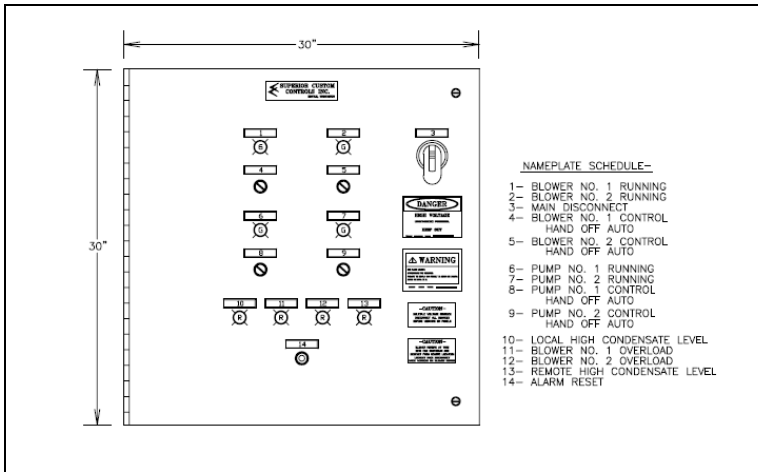
# Attachment F

Photographs





Photo of the gas system control panel taken November 29, 2021. The Blower No. 2 overload light is lit red.



Control Panel Schematic



Photo of the gas system control panel taken December 2, 2022. The Blower No. 2 light indicating the system is lit green and the overload light is off.

C3-B

SPPD Corrective Action Report



**SPPD PROPERTY LANDFILL GAS COLLECTION AND CONTROL  
CORRECTIVE ACTION SUMMARY REPORT**

**SOUTH PARK LANDFILL SITE  
SEATTLE, WASHINGTON**

**Submitted by:  
Farallon Consulting, L.L.C.  
975 5<sup>th</sup> Avenue Northwest  
Issaquah, Washington 98027**

**Farallon PN: 408-002**

**For:  
South Park Property Development, LLC  
c/o SEACON, L.L.C.  
165 Northeast Juniper Street, Suite 100  
Issaquah, Washington**

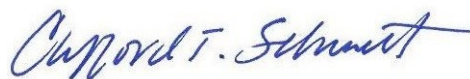
February 18, 2022

Prepared by:



Russell Luiten, P.E.  
Associate Engineer

Reviewed by:



Clifford T. Schmitt, L.G., L.H.G.  
Principal Hydrogeologist



## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1-1</b>
<b>2.0</b>	<b>CORRECTIVE ACTION RESULTS .....</b>	<b>2-1</b>
<b>3.0</b>	<b>ADDITIONAL INVESTIGATIONS AND FUTURE WORK .....</b>	<b>3-1</b>
<b>4.0</b>	<b>REFERENCES.....</b>	<b>4-1</b>
<b>5.0</b>	<b>LIMITATIONS .....</b>	<b>5-1</b>
5.1	GENERAL LIMITATIONS .....	5-1

## FIGURES

- Figure 1 *Vicinity Map*  
Figure 2 *Property Map*

## TABLES

- Table 1 *Perimeter Probe Compliance Monitoring Data, GP-29 and GP-33*



## ACRONYMS AND ABBREVIATIONS

Corrective Action Plan	<i>SPPD Property Landfill Gas Collection and Control System Corrective Action Plan, South Park Landfill Site, Seattle, Washington</i> dated December 22, 2021 prepared for SPPD by Farallon
Ecology	Washington State Department of Ecology
Farallon	Farallon Consulting, L.L.C.
LEL	lower explosive limit (5 percent methane)
LFGCCS	landfill gas collection and control system
LFG	landfill gas
OMMP	Operations, Maintenance, and Monitoring Plan
South Park Landfill Site	the locations where contamination caused by the release of hazardous substances from the South Park Landfill has come to be located
SPPD	South Park Property Development, LLC
SPPD Property	a 19.4-acre parcel purchased by South Park Property Development, LLC from King County in 2006 (King County Parcel No. 3224049005)



## 1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Corrective Action Summary Report on behalf of South Park Property Development, LLC (SPPD) to provide a summary of the corrective actions conducted in response to methane concentrations exceeding the lower explosive limit (LEL) at a compliance perimeter probe proximate to the SPPD-owned landfill gas collection and control system (LFGCCS) at a portion of what is known as the South Park Landfill in the South Park neighborhood of Seattle, Washington (Figure 1). The LFGCCS was designed to capture landfill gas (LFG) generated by mixed municipal solid waste at an approximately 19.4-acre parcel within the South Park Landfill that SPPD purchased from King County in 2006 (King County Parcel No. 3224049005) (SPPD Property) (Figure 2). Corrective actions for reducing methane concentrations in a perimeter probe adjacent to the SPPD LFGCCS were outlined in the *SPPD Property Landfill Gas Collection and Control System Corrective Action Plan, South Park Landfill Site, Seattle, Washington* dated December 22, 2021 prepared for SPPD by Farallon (2021) (Corrective Action Plan), which was submitted to the Washington State Department of Ecology (Ecology) on December 22, 2021.

The *Landfill Post-Closure Operations, Maintenance, and Monitoring Plan* (OMMP) (Floyd|Snider 2018) is an appendix to the *South Park Landfill, Final Cleanup Action Plan* dated March 2018, prepared by Ecology. The OMMP (2018) describes monitoring requirements and criteria for additional actions for the SPPD Property, South Recycling and Disposal Station Property, and certain adjacent rights-of-way (Figures 1 and 2). Contingent actions are triggered in the OMMP when concentrations of methane exceed 5 percent by volume in the perimeter probes.

Since December 27, 2021, concentrations of methane in perimeter probes proximate to the SPPD Property have been in compliance with the criteria as defined in the OMMP. The purpose of this Corrective Action Summary Report is to summarize the recent corrective actions completed, present results of additional monitoring and testing, provide a description of the suspected cause leading to the perimeter probes exceeding the methane concentration limit defined in the OMMP, and describe future operation of the LFGCCS.



## 2.0 CORRECTIVE ACTION RESULTS

The Corrective Action Plan outlined the following short-term actions for the SPPD LFGCCS to reduce methane concentrations in gas probe GP-29 and confirm that the SPPD-owned LFGCCS is operating as designed. In accordance with the Corrective Action Plan, these actions were completed within 7 days of providing the Corrective Action Plan to Ecology:

1. Vacuum verification testing of LFG collector H-5 conveyance piping;
2. Temporary modifications to the LFGCCS air dilution intake piping; and
3. Installation of methane detectors in the buildings at the property located at 8250 5<sup>th</sup> Avenue South (King County Parcel No. 7883600350), in Seattle Washington (former Ness Manitowoc Property).

A summary of the short-term corrective actions conducted and the results are as follows:

1. Vacuum verification testing of LFG collection H-5 was conducted on December 22, 2021. A vacuum monitoring port was installed at the connection point of the horizontal collection piping of LFG collector H-5. From the horizontal well connection point, conveyance piping is routed to the control assembly at the top of the slope of the SPPD Property where extracted LFG parameters are monitored and vacuum of this collector well is adjusted.

On December 22, 2021, vacuum was monitored at the control assembly and the trench connection point with results of 2.361 and 2.345 inches of water column, respectively. The minimal vacuum difference between the two monitoring points represents the pipe friction losses and confirms that the conveyance piping does not have a break or leak preventing application of the full vacuum to the LFG collector well screen.

2. Modifications to the air dilution intake for the LFGCCS were conducted on December 20, 2021 to increase the overall extraction flowrate and vacuum applied to the LFG collector network. A series of reducing PVC bushings were temporarily installed on the air dilution intake to decrease the dilution air for the LFGCCS. The reduction in dilution air to the LFGCCS increased the vacuum and extraction flowrate to the LFG collection network. With increasing flowrate and vacuum to the LFG collector network, a subset of LFG collection wells had their flowrates reduced on December 20 and 22, 2021 to increase the flowrate of LFG collector H-5.
3. Four Techamor Y401 methane detectors were installed in the buildings located at and associated with the property at 8250 5<sup>th</sup> Avenue South. One methane detector was placed in the western building, two methane detectors were placed in the central building, and one methane detector was placed in the in the building located at 500 South Sullivan Street (King County Parcel No. 7883600600) on the south-adjacent property (Figure 2). The 8250 5<sup>th</sup> Avenue South property previously had power service disconnected and was being restored as part of tenant improvements. Power was restored to the 8250 5<sup>th</sup> Avenue South





property on January 4, 2022, and subsequently to the methane detectors. Methane has not been detected at the four methane detector locations.

Medium-term or long-term corrective actions were not necessary, because methane concentrations were less than its LEL on December 27, 2021. From November 29 to December 24, 2021 methane concentration in gas probe GP-29 ranged from 4.7 to 6.2 percent by volume. During the December 27, 2021 monitoring event, methane concentrations in gas probe GP-29 were 1.8 percent by volume and confirmed to be less than methane's LEL on December 29, 2021 when methane concentrations were 1.2 percent by volume. Weekly methane monitoring of gas probe GP-29 had a decreasing trend with the last monitoring event for the corrective action with a concentration of 0.5 percent by volume on January 19, 2022 (Table 1).

Concentrations of methane in gas probe GP-33 have remained less than the LEL since the monitoring event on December 1, 2021.



### **3.0 ADDITIONAL INVESTIGATIONS AND FUTURE WORK**

The SPPD-owned LFGCCS was discovered shut down during the November 29, 2021 LFG monitoring event. The current operational blower, Blower No. 2, had an overload alarm from the blower thermal overload tripping. The thermal overload breaker for Blower No. 2 was reset on November 30, 2021, and the LFGCCS resumed operation and has operated continuously since that time. The cause of the thermal overload, and the duration of the period that the LFGCCS was not operational, has not been determined but is suspected to have been caused by a power surge related to a localized regional power outage. The LFGCCS has an alarm monitoring system that is supposed to call a preprogramed phone number when alarm conditions occur, such as the power outage or thermal overload. A notification was not received by the LFGCCS operator from the thermal overload for Blower No. 2. The alarm monitoring system's backup batteries no longer had a charge, and the alarm system was unable to place a call if there was a power outage. The batteries for the alarm system were replaced on January 3, 2022. The alarm system will be replaced with a telemetry system with cellular service and data-logging capabilities. The replacement alarm notification system is awaiting delivery and is expected to be installed by the end of February 2022. In addition to replacement of the notification system, additional alarm zones for reporting blower voltage present will be added to the alarm zones. Blower voltage present will be an indicator of if the blower is operational.

Methane accumulated proximate to gas probe GP-29 was removed from soil gas by increased LFG extraction at collector H-5. With methane concentrations below the LEL in gas probe GP-29, the LFGCCS will be rebalanced to its steady-state operation to control LFG generated on the SPPD Property. Rebalancing could include removal of portions of the air dilution intake modifications described in Section 2, Corrective Action Results.



## 4.0 REFERENCES

- Farallon Consulting, L.L.C. (Farallon). 2016. *SPPD Property Landfill Gas Collection and Control System Operation, Maintenance, and Monitoring Plan, South Park Landfill Site, Seattle, Washington*. Prepared for South Park Property Development, LLC. June 7.
- . 2021. *SPPD Property Landfill Gas Collection and Control System Corrective Action Plan, South Park Landfill Site, Seattle, Washington*. Prepared for South Park Property Development, LLC. December 22.
- Floyd|Snider. 2018. *South Park Landfill Post-Closure Operations, Maintenance, and Monitoring Plan*. Prepared for City of Seattle and South Park Property Development, LLC. March.
- Washington State Department of Ecology (Ecology). 2018. *South Park Landfill, Final Cleanup Action Plan*. March 2018.



## 5.0 LIMITATIONS

### 5.1 GENERAL LIMITATIONS

The conclusions contained in this report/assessment are based on professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location. The conclusions contained herein are subject to the following inherent limitations:

- **Accuracy of Information.** Farallon obtained, reviewed, and evaluated certain information used in this report/assessment from sources that were believed to be reliable. Farallon's conclusions, opinions, and recommendations are based in part on such information. Farallon's services did not include verification of its accuracy or authenticity. Should the information upon which Farallon relied prove to be inaccurate or unreliable, Farallon reserves the right to amend or revise its conclusions, opinions, and/or recommendations.
- **Reconnaissance and/or Characterization.** Farallon performed a reconnaissance and/or characterization of the Site that is the subject of this report/assessment to document current conditions. Farallon focused on areas deemed more likely to exhibit hazardous materials conditions. Contamination may exist in other areas of the Site that were not investigated or were inaccessible. Site activities beyond Farallon's control could change at any time after the completion of this report/assessment.

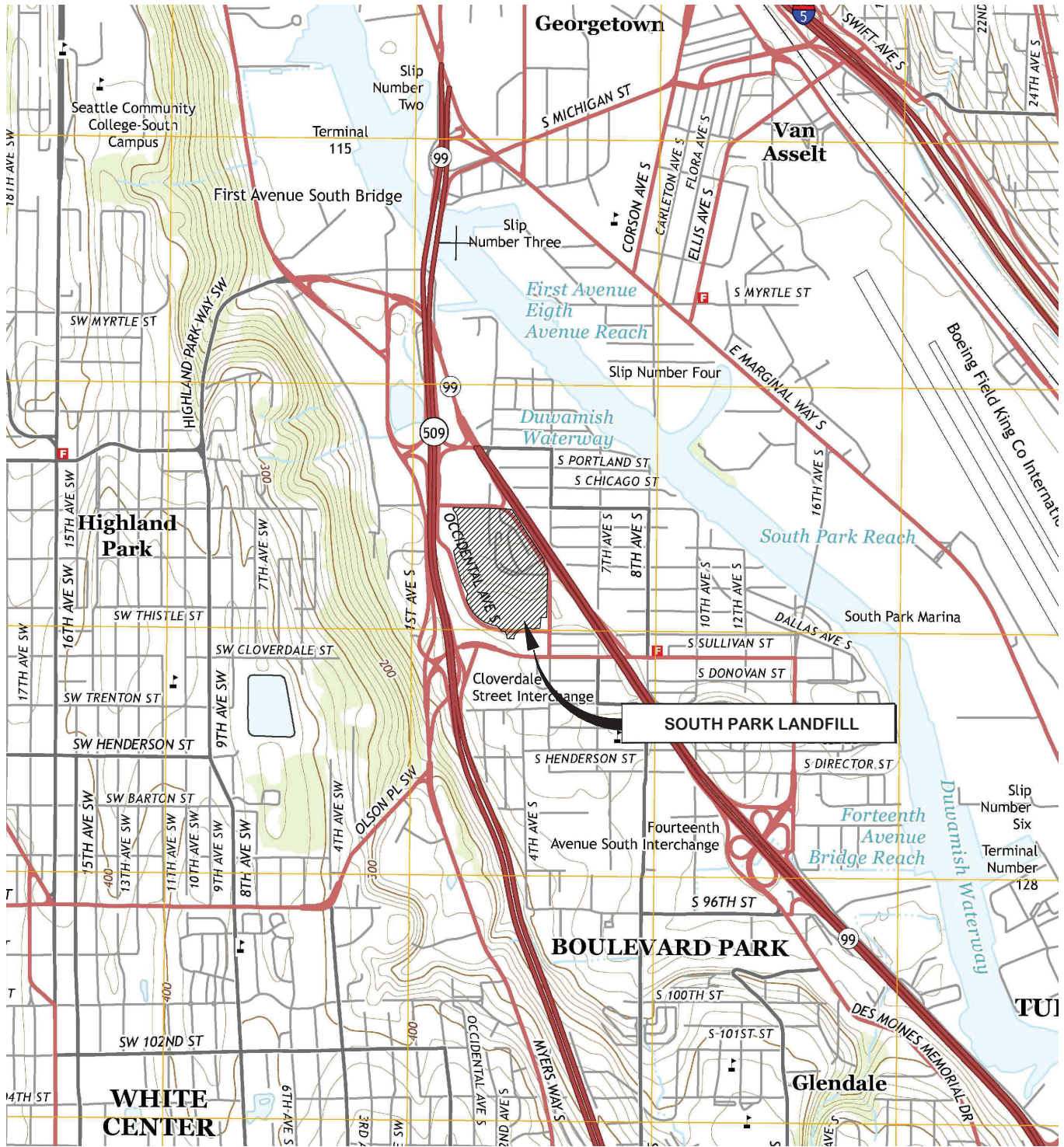
For the foregoing reasons, Farallon cannot and does not warrant or guarantee that the Site is free of hazardous or potentially hazardous substances or conditions, or that latent or undiscovered conditions will not become evident in the future. Farallon's observations, findings, and opinions can be considered valid only as of the date of the report.

This report/assessment has been prepared in accordance with the contract for services between Farallon and South Park Property Development L.L.C., and currently accepted industry standards. No other warranties, representations, or certifications are made.

## **FIGURES**

### **SPPD PROPERTY LANDFILL GAS COLLECTION AND CONTROL CORRECTIVE ACTION SUMMARY South Park Landfill Site Seattle, Washington**

**Farallon PN: 408-002**



REFERENCE: 7.5 MINUTE USGS QUADRANGLE SEATTLE SOUTH, WASHINGTON. DATED 2014

R:\Projects\408-002\Legacy\Drawings - Plots\BASEMAPb.dwg 12/22/2021 1:02 PM (Russell Luiten)



Washington  
Issaquah | Bellingham | Seattle

Oregon  
Portland | Baker City

California  
Oakland | Irvine

**FARALLON**  
CONSULTING

Your Challenges. Our Priority. | farallonconsulting.com

Drawn By: ROL    Checked By: CTS

**FIGURE 1**  
VICINITY MAP  
SOUTH PARK LANDFILL SITE  
SEATTLE, WASHINGTON

FARALLON PN:408-002

**CITY OF SEATTLE  
NEW SOUTH RECYCLING AND DISPOSAL STATION  
(TO BE CONSTRUCTED; FORMERLY KNOWN AS THE  
SOUTH KENYON STREET BUS YARD)**

7901 2nd AVE S, L.L.C.  
PARCEL NO. 3224049077  
0.72 ACRES

HARSCH INVESTMENT PROPERTIES, L.L.C.  
PARCEL NO. 3224049007  
6.49 ACRES

SEATTLE SOUTH RECYCLING  
AND DISPOSAL STATION  
PARCEL NO. 7328400005  
11.26 ACRES

SOUTH PARK PROPERTY  
DEVELOPMENT, L.L.C.  
PARCEL NO. 3224049005  
19.4 ACRES

FORMER NESS  
MANITOWOC PROPERTY  
PARCEL NO. 7883600350

PARCEL NO. 7883600600

KAHN FAMILY L.L.C.  
PARCEL NO. 3224049084  
0.62 ACRES

LENCI FRANK CORPORATION  
PARCEL NO. 3224049045  
2.77 ACRES

- LEGEND**
- SOUTH PARK LANDFILL BOUNDARY (FINAL CLEANUP ACTION PLAN)
  - KING COUNTY TAX PARCEL BOUNDARY
  - FENCE
  - DITCH OR CHANNEL
  - EXISTING BUILDING
  - SETTLEMENT AREA (FINAL CLEANUP ACTION PLAN)
  - LANDFILL GAS PROBE MONITORING LOCATIONS
  - SEWER MANHOLE MONITORING LOCATIONS
  - BAR HOLE MONITORING LOCATIONS
  - LANDFILL GAS VERTICAL COLLECTION WELL
  - LANDFILL GAS HORIZONTAL COLLECTION WELL
  - LANDFILL GAS COLLECTOR MAIN

**NOTES:**  
1. FIGURE INCLUDES INFORMATION PRESENTED IN COLOR. PHOTOCOPIES MAY NOT DEPICT ALL INTENDED INFORMATION ON THE ORIGINAL DRAWING.  
2. ALL LOCATIONS ARE APPROXIMATE.

0 100  
APPROXIMATE SCALE IN FEET



**FIGURE 2**  
PROPERTY MAP  
SOUTH PARK LANDFILL SITE  
SEATTLE, WASHINGTON

Drawn By:ROL Checked By:CTS

FARALLON PN: 408-002

**TABLE**

**SPPD PROPERTY LANDFILL GAS COLLECTION AND CONTROL  
CORRECTIVE ACTION SUMMARY  
South Park Landfill Site  
Seattle, Washington**

Farallon PN: 408-002



**Table 1**  
**Perimeter Probe Compliance Monitoring Data, GP-29 and GP-33**  
**South Park Landfill Site**  
**Seattle, Washington**  
**Farallon PN: 408-002**

Monitoring Location <sup>1</sup>	Start Date <sup>2</sup>	Barometric (in. Hg) <sup>3</sup>	Well Head Pressure (in. H <sub>2</sub> O) <sup>4</sup>	LFG Monitoring Parameters <sup>5</sup>			Balance Gas (% Volume)	CO (ppm)	LEL (% CH <sub>4</sub> )
				CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)			
GP-29	2/7/2011	30.10	0.06	7.1	12.5	0.0	-	-	-
	2/21/2011	29.89	0.09	3.6	6.9	9.0	-	-	-
	5/11/2011	29.73	-0.03	6.9	12.2	0.3	-	-	-
	5/25/2011	29.7	-0.06	2.4	4.1	12.6	-	-	-
	6/27/2011	29.68	0.11	8.5	13.1	0.0	-	-	-
	9/23/2011	29.99	0.03	7.2	14.2	0.0	-	-	-
	11/17/2011	29.73	-0.22	7.1	12.2	3.7	-	-	-
	12/28/2011	29.95	-0.11	8.1	15.1	0.0	-	-	-
	5/22/2013	29.8	-	7.9	12.5	0.0	-	41.0	-
	6/25/2014	29.79	-	6.6	12.8	0.0	80.4	-	-
	9/2/2014	29.67	-	8.1	16.6	0.5	74.9	-	100.0
	10/13/2014	29.71	0.003	8.5	16.9	0.0	-	-	100.0
	11/6/2014	29.85	-0.047	8.9	14.9	0.0	-	-	-
	1/28/2015	30.03	-	1.0	14.9	0.0	-	-	-
	2/26/2015	30.16	0.000	1.4	13.3	0.0	-	-	-
	2/26/2015	29.99	0.000	1.0	9.9	28.0	-	-	-
	5/12/2015	29.69	0.000	4.9	14.3	0.0	80.8	-	99.0
	11/17/2015	29.58	0.000	10.6	16.5	0.0	72.8	-	100.0
	12/17/2015	29.73	0.000	6.2	12.4	0.4	80.8	0.0	100.0
	2/17/2016	29.36	0.000	2.9	12.2	0.0	84.8	0.0	-
	3/1/2016	29.63	0.000	1.3	10.6	0.0	87.9	0.0	-
	3/18/2016	30.02	-	1.7	11.2	0.0	87.0	13.0	13.0
	4/13/2016	30.01	0.000	2.2	9.2	0.0	88.5	0.0	0.0
	5/11/2016	30.01	0.000	1.2	12.2	0.0	86.6	0.0	-
	6/13/2016	29.95	-	0.4	16.1	0.0	83.4	0.0	8.0
	9/26/2016	29.93	-0.009	0.0	15.5	0.0	84.4	0.0	0.0
	12/8/2016	29.97	0.000	3.4	17.3	0.0	79.3	1.0	67.0
	12/22/2016	29.88	0.000	3.1	15.1	0.0	81.8	0.0	-
	12/29/2016	30.11	-0.005	0.0	13.6	0.0	86.3	0.0	-
	3/21/2017	29.67	-0.047	0.9	15.1	0.1	83.8	-	-
	6/2/2017	29.97	-0.038	0.0	14.7	0.1	85.9	0.0	0.0
	9/6/2017	29.78	-0.031	0.0	0.4	20.0	79.6	-	-
	10/19/2017	29.78	-0.031	0.2	18.6	0.0	81.1	-	6.0
	3/9/2018	29.97	0.024	0.0	12.3	0.6	87.1	-	-
	5/21/2018	29.92	0.000	0.0	15.9	0.0	84.0	-	-
	9/13/2018	29.93	0.000	0.8	20.3	0.0	78.7	-	-
	12/26/2018	30.05	-	0.0	13.1	0.6	85.1	-	-
	4/1/2019	29.62	-	1.2	0.3	15.3	-	-	-
	5/14/2020	29.97	0.000	1.4	11.8	3.0	-	-	-
	8/24/2020	30.03	0.000	1.8	14.8	2.0	-	-	-
	11/9/2020	30.05	0.000	2.9	14.3	1.6	-	-	-
	2/22/2021	30.15	0.000	2.0	7.3	6.1	-	-	-
	5/17/2021	29.89	-0.020	1.6	14.1	-	-	-	-
	8/23/2021	29.66	-0.020	1.5	21.4	-	-	-	-
	11/15/2021	29.55	0.000	6.9	16.6	0.0	-	-	-
11/29/2021	30.24	0.100	5.1	13.5	0.1	-	-	-	
11/30/2021	30.23	0.030	5.2	13.4	0.2	-	-	-	
12/1/2021	30.16	0.010	5.2	13.5	0.0	-	-	-	
12/2/2021	30.27	-0.060	4.9	13.2	0.2	-	-	-	
12/3/2021	30.32	-	5.0	13.2	0.1	-	-	-	
12/4/2021	30.14	-0.010	4.7	12.7	0.8	-	-	-	
12/6/2021	29.99	-0.020	5.3	14.0	0.1	-	-	-	
12/7/2021	29.58	0.010	5.3	14.0	0.1	-	-	-	
12/8/2021	29.61	-0.020	5.2	13.9	0.1	-	-	-	
12/9/2021	29.89	-0.030	5.4	14.1	0.1	-	-	-	
12/10/2021	30.07	0.010	5.4	13.8	0.3	-	-	-	
12/13/2021	29.4	0.030	5.2	13.9	0.1	-	-	-	
12/14/2021	29.32	-0.010	5.3	13.9	0.3	-	-	-	
12/15/2021	29.73	0.030	5.3	13.3	0.1	-	-	-	
12/16/2021	29.59	-0.010	5.3	13.5	0.2	-	-	-	
12/17/2021	30.35	0.000	5.4	12.9	0.2	-	-	-	
12/18/2021	29.75	0.010	5.8	13.8	0.1	-	-	-	
12/19/2021	29.97	0.000	5.8	13.7	0.2	-	-	-	
12/20/2021	30.06	0.010	5.8	13.6	0.3	-	-	-	
12/22/2022	29.71	-0.010	6.0	13.6	0.2	-	-	-	
12/23/2021	29.47	-0.050	6.1	12.9	0.1	-	-	-	
12/24/2021	29.27	0.010	6.2	12.8	0.1	-	-	-	
12/27/2021	29.85	0.010	1.8	12.0	0.2	-	-	-	
12/29/2022	29.91	-0.020	1.2	12.6	1.4	-	-	-	
1/6/2022	29.7	0.010	1.4	11.7	0.1	-	-	-	
1/12/2022	29.72	-0.030	1.2	11.0	0.3	-	-	-	
1/19/2022	30.31	-0.010	0.5	10.6	0.1	-	-	-	

**Table 1**  
**Perimeter Probe Compliance Monitoring Data, GP-29 and GP-33**  
**South Park Landfill Site**  
**Seattle, Washington**  
**Farallon PN: 408-002**

Monitoring Location <sup>1</sup>	Start Date <sup>2</sup>	Barometric (in. Hg) <sup>3</sup>	Well Head Pressure (in. H <sub>2</sub> O) <sup>4</sup>	LFG Monitoring Parameters <sup>5</sup>			Balance Gas (% Volume)	CO (ppm)	LEL (% CH <sub>4</sub> )
				CH <sub>4</sub> (% Volume)	CO <sub>2</sub> (% Volume)	O <sub>2</sub> (% Volume)			
GP-33	5/22/2013	29.84	-0.15	1.5	11.7	3.3	83.5	293.0	29.0
	6/18/2013	29.82	0	0.0	12.8	5.0	82.1	0.0	0.0
	6/19/2013	29.01	-0.004	0.0	13.7	4.3	81.9	0.0	0.0
	6/25/2014	29.72	0.018	0.0	13.7	1.2	85.0	0.0	0.0
	10/13/2014	29.55	-0.013	4.9	16.5	0.0	78.7	-	97.0
	11/6/2014	29.93	0.033	0.0	1.2	18.9	-	-	-
	2/26/2015	30	0.014	0.0	7.2	3.5	-	-	-
	5/12/2015	29.63	0	7.6	6.5	10.3	75.3	-	100.0
	12/17/2015	29.69	-0.07	18.7	3.8	0.1	77.4	0.0	100.0
	3/18/2016	30.03	-	19.8	7.0	0.0	73.1	4.0	-
	3/18/2016	-	-	18.2	5.5	0.0	76.2	-	-
	4/13/2016	30.01	0.059	22.0	11.3	0.0	66.6	-	-
	5/11/2016	30.06	-0.05	4.6	9.7	0.0	85.6	10.0	-
	6/13/2016	29.92	-0.03	0.0	1.4	20.4	78.1	9.0	0.0
	6/28/2016	30.09	-0.033	0.1	10.6	0.8	88.4	-	-
	9/26/2016	29.95	-0.019	0.0	10.6	0.1	89.3	0.0	0.0
	12/8/2016	30.08	0.023	4.5	4.6	0.0	90.9	0.0	90.0
	12/22/2016	-	-	8.0	6.1	0.2	85.5	0.0	-
	12/29/2016	30.11	0.025	4.0	6.6	0.0	83.3	0.0	-
	3/21/2017	29.67	0.023	3.5	3.0	2.6	90.7	-	-
	5/31/2017	-	-	0.0	2.6	8.6	88.7	-	0.0
	9/6/2017	29.87	-0.265	0.8	10.3	0.0	88.7	-	-
	10/19/2017	29.87	-0.265	0.0	10.0	1.6	88.4	0.0	0.0
	3/9/2018	29.97	0.104	0.0	6.3	4.0	89.6	-	-
	5/21/2018	30.03	0	0.0	6.2	6.6	87.1	-	-
	9/12/2018	29.87	0	0.0	11.6	1.9	86.5	-	-
	12/26/2018	30.5	-	0.0	8.1	4.1	87.8	-	-
	4/1/2019	30.24	-	0.0	3.0	11.6	-	-	-
	5/14/2020	29.97	0	0.0	5.5	8.0	-	-	-
	8/24/2020	30.03	0	0.0	6.7	9.5	-	-	-
	11/9/2020	30.05	0	0.0	4.9	13.5	-	-	-
	2/22/2021	30.15	0	0.0	4.2	6.2	-	-	-
	5/17/2021	29.89	-0.05	0.0	4.7	8.2	-	-	-
8/23/2021	29.66	10.74	0.0	8.3	6.0	-	-	-	
11/15/2021	29.55	0	4.5	9.3	0.0	-	-	-	
11/29/2021	30.24	0.07	5.0	8.0	0.0	-	-	-	
11/30/2021	30.23	-0.3	5.2	7.9	0.0	-	-	-	
12/1/2021	30.16	0.03	4.9	8.0	0.0	-	-	-	
12/2/2021	30.27	-0.09	2.4	8.0	0.0	-	-	-	
12/3/2021	30.32	-	1.7	8.2	0.1	-	-	-	
12/4/2021	30.14	-0.02	0.9	8.5	0.0	-	-	-	
12/6/2021	29.99	-0.01	0.6	9.5	0.0	-	-	-	
12/7/2021	29.58	0	0.5	9.6	0.0	-	-	-	
12/10/2021	30.07	0	0.4	10.0	0.0	-	-	-	
12/16/2021	29.59	-0.02	0.0	9.4	2.1	-	-	-	
12/29/2022	29.91	0.01	0.1	9.5	3.5	-	-	-	
BH-1	12/10/2021	-	-	0.0	0.1	18.3	81.6	-	0.0
	12/20/2021	-	-	0.0	0.0	17.5	82.5	-	0.0
<b>Screening Level</b>				<b>5.0</b>	NA	NA	NA	NA	100

**NOTES:**

Results in **bold** denote that monitoring results are equal to or exceed the Lower Explosive Limit.

- denotes no data available

<sup>1</sup> Monitoring Locations are those identified for compliance monitoring in the Interim Action Compliance Monitoring Plan, Appendix C of the Interim Action Work Plan, South Park Landfill Site, Seattle, Washington dated February 22, 2013, prepared by Farallon Consulting, L.L.C. (Farallon)

<sup>2</sup>Monitoring data following May 22, 2013 until October 2017 were collected by Farallon. All prior data were collected by Floyd Snider; Aspect Consulting LLC; Associated Earth Sciences, Inc; Herrera Environmental Consultants, Inc.; and King County Solid Waste Division. Data following were collected by SeaCon LLC and Paramtrix

<sup>3</sup>Barometric pressure data collected by Farallon using the GEM 2000.

<sup>4</sup> Well head pressure measured using the Dwyer 475-2-FM Series 475 MK III Handheld Digital Manometer by Farallon.

<sup>5</sup>Data collected by Farallon using the GEM 2000, calibrated prior to monitoring.

% = percent  
 CH<sub>4</sub> = methane  
 CO = carbon monoxide  
 CO<sub>2</sub> = carbon dioxide  
 H<sub>2</sub>O = water  
 Hg = mercury  
 in. = inches  
 LEL = lower explosive limit  
 LFG = landfill gas  
 O<sub>2</sub> = oxygen  
 ppm = parts per million

# Appendix D

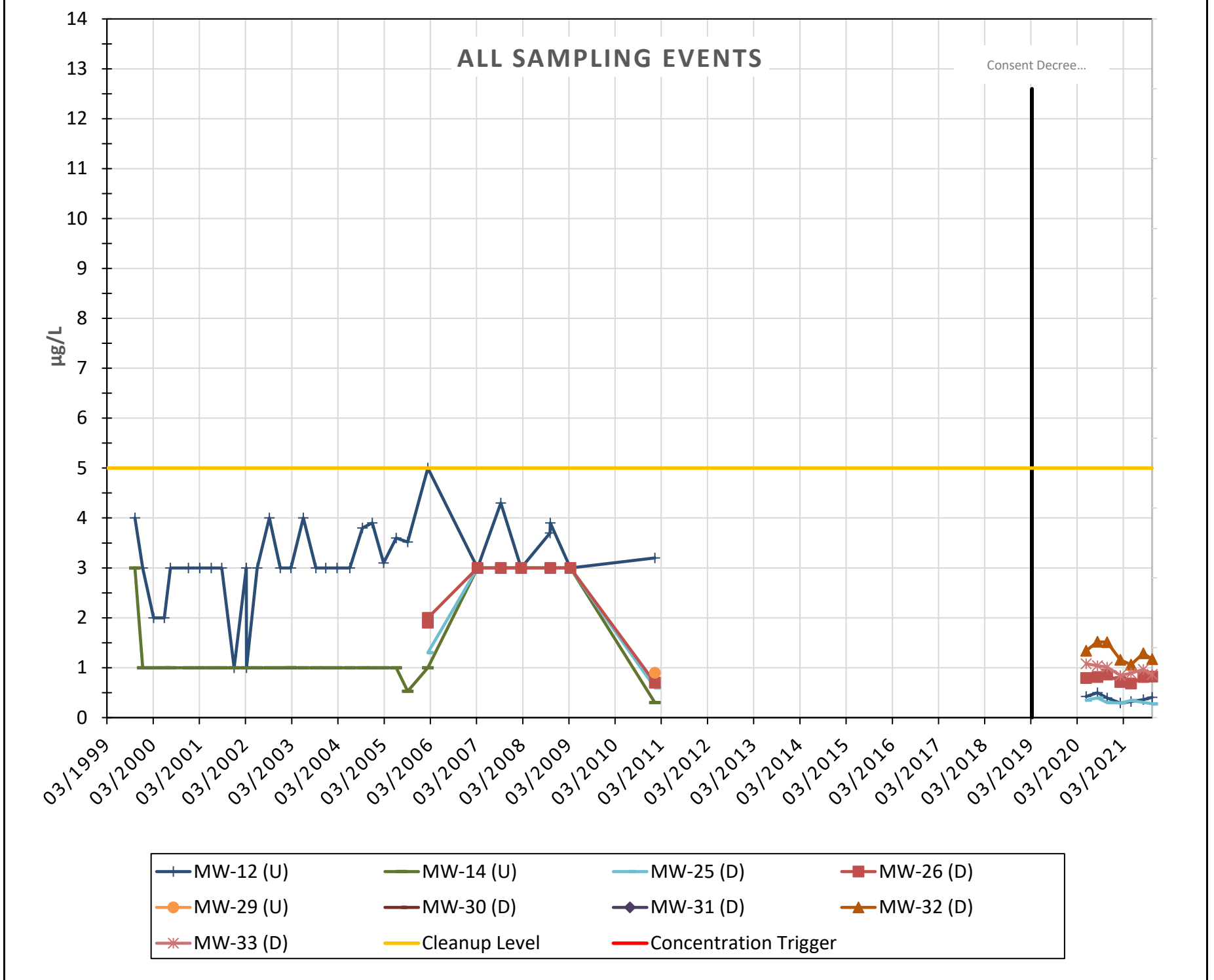
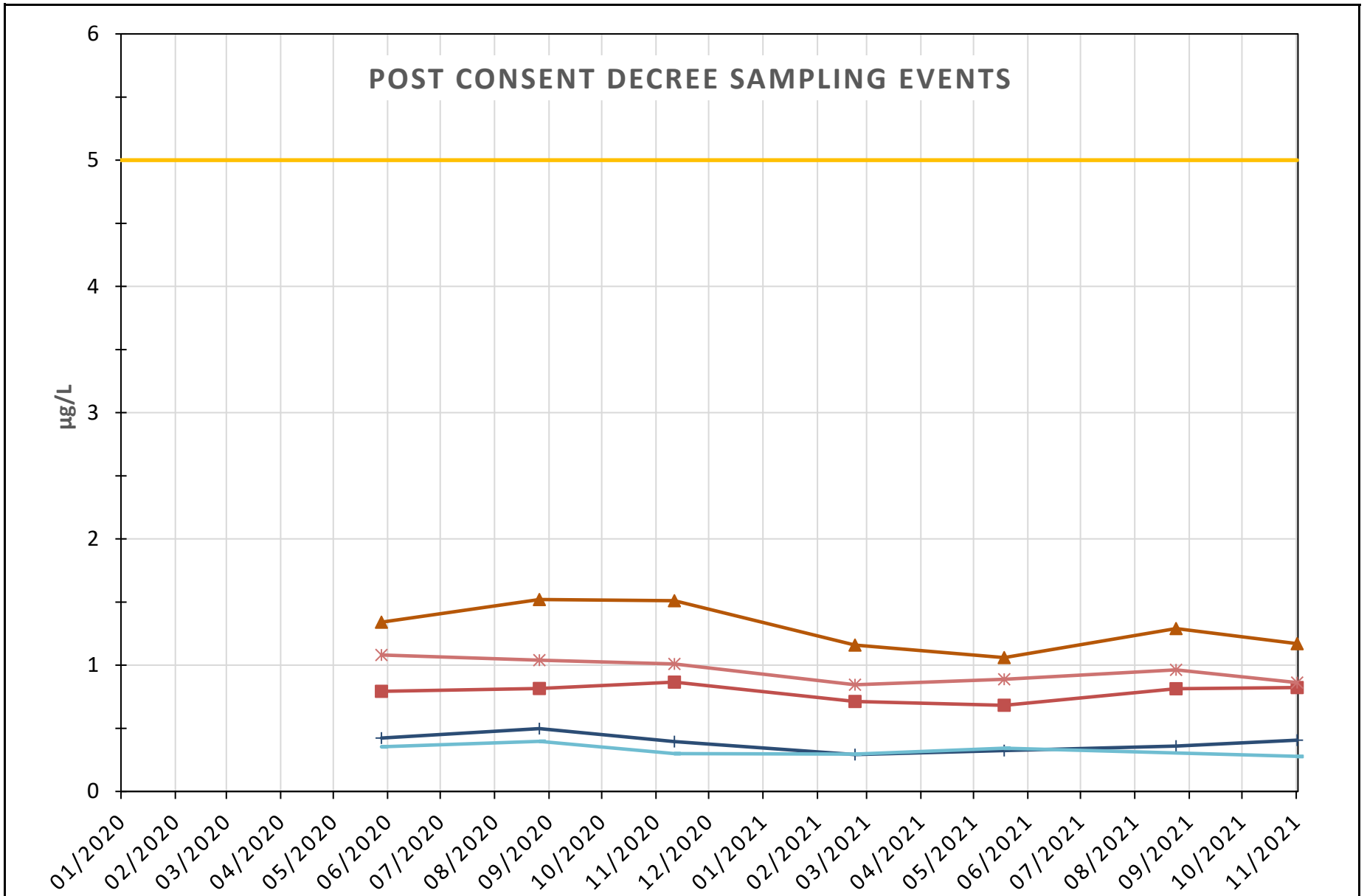
## Groundwater Monitoring



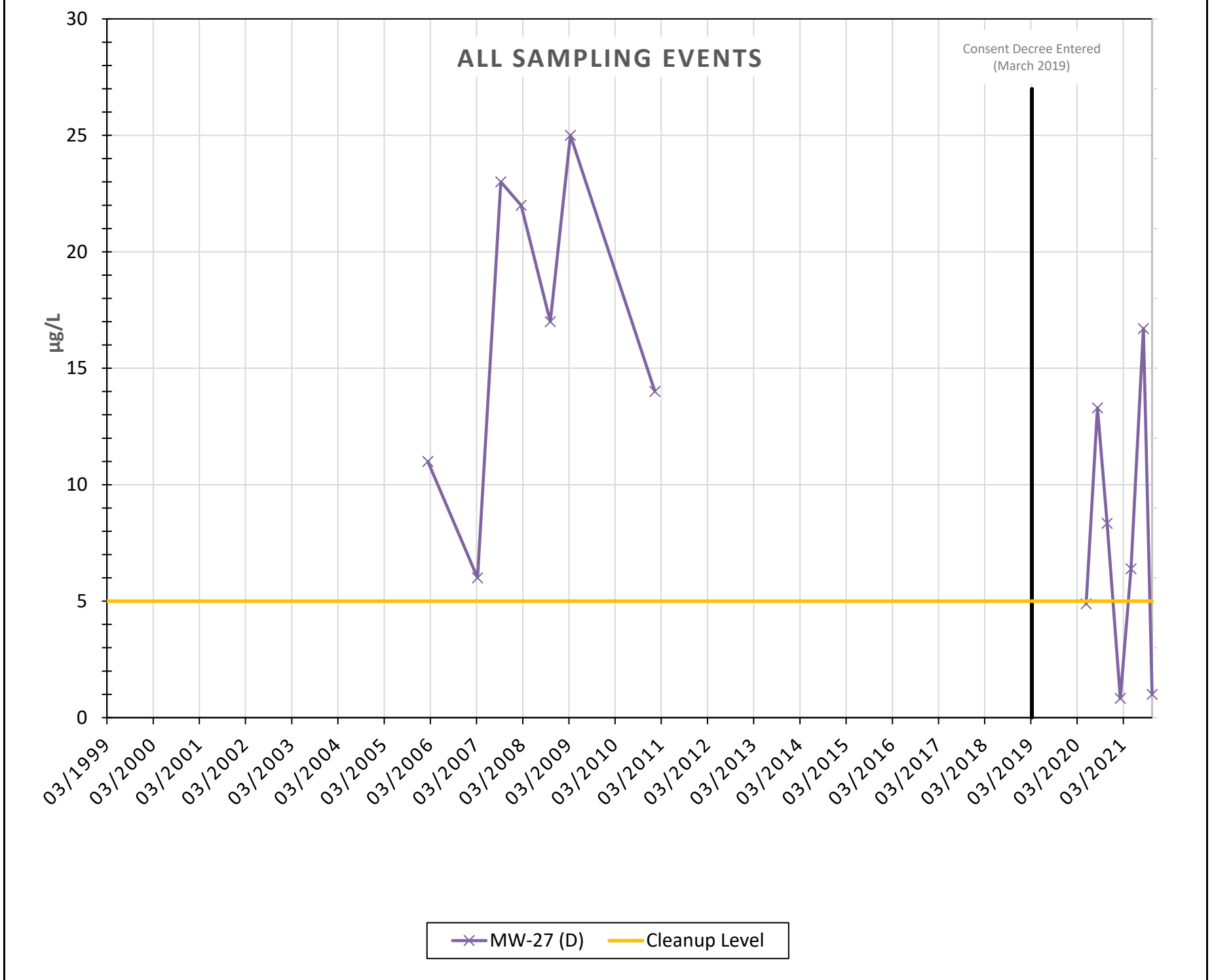
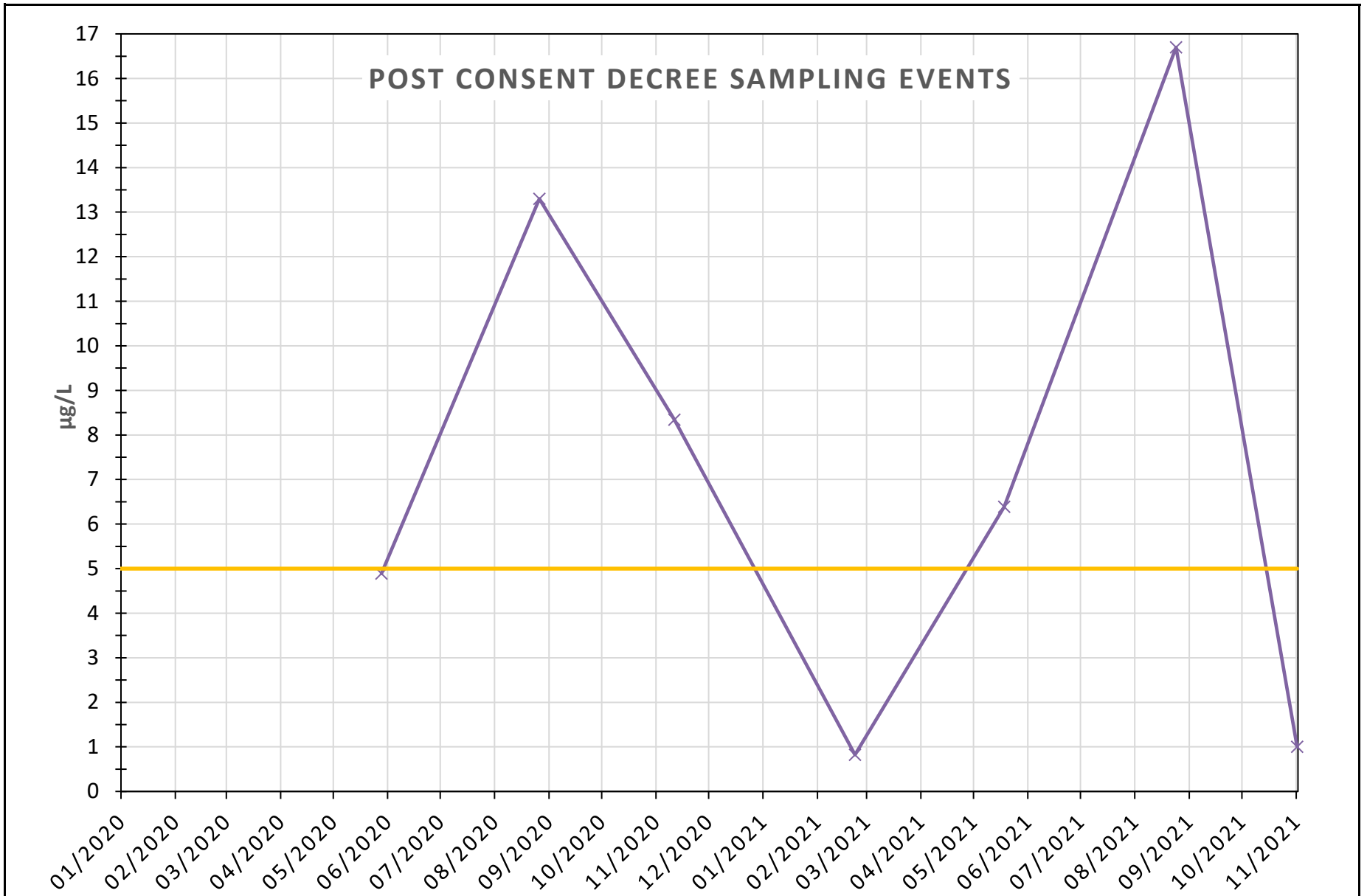
D1

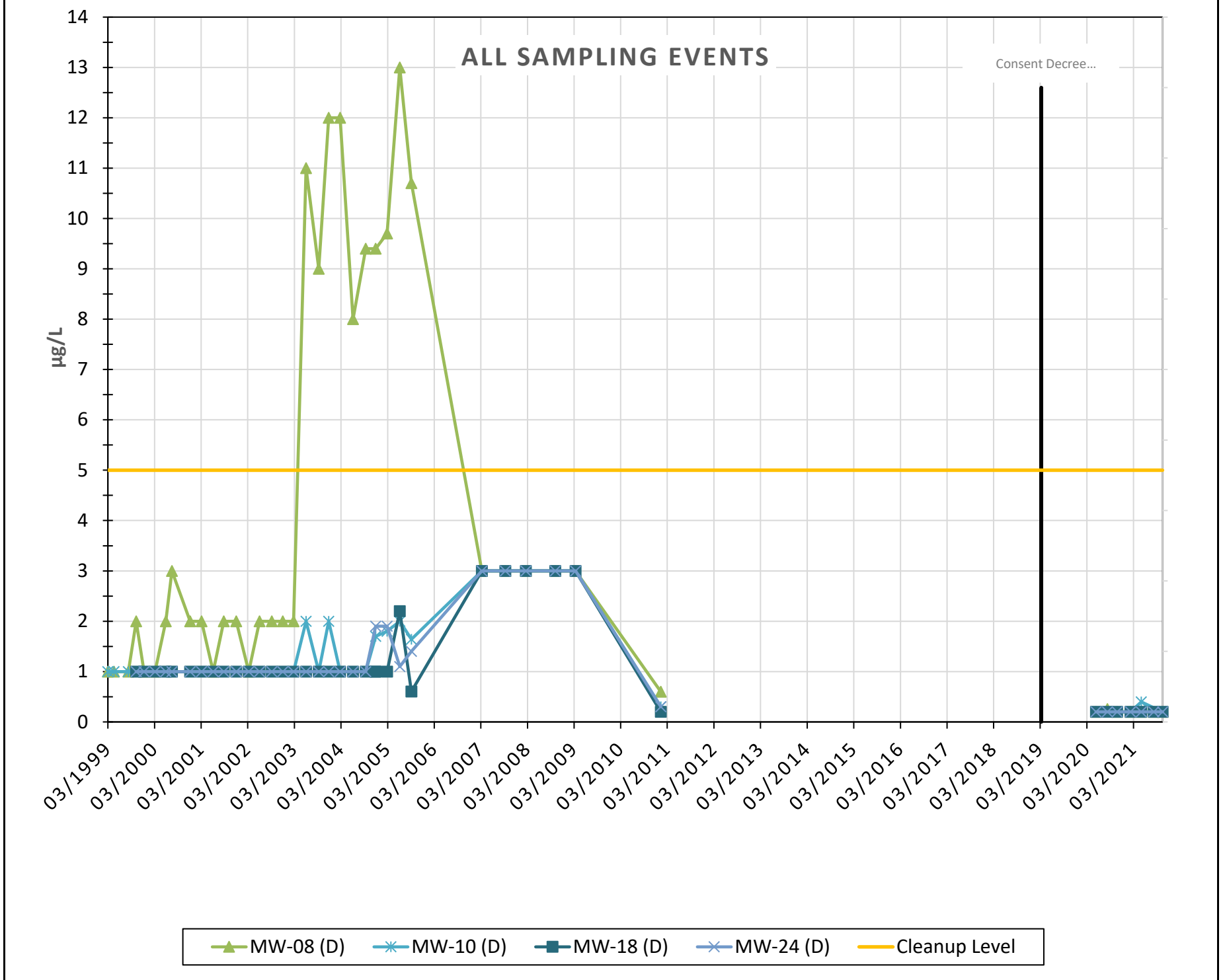
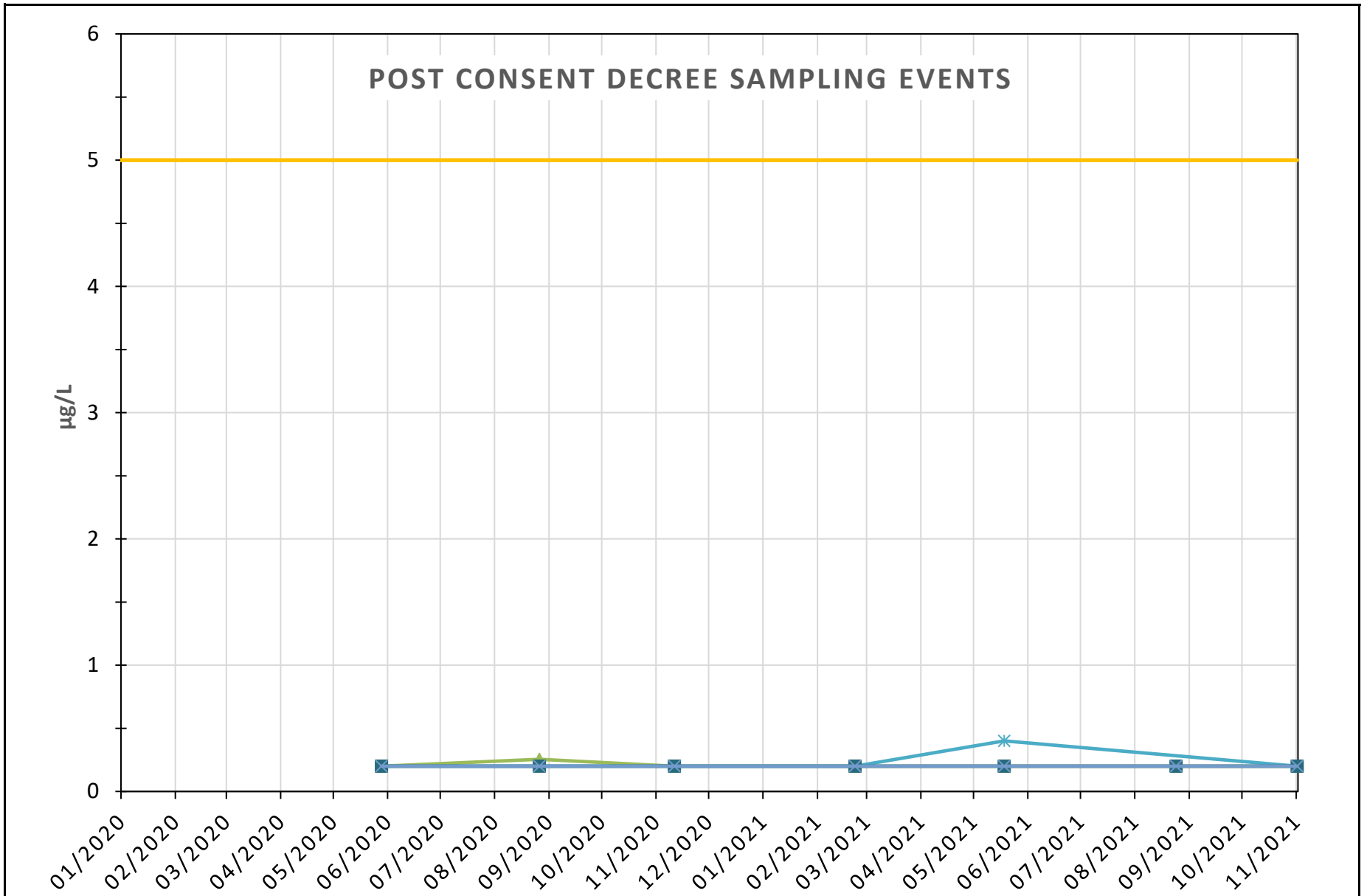
Time-Series Plots

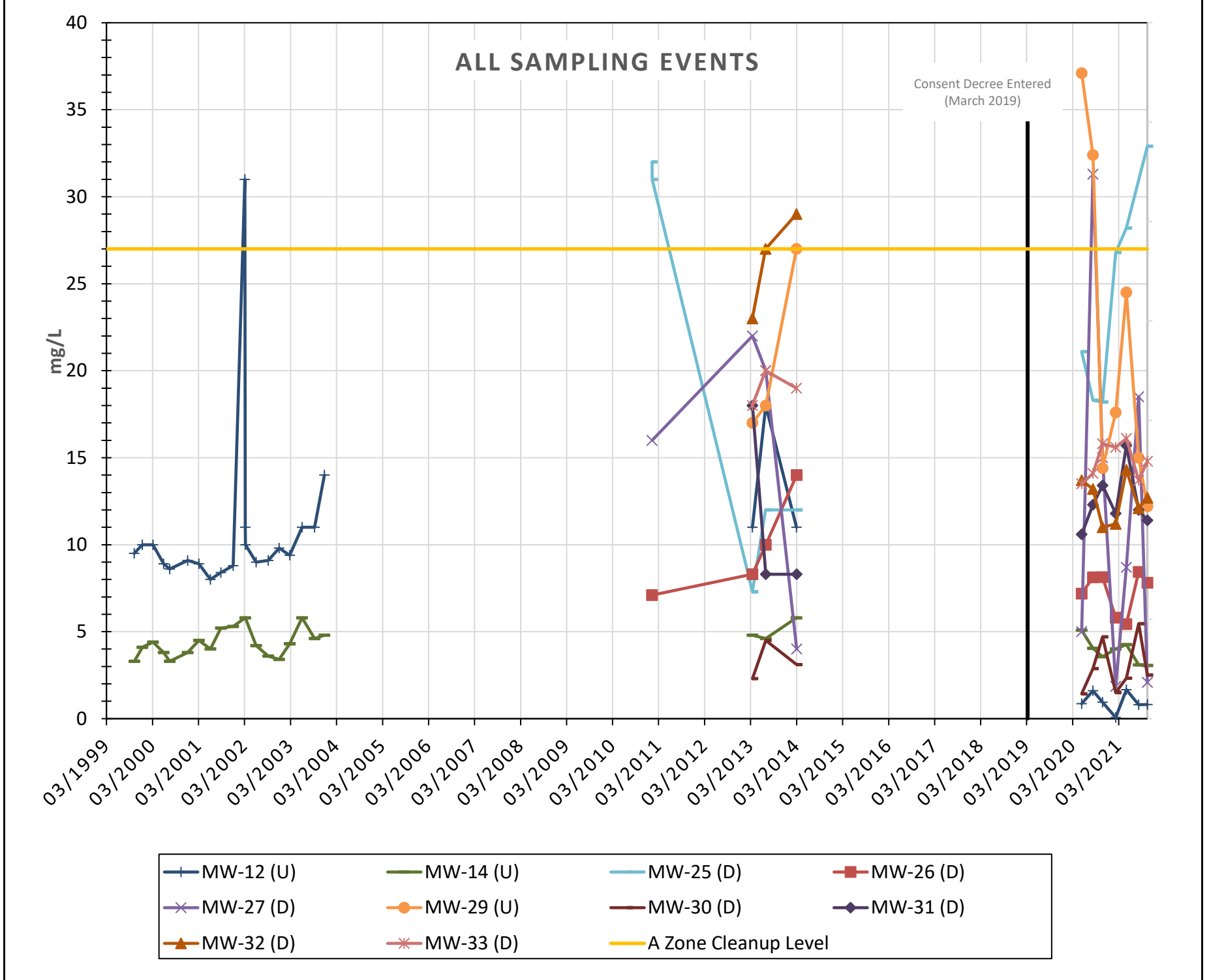
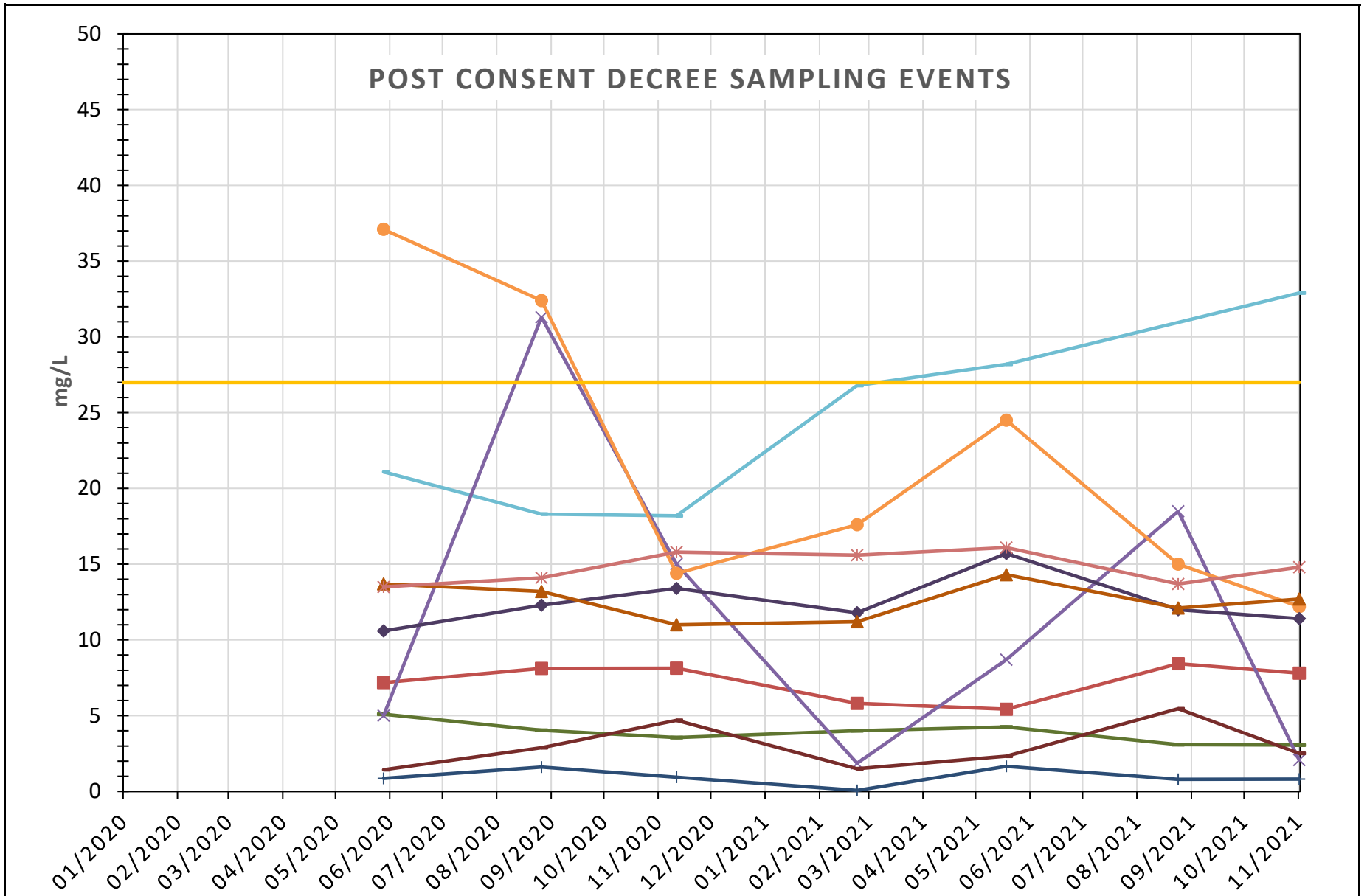




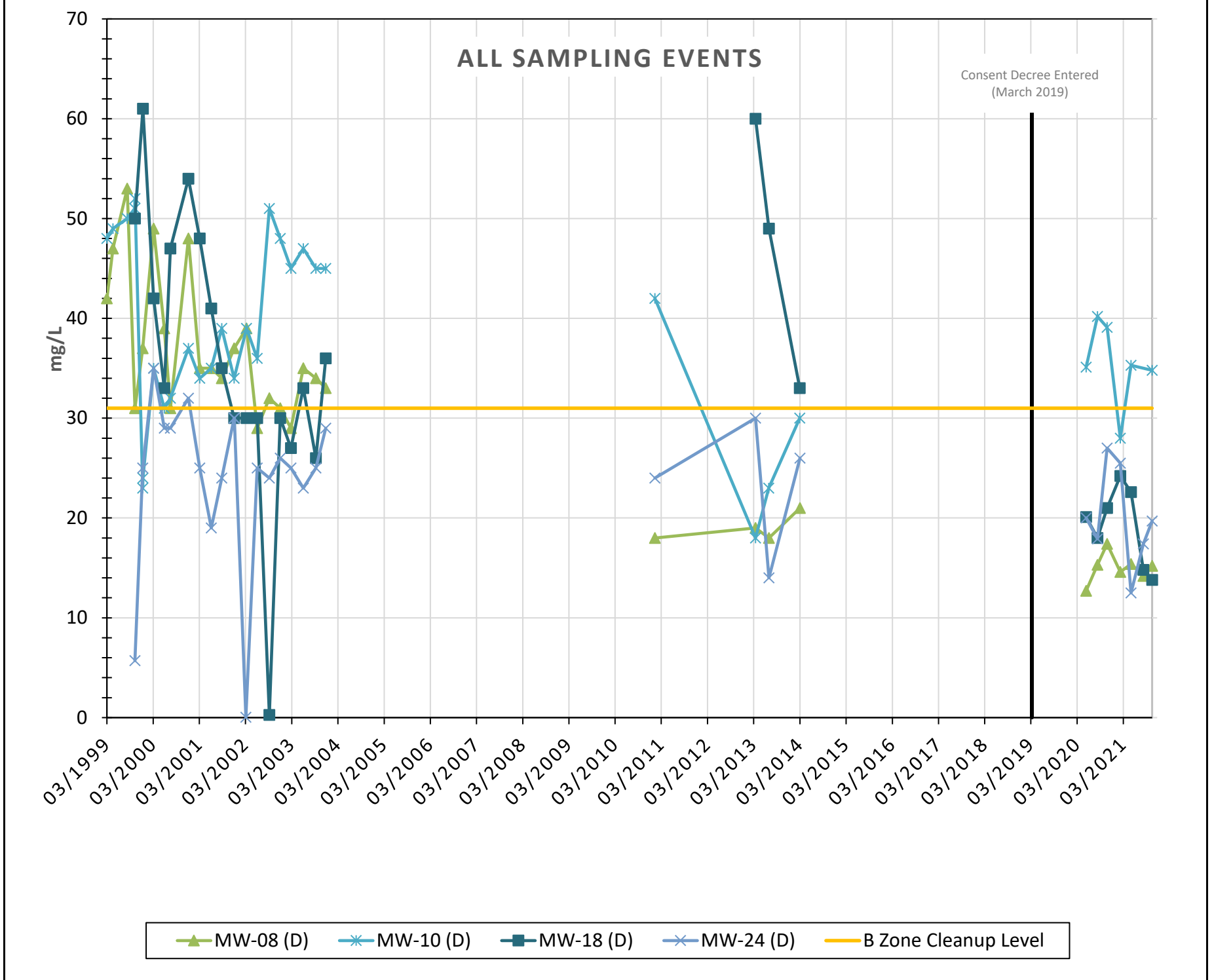
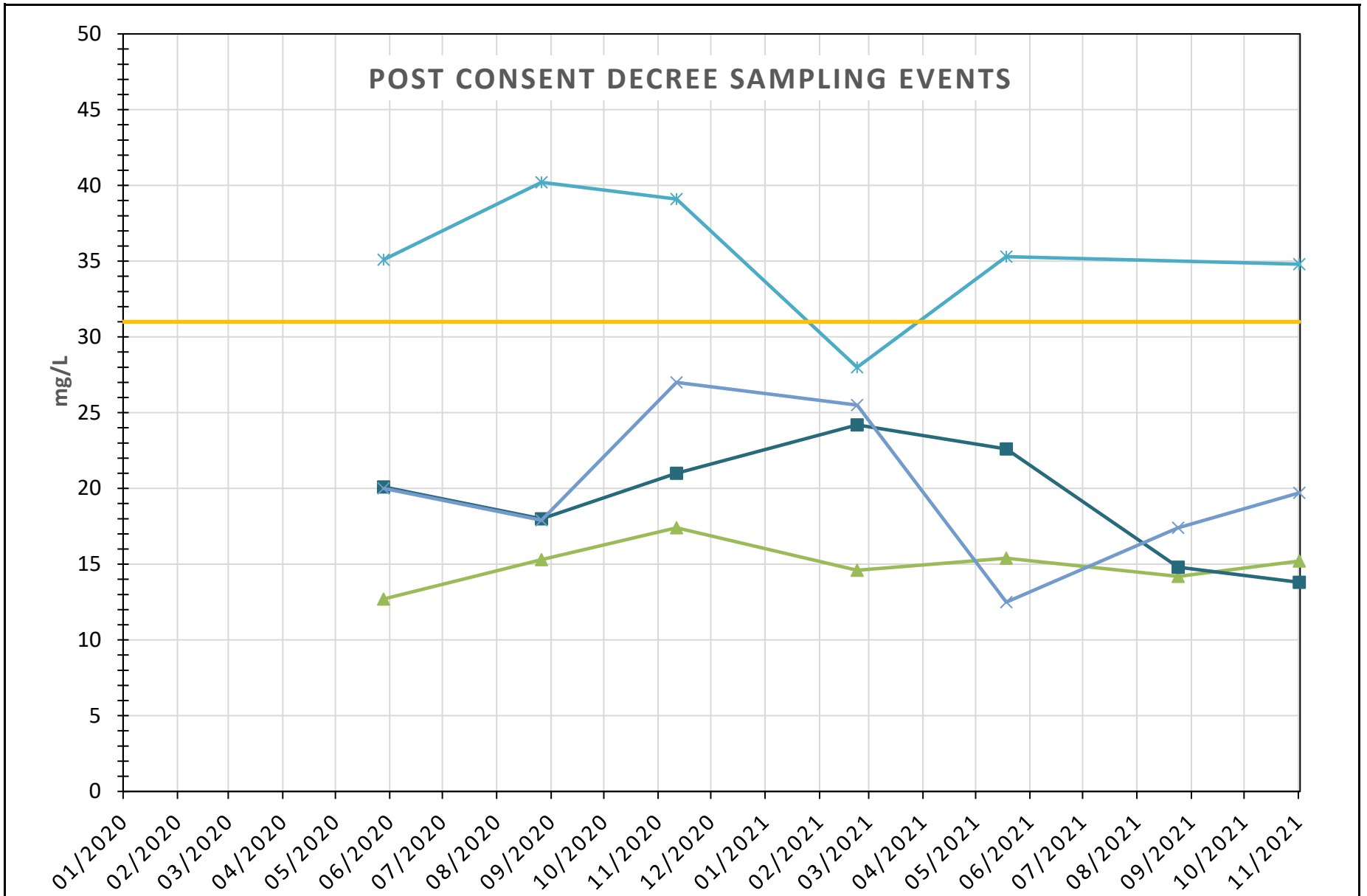
D = Downgradient  
U = Upgradient





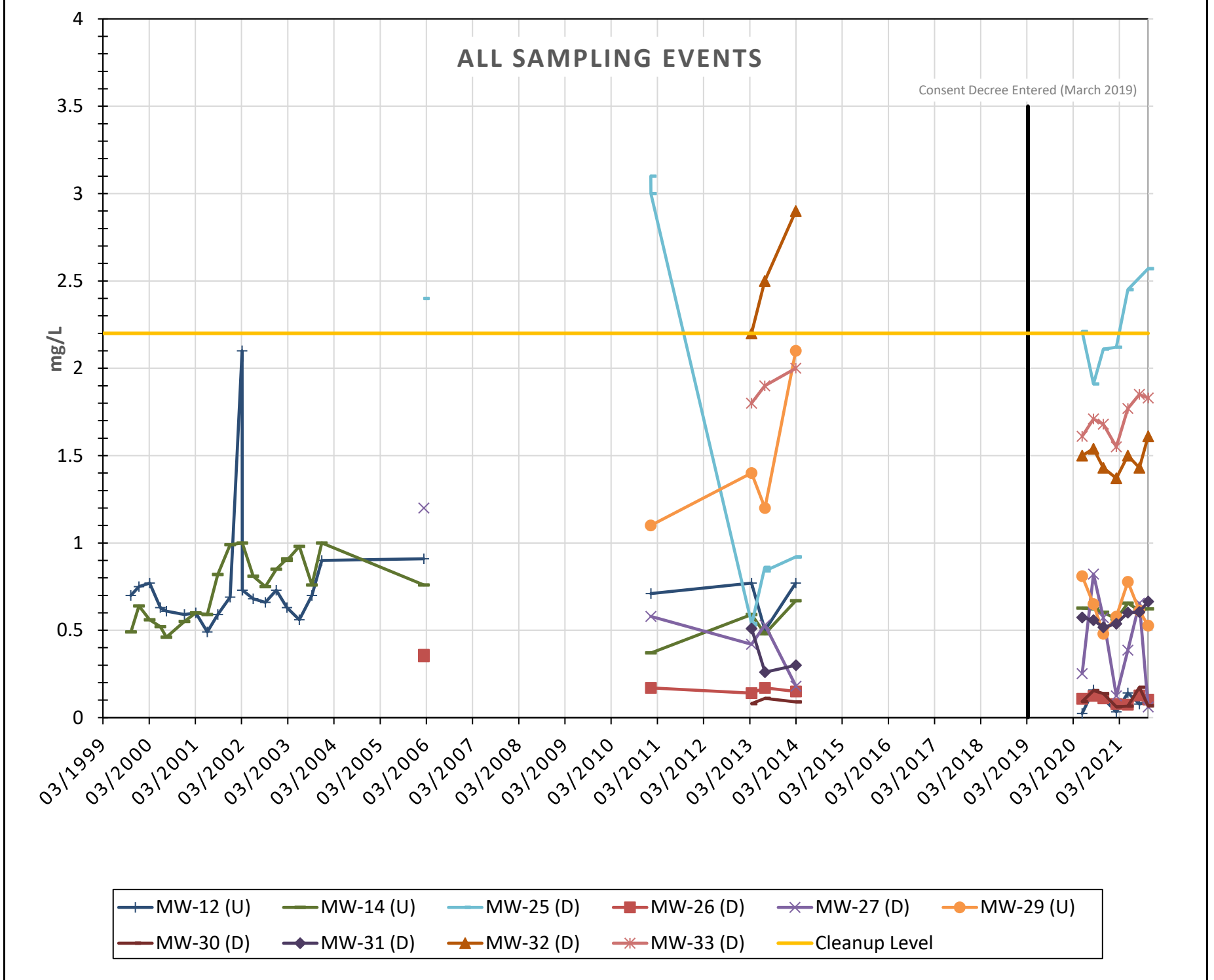
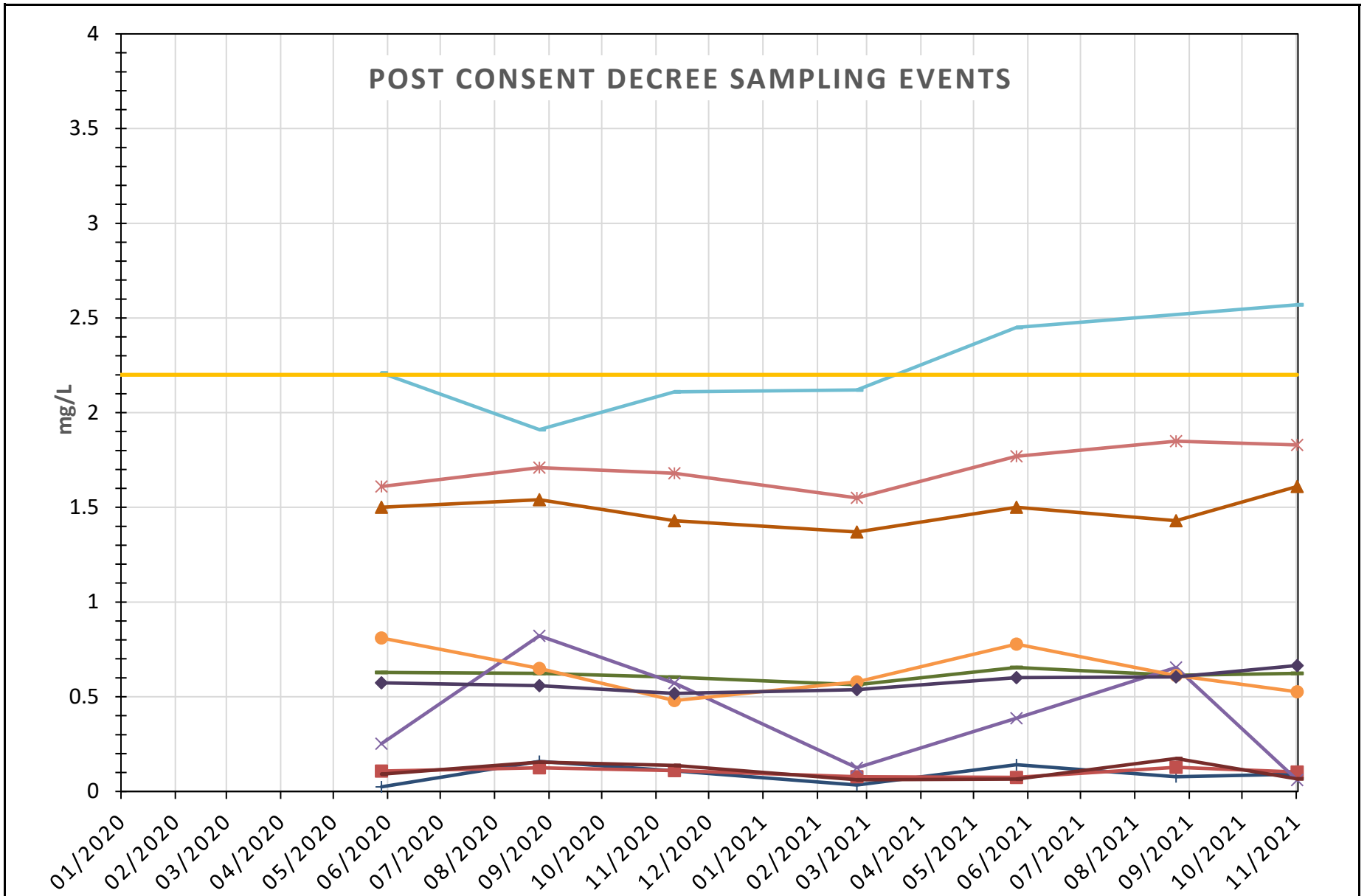


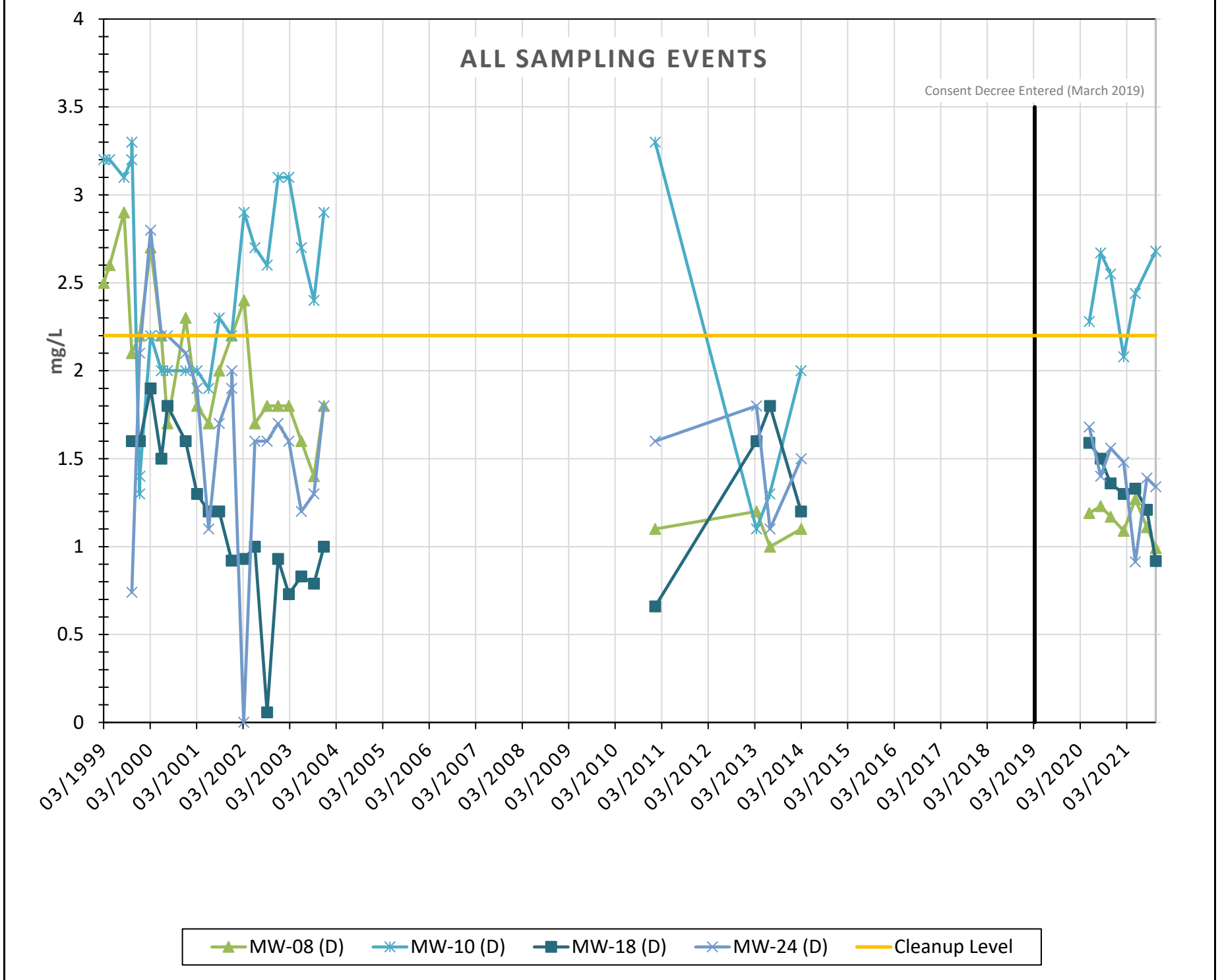
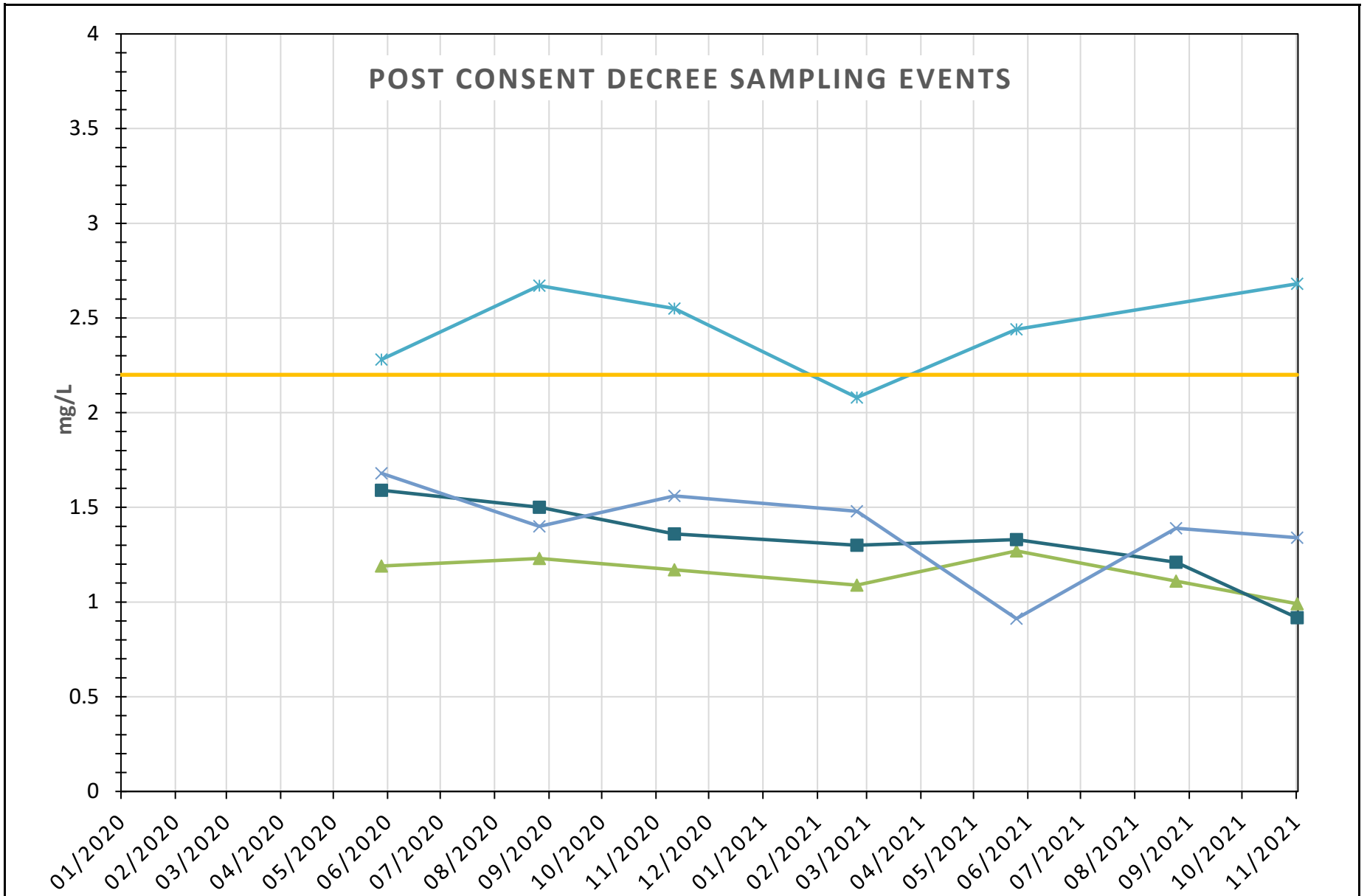




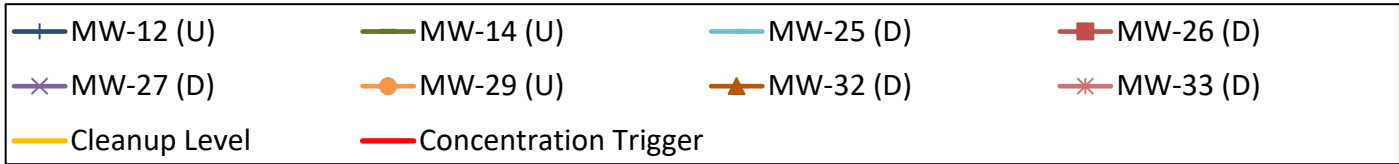
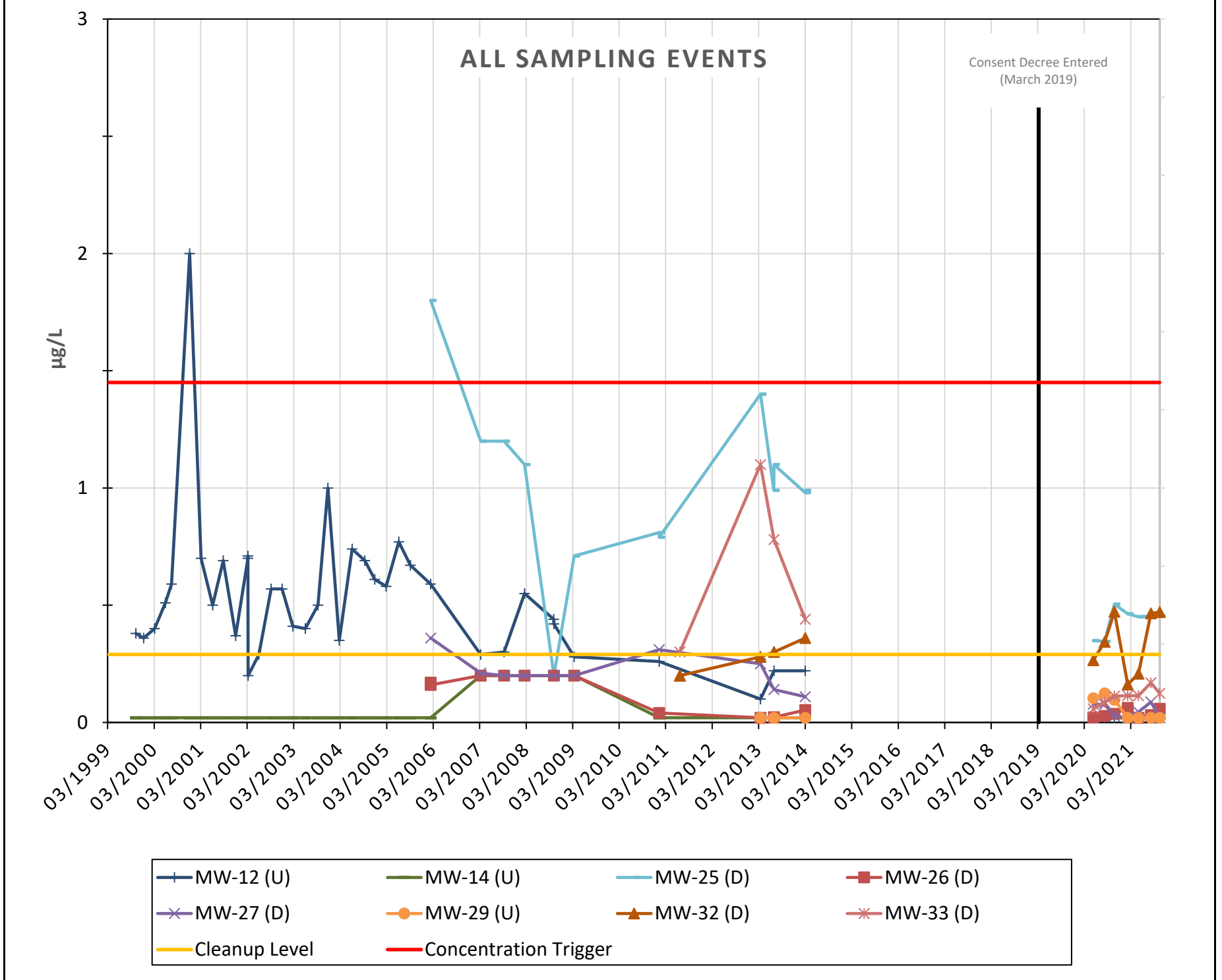
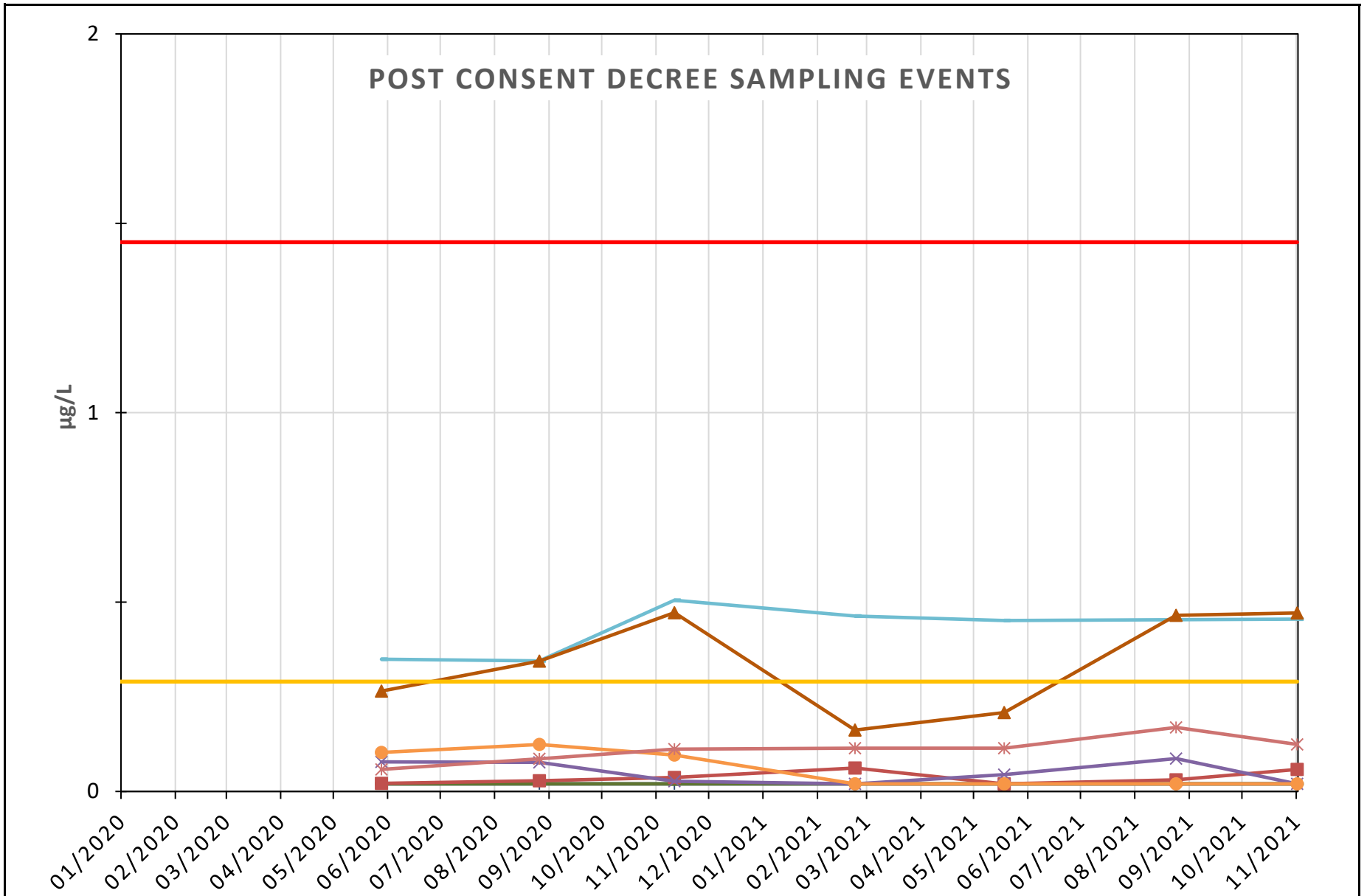
▲ MW-08 (D)   
 ✱ MW-10 (D)   
 ■ MW-18 (D)   
 ✱ MW-24 (D)   
 — B Zone Cleanup Level

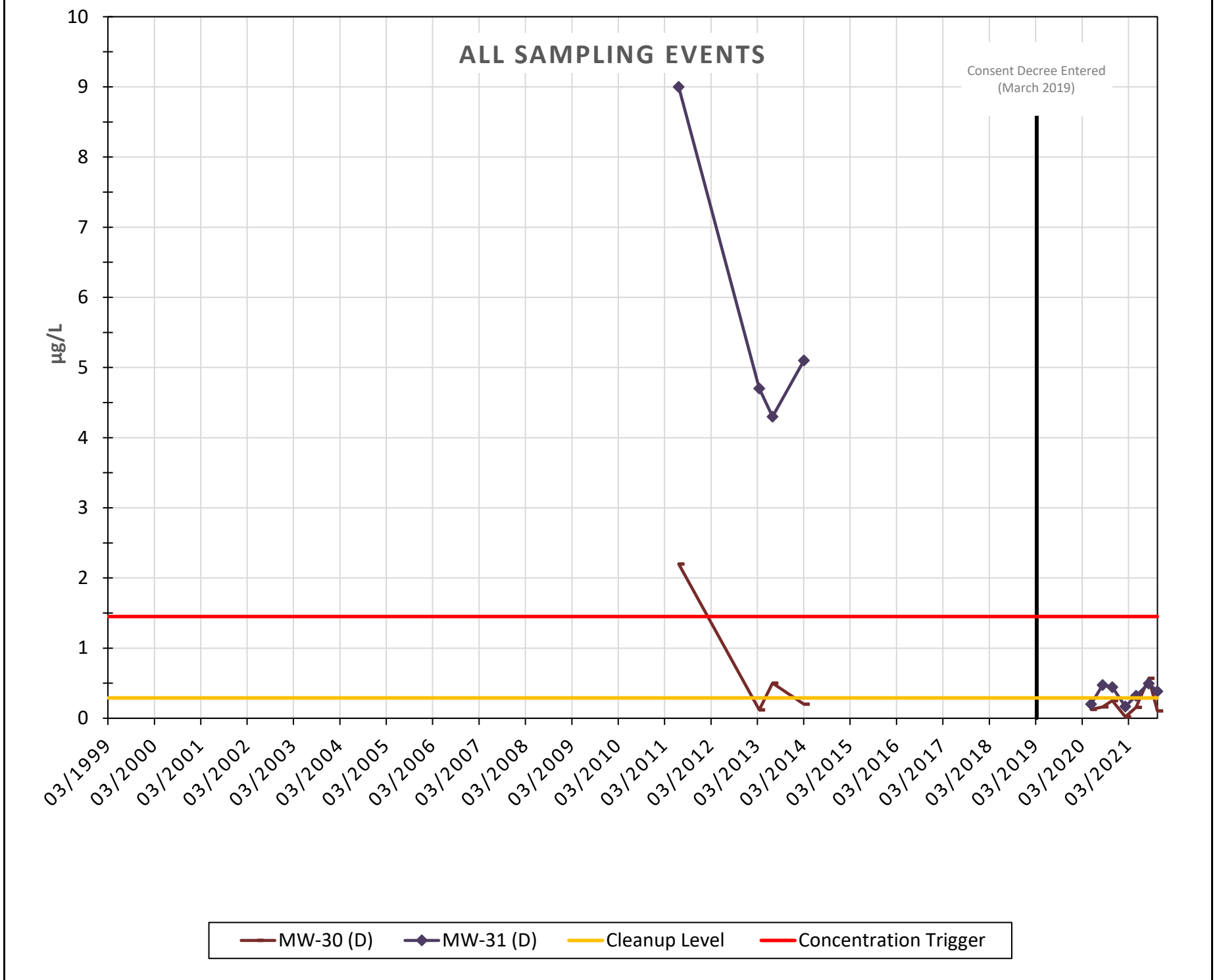
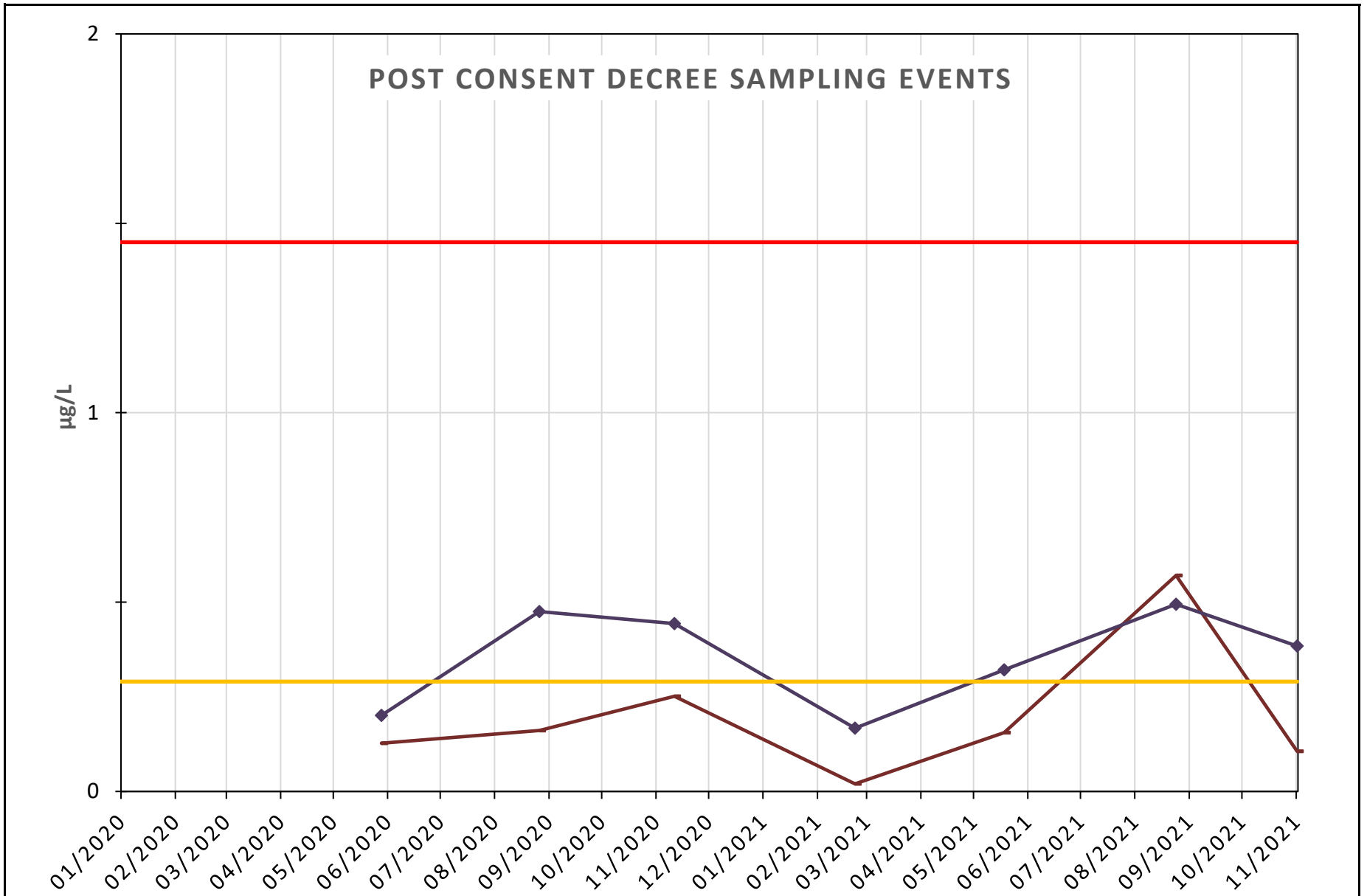
D = Downgradient  
U = Upgradient



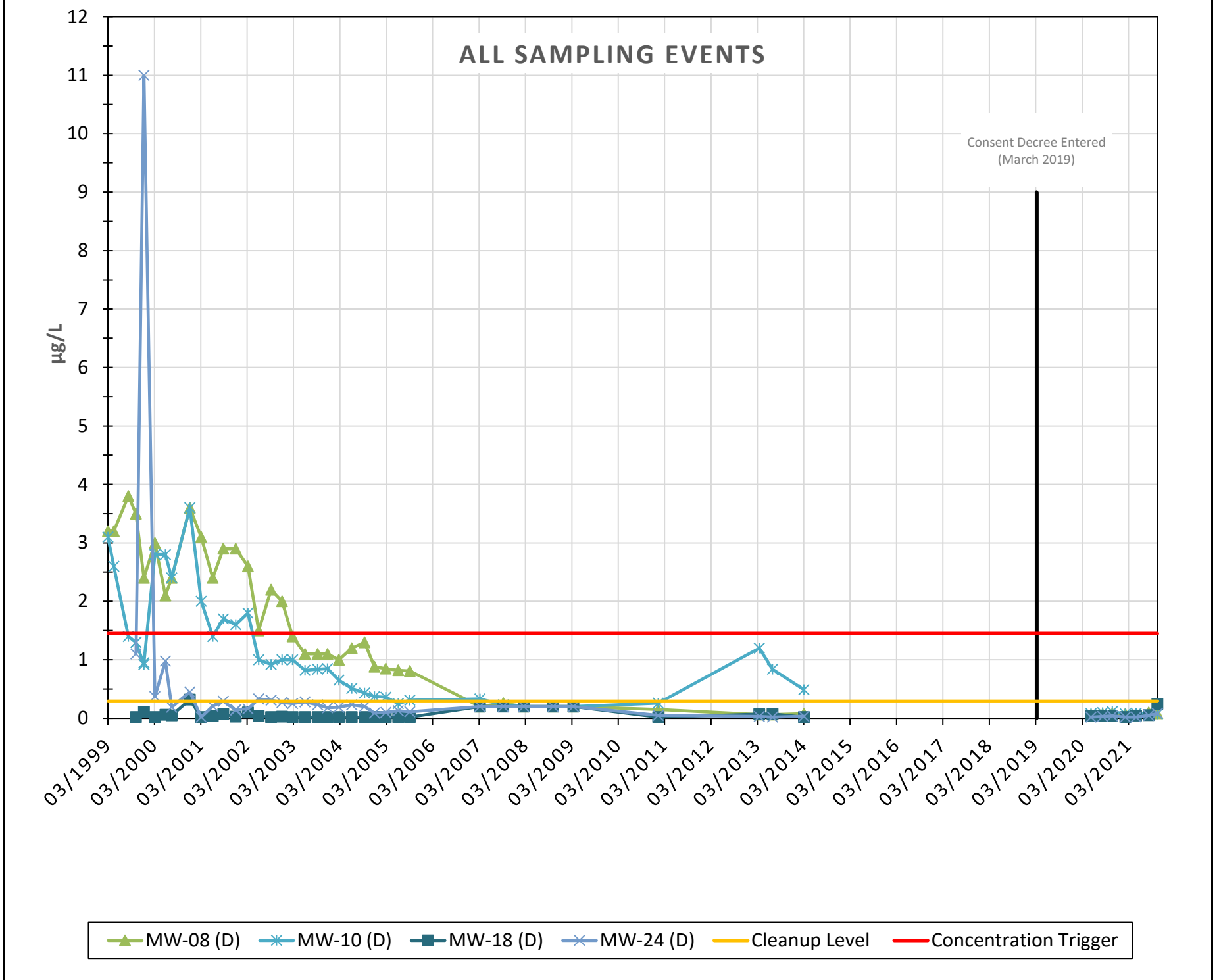
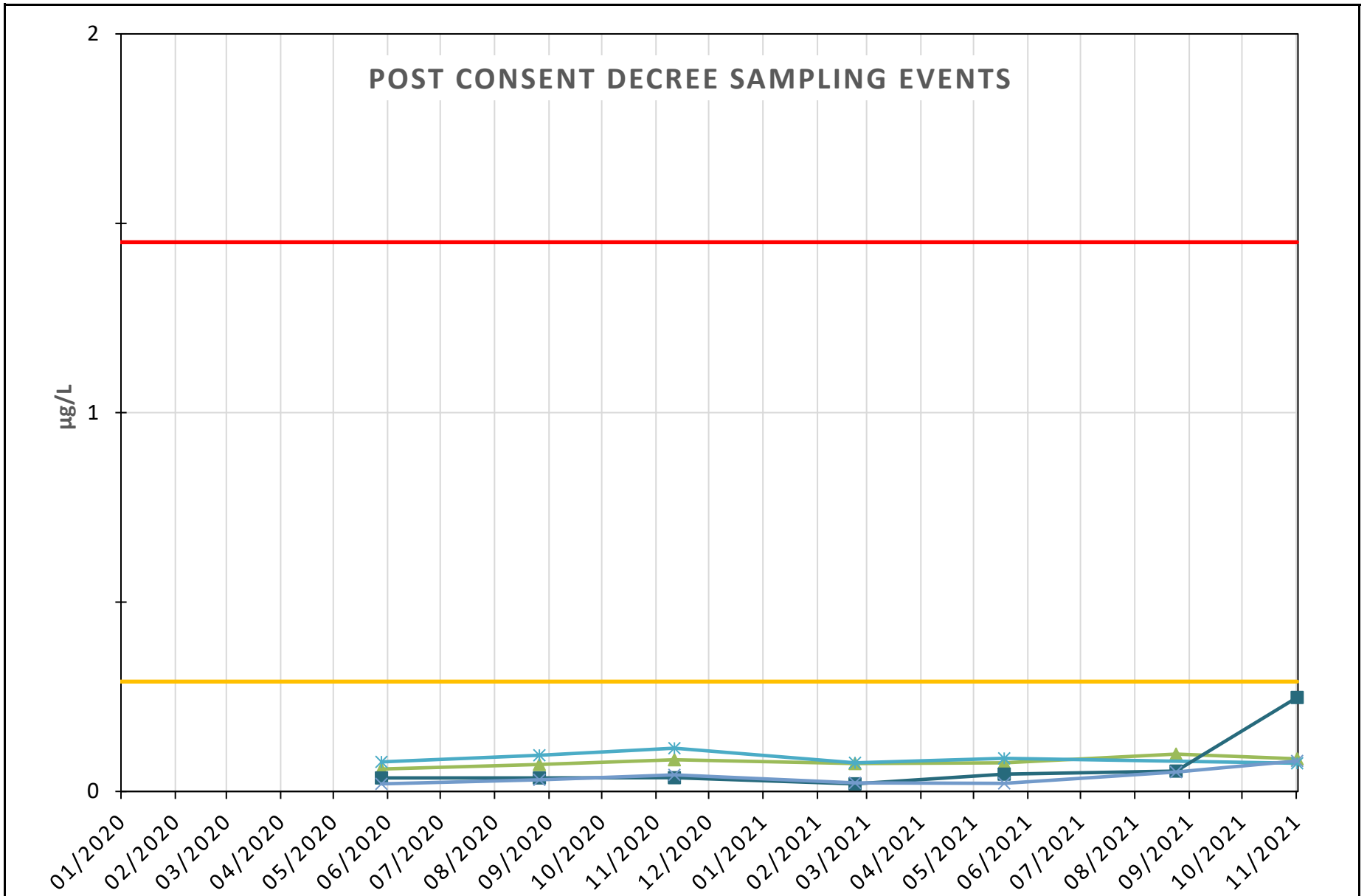


▲ MW-08 (D)   
 ✱ MW-10 (D)   
 ■ MW-18 (D)   
 ✱ MW-24 (D)   
 — Cleanup Level

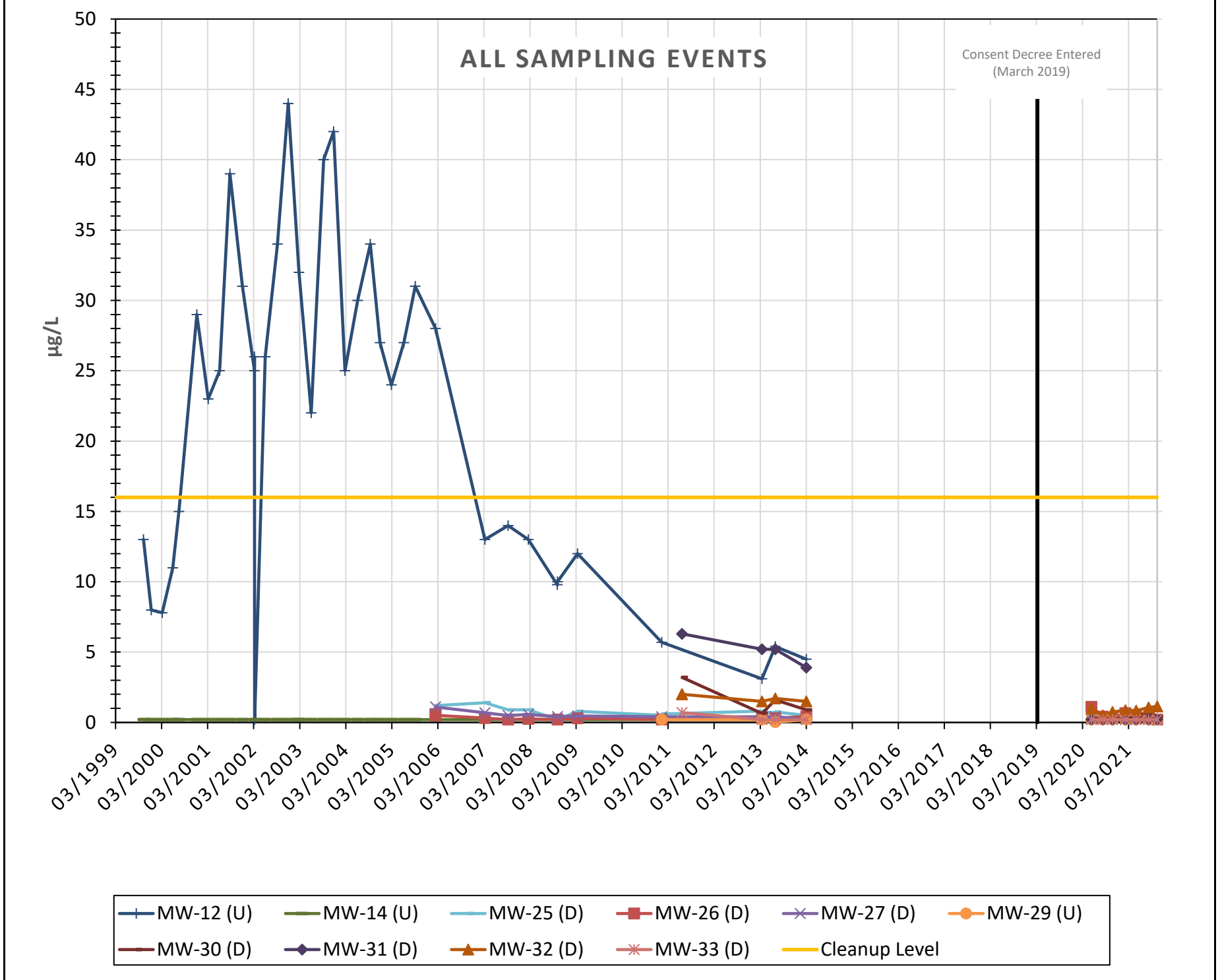
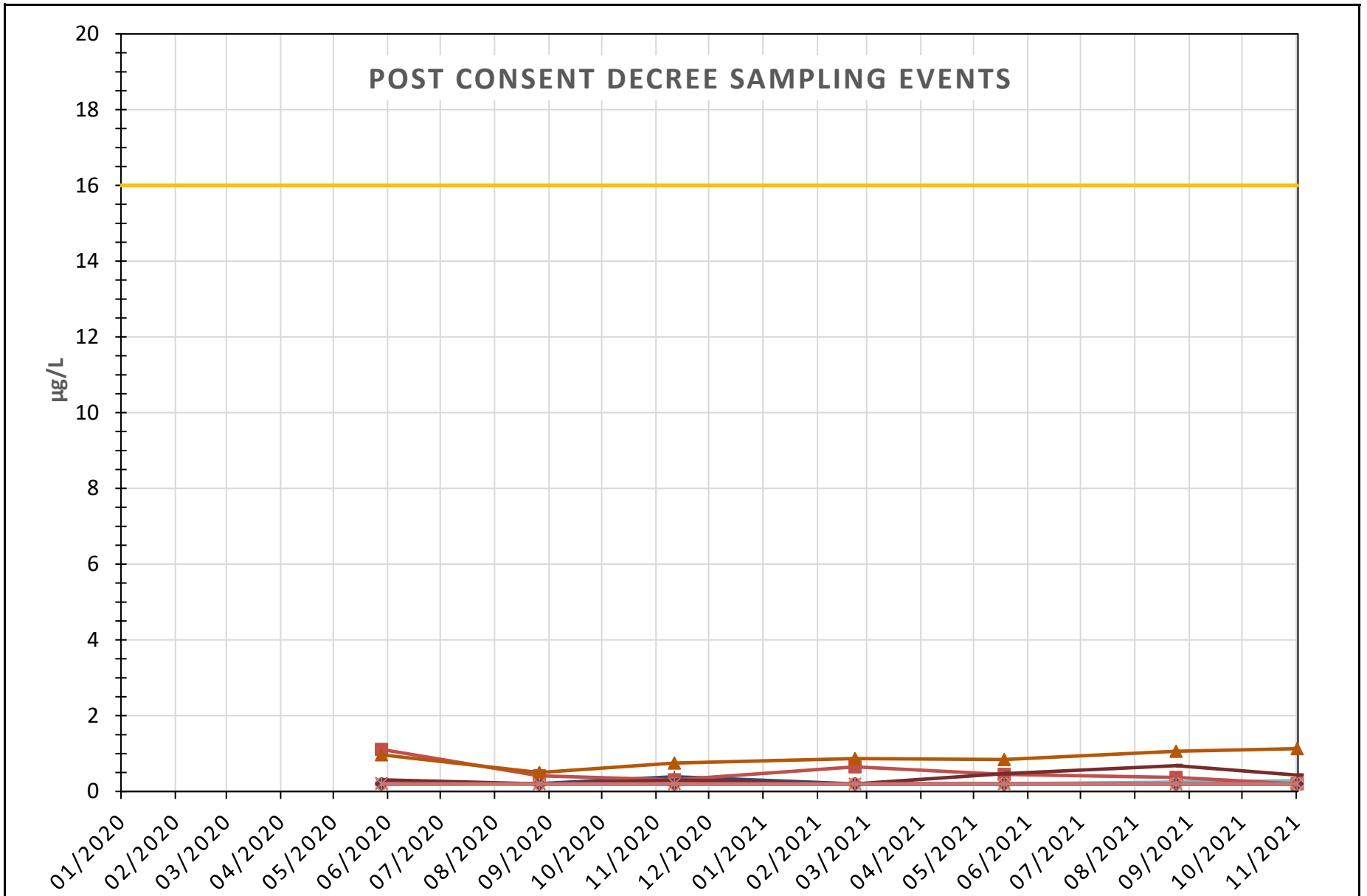


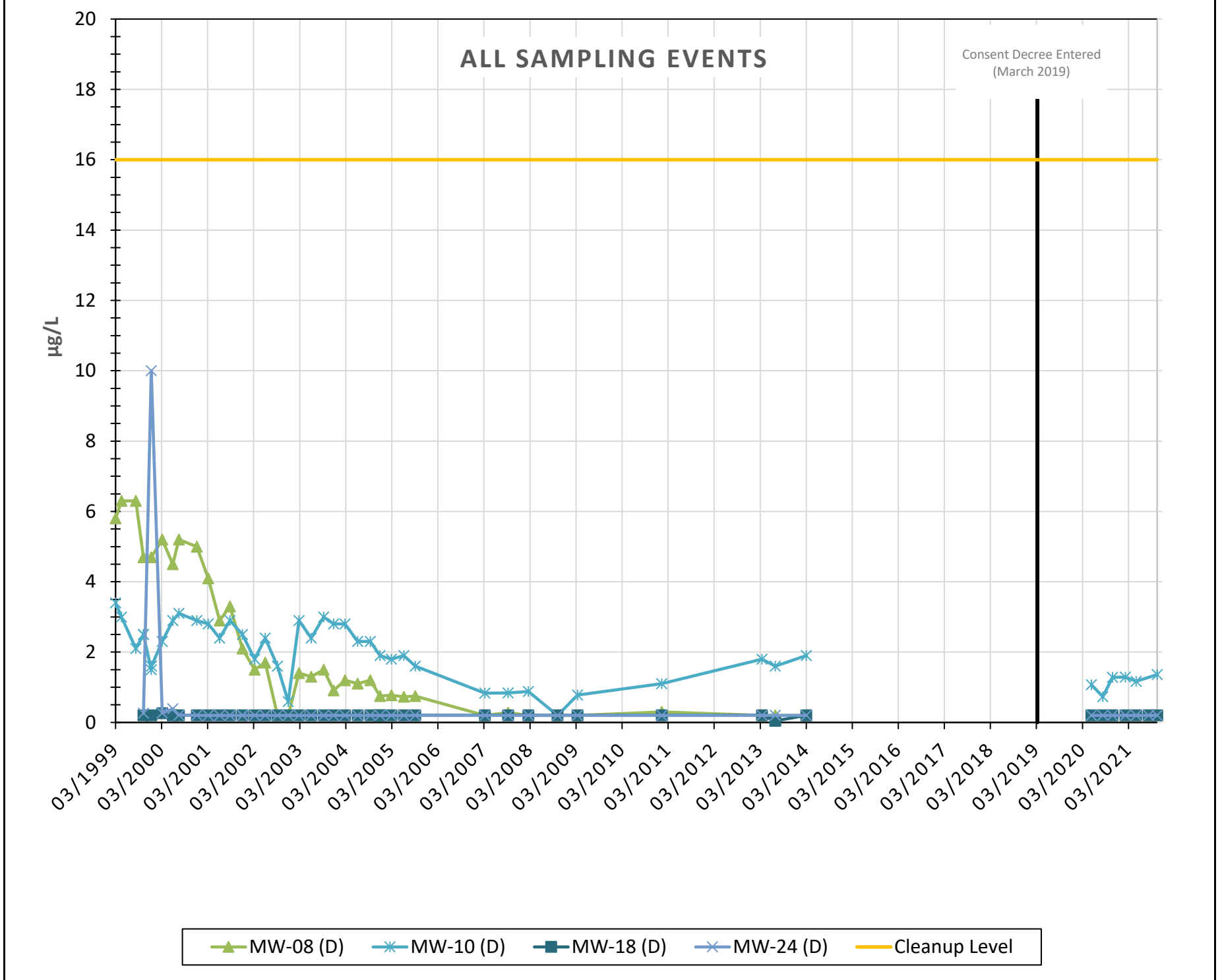
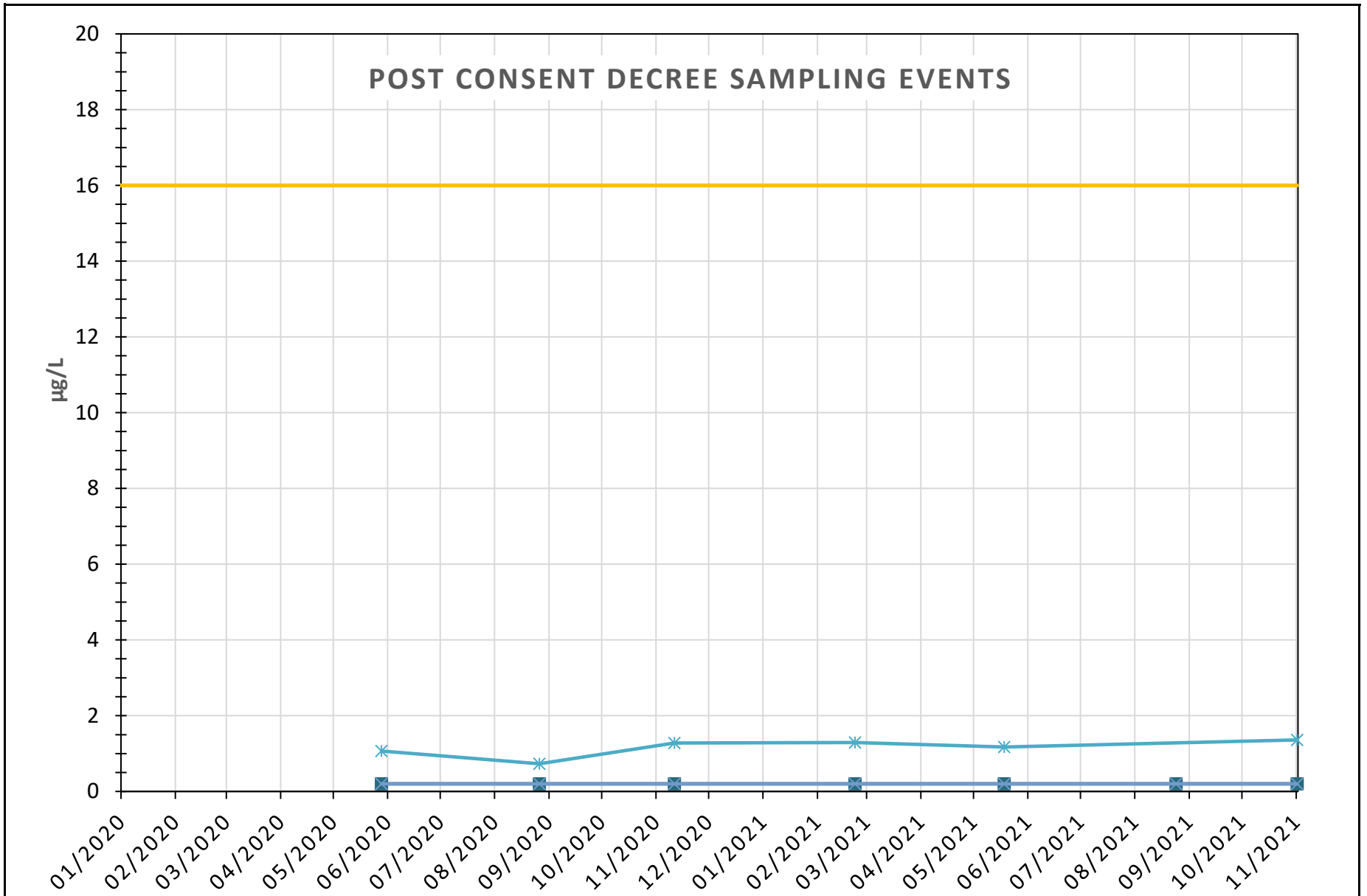


—◆ MW-30 (D)    
 —◆ MW-31 (D)    
 — Cleanup Level    
 — Concentration Trigger

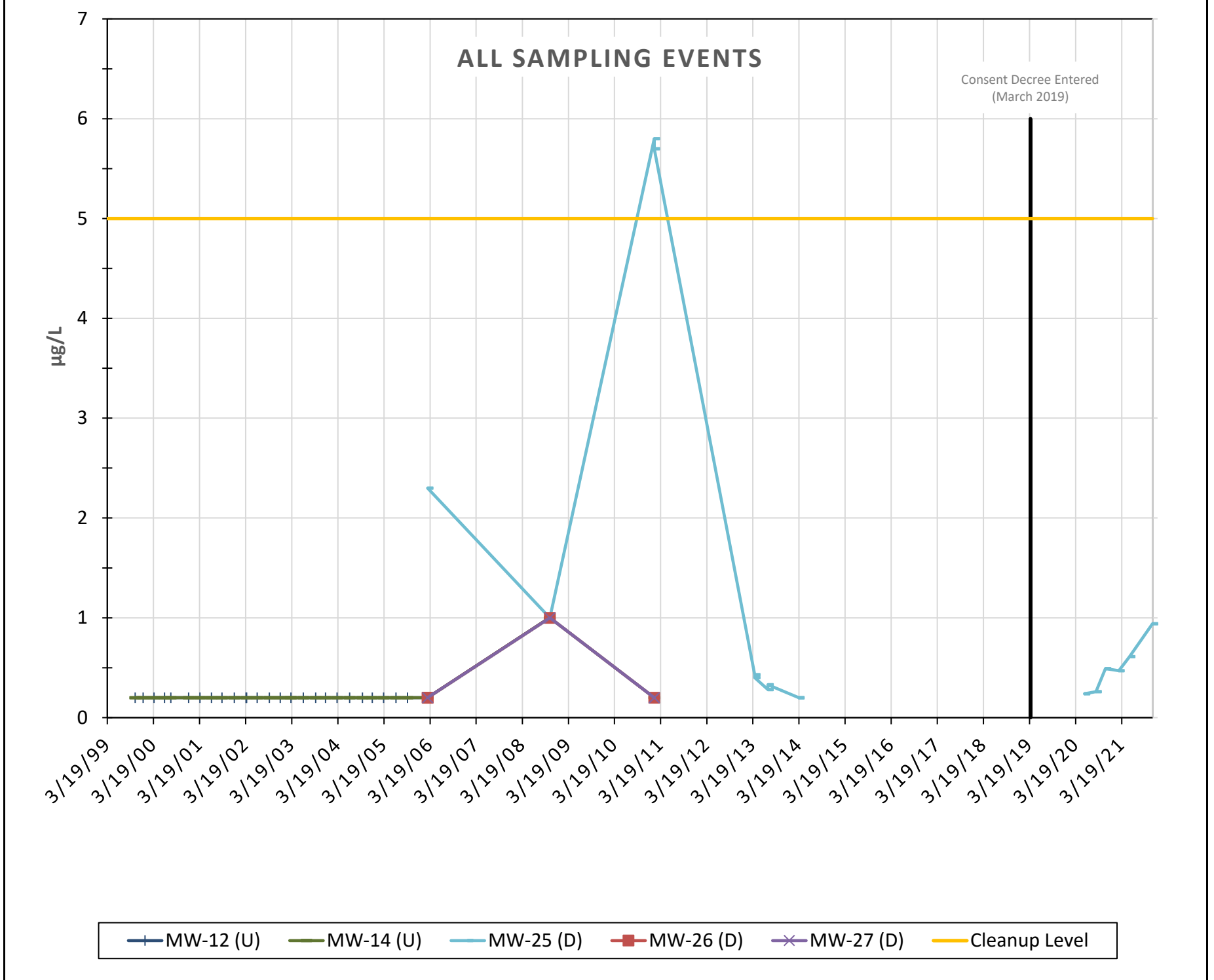
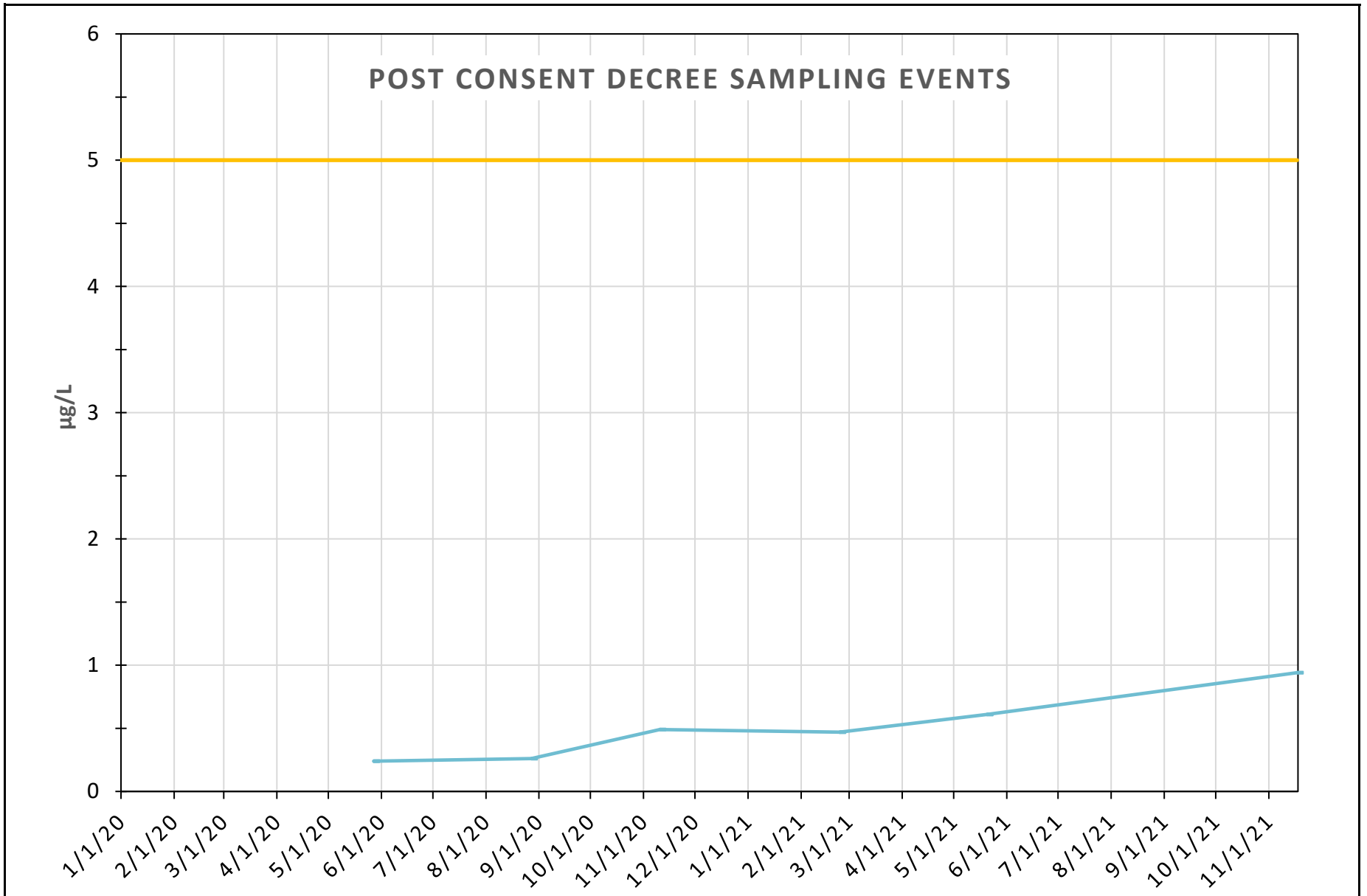


D = Downgradient  
U = Upgradient









D = Downgradient  
U = Upgradient

D2

Trend Analyses



## APPENDIX D2

### Trend Analyses

Per the CAP, the Mann-Kendall test was used to statistically evaluate groundwater quality trends. The Mann-Kendall test is a nonparametric trend evaluation procedure that can be used when there are missing values or when the data do not conform to any particular distribution. The Mann-Kendall test only uses directional differences (positive, zero, negative) of the data rather than the measured values. In statistical terms, the Mann-Kendall test is a nonparametric test for zero slope of the linear regression of time-ordered data versus time (Gilbert 1987). For the Mann-Kendall test, the null hypothesis ( $H_0$ ) is no trend (i.e., the observations are randomly ordered in time), which is tested against the alternative hypothesis ( $H_A$ ) of an increasing or decreasing monotonic trend.

An assumption underlying the Mann-Kendall test is that the time-ordered data are monotonic (Salmi et al. 2002); that is, the successive values in the data set consistently increase or decrease, but not necessarily in a linear manner, and they display no seasonal or other cycle. If the data are not monotonic, then the statistical power of the Mann-Kendall trend test is reduced. One example of non-monotonic data is precipitation, which can vary seasonally as well as by larger time intervals (e.g., years or decades). Statistical power is the strength of a test to identify an actual release of contaminated groundwater or difference from a compliance standard (EPA 2009). In the case of the Mann-Kendall test, statistical power is the strength to correctly identify an increasing or decreasing trend in a set of time-ordered data.

The Mann-Kendall test computes an  $S$  statistic based on pair-wise differences between each time-ordered value and all earlier values. A positive  $S$  value indicates an increasing trend, zero indicates no trend, and a negative value indicates a decreasing trend. The magnitude of  $S$  does not indicate the slope of the trend; instead, large positive values of  $S$  indicate that measurements taken later in time tend to be larger than those taken earlier. Similarly, large negative values of  $S$  indicate that measurements taken later in time tend to be smaller than those taken earlier (Gilbert 1987).

Significance of the Mann-Kendall test  $S$  statistic is a function of the magnitude of  $S$  and the number of measurements, with a larger positive or negative value of  $S$  and a greater number of measurements leading to a higher statistical significance (Gilbert 1987).

To evaluate trends in the monitoring data using the Mann-Kendall test, the EPA (2015) program ProUCL (version 5.1.002) was used. Per the CAP and Washington Department of Ecology guidance (Ecology 2005), groundwater monitoring data were evaluated at a 95 percent confidence level (5 percent significance level). That is, a trend was considered statistically significant if the confidence level was greater than 95 percent (the significance level was less than 5 percent).

Of the 14 wells evaluated:

- Three wells had no non-detects
- Four wells had 1 to 15 percent non-detects
- Four wells had 16 to 50 percent non-detects
- Two wells had 51 to 99 percent non-detects (MW-29 at 73 percent and MW-18 at 55 percent)
- One well had all non-detects (MW-14)

For data sets with non-detect, or “censored”, results, per the *Ecology Guidance for Monitoring at Landfills and Other Facilities* (Ecology 2018), the censored data were handled as follows:

- ProUCL guidance (EPA 2015) states that the substitution of half detection limits for censored values is not recommended, as the bias cannot be quantified with certainty. Because the Mann-Kendall test is a nonparametric test, it was not necessary to substitute censored values with half detection limits for wells with fewer than 15 percent non-detects. The Mann-Kendall test only uses directional differences (positive, zero, negative), which are not affected by use of detection limits or half detection limits for censored values.
- For all wells, censored values were replaced with estimated values using the ROS method prior to statistical analysis. The ROS method fits a regression line to the uncensored data, then assigns values from that line below the detection limit to estimate concentrations for the censored observations. The uncensored values are then combined with the estimated censored values for further statistical analysis.
- The two wells with more than 50 percent non-detects (MW-18 and MW-29) were analyzed using the Mann-Kendall test; however, the results should be interpreted with caution, as significance of the analysis may be diminished due the large number of censored data. Statistical evaluations are typically not performed on data sets with more than 50 percent non-detects because meaningful trends are difficult to determine due to the large number of censored values.

Vinyl chloride was detected in well MW-24 in 1999 at a concentration of 11 µg/L, which is an order of magnitude higher than any prior or subsequent result (see time-series plot in Appendix D1), suggesting a possible statistical outlier. The Mann Kendall test was run with and without this value, and the results yielded different *S* values (-373 with outlier, -341 without outlier) but both indicated a significantly decreasing trend.

## REFERENCES

- Ecology (Washington State Department of Ecology). 2005. Implementation Guidance for the Ground Water Quality Standards. Washington State Department of Ecology Publication #96-02. Olympia, WA.
- Ecology. (Washington State Department of Ecology). 2018. Guidance for Monitoring at Landfills and Other Facilities Regulated Under Chapters 173-304, 173-306, 173-350, and 173-351 WAC, Revised December 2018. Washington State Department of Ecology Publication no. 12-07-072.
- EPA (U.S. Environmental Protection Agency). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530/R-09-007. March 2009. U.S. Environmental Protection Agency Office of Resource and Recovery. Washington, D.C.
- EPA (U.S. Environmental Protection Agency). 2015. ProUCL Version 5.1.002 User Guide: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. EPA/600/R-07/041. October 2015. U.S. Environmental Protection Agency Office of Research and Development. Washington, D.C.
- Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley & Sons, Inc. New York, NY. 320 pages.

## Mann-Kendall Trend Test Analysis

User Selected Options  
Date/Time of Computation ProUCL 5.13/17/2022 12:48:02 PM  
From File VC input wo MW-14 and outlier removed.xls  
Full Precision OFF  
Confidence Coefficient 0.95  
Level of Significance 0.05

### LnROS\_VC-mw-08

#### General Statistics

Number of Events Reported (m)	44
Number of Missing Events	0
Number of Reported Events Used	44
Number Values Reported (n)	44
Minimum	0.00569
Maximum	3.8
Mean	1.354
Geometric Mean	0.501
Median	1.1
Standard Deviation	1.25
Coefficient of Variation	0.923

#### Mann-Kendall Test

M-K Test Value (S)	-681
Critical Value (0.05)	-1.645
Standard Deviation of S	98.82
Standardized Value of S	-6.881
Approximate p-value	2.965E-12

Statistically significant evidence of a decreasing trend at the specified level of significance.

### LnROS\_VC-mw-10

#### General Statistics

Number of Events Reported (m)	45
Number of Missing Events	0
Number of Reported Events Used	45
Number Values Reported (n)	45
Minimum	0.02
Maximum	3.6
Mean	1.002
Geometric Mean	0.56
Median	0.84
Standard Deviation	0.92
Coefficient of Variation	0.918

#### Mann-Kendall Test

M-K Test Value (S)	-700
Critical Value (0.05)	-1.645
Standard Deviation of S	102.2
Standardized Value of S	-6.841
Approximate p-value	3.941E-12

Statistically significant evidence of a decreasing trend at the specified level of significance.

**LnROS\_VC-mw-12**

**General Statistics**

Number of Events Reported (m)	45
Number of Missing Events	0
Number or Reported Events Used	45
Number Values Reported (n)	45
Minimum	0.00219
Maximum	2
Mean	0.444
Geometric Mean	0.224
Median	0.41
Standard Deviation	0.345
Coefficient of Variation	0.777

**Mann-Kendall Test**

M-K Test Value (S)	-400
Critical Value (0.05)	-1.645
Standard Deviation of S	102.2
Standardized Value of S	-3.905
Approximate p-value	4.7183E-5

Statistically significant evidence of a decreasing trend at the specified level of significance.

**LnROS\_VC-mw-18**

**General Statistics**

Number of Events Reported (m)	42
Number of Missing Events	0
Number or Reported Events Used	42
Number Values Reported (n)	42
Minimum	0.00827
Maximum	0.32
Mean	0.0404
Geometric Mean	0.0283
Median	0.0289
Standard Deviation	0.0503
Coefficient of Variation	1.246

**Mann-Kendall Test**

M-K Test Value (S)	160
Critical Value (0.05)	1.645
Standard Deviation of S	92.26
Standardized Value of S	1.723
Approximate p-value	0.0424

Statistically significant evidence of an increasing trend at the specified level of significance.

**LnROS\_VC-mw-24**

**General Statistics**

Number of Events Reported (m)	34
-------------------------------	----

Number of Missing Events	0
Number or Reported Events Used	34
Number Values Reported (n)	34
Minimum	0.022
Maximum	1.1
Mean	0.218
Geometric Mean	0.142
Median	0.17
Standard Deviation	0.236
Coefficient of Variation	1.082

**Mann-Kendall Test**

M-K Test Value (S)	-341
Critical Value (0.05)	-1.645
Standard Deviation of S	67.44
Standardized Value of S	-5.041
Approximate p-value	2.3105E-7

**Statistically significant evidence of a decreasing trend at the specified level of significance.**

**LnROS\_VC-mw-25**

**General Statistics**

Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.0795
Maximum	1.8
Mean	0.856
Geometric Mean	0.715
Median	0.895
Standard Deviation	0.438
Coefficient of Variation	0.511

**Mann-Kendall Test**

M-K Test Value (S)	-84
Tabulated p-value	0.003
Standard Deviation of S	30.76
Standardized Value of S	-2.699
Approximate p-value	0.00348

**Statistically significant evidence of a decreasing trend at the specified level of significance.**

**LnROS\_VC-mw-26**

**General Statistics**

Number of Events Reported (m)	18
Number of Missing Events	0
Number or Reported Events Used	18
Number Values Reported (n)	18
Minimum	0.0216
Maximum	0.17
Mean	0.0689
Geometric Mean	0.0548

Median	0.0556
Standard Deviation	0.0476
Coefficient of Variation	0.69

#### **Mann-Kendall Test**

M-K Test Value (S)	-63
Tabulated p-value	0.009
Standard Deviation of S	26.4
Standardized Value of S	-2.348
Approximate p-value	0.00943

**Statistically significant evidence of a decreasing trend at the specified level of significance.**

#### **LnROS\_VC-mw-27**

##### **General Statistics**

Number of Events Reported (m)	17
Number of Missing Events	0
Number or Reported Events Used	17
Number Values Reported (n)	17
Minimum	0.0252
Maximum	0.36
Mean	0.136
Geometric Mean	0.103
Median	0.128
Standard Deviation	0.0982
Coefficient of Variation	0.72

##### **Mann-Kendall Test**

M-K Test Value (S)	-84
Tabulated p-value	0
Standard Deviation of S	24.28
Standardized Value of S	-3.419
Approximate p-value	3.1427E-4

**Statistically significant evidence of a decreasing trend at the specified level of significance.**

#### **LnROS\_VC-mw-29**

##### **General Statistics**

Number of Events Reported (m)	11
Number of Missing Events	0
Number or Reported Events Used	11
Number Values Reported (n)	11
Minimum	0.0269
Maximum	0.124
Mean	0.0511
Geometric Mean	0.0423
Median	0.0312
Standard Deviation	0.0369
Coefficient of Variation	0.722

##### **Mann-Kendall Test**

M-K Test Value (S)	27
Tabulated p-value	0.02



Standard Deviation of S	12.85
Standardized Value of S	2.024
Approximate p-value	0.0215

**Statistically significant evidence of an increasing trend at the specified level of significance.**

**LnROS\_VC-mw-30**

**General Statistics**

Number of Events Reported (m)	11
Number of Missing Events	0
Number of Reported Events Used	11
Number Values Reported (n)	11
Minimum	0.0339
Maximum	2.2
Mean	0.402
Geometric Mean	0.214
Median	0.161
Standard Deviation	0.619
Coefficient of Variation	1.539

**Mann-Kendall Test**

M-K Test Value (S)	-13
Tabulated p-value	0.179
Standard Deviation of S	12.85
Standardized Value of S	-0.934
Approximate p-value	0.175

**Insufficient evidence to identify a significant trend at the specified level of significance.**

**LnROS\_VC-mw-31**

**General Statistics**

Number of Events Reported (m)	11
Number of Missing Events	0
Number of Reported Events Used	11
Number Values Reported (n)	11
Minimum	0.167
Maximum	9
Mean	2.326
Geometric Mean	0.92
Median	0.475
Standard Deviation	2.984
Coefficient of Variation	1.283

**Mann-Kendall Test**

M-K Test Value (S)	-27
Tabulated p-value	0.02
Standard Deviation of S	12.85
Standardized Value of S	-2.024
Approximate p-value	0.0215

**Statistically significant evidence of a decreasing trend at the specified level of significance.**

**LnROS\_VC-mw-32**

**General Statistics**

Number of Events Reported (m)	12
Number of Missing Events	0
Number or Reported Events Used	12
Number Values Reported (n)	12
Minimum	0.162
Maximum	0.472
Mean	0.311
Geometric Mean	0.292
Median	0.29
Standard Deviation	0.113
Coefficient of Variation	0.362

**Mann-Kendall Test**

M-K Test Value (S)	25
Tabulated p-value	0.058
Standard Deviation of S	14.55
Standardized Value of S	1.65
Approximate p-value	0.0495

**Insufficient evidence to identify a significant trend at the specified level of significance.**

**LnROS\_VC-mw-33****General Statistics**

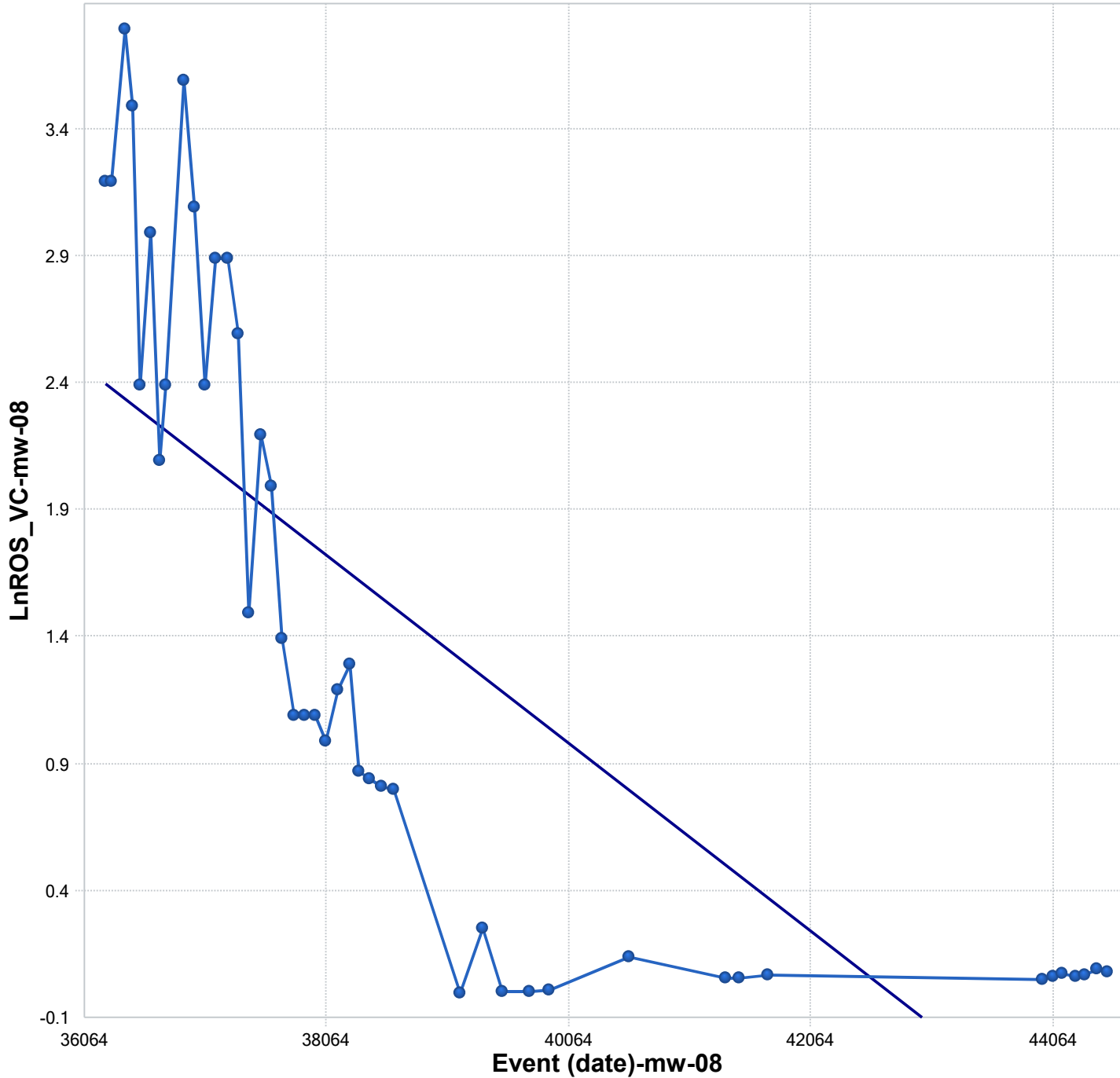
Number of Events Reported (m)	11
Number of Missing Events	0
Number or Reported Events Used	11
Number Values Reported (n)	11
Minimum	0.0582
Maximum	1.1
Mean	0.309
Geometric Mean	0.197
Median	0.124
Standard Deviation	0.339
Coefficient of Variation	1.096

**Mann-Kendall Test**

M-K Test Value (S)	-10
Tabulated p-value	0.223
Standard Deviation of S	12.81
Standardized Value of S	-0.703
Approximate p-value	0.241

**Insufficient evidence to identify a significant trend at the specified level of significance.**

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

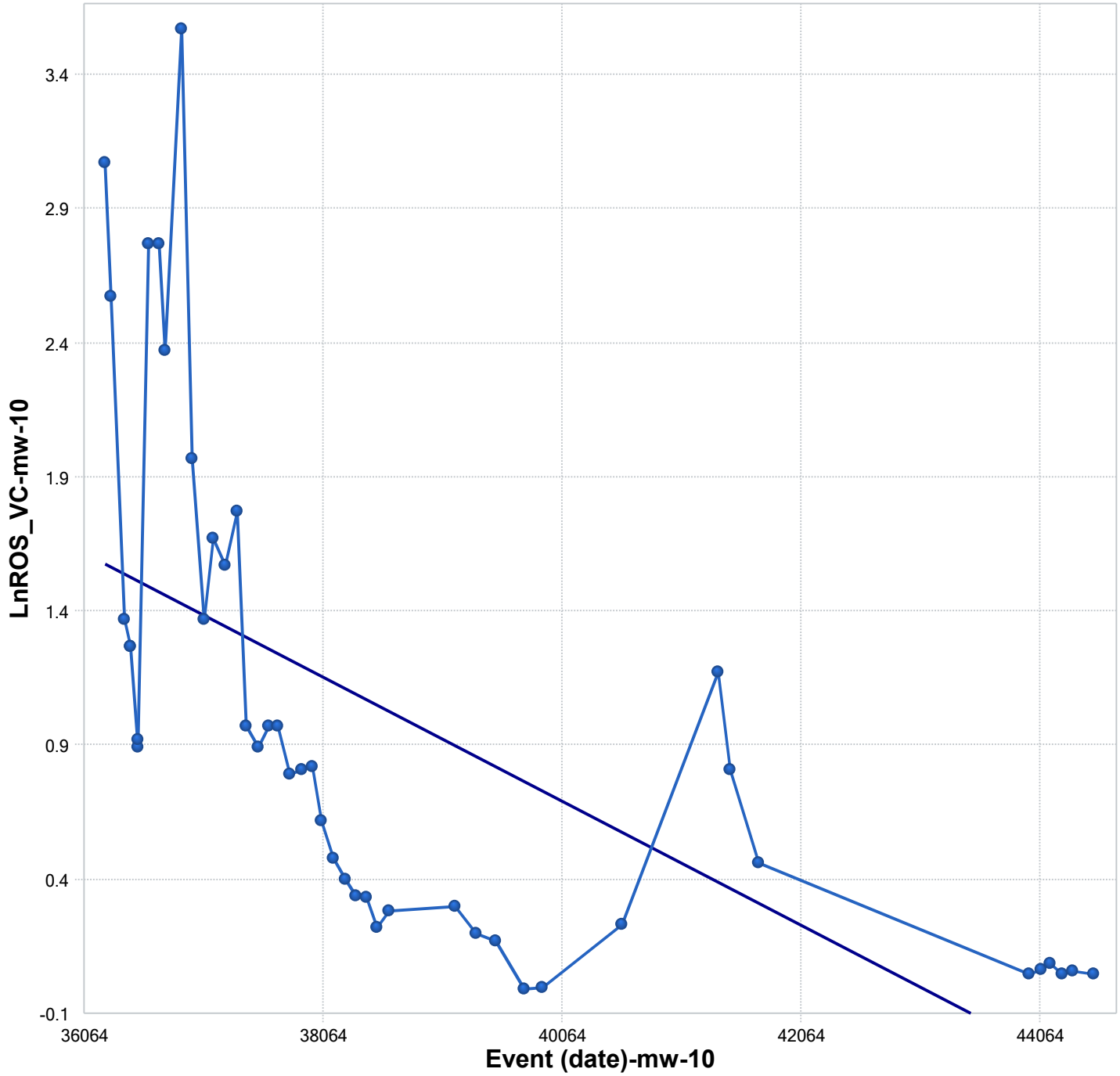
n	44
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	98.8180
Standardized Value of S	-6.8813
M-K Test Value (S)	-681
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

## OLS Regression Line (Blue)

OLS Regression Slope	-0.0004
OLS Regression Intercept	15.8345

Statistically significant evidence of a decreasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

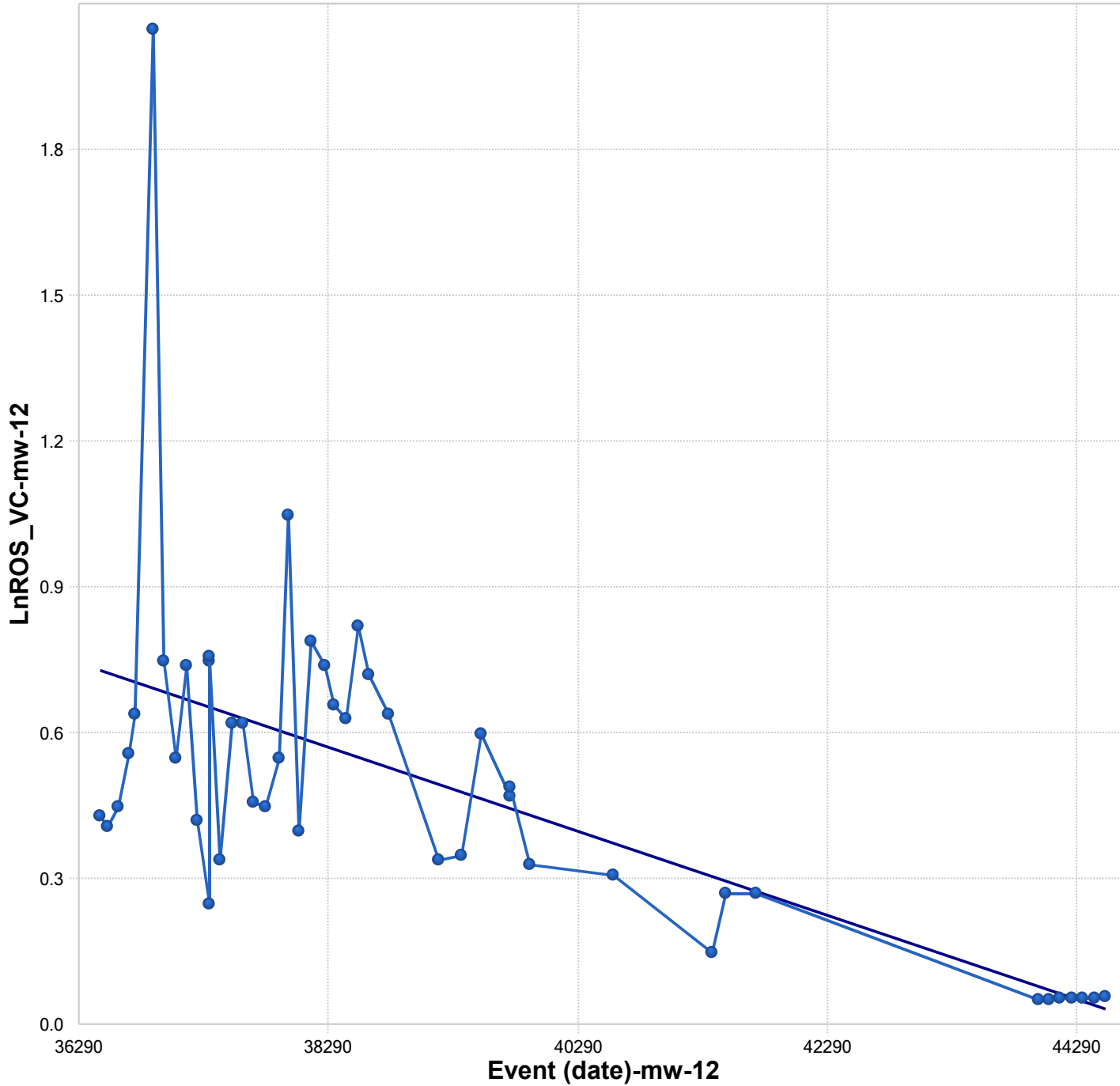
n	45
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	102.1828
Standardized Value of S	-6.8407
M-K Test Value (S)	-700
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	9.9968

Statistically significant evidence of a decreasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

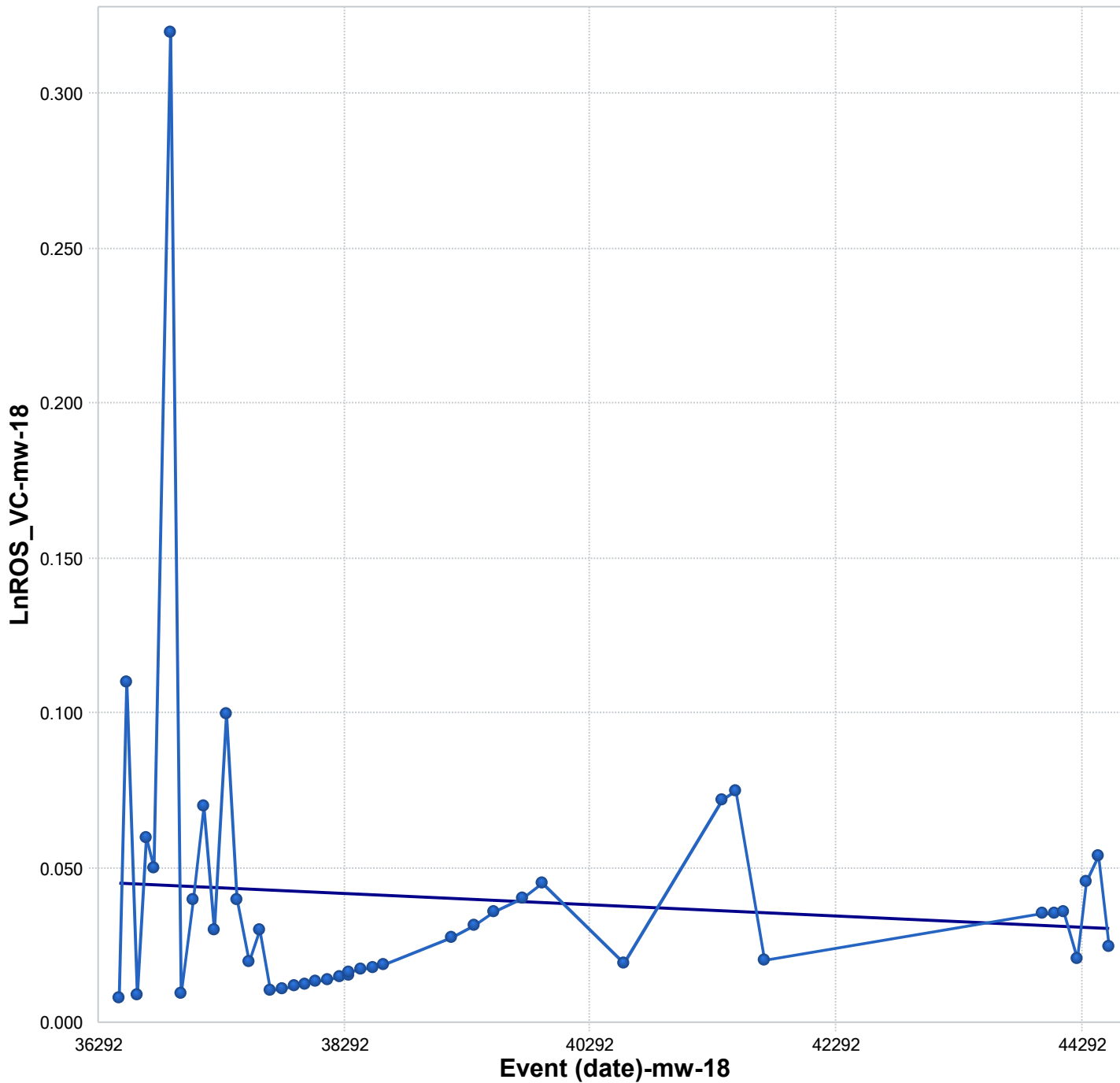
n	45
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	102.1861
Standardized Value of S	-3.9046
M-K Test Value (S)	-400
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	3.8315

Statistically significant evidence of a decreasing trend at the specified level of significance.

## Mann-Kendall Trend Test



### Mann-Kendall Trend Analysis

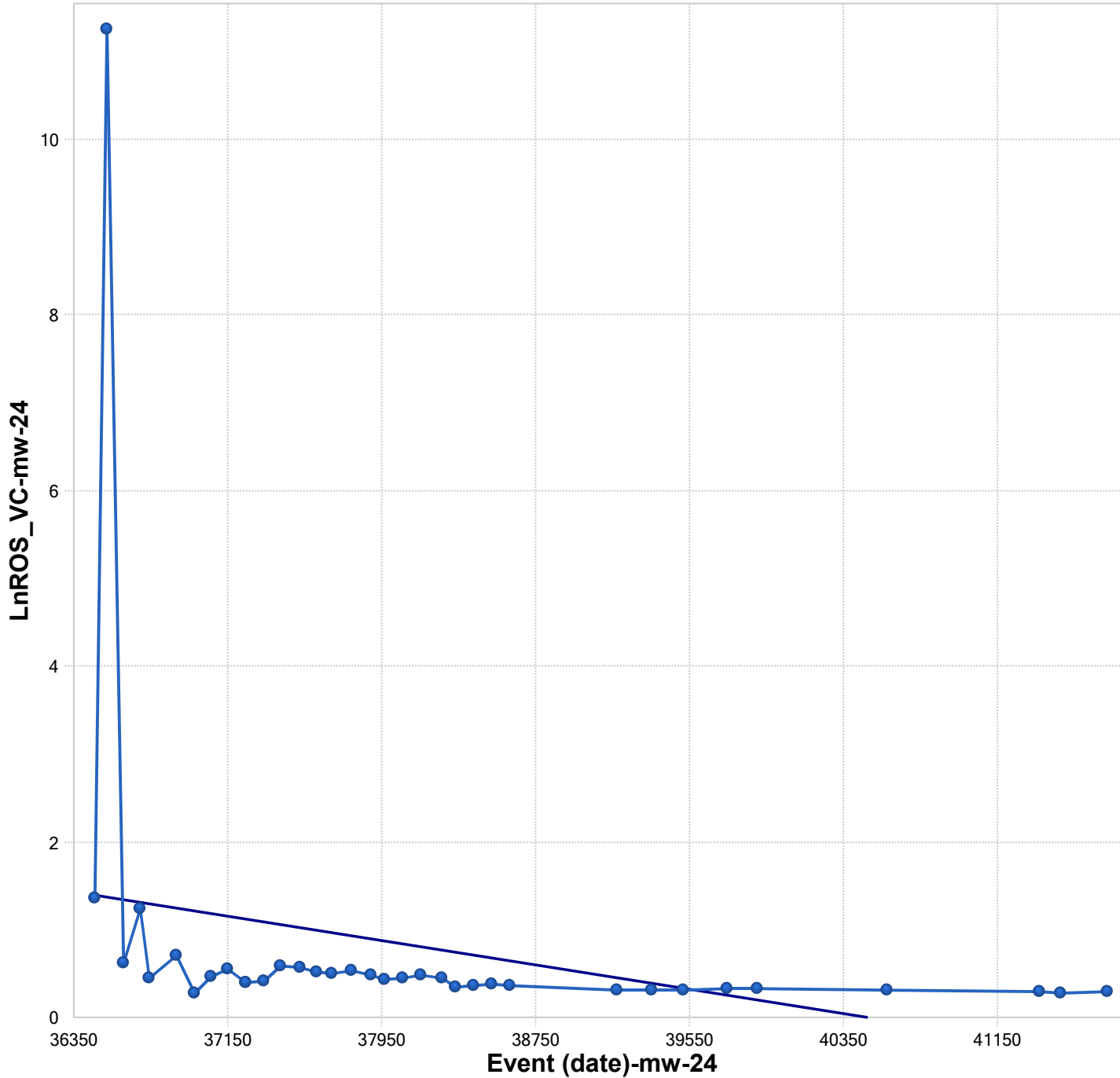
n	42
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	92.2569
Standardized Value of S	1.7234
M-K Test Value (S)	160
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0424

### OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.1132

Statistically significant evidence of an increasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

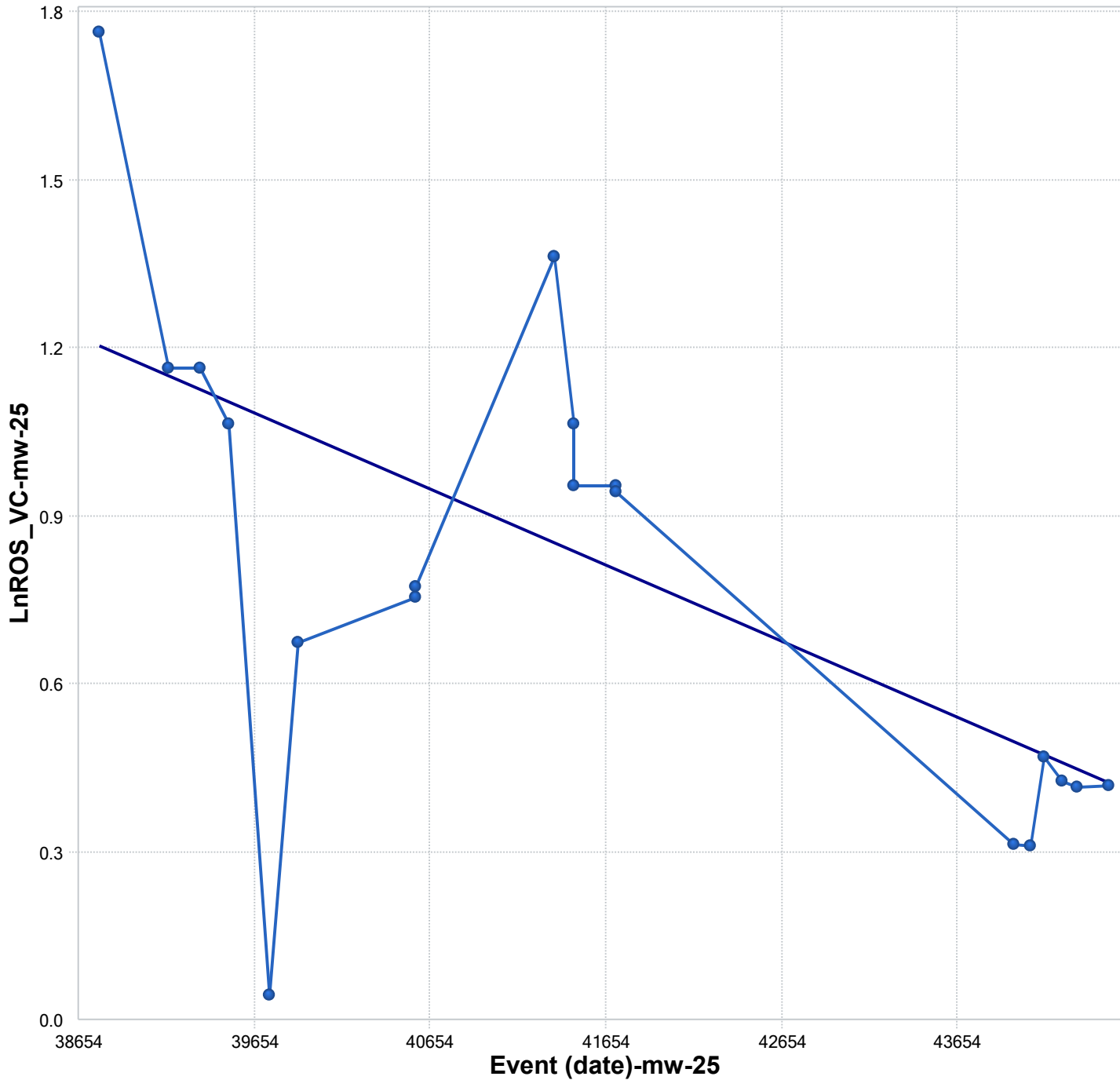
n	35
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	70.4012
Standardized Value of S	-5.2840
M-K Test Value (S)	-373
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

## OLS Regression Line (Blue)

OLS Regression Slope	-0.0003
OLS Regression Intercept	13.8609

Statistically significant evidence of a decreasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.7571
Standardized Value of S	-2.6986
M-K Test Value (S)	-84
Tabulated p-value	0.0030
Approximate p-value	0.0035

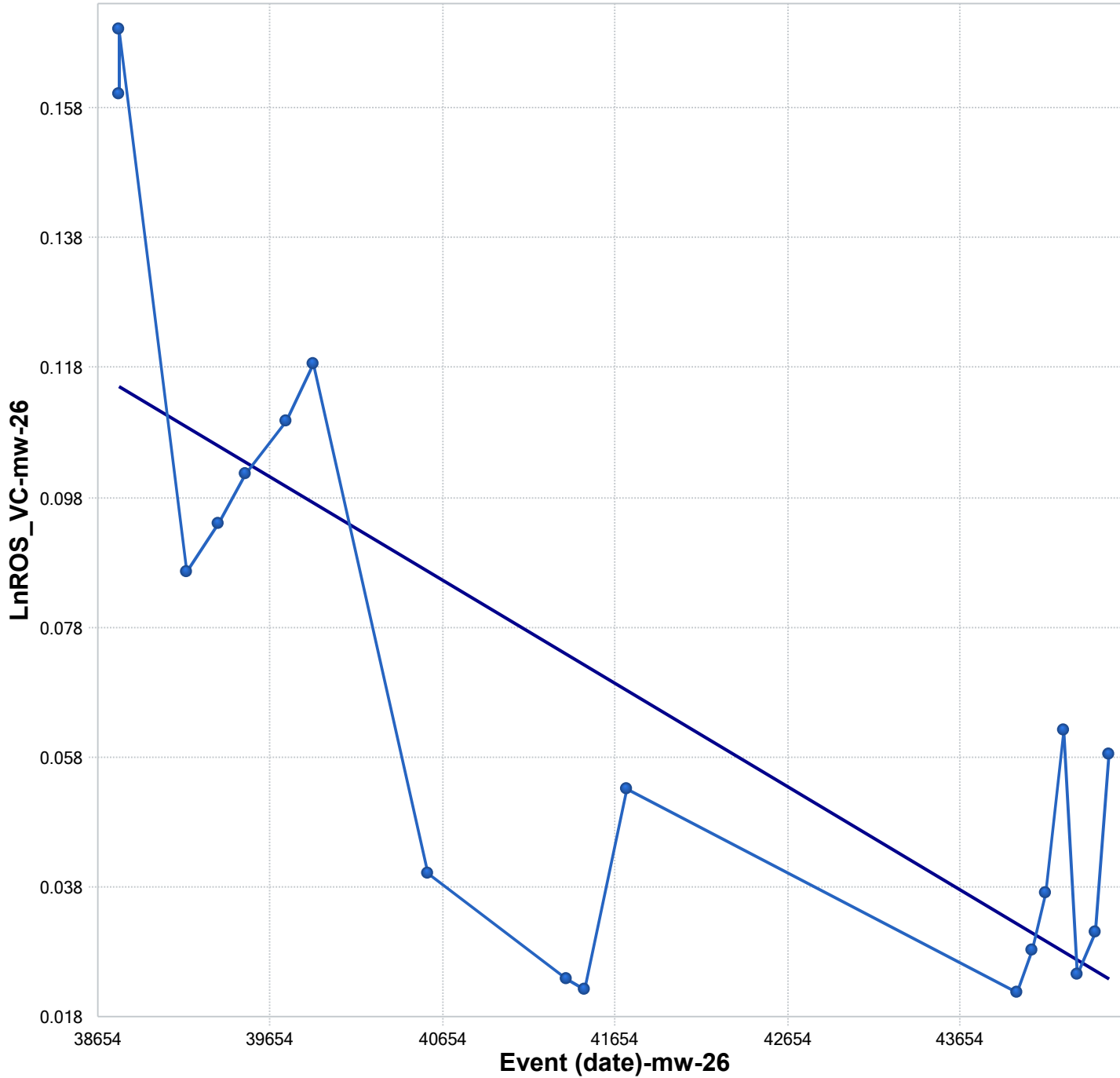
## OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	6.5048

Statistically significant evidence of a decreasing trend at the specified level of significance.



# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

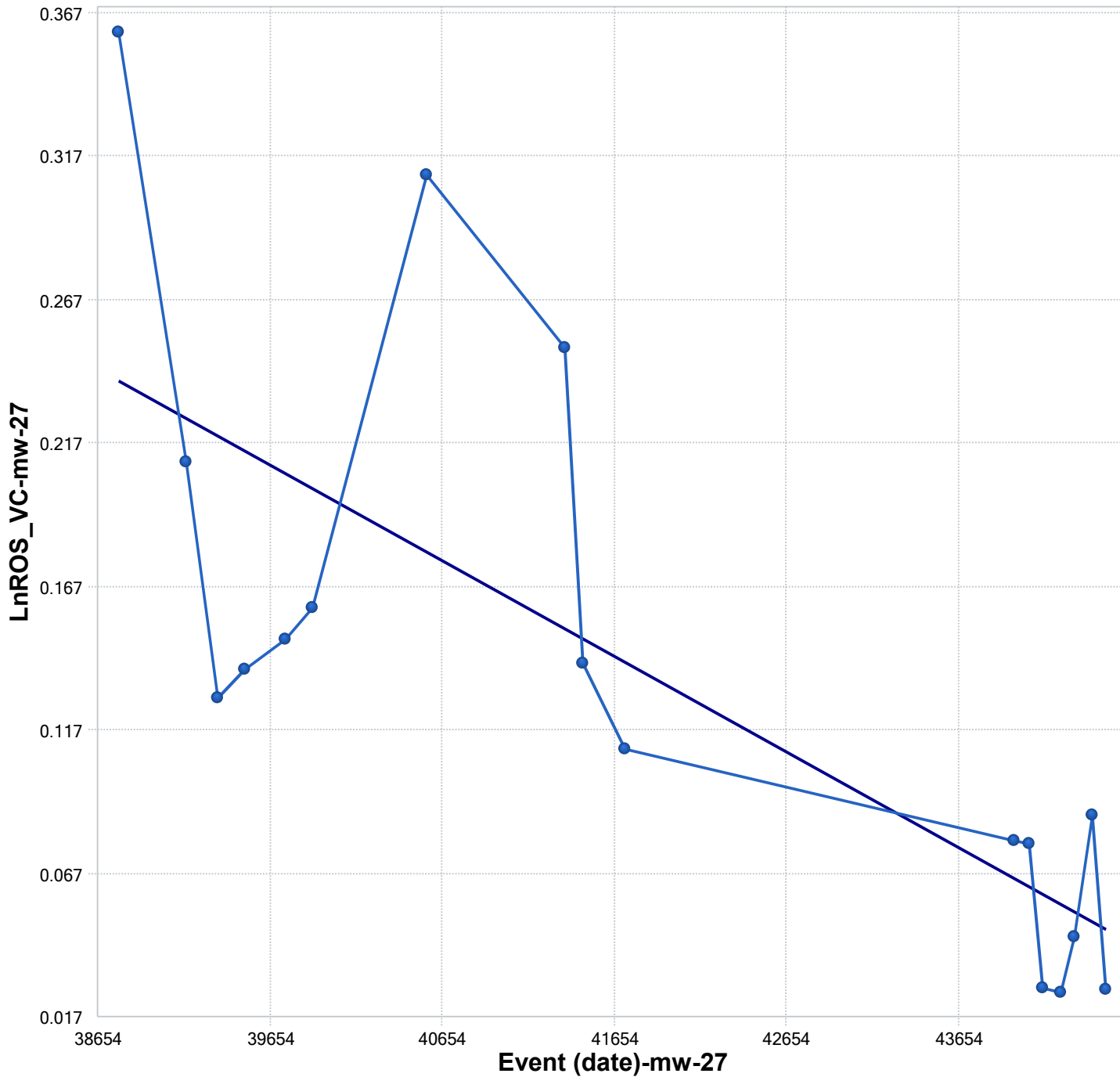
n	18
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	26.4008
Standardized Value of S	-2.3484
M-K Test Value (S)	-63
Tabulated p-value	0.0090
Approximate p-value	0.0094

## OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.7314

Statistically significant evidence of a decreasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

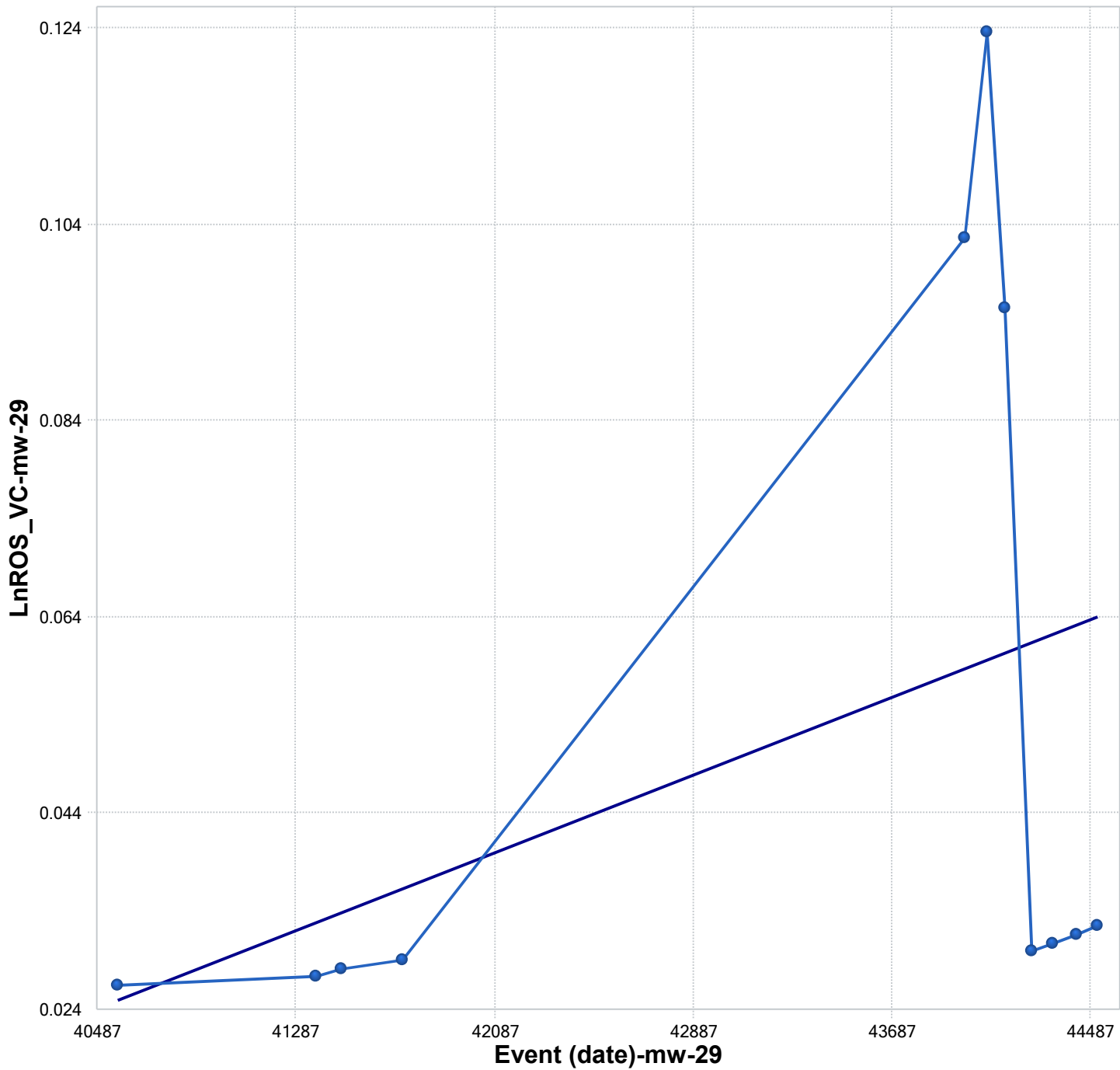
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2762
Standardized Value of S	-3.4190
M-K Test Value (S)	-84
Tabulated p-value	0.0000
Approximate p-value	0.0003

## OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	1.5316

Statistically significant evidence of a decreasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

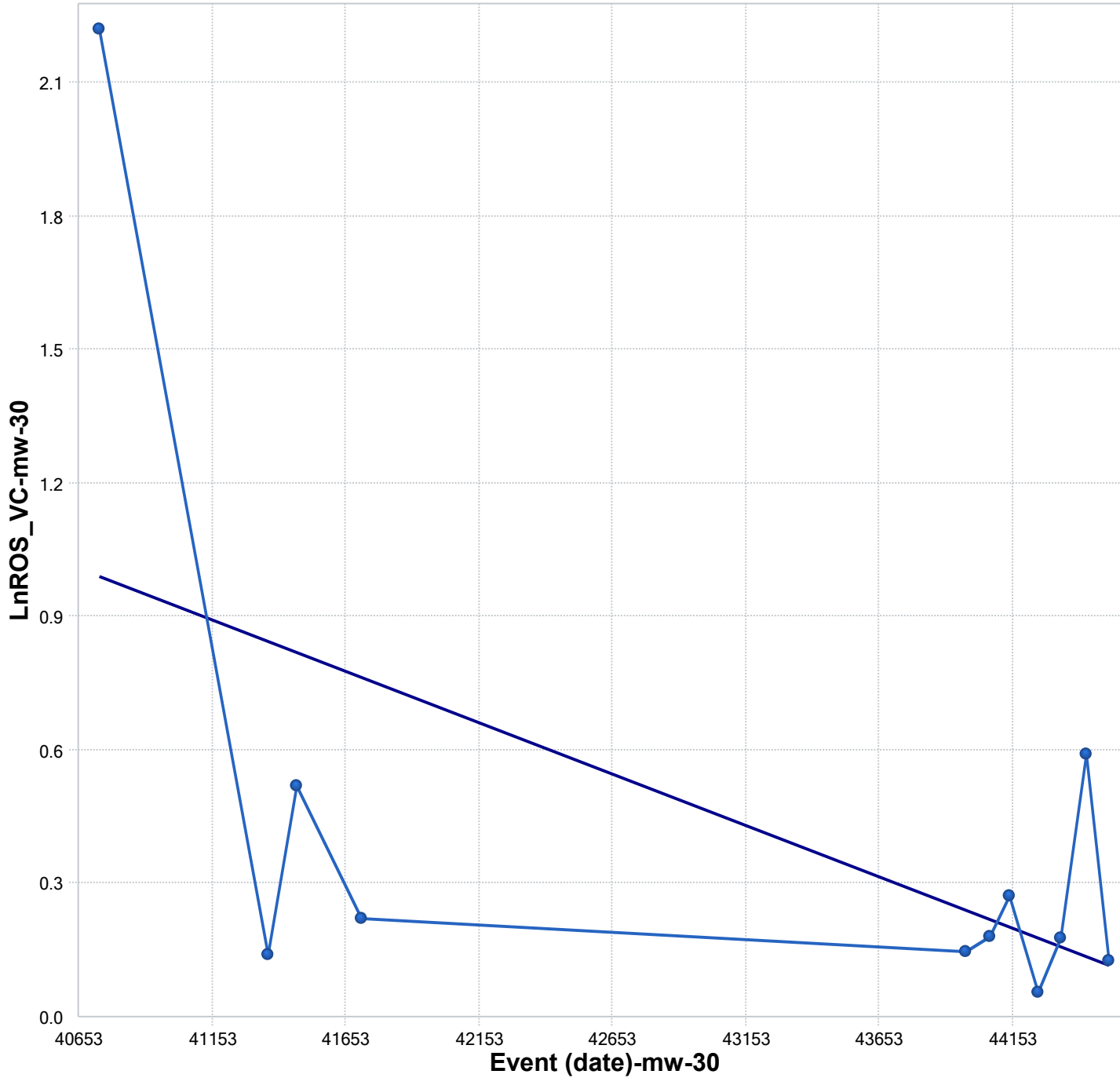
n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	2.0241
M-K Test Value (S)	27
Tabulated p-value	0.0200
Approximate p-value	0.0215

## OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-0.3775

Statistically significant evidence of an increasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

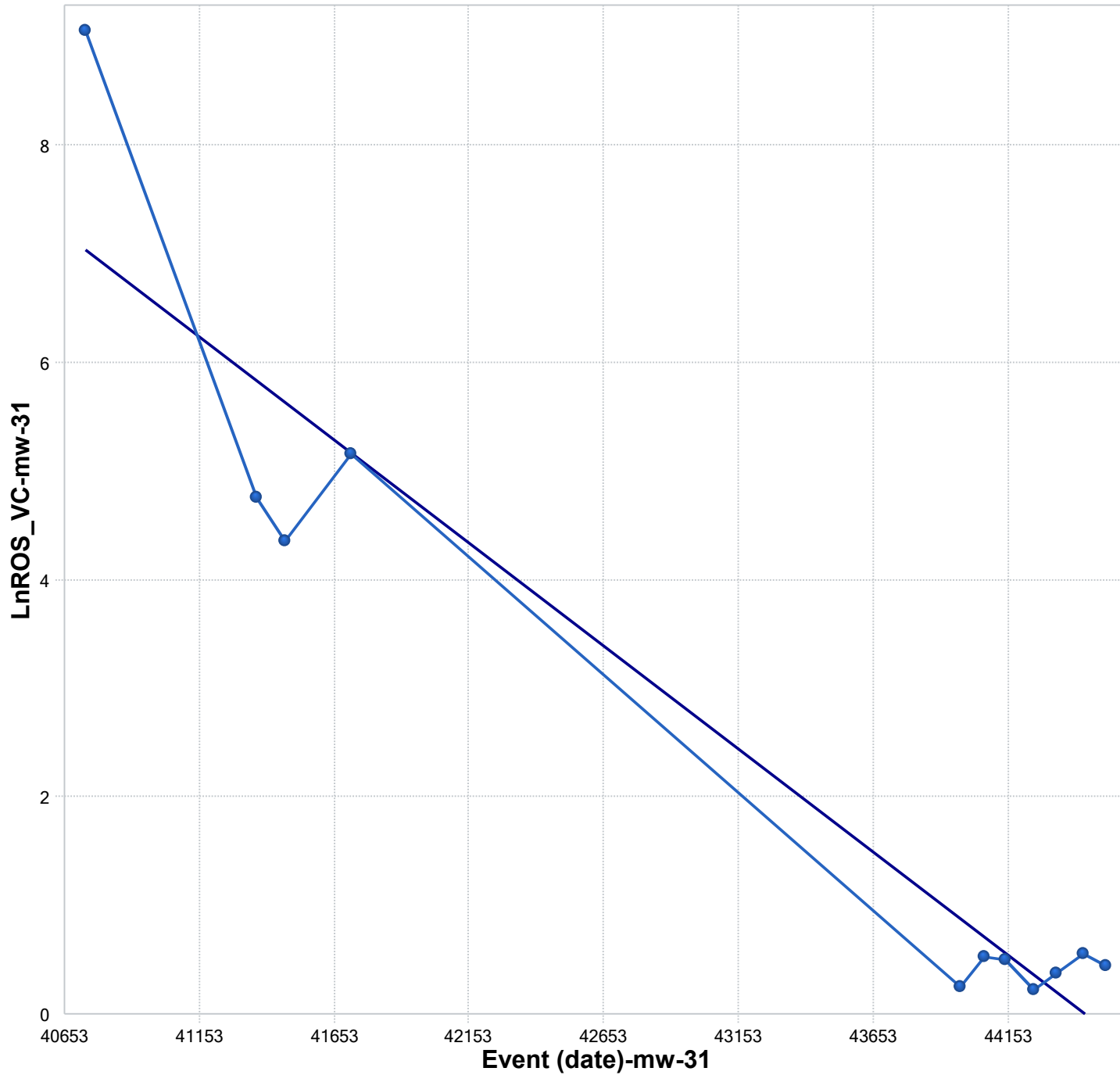
n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-0.9342
M-K Test Value (S)	-13
Tabulated p-value	0.1790
Approximate p-value	0.1751

## OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	10.3767

Insufficient statistical evidence of a significant trend at the specified level of significance.

## Mann-Kendall Trend Test



### Mann-Kendall Trend Analysis

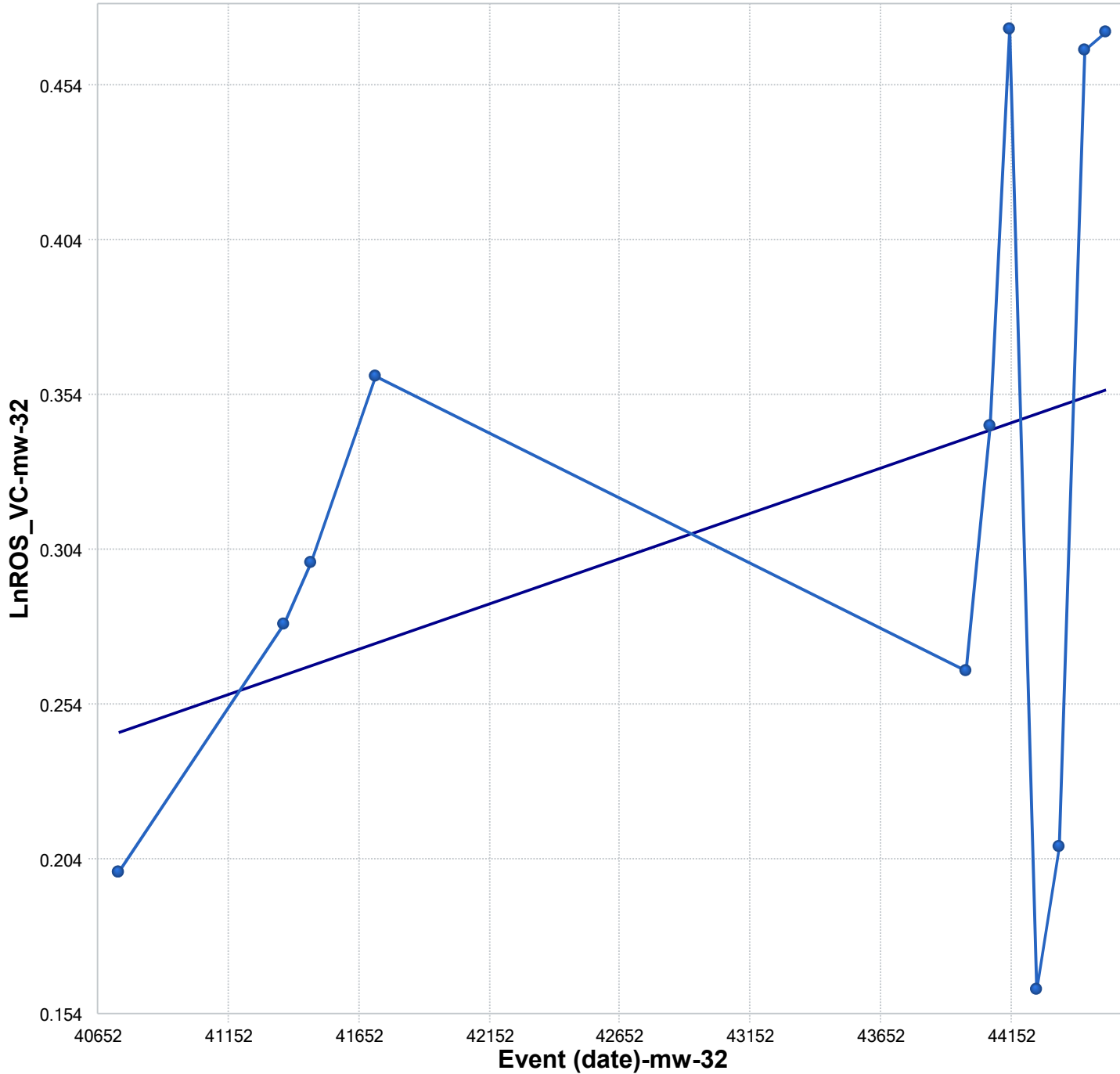
n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-2.0241
M-K Test Value (S)	-27
Tabulated p-value	0.0200
Approximate p-value	0.0215

### OLS Regression Line (Blue)

OLS Regression Slope	-0.0019
OLS Regression Intercept	84.2449

Statistically significant evidence of a decreasing trend at the specified level of significance.

# Mann-Kendall Trend Test



## Mann-Kendall Trend Analysis

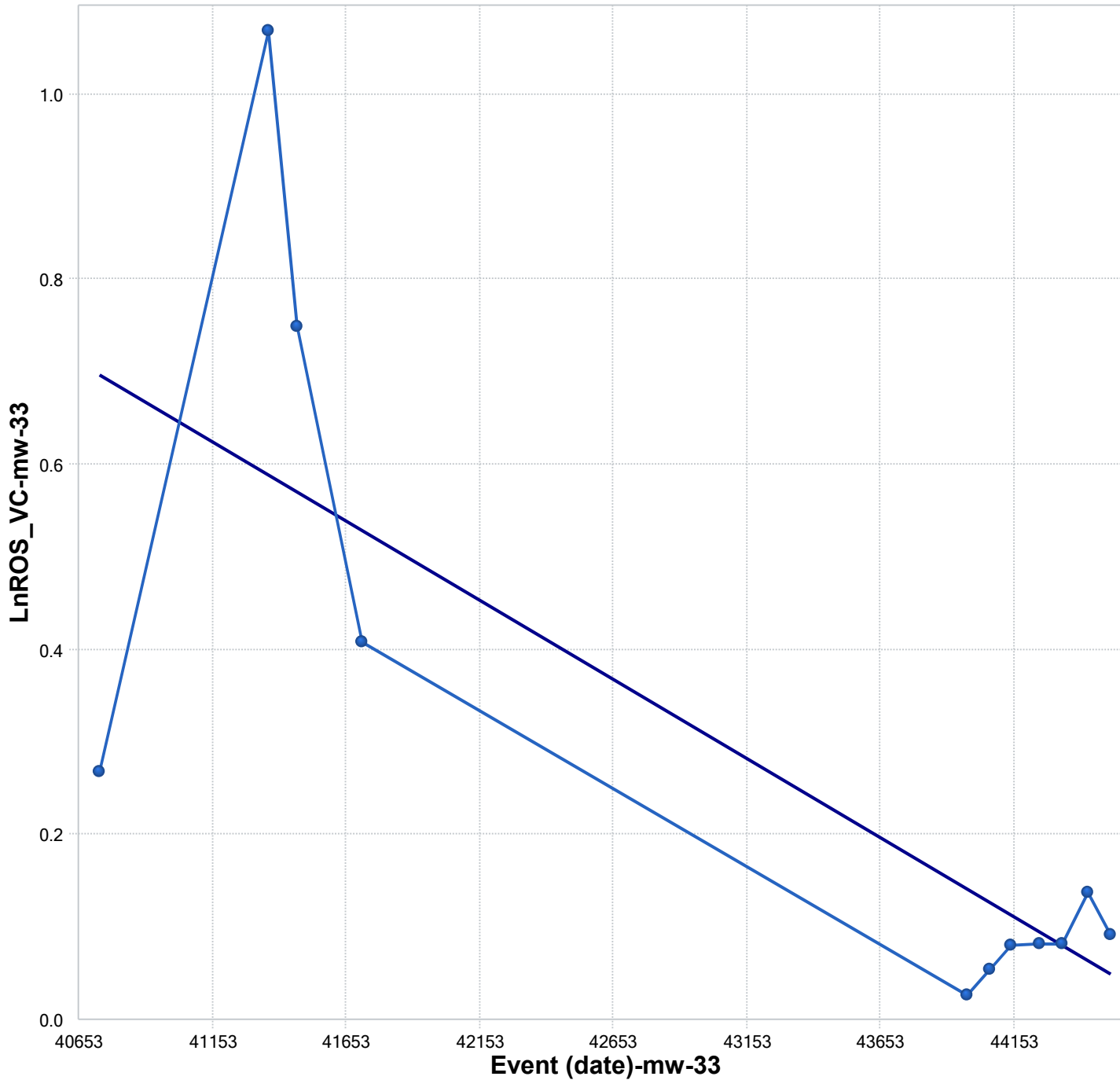
n	12
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.5488
Standardized Value of S	1.6496
M-K Test Value (S)	25
Tabulated p-value	0.0580
Approximate p-value	0.0495

## OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-0.9493

Insufficient statistical evidence of a significant trend at the specified level of significance.

## Mann-Kendall Trend Test



### Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8062
Standardized Value of S	-0.7028
M-K Test Value (S)	-10
Tabulated p-value	0.2230
Approximate p-value	0.2411

### OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	7.6940

Insufficient statistical evidence  
of a significant trend at the  
specified level of significance.

D3

Groundwater Monitoring Well Data and Field Forms





# Water Level Measurement Field Report

DATE <u>2/22/21</u>	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER <u>Overcast w/ light rain</u>	TEMP ° at _____ AM ° at _____ PM
PRESENT AT SITE <u>T. Kelly + C. Bourgeois</u>	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	<u>13:31</u>	<u>4.86</u>	—	TOC	15.3	10-15	1.52
MW-14	<u>13:40</u>	<u>1.90</u>	—	TOC	21.8	11.5-21.5	0.8
MW-29	<u>13:45</u>	<u>5.67</u>	—	TOC	30	20-30	-0.29
MW-18	<u>13:50</u>	<u>13.89</u>	—	TOC	40.4	30-40	1.25
MW-25	<u>14:10</u>	<u>12.54</u>	—	TOC	27	22-27	2.79
MW-32	<u>13:58</u>	<u>9.44</u>	—	TOC	24	19-24	-0.44
MW-33	<u>14:02</u>	<u>9.57</u>	—	TOC	25	20-25	-0.47
MW-26	<u>14:32</u>	<u>8.21</u>	—	TOC	25	15-25	2.39
MW-27	<u>14:48</u>	<u>6.86</u>	—	TOC	20	10-20	2.04
MW-10	<u>14:14</u>	<u>11.75</u>	—	TOC	45	35-45	1.65
MW-24	<u>14:36</u>	<u>7.42</u>	—	TOC	45.3	35-45	1.56
MW-08	<u>14:45</u>	<u>6.90</u>	—	TOC	45.6	35.5 – 45.5	1.88
MW-30	<u>14:20</u>	<u>8.85</u>	—	TOC	13	8-13	-0.53
MW-31	<u>14:23</u>	<u>9.71</u>	—	TOC	23	35.5-45.5	-0.46

Comments:

TOC – top of PVC casing      SG – staff gauge

SIGNED: \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/24/21 Well ID: MW-08

Sampling Organization: Parametrix Samplers: T. Pamy + C. Bourgeois

Purge Data Screened Interval (ft bgs): 5.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 7.16 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 10.5ft

Begin Purge Time: 8:24 End Purge Time: 9:08

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
828	7.18	9/12	360	0.75	11.5	1.73	1492	7.17	32.1	38.6	
833	"	"	"	1.1	11.2	2.60	1302	7.25	-16.8	25.1	
838	"	"	"	1.6	11.3	1.20	1286	7.31	-32.8	11.3	
843	"	"	"	2.1	11.3	1.57	1274	7.32	-44.8	4.51	
848	7.18	"	"	2.6	11.3	3.14	1266	7.32	-49.0	3.13	
853	"	"	"	3.0	11.3	1.92	1263	7.31	-52.3	2.99	
858	"	"	"	3.6	11.3	1.13	1254	7.29	-54.0	2.57	
903	"	"	"	4.0	11.3	1.11	1255	7.28	-55.1	2.67	
908	"	"	"	4.5	11.3	1.10	1278	7.28	-56.6	2.33	
913											

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW\_MW08- Time Collected: 9:15 Weather: Partly cloudy, 40's

Sample Description (Color, Turbidity, Odor, Other): N/A

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/23/21 Well ID: MW-10

Sampling Organization: Parametrix Samplers: T. Pamy + C. Bourgeois

Purge Data Screened Interval (ft bgs): 35.0-44.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 5.77 11.90 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 30.0 ft

Begin Purge Time: 1155 End Purge Time: 1232

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1157	5.77	1/3	260 mL/min	0.1	13.3	1.33	1447	7.44	-50.8	4.8	
1202	11.90	"	"	0.4	13.5	1.01	1487	7.45	-87.7	4.0	
1207	"	"	"	0.75	13.6	0.68	1788	7.48	-98.3	7.62	
1212	"	"	"	1.1	13.6	0.56	1490	7.49	-102.3	6.96	
1217	11.90	"	"	1.5	13.6	0.52	1486	7.49	-104.5	4.87	
1222	"	"	"	2.0	13.7	0.42	1486	7.50	-106.3	3.1	
1227	"	"	"	2.3	13.7	0.45	1484	7.50	-107.5	2.50	
1232	"	"	"	2.75	13.6	0.44	1482	7.50	-108.4	1.92	
1237											

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW10-0221 Time Collected: 12:40 Weather: Slightly overcast

Sample Description (Color, Turbidity, Odor, Other): N/A.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 2/22/21 Well ID: MW-12

Sampling Organization: Parametrix Samplers: T. Remy + C. Bourgeois

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 4.86 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 12.5 ft

Begin Purge Time: 15:35 End Purge Time: 16:05

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1540		5/7	340 ml/min	0.5 gal	10.9	8.32	554.7	6.67	298.0	6.59	
1545	4.91	"	"	0.8 gal	10.8	11.23	570.1	6.75	283.0	2.64	
1550	"	"	"	1.25	10.8	6.05	562.2	6.77	277.1	1.43	
1555	"	"	"	1.60	10.8	5.26	565.0	6.78	274.2	0.46	
1600	"	"	"	2.0	10.8	4.82	561.7	6.79	267.7	0.02	
1605	"	"	"	2.5	10.8	4.79	558.6	6.78	266.7	0.02	

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW\_MW12-0221 Time Collected: 1535 (actual time) Weather: Overcast  
 Sample Description (Color, Turbidity, Odor, Other): Clear *(different than above)*  
 Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 2/22 Well ID: MW-14

Sampling Organization: Parametrix Samplers: T. Pamy + C. Bourgeois

**Purge Data** Screened Interval (ft bgs): 11.5-21.5 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 1.95 Purge Water Disposal Method: Dam

Purge Device: dedicated bladder pump Pump Intake Depth: 16.5 ft

Begin Purge Time: 1607 End Purge Time: 1706

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1610	2.04	5/7	260 ml/min	0.25	13.0	2.14	549.9	7.30	50.0	182	
1615	"	"	"	0.40	13.1	0.96	532.4	7.27	5.0	318	
1620	"	"	"	0.65	12.9	0.81	489.0	7.19	12.5	112	
1625	"	"	"	0.8	12.9	0.71	467.9	7.16	14.7	43.7	
1630	"	"	"	1.20	12.9	0.63	460.5	7.16	13.8	34.4	
1635	"	"	"	1.50	13.0	0.55	458.6	7.16	12.2	12.5	
1640	"	"	"	2.0	13.0	0.71	457.1	7.16	10.9	7.35	
1645	2.02	"	"	2.25	13.1	0.79	456.7	7.17	8.5	6.10	
1650	"	"	"	2.50	13.0	0.77	457.0	7.17	6.8	4.98	
1655	"	"	"	2.75	13.0	0.76	454.8	7.18	5.4	3.03	
1700	"	"	"	3.15	13.1	0.74	453.8	7.18	4.2	4.0	
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10%	

**Sampling Data**

Sample ID: SPL-GW-MW14-0221 Time Collected: 1710 Weather: Overcast

Sample Description (Color, Turbidity, Odor, Other): faint odor.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/23/21 Well ID: MW-18

Sampling Organization: Parametrix Samplers: T. Pomy + C. Bourgeois

Purge Data Screened Interval (ft bgs): \_\_\_\_\_ Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 30.0-40.0 Purge Water Disposal Method: Drain

Purge Device dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 0822 End Purge Time: 9:17

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
	<u>14.04</u>	<u>7/10</u>	<u>260ml/min</u>								
<u>8:25</u>	<u>14.04</u>	<u>"</u>	<u>"</u>	<u>0.3 g</u>	<u>13.1</u>	<u>1.98</u>	<u>918</u>	<u>7.19</u>	<u>72.0</u>	<u>2.43</u>	
<u>8:30</u>	<u>14.04</u>	<u>"</u>	<u>"</u>	<u>0.6 g</u>	<u>13.2</u>	<u>0.84</u>	<u>1168</u>	<u>7.25</u>	<u>-6.8</u>	<u>0.02</u>	
<u>8:35</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>0.9 g</u>	<u>13.2</u>	<u>0.62</u>	<u>1211</u>	<u>7.31</u>	<u>-28.7</u>	<u>0.02</u>	
<u>8:40</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>1.2 g</u>	<u>13.3</u>	<u>0.57</u>	<u>1189</u>	<u>7.32</u>	<u>-38.3</u>	<u>0.02</u>	
<u>8:45</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>1.6 g</u>	<u>13.1</u>	<u>0.51</u>	<u>1161</u>	<u>7.32</u>	<u>-44.2</u>	<u>0.02</u>	
<u>8:50</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>1.8 g</u>	<u>13.3</u>	<u>0.48</u>	<u>1152</u>	<u>7.31</u>	<u>-47.7</u>	<u>0.02</u>	
<u>8:55</u>	<u>14.04</u>	<u>"</u>	<u>"</u>	<u>2.2 g</u>	<u>13.3</u>	<u>0.64</u>	<u>1149</u>	<u>7.36</u>	<u>-49.0</u>	<u>0.02</u>	
<u>9:00</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>2.5 g</u>	<u>13.3</u>	<u>0.5</u>	<u>1154</u>	<u>7.30</u>	<u>-50.5</u>	<u>0.02</u>	
<u>9:05</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>2.8 g</u>	<u>13.2</u>	<u>0.47</u>	<u>1158</u>	<u>7.29</u>	<u>-51.5</u>	<u>0.02</u>	
<u>9:10</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>3.1 g</u>	<u>13.4</u>	<u>0.42</u>	<u>1161</u>	<u>7.29</u>	<u>-52.1</u>	<u>0.02</u>	

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW18-0221 Time Collected: 9:10 Weather: Overcast

Sample Description (Color, Turbidity, Odor, Other): Clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/24/21 Well ID: MW-24

Sampling Organization: Parametrix Samplers: J. Perry + C. Bourgeois

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~35.0-45.0~~ 7.70 Purge Water Disposal Method: Drain

Purge Device dedicated bladder pump Pump Intake Depth: 40.0 ft

Begin Purge Time: 11:48 End Purge Time: 12:15

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
11:50	7.73	7/9	270 ml/min		10.1	6.87	801	7.56	140.3	3.49	
11:55	7.73	"	"	0.5	11.8	1.88	972	7.10	-2.3	1.15	
12:00	"	"	"	0.8	11.9	1.23	985	7.11	-25.6	0.02	
12:05	"	"	"	1.20	12.0	1.01	987	7.13	-37.7	0.88	
12:10	8.73	"	"	1.40	12.1	0.95	982	7.14	-39.0	1.61	
12:15	"	"	"	1.85	12.0	0.93	979	7.13	-41.5	1.35	

Stabilization Criteria    3%    10%    3%    ± 0.1    ±10 mv    10%

**Sampling Data**

Sample ID: SPL-GW-MW24- Time Collected: 12:10 Weather: Partly cloudy

Sample Description (Color, Turbidity, Odor, Other): N/A

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/23 Well ID: MW-25

Sampling Organization: Parametrix Samplers: T. Amy + C. Bourgeois

Purge Data Screened Interval (ft bgs): 20.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 12.65 Purge Water Disposal Method: Drain

Purge Device: dedicated bladder pump Pump Intake Depth: 24.5 ft

Begin Purge Time: 1057 End Purge Time: 1132

Table with columns: Time, Depth to Water (feet below MP), Pump Setting, Purge Rate, Cum. Vol. Purged, Temp (°C), DO (mg/L), Specific Conductance (mg/cm), pH (units), ORP (mv), Turbidity (NTU), Comments. Includes handwritten data for times 1107 through 1132.

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW-MW25-0221 Time Collected: 1140 Weather: Slightly overcast

Sample Description (Color, Turbidity, Odor, Other): N/A

Sample Analyses: cis-1,2-DCE, benzene, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected: [ ] Yes [X] No If yes, ID: \_\_\_\_\_

MS/MSD Collected: [ ] Yes [X] No

Additional Information/Comments



GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/24/21 Well ID: MW-26
Sampling Organization: Parametrix Samplers: T. Perry + C. Bourgeois

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in
Initial Depth of Water (Ft below TOC): 8.46 Purge Water Disposal Method: Drum
Purge Device dedicated bladder pump Pump Intake Depth: 20.0 ft
Begin Purge Time: 12:33 End Purge Time: 13:40

Table with columns: Time, Depth to Water (feet below MP), Pump Setting, Purge Rate, Cum. Vol. Purged, Temp (°C), DO (mg/L), Specific Conductance (mg/cm), pH (units), ORP (mv), Turbidity (NTU), Comments. Contains handwritten data rows from 12:35 to 13:50.

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW\_MW26- 0221 Time Collected: 1350 Weather: Partly Cloudy
Sample Description (Color, Turbidity, Odor, Other): Faint orange color.
Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic
Duplicate Sample Collected: [ ] Yes [X] No If yes, ID:
MS/MSD Collected: [ ] Yes [X] No

Additional Information/Comments

Oil Sheen observed in bucket at the end of purge

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/24/21 Well ID: MW-27

Sampling Organization: Parametrix Samplers: J. Pamy + C. Bourgeois

Purge Data Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 7.09 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 15.0 ft

Begin Purge Time: 9:32 End Purge Time: 10:50

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
935	7.11	5/9	240 ml/min	0.25	8.8	5.60	336.4	6.98	57.6	48.7	Strong orange color
940	7.09	"	"	0.35	9.1	2.29	242.4	6.97	62.3	58.6	"
945	7.09	"	"	0.55	9.7	1.48	220.4	6.92	67.1	35.3	More clear
950	7.10	"	"	1.20	9.8	1.27	216.2	6.97	68.5	35.0	
955	7.10	"	"	1.50	9.9	1.32	218.7	6.97	72.2	17.8	
1000	"	"	"	2.25	10.0	1.42	225.5	6.97	76.2	7.44	
1005	"	"	"	2.60	10.0	1.30	229.7	6.95	76.9	89.1	
1010	"	"	"	3.15	10.0	1.50	236.7	6.93	76.9	50.3	
1015	<del>7.10</del> 7.10	"	"	3.60	10.0	1.42	238.3	6.93	43.7	20.9	
1020	7.12	"	"	+0.25	10.1	1.21	241.3	6.93	71.0	15.8	Dumped bucket
1025	"	"	"	+0.50	10.1	1.13	244.2	6.93	69.5	10.9	
1030	7.12	"	"	+0.9	10.1	1.05	249.9	6.93	67.1	8.96	
1035	"	"	"	+1.4	10.1	1.02	252.7	6.93	65.4	7.31	
1040	"	"	"	+2.0	10.2	0.97	259.3	6.92	64.9	5.95	
1045	"	"	"	+2.6	10.2	1.01	261.5	6.91	63.6	5.51	
1050	"	"	"	+3.0	10.2	1.01	263.0	6.91	61.8	5.80	

Stabilization Criteria      3%                  10%                  3%                  ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW27-0221 Time Collected: 11:00 Weather: Partly cloudy

Sample Description (Color, Turbidity, Odor, Other): N/A

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/23 Well ID: MW-29  
 Sampling Organization: Parametrix Samplers: T. Perry + C. Bourgeois

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 5.77 Purge Water Disposal Method: Open  
 Purge Device peristaltic pump Pump Intake Depth: 25.0 ft  
 Begin Purge Time: 9:42 End Purge Time: 10:35

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
945	6.47	1/3	250 mL/min	0.2g	11.7	2.25	777	7.30	-42.0	11.6	
950	6.51	"	"	0.5g	11.8	0.87	773	7.32	-61.0	33.5	
955	6.69	"	"	0.75g	11.9	0.67	757	7.34	-62.8	11.9	
1000	6.71	"	"	1.16g	11.9	0.63	766	7.36	-72.1	3.72	
1005	6.78	"	"	1.40g	12.0	0.53	774	7.37	-74.5	2.10	
1010	6.8	"	"	1.80g	12.2	0.48	777	7.38	-77.2	0.89	
1015	6.8	"	"	2.10	12.1	0.48	777	7.40	-78.7	0.02	
1020	6.8	"	"	2.5	12.2	0.46	777	7.40	-79.7	0.10	
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10%	

**Sampling Data**  
 Sample ID: SPL-GW\_MW29-022 Time Collected: 10:25 Weather: Slight overcast.  
 Sample Description (Color, Turbidity, Odor, Other): Clear  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: SPL-GW-MW60-022  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**  
 \_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/23 Well ID: MW-30

Sampling Organization: Parametrix Samplers: T. Pany + C. Bungeo

Purge Data Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.85 Purge Water Disposal Method: Drain

Purge Device peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 1314 End Purge Time: 1404

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1317	8.85	1/3	"	0.1	11.4	1.64	611.0	7.13	18.6	217	
1322	8.93	"	"	0.4	11.5	1.03	592.4	6.87	42.5	75.7	Flow through cell emptied
1327	8.95	"	"	0.6	11.4	0.79	583.0	6.86	44.3	81.7	
1332	8.97	"	300 <sup>ml</sup> /min	1.0	11.3	0.81	557.3	6.85	47.7	93.4	Flow through cell emptied
1337	8.97	"	"	1.30	11.3	0.77	533.8	6.85	49.4	11.5	
1342	8.97	"	"	1.75	11.4	0.71	509.0	6.83	51.7	5.80	
1347	8.99	"	"	2.25	11.2	0.78	494.2	6.81	55.4	3.78	
1352	9.00	"	"	2.60	11.1	0.75	479.9	6.80	57.4	2.32	
1357	9.01	"	"	3.00	11.0	0.77	473.3	6.78	59.5	0.02	
1402	9.01	"	"	3.50	10.9	0.74	473.1	6.78	60.3	0.02	

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW\_MW30-0221 Time Collected: 1410 Weather: Partly Cloudy

Sample Description (Color, Turbidity, Odor, Other): NIA

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/23/21 Well ID: MW-31  
 Sampling Organization: Parametrix Samplers: T. Pamy + C. Bourgeois

Purge Data Screened Interval (ft bgs): 18.0-23.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 9.75 Purge Water Disposal Method: Drum  
 Purge Device: dedicated bladder pump Pump Intake Depth: 20.5ft  
 Begin Purge Time: 1422 End Purge Time: 1518

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1428	9.75	6/10	270ml/min	0.20	12.9	1.00	409.7	6.91	15.9	196	
1433	9.75	5/9	"	0.60	12.9	0.99	418.3	6.96	-10.2	37	
1438	9.75	"	"	1.00	12.9	0.75	421.0	6.98	-18.6	18.7	
1443	"	"	"	1.25	12.9	0.88	421.5	6.96	-22.0	14.1	
1448	"	"	"	1.60	13.0	0.67	421.7	6.99	-25.8	9.72	
1453	"	"	"	1.90	13.1	0.57	421.1	6.99	-27.7	8.59	
1458	"	"	"	2.25	13.0	0.57	420.7	6.99	-28.8	7.55	
1503	"	"	"	2.55	13.1	0.57	419.7	6.99	-29.5	6.50	
1508	"	"	"	2.80	13.0	0.59	419.2	6.99	-29.7	5.33	
1513	"	"	"	3.20	13.1	0.60	417.9	6.99	-29.4	5.52	
1518	"	"	"	3.50	13.1	0.62	417.0	6.98	-28.8	5.88	
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10%	

**Sampling Data**

Sample ID: SPL-GW\_MW31-0221 Time Collected: 1525 Weather: Rain w/ hail  
 Sample Description (Color, Turbidity, Odor, Other): N/A.  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: SPL-GW-MW31-0221  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 2/23/21

Well ID: MW-32

Sampling Organization: Parametrix

Samplers: J. Pamy + C. Bourgeois

Purge Data Screened Interval (ft bgs):

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 19.0-24.0

Purge Water Disposal Method: Onm

Purge Device peristaltic pump

Pump Intake Depth: 21.5 ft

Begin Purge Time: 1610

End Purge Time:

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
	9.55	113	240								
1615	9.55	"	"	0.4	13.4	0.88	816	7.23	-2.1	14.8	
1620	9.55	"	"	0.75	13.5	0.69	826	7.31	-32.0	6.35	
1625	"	"	"	1.0	13.5	0.55	831	7.34	-44.4	6.44	
1630	9.55	"	"	1.4	13.5	0.56	835	7.35	-52.3	4.37	
1635	"	"	"	1.76	13.6	0.48	836	7.36	-56.6	3.83	
1640	9.55	"	"	2.10	13.6	0.45	839	7.37	-59.8	1.96	
1645	"	"	"	2.50	13.6	0.44 0.74	839	7.37	-63.3	1.34	

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW\_MW32- 0221

Time Collected: 16:55

Weather: overcast

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID:

MS/MSD Collected:  Yes  No

Additional Information/Comments

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 2/24/21 Well ID: MW-33

Sampling Organization: Parametrix Samplers: J. Perry + C. Bourgeois

Purge Data Screened Interval (ft bgs): 20.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.83 Purge Water Disposal Method: Drum

Purge Device peristaltic pump Pump Intake Depth: 22.5ft

Begin Purge Time: 1421 End Purge Time: 1545

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1425	9.84	215	260	0.25	14.6	1.24	1381	7.29	-37.9	18.5	
130 (45)	"	"	"	0.4	14.7	1.03	1377	7.36	-64.3	12.0	
1435	9.85	"	"	0.76	14.7	0.88	1375	7.37	-71.3	9.77	
1446	"	"	"	1.0	14.7	0.70	1371	7.38	-75.9	9.58	
1445	"	"	"	1.2	14.9	0.52	1363	7.38	-78.8	6.68	
1450	"	"	"	1.70	14.8	0.41	1360	7.38	-81.0	9.49	
1455	"	"	"	2.10	14.9	0.37	1355	7.37	-82.6	6.28	
1500	9.84	"	"	2.50	14.9	0.73	1348	7.35	-83.3	7.43	
1505	"	"	"	2.80	14.9	0.40	1342	7.35	-85.0	7.34	
1510	9.84	"	"	3.25	14.9	0.35	1338	7.33	-86.8	11.7	
1515	"	"	"	3.60	14.9	0.35	1334	7.31	-87.4	4.06	
1520	"	"	"	4.00	14.9	0.34	1333	7.30	-88.4	8.30	
1525	"	"	"	4.5	14.9	0.34	1330	7.29	-89.3	8.96	pumped bucket
1530	"	"	"	+0.25	14.9	0.34	1338	7.29	-89.1	2.03	
1535	"	"	"	+0.50	14.8	0.73	1335	7.28	-89.2	2.25	
1540	"	"	"	+0.8	14.9	0.73	1329	7.30	-90.2	3.35	
1545	"	"	"	+1.25	14.9	0.40	1330	7.31	-91.2	3.80	

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW33- Time Collected: 1555 Weather: Partly Cloudy

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

suds present      at 1530, YSI fell asleep

## Water Level Measurement Field Report

DATE <u>5/17/21</u>		JOB NO. 553-1550-067	
PROJECT: South Park Landfill		CLIENT: Seattle Public Utilities	
LOCATION: Seattle, WA			
WEATHER <u>overcast</u>	TEMP <u>~60°</u>	° at <u>1423 start</u>	AM PM
PRESENT AT SITE <u>C. Bourgeois } A. Thon</u>			

## THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	1612	5.93	—	TOC	15.3	10-15	1.52
MW-14	1619	2.68	—	TOC	21.8	11.5-21.5	0.8
MW-29	1629	6.85	—	TOC	30	20-30	-0.29
MW-18	1539	15.31	—	TOC	40.4	30-40	1.25
MW-25	11605	13.53	—	TOC	27	22-27	2.79
MW-32	1550	10.82	—	TOC	24	19-24	-0.44
MW-33	1555	10.89	—	TOC	25	20-25	-0.47
MW-26	1455	9.74	—	TOC	25	15-25	2.39
MW-27	1423	8.31	—	TOC	20	10-20	2.04
MW-10	1605	13.20	—	TOC	45	35-45	1.65
MW-24	1455	8.90	—	TOC	45.3	35-45	1.56
MW-08	1450	8.47	—	TOC	45.6	35.5 – 45.5	1.88
MW-30	1505	10.34	—	TOC	13	8-13	-0.53
MW-31	1505	11.11	—	TOC	23	35.5-45.5	-0.46

Comments:

TOC – top of PVC casing      SG – staff gauge

SIGNED: 



**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067

Date: 5/19/21

Well ID: MW-08

Sampling Organization: Parametrix

Samplers: A. Thomas & C. Bourgeois

Purge Data Screened Interval (ft bgs): 5.0-20.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~8.15~~ 8.45

Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump

Pump Intake Depth: 10.5ft

Begin Purge

Time: 1229

End Purge Time: 1320

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
<del>1230</del>	8.45	9/12	50 ml/min	0.5g	12.3	8.3	1143	6.6	-11.4	26.3	yellow hne
1235	7.56	6/10	200 ml/min	0.8g	13.0	12.5	1127	6.63	-37.4	14.2	yellow hne
1240	8.41	6/10	75 ml/min	0.75g	13.6	16.7	1098	6.64	-50.3	15.7	yellow hne
1245	8.40	7/10	285 ml/min	1.0g	12.3	18.3	1019	6.61	-55.1	10.9	clear, slightly opaque
1250	8.43	7/10	290 ml/min	1.4g	12.4	64.3	1083	6.62	-62.1	10.2	slightly yellow
1255	8.39	6.9/10	165 ml/min	1.5g	12.7	8.9	1058	6.62	-66.9	8.94	clear
1300	8.42	7/10	475 ml/min	2.0g	12.2	12.0	1092	6.61	-70.0	7.66	clear
1305	8.40	6.9/10	50 ml/min	2.5g	12.5	18.7	1036	6.63	-73.8	7.41	clear
1310	8.36	7/10	250 ml/min	2.5g	12.5	79.9	1048	6.62	-73.8	7.49	clear
1315	8.35	7/10	"	2.75g	12.5	81.0	1053	6.62	-72.5	6.95	"
1320	8.36	"	"	3.1g	12.5	79.1	1053	6.62	-75.4	7.07	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW\_MW08-0521

Time Collected: 1330

Weather: Sunny, Warm

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No      If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 5/20/21 Well ID: MW-10

Sampling Organization: Parametrix Samplers: A. Thum & C. Bourgeois

Purge Data Screened Interval (ft bgs): 35.0-44.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.40 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 30.0 ft

Begin Purge Time: 1300 End Purge Time: 1315

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (gallons)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1305	13.32	8:00	225	0.4	13.9	6.5	1236	6.65	-31.8	12.9	Slight yellow hue
1310	13.32	8:30	250	0.75	13.8	6.1	1257	6.61	-57.8	11.0	pale yellow, minor turb
1315	13.32	"	"	0.9	13.8	4.3	1275	6.65	-74.2	11.7	"
1320	13.32	"	"	1.2	13.8	3.4	1287	6.67	-85.4	13.8	"
1325	13.32	"	"	1.5	13.9	3.0	1297	6.69	-93.9	11.6	"
1330	13.32	"	"	1.75	13.9	2.7	1303	6.70	-98.7	11.9	"
1335	13.33	"	"	2.1	13.9	2.7	1305	6.71	-103.0	11.6	"
1345	13.33	"	"	2.3	13.9	2.6	1306	6.72	-106.1	10.8	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW10-0521 Time Collected: 1355 Weather: partly cloudy

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 5/18/21 Well ID: MW-12

Sampling Organization: Parametrix Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 6.0 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 12.5 ft

Begin Purge Time: 8:44 End Purge Time: 9:30

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
844	6.0	4/7	0.9 gal	250 <sup>ml</sup> min	11.6	30.1	351.7	6.09	180.7	7.94	clear
850	6.04	2/7	"	0.75g	11.7	10.3	351.2	6.13	148.3	8.55	"
855	6.04	"	"	1g	11.7	7.0	358.5	6.13	114.6	3.86	"
900	6.04	"	"	1.125	11.7	5.6	360.0	6.17	96.3	2.26	"
905	"	"	"	1.7	11.7	4.7	359.6	6.22	81.1	0.37	"
910	"	"	"	2.0	11.7	4.1	359.5	6.22	71.7	1.18	"
915	6.05	"	"	2.5	11.7	3.8	359.6	6.29	64.6	1.14	"
920	6.02	"	"	2.8	11.7	3.5	366.4	6.31	58.8	0.02	"
925	6.05	"	"	3	11.7	3.4	362.6	6.35	51.7	0.02	"
930	6.04	"	"	3.125	11.8	3.3	362.4	6.35	50.3	0.02	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW\_MW12-0521 Time Collected: 940 Weather: Sunny, windy

Sample Description (Color, Turbidity, Odor, Other): clear from the start

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067

Date: 5/18/21

Well ID: MW-14

Sampling Organization: Parametrix

Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 11.5-21.5

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 2.54

Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump

Pump Intake Depth: 16.5 ft

Begin Purge Time: 10:00

End Purge Time: 11:05

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
10:05	2.60	3/4	<del>3/4</del> <sup>230 ml/min</sup>	0.5g	14.7	12.5	490.0	6.69	-14.0	24.2	v. turbid
<del>10:10</del> 10:10	2.61	"	"	0.75g	14.6	7.5	455.0	6.69	-40.3	>40	cloudy
10:15	2.63	"	"	1.1g	14.6	4.3	436.0	6.68	-67.1	18.5	"
10:20	2.63	"	"	1.5g	14.7	3.2	428.2	6.67	-98.0	7.44	"
10:25	"	"	"	1.75g	14.6	2.6	424.0	6.65	-113.3	4.98	"
10:30	2.64	"	"	2.0g	14.6	2.4	423.9	6.65	-120.6	2.96	2.93 clear
10:35	"	"	"	2.2g	14.6	2.2	422.3	6.65	-126.1	3.86	Clear
10:40	2.63	"	<sup>230 ml/min</sup>	2.5g	14.5	2.3	422.1	6.64	-132.3	4.02	"
10:45	2.61	"	"	2.75g	14.4	2.3	421.9	6.63	-138.9	1.00	"
10:50	2.63	"	"	3g	14.5	2.1	421.7	6.64	-145.8	2.46	"
10:55	2.62	"	"	3.3g	14.5	2.1	421.6	6.63	-151.1	2.62	"
11:00	2.65	"	"	3.6g	14.5	2.0	422.1	6.63	-156.1	3.13	"
11:05	2.62	"	"	4g	14.4	1.9	422.2	6.63	-159.6	2.96	"
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10%	

**Sampling Data**

Sample ID: SPL-GW-MW14-0521

Time Collected: 11:0

Weather: Sunny

Sample Description (Color, Turbidity, Odor, Other): first 1.5g turbid (cloudy)

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/28/21 Well ID: MW-18
Sampling Organization: Parametrix Samplers: A. Thim & C. Bourgeois

Purge Data Screened Interval (ft bgs): 30.6-40.6 Well Casing/Diameter: PVC/2 in
Initial Depth of Water (Ft below TOC): 30.0-40.0 15.91 Purge Water Disposal Method: Drom
Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft
Begin Purge Time: 1610 End Purge Time: 1700

Table with columns: Time, Depth to Water (feet below MP), Pump Setting, Purge Rate, Cum. Vol. Purged, Temp (°C), DO (mg/L), Specific Conductance (mg/cm), pH (units), ORP (mv), Turbidity (NTU), Comments. Contains handwritten data rows from 1415 to 1700.

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW-MW18-0521 Time Collected: 1720 Weather: overcast
Sample Description (Color, Turbidity, Odor, Other): clear
Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic
Duplicate Sample Collected: [X] Yes [ ] No If yes, ID: SPL-GW-MW60-0521
MS/MSD Collected: [X] Yes [ ] No

Additional Information/Comments

Had difficulty getting water to start flowing. Dup collected at 1720. Ran out of gas @ 1737. Resumed @

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067

Date: 5/19/20

Well ID: MW-24

Sampling Organization: Parametrix

Samplers: A. Thum & C. Baurgois

Purge Data Screened Interval (ft bgs): 35.0-45.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~35.0-45.0~~ 6.02

Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump

Pump Intake Depth: 40.0 ft

Begin Purge Time: 1020

End Purge Time: 1130

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1025	5.98	7/9	120 <sup>ml</sup> / <sub>min</sub>	0.25	12.4	13.7	781	6.53	42.1	7.93	clear
1030	6.01	8/8	170 <sup>ml</sup> / <sub>min</sub>	0.45	11.9	12.1	804	6.47	15.3	8.89	clear
1035	5.99	8/9	27 <sup>ml</sup> / <sub>min</sub>	0.80	11.9	5.6	784	6.56	-1.5	6.22	clear
1040	6.01	"	"	1.25g	11.9	4.7	759	6.55	-14.5	6.54	clear
1045	5.99	"	"	1.5g	11.9	4.24	751	6.56	-27.0	5.96	clear
1050	6.01	"	"	1.75g	11.8	3.6	757	6.55	-32.0	5.52	"
1055	6.02	"	"	2.25g	11.8	3.4	764	6.54	-39.2	5.40	"
1100	"	"	250 <sup>ml</sup> / <sub>min</sub>	2.50g	12.1	3.4	765	6.56	-46.9	5.41	"
1105	"	"	"	2.9	12.2	3.2	768	6.55	-51.7	5.12	"
1110	6.03	"	"	3.20	12.0	3.1	770	6.55	-50.1	4.62	"
1115	6.02	"	"	3.60	11.9	3.1	774	6.55	-59.2	5.88	"
1120	6.01	"	"	4.0g	12.0	3.3	773	6.55	-62.3	4.59	"
1125	"	"	"	4.25g	12.1	3.3	774	6.56	-64.4	4.75	"
1130	5.99	"	"	4.5	12.1	3.0	775	6.56	-66.4	4.98	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW24-0521

Time Collected: 1140

Weather: partly cloudy, cold

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes     No

If yes, ID: SPL-GW-MW24-0521

MS/MSD Collected:  Yes     No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 5/26/21 Well ID: MW-25  
 Sampling Organization: Parametrix Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 20.0-27.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 14.05 Purge Water Disposal Method: Drum  
 Purge Device dedicated bladder pump Pump Intake Depth: 24.5 ft  
 Begin Purge Time: 1410 End Purge Time: 1500

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (gallons)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1420	14.03	6/9	300 <sup>ml/min</sup>	0.75	13.8	15.7	848	6.46	17.2	10.8	Slightly yellow hue
1425	14.03	6/9	200	1.0	13.8	7.4	889	6.48	-13.5	10.2	"
1430	14.04	7/11	200 <sup>200</sup> <sub>210</sub>	1.5	13.8	4.5	910	6.48	-31.9	10.5	"
1435	14.04	7/11	255	1.75	13.8	3.0	927	6.49	-46.5	11.4	"
1440	14.04	7/11		2.0	13.8	2.5	935	6.50	-57.2	10.8	"
1445	14.02	7/11		2.25	13.9	2.3	940	6.51	-64.0	10.5	"
1450	14.02	7/11		2.75	14.0	2.3	943	6.52	-68.3	9.98	"
1455	14.02	7/11		3.0	13.9	2.1	946	6.52	-72.8	9.12	
1500	14.03	7/11		3.25	13.9	2.1	948	6.52	-75.8	9.23	

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW25-0521 Time Collected: 1510 Weather: Partly Cloudy  
 Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_  
 Sample Analyses: cis-1,2-DCE, benzene, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 5/19/21 Well ID: MW-26  
 Sampling Organization: Parametrix Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 9.80 Purge Water Disposal Method: Drum  
 Purge Device dedicated bladder pump 830 Pump Intake Depth: 20.0 ft  
 Begin Purge Time: 830 End Purge Time: 950

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
830	9.80	6/9	175 <sup>ML</sup> / <sub>min</sub>	0.25g	11.6	59.4	164.3	6.21	17.7	17.6	yellow hue
835	9.78	7/9	475 <sup>ML</sup> / <sub>min</sub>	0.6g	11.6	14.6	171.0	5.98	11.0	38.5	yellow
840	11	6/8	270 <sup>ML</sup> / <sub>min</sub>	1g	11.8	6.7	160.0	6.00	7.0	174	mustard yellow
845	9.78	6/8	"	1.33g	11.8	4.7	154.8	5.98	8.0	93	yellow
850	9.77	6/8	"	1.75g	11.8	4.4	154.1	5.98	8.5	52.9	
855	9.77	6/8	310 <sup>ML</sup> / <sub>min</sub>	2.0g	11.8	4.0	150.8	5.97	10.7	59.2	yellow
900	9.78	6/8	"	2.4g	11.8	5.4	148.9	5.98	11.7	89.2	yellow
905	9.77	6/6	375 <sup>ML</sup> / <sub>min</sub>	2.75g	11.8	6.8	147.5	5.98	13.8	43.1	yellow hue
910	11	4/9	"	3g	11.6	6.6	149.6	6.00	15.0	30.9	cloudy, less yellow
915	9.78	7/2	100 <sup>ML</sup> / <sub>min</sub>	3.25g	11.6	6.2	150.6	5.99	17.2	21.0	slight yellow hue
920	"	6/6	220	3.4g	11.6	6.5	151.2	6.00	18.0	11.6	gen. stopped for 1 min
925	"	"	"	3.7g	11.8	8.1	149.1	6.00	19.7	13.9	slight yellow hue
930	9.77	"	"	4.0g	12.0	8.6	148.7	6.00	20.7	12.0	clear
935	"	"	"	4.25g	11.9	8.3	148.6	6.01	21.0	10.1	new hue
940	"	"	"	4.5g	11.9	8.0	149.3	6.00	23.3	8.34	clear
945	9.76	"	"	4.75g	12.2	8.2	148.8	6.01	23.2	7.50	"
950	"	"	"	5.0g	12.2	8.8	149.0	6.03	23.5	7.59	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW\_MW26-0521 Time Collected: 1000 Weather: cold, windy, overcast  
 Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**



**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067

Date: 5/19/21

Well ID: MW-27

Sampling Organization: Parametrix

Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 10.0-20.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.39

Purge Water Disposal Method: Down

Purge Device dedicated bladder pump

Pump Intake Depth: 15.0 ft

Begin Purge Time: 15:1350

End Purge Time: 15:00

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	147	Comments
1355	8.39	5/9	<sup>175</sup> <del>200</del> ml/min	0.25g	11.9	21.1	195.0	6.42	22.2	<del>8.1</del> 5.2		yellow hue
1400	8.41	6/11	450 ml/min	0.8g	11.5	7.3	214.0	6.42	31.2	52.2		clearer
1405	8.40	5/10	280 ml/min	1.5g	11.8	6.0	259.3	6.40	25.7	152		more yellow
1410	8.41	"	"	1.5g	11.7	5.1	276.1	6.39	19.6	52.5		clearer, slight yellow
1415	"	"	"	1.8g	11.7	4.0	282.1	6.40	10.5	29.0		slight yellow hue
1420	8.40	"	"	2.4g	11.7	3.5	283.2	6.40	2.3	21.2		clear
1425	8.40	5/9.5	200 ml/min	2.6g	11.8	3.4	283.2	6.42	-7.1	15.4		clear
1436	8.40	"	"	2.8g	11.8	3.3	284.2	6.43	-10.0	14.2		clear
1435	"	"	"	3.2g	11.8	3.1	284.1	6.43	-15.7	18.9		clear
1440	"	"	"	3.4g	11.8	3.1	284.1	6.43	-18.7	15.1		"
1445	"	"	"	3.6g	11.8	3.1	284.6	6.43	-21.4	<del>14.3</del> 14.3		"
1450	"	"	"	3.8g	11.7	3.1	283.1	6.41	-24.2	11.8		"
1455	"	"	"	4.0g	11.7	3.0	285.1	6.43	-25.5	11.4		"
1500	"	"	"	4.2g	11.7	2.8	283.2	6.43	-27.5	10.7		"
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10%		

**Sampling Data**

Sample ID: SPL-GW-MW27-0521

Time Collected: 1510

Weather: Sunny & Warm

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/18/21 Well ID: MW-29  
 Sampling Organization: Parametrix Samplers: A. Thum & C. Bourgeois

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 7.44 Purge Water Disposal Method: Down  
 Purge Device peristaltic pump Pump Intake Depth: 25.0 ft  
 Begin Purge Time: 1145 End Purge Time: 1250

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1145	8.49	113	200 ml/min	0.25g	12.8	50.8	769.2	6.61	50.6	2.40	
1150	8.51	"	"	0.6g	13.0	48.6	469.5	6.61	52.7	6.48	
1155	8.52	"	"	0.8	12.8	48.5	746	6.56	53.6	3.14	Clear
1200	8.51	"	"	1.0	13.1	7.4	824	6.53	-16.6	2.62	"
1205	8.49	"	"	1.3	13.3	4.5	833	6.62	-61.8	0.96	"
1210	8.50	"	"	1.6	13.2	3.3	837	6.64	-84.0	1.68	"
1215	8.50	"	"	1.9	13.2	2.8	832	6.65	-93.3	1.01	"
1220	8.50	"	"	2.2	13.2	2.4	828	6.65	-98.8	0.74	"
1225	8.50	"	"	2.5	13.3	2.3	816	6.66	-104.1	1.63	"
1230	8.50	"	"	2.8	13.3	2.0	805	6.67	-108.3	1.51	"
1235	8.51	"	"	3.1	13.2	2.1	794	6.68	-110.8	1.37	"
1240	8.52	"	"	3.4	13.1	3.2	786	6.68	-112.3	0.56	"
1245	8.52	"	"	3.7	13.2	3.3	780	6.69	-114.6	0.93	"
1250	8.51	"	"	4.0	13.3	3.0	774	6.70	-116.9	0.95	"

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW\_MW29- 0521 Time Collected: 1250 1300 Weather: Partially Cloudy  
 Sample Description (Color, Turbidity, Odor, Other):  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID:  
 MS/MSD Collected:  Yes  No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 5/26/21

Well ID: MW-30

Sampling Organization: Parametrix

Samplers: A. Thum & C. Bourgeois

Purge Data Screened Interval (ft bgs): 8.0-13.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.40

Purge Water Disposal Method: Down

Purge Device peristaltic pump

Pump Intake Depth: 10.5 ft

Begin Purge Time: 9:30

End Purge Time: 10:25

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:35	6	Low	225 ml/min	0.25g	12.1	7.70	464.7	6.18	17.0	8.22	Clear
9:40	10.55	"	230 ml/min	0.65g	12.1	4.30	470.6	6.19	12.7	8.00	"
9:45	10.57	"	"	1g	12.1	3.7	468.5	6.20	9.8	9.08	"
9:50	"	"	"	1.25g	12.1	4.8	467.0	6.20	7.8	8.62	"
9:55	"	"	"	1.5g	12.1	5.9	467.2	6.21	6.2	8.54	"
10:00	"	"	"	1.75g	12.1	7.9	467.1	6.21	6.0	8.78	"
10:05	"	"	"	2.0g	12.1	8.4	466.7	6.21	5.5	8.26	"
10:10	"	"	"	2.25g	12.1	10.1	460.8	6.21	5.7	7.95	"
10:15	"	"	"	2.5g	12.1	11.3	455.3	6.21	6.0	7.79	"
10:20	"	"	"	3g	12.1	10.4	458.0	6.21	6.8	7.85	"
10:25	"	"	"	3.25g	12.2	11.0	457.6	6.21	7.3	7.87	"
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW\_MW30- 0621

Time Collected: 10:35

Weather: overcast, cold

Sample Description (Color, Turbidity, Odor, Other): faint smell of bleach at this well. Not positive it's GOW

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID:

MS/MSD Collected:  Yes  No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 5/11/21

Well ID: MW-31

Sampling Organization: Parametrix

Samplers: A. Thomas & C. Bowyer

Purge Data Screened Interval (ft bgs): 18.0-23.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.25

Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump

Pump Intake Depth: 20.5ft

Begin Purge Time: 815

End Purge Time: 910

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
820	11.20	5/9	165 <sup>ml</sup> / <sub>min</sub>	0.5g	13.0	35.1	365.6	5.96	52.2	19.1	yellow, v. turbid
825	"	"	275 <sup>ml</sup> / <sub>min</sub>	0.7g	12.9	11.2	366.7	6.03	38.8	44.5	"
830	"	"	"	1g	13.0	5.3	369.1	6.11	19.1	25.5	yellow huc
835	"	"	"	1.5g	13.0	4.2	367.2	6.15	4.3	18.6	"
840	"	"	"	1.75	13.0	3.6	367.8	6.17	-7.0	15.6	gushing water
845	"	"	"	2.2	13.0	3.1	366.6	6.21	-13.0	13.9	"
850	"	6/9	170 <sup>ml</sup> / <sub>min</sub>	2.675	13.0	3.1	366.5	6.23	-18.4	12.7	"
855	"	"	"	2.5	13.0	2.9	368.2	6.24	-22.5	11.7	"
890	"	6.5/9	275 <sup>ml</sup> / <sub>min</sub>	2.8	13.1	2.5	369.7	6.24	-27.9	11.3	"
905	"	"	"	3.2g	13.1	2.7	369.1	6.26	-32.7	11.1	Slight yellow huc
910	"	"	"	3.5	13.1	2.3	369.4	6.26	-36.5	16.7	"

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW\_MW31-0521

Time Collected: 920

Weather: overcast, drizzling

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID:

MS/MSD Collected:  Yes  No

Additional Information/Comments

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 5/18/20 Well ID: MW-32  
 Sampling Organization: Parametrix Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 19.0-24.0 10.94 Purge Water Disposal Method: Drain  
 Purge Device peristaltic pump Pump Intake Depth: 21.5 ft  
 Begin Purge Time: 1355 End Purge Time: 1515

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1355	10.94	1/5 open	240 mL/min	0	14.8	15.0	717	6.71	34.0	8.04	visible orange flecks
1400	10.96	"	"	0.25g	15.0	7.0	717	6.70	-51.7	5.84	"
1405	10.95	"	187.5 mL/min	0.5g	15.0	4.8	715	6.71	-72.5	7.44	"
1410	10.95	"	"	0.7g	15.0	3.3	715	6.71	-83.5	10.2	"
1415	10.95	"	"	1.0g	14.9	4.0	718	6.70	-91.7	8.09	"
1420	"	"	200 mL/min	1.25g	15.0	4.0	720	6.71	-98.1	6.47	"
1425	10.94	"	"	1.50g	14.8	2.6	725	6.70	-102.8	5.48	"
1430	10.95	"	"	1.75g	15.0	2.1	730	6.70	-105.2	3.28	"
1435	10.94	"	"	2.1	15.0	2.1	729	6.71	-109.3	5.19	"
1440	"	"	"	2.5	15.0	2.1	732	6.71	-111.7	4.3	"
1445	"	"	"	2.75	14.9	3.6	735	6.71	-113.6	6.36	fewer flecks
1450	10.95	"	"	3	14.9	3.9	738	6.71	-115.7	5.57	"
1455	"	"	"	3.25	15.1	3.2	737	6.71	-117.0	5.13	"
1500	"	"	"	3.6g	14.8	2.7	739	6.70	-118.1	4.96	"
1505	10.96	"	"	3.9g	14.6	2.3	743	6.70	-119.8	3.75	"
1510	10.95	"	"	4.2g	14.5	2.1	739	6.70	-122.3	3.37	"
1515	10.95	"	"	4.5g	14.5	2.1	749	6.71	-124.7	2.65	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**  
 Sample ID: SPL-GW\_MW32-0521 Time Collected: 1520 Weather: Sunny, windy  
 Sample Description (Color, Turbidity, Odor, Other): visible orange/brown-colored flecks  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**  
purged water opaque, pale yellow

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 5/20/21 Well ID: MW-33

Sampling Organization: Parametrix Samplers: A. Thom & C. Bourgeois

Purge Data Screened Interval (ft bgs): 20.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.12 Purge Water Disposal Method: Drum

Purge Device peristaltic pump Pump Intake Depth: 22.5ft

Begin Purge Time: 1155 End Purge Time: 1150

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate <sup>MI</sup> / <sub>min</sub>	Cum. Vol. Purged <sup>gallons</sup>	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1110	11.15	9.00	255/min	0.5	14.8	5.0	1228	6.67	-27.1	9.3	Slight yellow hue
1115	11.15	"	250/min	0.7	14.8	4.2	1230	6.67	-42.6	13.7	"
1120	11.15	"	250/min	1.0	14.8	2.9	1226	6.68	-63.0	9.54	"
1125	11.15	"	"	1.25	14.8	2.5	1224	6.69	-74.5	10.2	"
1130	11.15	"	240	1.5	14.9	2.1	1222	6.69	-81.7	11.5	"
1135	11.15	"	240	1.8	14.9	2.0	1220	6.69	-86.7	8.70	"
1140	11.15	"	"	2.15	14.9	1.9	1216	6.69	-90.3	<del>7.79</del> 7.79	"
1145	11.15	"	"	2.4	14.9	1.8	1211	6.69	-93.3	8.13	"
1150	11.15	"	"	2.75	14.9	1.8	1209	6.69	-95.4	8.01	"

Stabilization Criteria      3%      10%      3%      ± 0.1      ± 10 mv      10%

**Sampling Data**

Sample ID: SPL-GW-MW33-0520 Time Collected: 1200 Weather: partly cloudy

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

Purge water in bucket is dark yellow-brown  
- Sampled gw frothy and pale yellow

## Water Level Measurement Field Report

DATE: 8-23-21	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER: Sunny	TEMP: 67 ° at 1316 AM/PM
PRESENT AT SITE	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	1401	6.59	12.11	TOC	15.3	10-15	1.52
MW-14	1407	3.61	16.95	TOC	21.8	11.5-21.5	0.8
MW-29	1413	8.50	29.59	TOC	30	20-30	-0.29
MW-18	1510	16.06	33.30	TOC	40.4	30-40	1.25
<del>MW-25</del>	—	—	—	TOC	27	22-27	2.79
MW-32	1512	11.54	23.29	TOC	24	19-24	-0.44
MW-33	1519	11.72	24.88	TOC	25	20-25	-0.47
MW-26	1330	10.41	20.04	TOC	25	15-25	2.39
MW-27	1321	9.16	14.87	TOC	20	10-20	2.04
<del>MW-10</del>	—	—	—	TOC	45	35-45	1.65
MW-24	1334	9.67	39.12	TOC	45.3	35-45	1.56
MW-08	1316	9.17	39.34	TOC	45.6	35.5 - 45.5	1.88
MW-30	1347	11.04	12.70	TOC	13	8-13	-0.53
MW-31	1341	11.71	18.29	TOC	23	35.5-45.5	-0.46

(All wells sit free)

Comments:

Subtract probe leader <sup>for TWD</sup> from measurements (H<sub>2</sub>O)  
 Add

TOC – top of PVC casing      SG – staff gauge

SIGNED:

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-25-21 Well ID: MW-08  
 Sampling Organization: Parametrix Samplers: CDB, MAB

**Purge Data** Screened Interval (ft bgs): 5.0-20.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 9.16 Purge Water Disposal Method: SPU - Authorized Drain  
 Purge Device: dedicated bladder pump Pump Intake Depth: 10.5ft  
 Begin Purge Time: 1045 End Purge Time: 1135

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1050	9.19	9/8	250		14.5	10.0	1301	6.24	143.0	0.72	
1055	9.17	9/8	250		14.3	13.4	1163	6.26	141.2	2.13	
1100	9.17	9/8	250		14.2	22.5	1154	6.32	137.0	1.87	
<del>1105</del>	9.17	9/8	250		14.2	27.2	1152	6.37	132.5	1.43	
<del>1105</del>	9.17	9/8	250		14.2	29.7	1146	6.40	128.7	0.29	
<del>1110</del>	9.19	9/8	250		14.2	12.5	1148	6.41	125.5	0.46	
1120	9.21	9/8	250		14.2	19.8	1142	6.42	122.6	0.63	
1125	9.21	9/8	250		14.2	20.9	1130	6.44	119.4	1.09	
1130	9.21	9/8	250		14.1	25.2	1126	6.44	116.2	0.47	
1135	9.21	9/8	250		14.3	6.6	1128	6.44	112.2	0.44	
				~4 gal total							

Stabilization Criteria    3%    10%, or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW08-0821 Time Collected: 1140 Weather: Sunny 71°  
 Sample Description (Color, Turbidity, Odor, Other): no color to v. slightly yellow haze  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

Dedicated port tubing bad, used tygon silicon tubing instead, large bubbles coming up from bladder pump, might affect DO?





GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8-24-21 Well ID: MW-12

Sampling Organization: Parametrix Samplers: CDB MAB

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 6.57 Purge Water Disposal Method: SPU - Authorized Drain

Purge Device dedicated bladder pump Pump Intake Depth: 12.5 ft

Begin Purge Time: 1455 End Purge Time: 1535

Table with columns: Time, Depth to Water (feet below MP), Pump Setting, Purge Rate, Cum. Vol. Purged, Temp (°C), DO (mg/L), Specific Conductance (mg/cm), pH (units), ORP (mv), Turbidity (NTU), Comments. Includes data rows from 1500 to 1535 and a total row for ~3.5 gal.

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW\_MW12-0821 Time Collected: 1540 Weather: Sunny, 75°

Sample Description (Color, Turbidity, Odor, Other): no color

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected: [ ] Yes [x] No If yes, ID:

MS/MSD Collected: [ ] Yes [x] No

Additional Information/Comments

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-24-21 Well ID: MW-14  
 Sampling Organization: Parametrix Samplers: CDB, MAB

Purge Data Screened Interval (ft bgs): 11.5-21.5 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 3.59 Purge Water Disposal Method: Spu - Authorized Drain  
 Purge Device dedicated bladder pump Pump Intake Depth: 16.5 ft  
 Begin Purge Time: 1330 End Purge Time: 1412

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1330	3.59	8/7	~480		16.2	22.0	594.8	6.65	86.6	10.7	
1335	3.77	7/5	265		16.5	4.6	554.5	6.14	81.8	25.4	
1340	3.77	7/5	265		16.9	4.0	554.0	6.22	70.8	8.28	
1345	3.72	7/5	265		17.0	3.3	553.0	6.32	60.1	2.05	
1350	3.72	7/5	265		17.0	3.1	554.5	6.37	53.7	4.37	
1354	Flow stopped, started again @ 1356										
1358	3.72	7/5	265		15.9	3.3	557.0	6.31	51.7		
1403	3.72	7/5	~480		15.7	2.6	556.2	6.33	50.5	9.11	
1406	3.69	5/1	240		16.9	2.6	555.5	6.35	44.1	3.65	
1409	3.69	5/1	240		17.0	2.4	555.1	6.40	39.5	2.78	
1412	3.69	5/1	240		17.1	2.7	555.6	6.43	36.2	0.07	

Stabilization Criteria    3%    10%, or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW14-0821 Time Collected: 1415 Weather: Sunny 70s  
 Sample Description (Color, Turbidity, Odor, Other): pale brown  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

Slight reaction w/ HCl

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-24-21 Well ID: MW-18

Sampling Organization: Parametrix Samplers: CAB VVAB

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 30.0-40.0 ~~15.10~~ 16.1 Purge Water Disposal Method: SPU - Authorized Drain

Purge Device dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 11:55 End Purge Time: 12:45

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
11:55	16.10	7/5	400		15.4	14.8	1223	6.41	-12.9	5.49	
12:00	16.10	6/5	240		16.6	12.3	1226	6.26	78.8	7.25	
12:05	16.10	6/5	240		16.5	9.3	1174	6.29	66.4	5.34	Visible parts.
12:10	16.10	6/5	240		16.6	8.1	1128	6.32	51.2	6.03	
12:15	16.10	6/5	240		16.6	7.2	1111	6.31	38.2	3.96	
12:20	16.10	6/5	240		16.7	5.4	1103	6.35	24.7	2.49	
12:25	16.10	6/5	240		16.5	4.7	1098	6.35	13.4	1.58	
12:30	16.10	6/5	240		16.5	4.5	1091	6.35	2.9	1.33	
12:35	16.10	6/5	240		16.7	3.9	1088	6.35	-8.1	0.38	
12:40	16.10	6/5	240		16.6	4.1	1085	6.36	-12.8	1.47	
12:45	16.10	6/5	240		16.8	3.7	1086	6.36	-10.2	0.02	
				2.5 gal total							
Stabilization Criteria				3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU		

**Sampling Data**

Sample ID: SPL-GW-MW18-0821 Time Collected: 12:50 Weather: Sunny 71° F

Sample Description (Color, Turbidity, Odor, Other): Slight yellow haze.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

Dedicated tubing is leaking @ elbow connection, tightened w/ wrench to minimize

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-25-21 Well ID: MW-24

Sampling Organization: Parametrix Samplers: CDB, MMB

**Purge Data** Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 35.0-45.0 9.65 Purge Water Disposal Method: SPU - Authorized Drain

Purge Device dedicated bladder pump Pump Intake Depth: 40.0 ft

Begin Purge Time: 1340 End Purge Time: 1420

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1340	9.66	7/9	240		15.1	14.1	905	6.08	116.3	6.21	
1345	9.66	7/9	240		14.9	12.9	947	6.14	112.9	3.89	
1350	9.69	7/9	240		14.9	9.0	954	6.23	107.2	2.64	
1355	9.69	7/9	240		14.9	7.4	968	6.30	100.4	2.44	
1400	9.69	7/9	240		14.7	6.6	970	6.34	95.3	1.89	
1405	9.69	7/9	240		15.0	6.6	980	6.35	89.5	2.58	
1410	9.69	7/9	240		14.7	6.6	982	6.38	81.9	2.83	
1415	9.69	7/9	240		14.8	6.8	987	6.38	77.8	2.63	
1420	9.69	7/9	240		14.9	6.7	988	6.39	71.4	2.95	

~3.5 gal total

**Stabilization Criteria**    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW24- 0821 Time Collected: 1425 Weather: Sunny 77°

Sample Description (Color, Turbidity, Odor, Other): v. slightly yellowed taste

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**



**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-25-21 Well ID: MW-26  
 Sampling Organization: Parametrix Samplers: CDB, MAB

**Purge Data** Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 10.72 Purge Water Disposal Method: SPO - Authorized Drain  
 Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft  
 Begin Purge Time: 1445 End Purge Time: 1530

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1445	10.72	5/8	265		14.2	22.2	210.4	5.81	67.3	14.1	
1450	10.72	5/8	265		14.3	12.5	223.9	5.63	70.6	68.3	
1455	10.72	5/8	265		14.4	6.7	224.3	5.66	67.1	48.3	
1500	10.72	5/8	265		14.3	4.6	225.6	5.68	65.1	20.5	
1505	10.72	5/8	265		14.2	4.0	228.3	5.69	63.5	11.1	
1510	10.72	5/8	265		14.2	4.1	228.8	5.69	62.3	6.68	
1515	10.72	5/8	265		14.0	4.3	229.4	5.68	62.1	5.53	
1520	10.72	5/8	265		13.9	3.0	229.3	5.67	62.1	4.48	
1525	10.72	5/8	265		14.1	3.2	229.2	5.66	61.5	3.80	
1530	10.72	5/8	265		13.9	3.1	231.1	5.70	58.7	3.23	
				~4 gal total							

Stabilization Criteria    3%    10%, or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW26-0821 Time Collected: 1535 Weather: Sunny, 77°  
 Sample Description (Color, Turbidity, Odor, Other): yellow/brown  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes     No    If yes, ID: SPL-GW-MW61-0821 (@ 1555)  
 MS/MSD Collected:  Yes     No

**Additional Information/Comments**

MSMSD DUP (MW-61)

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-25-21 Well ID: MW-27

Sampling Organization: Parametrix Samplers: CDB, MAB

**Purge Data** Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.14 Purge Water Disposal Method: SPU - Authorized Drain

Purge Device: dedicated bladder pump Pump Intake Depth: 15.0 ft

Begin Purge Time: 1155 End Purge Time: 1240

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1200	9.14	5/7	300		15.1	2.1	479.1	6.01	88.0	14.6	
1205	9.14	5/7	300		14.8	7.9	495.7	6.07	78.8	7.24	
1210	9.14	6/7	300		14.8	4.9	499.3	6.10	73.0	6.15	
1215	9.14	5/7	300		14.7	3.6	499.9	6.15	64.5	6.42	
1220	9.14	5/7	300		14.6	3.4	500.2	6.18	57.0	4.53	
1225	9.14	5/7	300		14.5	3.2	500.1	6.21	49.4	3.87	
1230	9.14	5/7	300		14.5	3.0	499.5	6.22	42.6	4.09	
1235	9.16	5/7	300		14.6	2.9	499.4	6.22	37.5	2.75	
1240	9.16	5/7	300		14.5	3.0	499.8	6.23	32.7	2.30	

*-5 gal total*

**Stabilization Criteria**    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW27-0821 Time Collected: 1245 Weather: Sunny 73°

Sample Description (Color, Turbidity, Odor, Other): yellow/brown

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**



**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-24-21 Well ID: MW-29

Sampling Organization: Parametrix Samplers: CDR, MAB

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.34 Purge Water Disposal Method: SPU - Authorized Drain

Purge Device peristaltic pump Pump Intake Depth: 25.0 ft

Begin Purge Time: 1612 End Purge Time: 1730

Time	Depth to Water below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1615	10.10	3	240		14.6	6.9	868	6.25	95.1	5.29	coarse particles in water
1620	10.10	3	240		14.8	4.5	867	6.21	95.5	7.67	
1625	10.10	3	240		14.7	3.8	861	6.32	88.1	9.30	
1630	10.13	3	240		14.5	3.3	858	6.39	80.6	9.96	
1635	10.12	3	240		14.6	3.1	857	6.43	73.0	5.52	
1640	10.12	3	240		14.5	2.8	855	6.47	60.6	4.15	
1645	10.12	3	240		14.5	2.6	849	6.49	49.2	3.11	
1650	10.12	3	240		14.5	2.3	842	6.51	35.1	2.89	
1655	10.12	3	240		14.5	2.6	833	6.52	21.6	4.21	
1700	10.12	3	240		14.3	2.1	824	6.53	8.8	4.25	
1705	10.12	3	240		14.1	2.4	821	6.53	-0.9	3.66	
1710	10.12	3	240		14.1	2.4	818	6.53	-12.0	2.86	
1715	10.12	3	240		14.2	2.0	809	6.54	-22.1	3.49	
1720	10.12	3	240		14.1	2.3	800	6.55	-29.9	1.69	
1725	10.12	3	240		14.1	2.3	795	6.56	-35.5	2.08	
1730	10.12	3	240		14.1	2.3	795	6.57	-39.8	1.74	
1735				-5 gal total							

Stabilization Criteria    3%    10%, or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW29-0821 Time Collected: 17:35 Weather: Sunny 76°

Sample Description (Color, Turbidity, Odor, Other): Slight yellow/brown tinge, apparent thin stream on purge H<sub>2</sub>O

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

monument screws<sup>holes</sup> stripped. water in monument, ~2 oz fell into well upon opening

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-5-21 Well ID: MW-30

Sampling Organization: Parametrix Samplers: CDB, M4B

**Purge Data** Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.05 Purge Water Disposal Method: SPU-Authorized Pram

Purge Device: peristaltic pump Pump Intake Depth: 10.5 ft ~12' (see water depth)

Begin Purge Time: 0908 End Purge Time: 0935

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
0910	<u>11.48</u>	<u>3</u>	<u>250</u>		<u>15.9</u>	<u>5.6</u>	<u>598.1</u>	<u>6.13</u>	<u>101.1</u>	<u>5.71</u>	
0915	<u>11.50</u>	<u>3</u>	<u>250</u>		<u>15.9</u>	<u>4.5</u>	<u>602.2</u>	<u>5.97</u>	<u>106.7</u>	<u>2.97</u>	<u>vis. particles</u>
0920	<u>11.51</u>	<u>3.3</u>	<u>230</u>		<u>15.8</u>	<u>4.2</u>	<u>605.5</u>	<u>5.92</u>	<u>106.2</u>	<u>1.13</u>	
0925	<u>11.55</u>	<u>3.3</u>	<u>230</u>		<u>15.7</u>	<u>3.2</u>	<u>607.0</u>	<u>5.97</u>	<u>101.1</u>	<u>1.10</u>	
0930	<u>11.55</u>	<u>3.3</u>	<u>230</u>		<u>15.7</u>	<u>3.0</u>	<u>606.6</u>	<u>6.00</u>	<u>97.5</u>	<u>0.48</u>	
0935	<u>11.55</u>	<u>3.3</u>	<u>230</u>		<u>15.7</u>	<u>3.0</u>	<u>605.3</u>	<u>6.01</u>	<u>94.8</u>	<u>1.46</u>	
				<u>~2 gal total</u>							

**Stabilization Criteria**      3%      10% , or 3<0.5      3%      ± 0.1      ± 10 mv      10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW30-0821 Time Collected: 0940 Weather: Sunny 60°

Sample Description (Color, Turbidity, Odor, Other): no color

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

adjusted depth

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-25-21 Well ID: MW-31

Sampling Organization: Parametrix Samplers: CDB, MMB

**Purge Data** Screened Interval (ft bgs): 18.0-23.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.75 Purge Water Disposal Method: SPU - Authorized Prm

Purge Device dedicated bladder pump Pump Intake Depth: 20.5ft

Begin Purge Time: 0751 End Purge Time: 0840

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
0755	11.76	6/9	250		14.2	7.6	417.0	5.45	164.2	48.9	
0800	11.77	6/9	250		14.2	7.1	425.6	5.56	149.3	31.7	V.S. Small V. Turbid particulat
0805	11.77	4/8	125		14.9	5.6	423.3	5.67	136.0	24.2	
0810	11.77	4/6	250		14.2	4.7	429.9	5.79	125.5	15.9	
0815	11.77	4/6	250		14.2	5.6	427.3	5.82	126.2	12.5	
0820	11.77	4/6	250		14.2	4.6	430.1	5.86	114.8	9.89	
0825	11.76	4/6	250		14.3	4.2	429.6	5.89	111.9	7.40	water clears
0830	11.76	4/6	250		14.2	3.6	429.2	5.92	107.6	5.61	
0835	11.76	4/6	250		14.3	3.6	428.7	5.94	104.6	5.55	
0840	11.76	4/6	250		14.3	3.5	427.7	5.96	101.6	5.48	
				~5 gal. total							

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW31-0821 Time Collected: 0845 Weather: Sunny 60°

Sample Description (Color, Turbidity, Odor, Other): yellowish brown

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-24-2021 Well ID: MW-32

Sampling Organization: Parametrix Samplers: Chris B, Mary Alice B (HWA)

Purge Data Screened Interval (ft bgs): 19.0 - 24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 19.0-24.0 11.62 Purge Water Disposal Method: SPU-Approved Drain

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 0840 End Purge Time: 0920

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
0840	11.62	4	207		14.4	12.7	823	6.35	-22.8	8.45	
0845	11.60	4	240		14.3	7.1	820	6.32	-30.3	7.49	pale yellow
0850	11.61	4	240		14.3	6.1	822	6.31	-35.7	8.10	
0855	11.61	4	240		14.3	6.0	<del>823</del>	6.33	-40.2	6.12	
0900	11.61	4	240		14.5	4.7	838	6.35	-46.0	4.13	pale yellow/brown
0905	11.61	3.5	207		14.4	4.2	851	6.38	-49.5	2.32	
0910	11.61	3.5	225		14.5	3.9	855	6.4	-52.5	1.77	
0915	11.61	3.5	225		14.5	3.6	856	6.42	-54.8	1.46	
0920	11.61	3.5	225	<u>~3.5 gal total</u>	14.4	3.6	860	6.44	-56.9	0.97	

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW32- Time Collected: 0925 Weather: Sunny, 58° F

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes     No    If yes, ID: SPL-GW-MW60-trip

MS/MSD Collected:  Yes     No

**Additional Information/Comments**

MSMSD DUP (MW-60) collected @ 0940

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 8-24-21 Well ID: MW-33

Sampling Organization: Parametrix Samplers: CPB + MAB

**Purge Data** Screened Interval (ft bgs): 20.0-25.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 11.75 Purge Water Disposal Method: SPU - Authorized Drain  
 Purge Device peristaltic pump Pump Intake Depth: 22.5ft  
 Begin Purge Time: 1020 End Purge Time: 1100

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1020	11.75	3	240		15.8	11.7	1334	6.56	57.2	4.61	Vis. particle turb.
1025	11.75	3	240		15.6	6.3	1357	6.47	24.4	5.10	
1030	11.75	3	240		15.7	4.7	1420	6.47	-2.6	6.87	
1035	11.75	3	240		15.6	4.0	1426	6.48	-20.8	6.10	
1040	11.75	3	240		15.7	3.4	1427	6.5	-34.5	5.27	
1045	11.75	3	240		15.7	3.2	1428	6.50	-18.1	0.22	
1050	11.75	3	240		15.8	3.0	1424	6.51	-50.5	1.17	
1055	11.75	3	240		15.7	2.8	1424	6.52	-54.4	0.02	can still see particles
1100	11.75	3	240		15.7	2.8	1420	6.52	-58.3	3.07	
				~3 g. H <sub>2</sub> O total							

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW33-0821 Time Collected: 1105 Weather: Sunny 66°F

Sample Description (Color, Turbidity, Odor, Other): vis. turb. & purge water pale yellow / brown

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

water reacting w/HCl, creating bubbles, movement

# Water Level Measurement Field Report

DATE <u>11/15/21</u>	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER <i>Overcast w/ heavy rain</i>	TEMP <u>56°F</u> ° at <u>8:00</u> AM <u>58°F</u> ° at <u>13:30</u> PM
PRESENT AT SITE <i>J. Blum</i>	

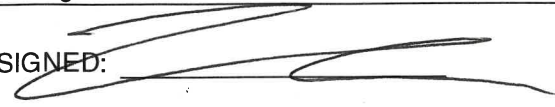
THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	13:59	3.37		TOC	15.3	10-15	1.52
MW-14	13:55	1.92		TOC	21.8	11.5-21.5	0.8
MW-29	14:32	5.87		TOC	30	20-30	-0.29
MW-18	14:12	14.49		TOC	40.4	30-40	1.25
MW-25	14:09	12.71		TOC	27	22-27	2.79
MW-32	14:28	10.00		TOC	24	19-24	-0.44
MW-33	14:24	10.21		TOC	25	20-25	-0.47
MW-26	13:27	8.89		TOC	25	15-25	2.39
MW-27	13:12	7.58		TOC	20	10-20	2.04
MW-10	14:06	12.15		TOC	45	35-45	1.65
MW-24	13:30	8.15		TOC	45.3	35-45	1.56
MW-08	13:10	7.65		TOC	45.6	35.5 - 45.5	1.88
MW-30	13:21	9.68		TOC	13	8-13	-0.53
MW-31	14:19	9.97		TOC	23	35.5-45.5	-0.46

Comments:

TOC – top of PVC casing      SG – staff gauge

SIGNED: \_\_\_\_\_



**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-08  
 Sampling Organization: Parametrix Samplers: T. Parry + MAB

Purge Data Screened Interval (ft bgs): 5.0-20.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 8.12 Purge Water Disposal Method: Oil Separator  
 Purge Device: dedicated bladder pump Pump Intake Depth: 10.5ft  
 Begin Purge Time: 11:25 End Purge Time: \_\_\_\_\_

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1132	8.12	10/12	250 <sup>m<sup>3</sup>/h</sup>	0.1	12.2	0.38	749	6.59	15.3	36.7	Orangeish
1137	8.18	"	"	0.5	12.2	0.21	752	6.58	-30.5	20.6	"
1142	8.12	"	"	0.9	12.3	0.21	772	6.57	-46.0	13.7	
1147	8.12	"	"	1.3	12.3	0.17	803	6.57	-53.7	10.3	
1152	8.12	"	"	1.7	12.2	0.17	823	6.57	-58.3	6.66	
1157	8.12	"	"	2.1	12.2	0.16	833	6.57	-61.1	7.85	
1202	8.13	"	"	2.5	12.2	0.16	839	6.57	-62.8	16.4	
1207	8.13	"	"	2.9	12.2	0.13	842	6.57	-64.1	20.8	
1212	8.13	"	"	3.3	12.3	0.15	847	6.57	-65.0	21.5	
1217	8.13	"	"	3.7	12.2	0.16	848	6.57	-65.9	16.0	
1222	8.13	"	"	4.1	12.3	0.17	850	6.57	-66.8	10.8	
1227	8.13	"	"	4.5	12.3	0.19	855	6.57	-67.5	8.84	
1232	8.13	"	"	4.9	12.3	0.46	858	6.53	-66.1	5.47	auto 452F stopped, restarted @ 1230
1237	8.14	"	"	5.3	12.3	0.27	862	6.56	-68.1	4.27	Bubbles, linger after production
1242	8.14	"	"	5.7	12.3	0.14	865	6.56	-68.9	3.70	
1247	8.14	"	"	6.1	12.1	0.19	865	6.57	-69.4	2.48	water has oily sheen, no smell

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW08-1121 Time Collected: 1250 Weather: Sunny w/ clear sky  
 Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes     No    If yes, ID: SPL-GW-MW08-1121  
 MS/MSD Collected:  Yes     No

**Additional Information/Comments**

Water was orangeish in color, had bubbles, and an oily sheen

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-10
Sampling Organization: Parametrix Samplers: T. Pamy + MAB

Purge Data Screened Interval (ft bgs): 35.0-44.0 Well Casing/Diameter: PVC/2 in
Initial Depth of Water (Ft below TOC): 12.43 Purge Water Disposal Method: Oil separator
Purge Device dedicated bladder pump Pump Intake Depth: 30.0 ft
Begin Purge Time: 10:25 End Purge Time: 10:55

Table with 11 columns: Time, Depth to Water (feet below MP), Pump Setting, Purge Rate, Cum. Vol. Purged, Temp (°C), DO (mg/L), Specific Conductance (mg/cm), pH (units), ORP (mv), Turbidity (NTU), Comments. Rows include data for times 10:30 through 11:00.

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU
Sampling Data
Sample ID: SPL-GW-MW10-2121 Time Collected: 11:00 Weather: Sunny with clear sky
Sample Description (Color, Turbidity, Odor, Other):
Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic
Duplicate Sample Collected: [ ] Yes [X] No If yes, ID:
MS/MSD Collected: [ ] Yes [X] No

Additional Information/Comments



GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 7-26 11/16/21 Well ID: MW-12  
 Sampling Organization: Parametrix Samplers: T. Perry & MAB

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 3.71 Purge Water Disposal Method: Oil Separator  
 Purge Device: dedicated bladder pump Pump Intake Depth: 12.5 ft  
 Begin Purge Time: 8:21 End Purge Time: 10:04

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
8:25	3.71	5/7	400 ml/min	0.25	13.6	3.61	333.7	5.85	279.9	2.53	
8:30	3.71	"	"	0.50	13.6	1.35	313.5	5.88	271.1	0.32	
8:35	3.71	"	"	1.00	13.6	0.91	313.5	5.94	264.2	0.02	
8:40	3.71	"	"	2.00	13.7	0.79	316.7	5.98	259.2	0.02	
8:45	3.71	"	"	2.50	13.7	0.69	319.4	6.01	253.7	0.02	
8:50	The pump stopped working										
9:02	<del>8:55</del>	"	"	3.50	14.1	0.57	333.2	6.07	223.6	0.02	
9:07	<del>9:00</del>	3.72	"	4.00	13.6	0.60	337.2	6.09	204.4	0.2	
9:12	3.72	"	"	4.50	13.8	0.58	347.9	6.11	197.1	0.02	
9:17	3.72	"	"	5.25	13.9	0.51	356.9	6.12	179.1	0.02	
9:22	3.72	"	"	6.00	13.9	0.49	364.3	6.12	155.3	0.02	
9:27	3.72	"	"	7.00	13.6	0.47	368.3	6.15	144.7	0.02	
9:32	3.72	"	"	8.00	13.9	0.49	372.7	6.14	137.8	0.02	
9:37	3.72	"	"	9.00	13.9	0.45	378.0	6.15	130.9	0.02	
9:42	3.72	"	"	10.00	13.9	0.47	382.3	6.16	124.3	0.02	
9:47	The pump stopped working. There is an electrical issue.										
9:54	<del>9:47</del>	3.71	"	11.00	14.1	0.48	384.8	6.18	115.7	0.02	
9:59	3.71	"	"	12.00	13.4	0.41	388.9	6.19	112	0.02	
10:04	3.71	"	"	12.50	13.4	0.46	384.1	6.18	110.5	0.02	
10:09											

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data  
 Sample ID: SPL-GW\_MW12-1121 Time Collected: 10:10 Weather: Overcast  
 Sample Description (Color, Turbidity, Odor, Other): Clear  
 Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

Additional Information/Comments  
 Two vinyl chloride samples were preserved with HCl. Purge times and sample times should be one hour earlier. The YSI time was wrong. The COC is accurate.

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-14  
 Sampling Organization: Parametrix Samplers: J. Phung + MAB

Purge Data Screened Interval (ft bgs): 11.5-21.5 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 2.21 Purge Water Disposal Method: oil separator  
 Purge Device dedicated bladder pump Pump Intake Depth: 16.5 ft  
 Begin Purge Time: 7:20 End Purge Time: 8:15

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
7:25	2.30	5/7	210 ml/min	0.25	14.3	2.00	573.5	6.34	141.8	17.8	
7:30	2.30	"	"	0.50	14.5	1.14	546.5	6.42	90.3	25.8	
7:35	2.30	"	"	0.75	14.1	0.95	534.7	6.42	67.7	16.7	
7:40	2.30	"	"	1.00	14.3	0.69	527.9	6.49	46.7	14.9	
7:45	2.30	"	"	1.25	14.3	0.53	525.5	6.51	37.8	13.4	
7:50	2.30	"	"	1.50	14.4	0.48	525.5	6.52	31.3	8.91	
7:55	2.30	"	"	1.75	14.6	0.39	523.0	6.53	25.7	5.61	
8:00	2.30	"	"	2.0	14.6	0.38	523.0	6.55	21.2	4.23	
8:10	2.30	"	"	2.25	14.5	0.31	522.4	6.55	17.7	2.80	
8:15	2.30	"	"	2.50	14.3	0.35	522.5	6.56	14.9	1.98	
8:20	-	-	-	-	-	-	-	-	-	-	

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW14- 1121 Time Collected: 8:20 Weather: Clear skies  
 Sample Description (Color, Turbidity, Odor, Other): Faint odor, some bubbles in purged bucket.  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-18  
 Sampling Organization: Parametrix Samplers: J. Perry + MAB

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 14.92 Purge Water Disposal Method: Oil separator  
 Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft  
 Begin Purge Time: 8:34 End Purge Time: 9:03

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
8:34	14.92	7/10	375 ml/min	0.10	14.2	1.96	1057	6.51	39.0	1.78	
8:43	14.92	"	"	0.75	14.1	0.55	922	6.56	3.6	0.73	
8:48	14.92	"	"	1.00	14.1	0.30	880	6.58	-20.1	0.02	
8:53	14.92	"	"	1.25	14.1	0.26	872	6.58	-32.0	0.02	
8:58	14.92	"	"	1.50	14.1	0.25	870	6.58	-37.5	0.02	
9:03	14.92	"	"	1.75	14.2	0.21	870	6.58	-41.9	0.02	
9:08	-	-	-	-	-	-	-	-	-	-	
9:13											
9:18											

Stabilization Criteria    3%    10%, or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW18-1121 Time Collected: 9:10 Weather: Clear Skies with Sun.  
 Sample Description (Color, Turbidity, Odor, Other): frank odor (sulphur-like)  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

# South Park Landfill

Project No.: 553-1550-067 Date: 11/17/2021 Well ID: MW-24  
 Sampling Organization: Parametrix Samplers: T. Pamy + MAB

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): ~~35.0-45.0~~ 8.54 Purge Water Disposal Method: Oil Separator  
 Purge Device dedicated bladder pump Pump Intake Depth: 40.0 ft  
 Begin Purge Time: 1413 End Purge Time: 1449

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1419	8.54	7/9	400 ml/min	0.25	12.2	0.40	940	6.42	28.9	0.02	
1424	8.54	"	350 ml/min	0.75	12.2	0.28	946	6.44	13	0.02	
1429	8.54	"	"	1.25	12.2	0.22	949	6.45	-15.1	0.02	
1434	8.56	"	"	1.75	12.2	0.20	947	6.45	-27.2	0.02	
1439	8.55	"	"	2.25	12.2	0.21	947	6.46	-33.1	0.02	
1444	8.56	"	"	2.75	12.2	0.19	947	6.47	-38.1	0.02	
1449	8.56	"	"	3.25	12.2	0.18	948	6.46	-41.3	0.02	
1454	-	-	-	-	-	-	-	-	-	-	
1459											
1504											
1509											

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW24-1121 Time Collected: 1500 Weather: Sunny w/ clear sky  
 Sample Description (Color, Turbidity, Odor, Other): slight/faint orange  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**  
 \_\_\_\_\_  
 \_\_\_\_\_

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-25

Sampling Organization: Parametrix Samplers: T. Parry + MAB

Purge Data Screened Interval (ft bgs): 20.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.10 Purge Water Disposal Method: Oil separator.

Purge Device dedicated bladder pump Pump Intake Depth: 24.5 ft

Begin Purge Time: 9:31 End Purge Time: 9:57

Table with 11 columns: Time, Depth to Water (feet below MP), Pump Setting, Purge Rate, Cum. Vol. Purged, Temp (°C), DO (mg/L), Specific Conductance (mg/cm), pH (units), ORP (mv), Turbidity (NTU), Comments. Includes handwritten data for times 9:37 through 10:27.

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW25- Time Collected: 10:00 Weather: Sunny w/ clear skies

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses: cis-1,2-DCE, benzene, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected: [ ] Yes [X] No If yes, ID:

MS/MSD Collected: [ ] Yes [X] No

Additional Information/Comments

Purged water has bubbles that do not dissipate.

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-26

Sampling Organization: Parametrix Samplers: T. Lang + MAB

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.20 Purge Water Disposal Method: Oil Separator

Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 13:29 End Purge Time: \_\_\_\_\_

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1333	9.20	6/9	375 ml/min	0.25	12.1	3.64	199.2	6.02	30.5	1.62	
1338	9.20	"	"	0.75	12.1	0.89	202.7	5.90	41.5	0.02	
1343	9.20	"	"	1.25	12.1	9.56	203.7	5.87	44.7	0.02	
1348	9.20	"	"	1.75	12.1	0.37	204.4	5.88	45.2	0.02	
1353	9.20	"	"	2.25	12.1	0.35	205.6	5.87	45.7	0.02	
1358	9.20	"	"	2.75	12.1	0.28	205.8	5.87	46.2	0.02	
1403											
1408											
1413											
1418											

Stabilization Criteria      3%      10% , or 3<0.5      3%      ± 0.1      ± 10 mv      10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW26-1121 Time Collected: 14:00 Weather: Sunny w/ clear sky

Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_

MS/MSD Collected:  Yes  No

**Additional Information/Comments**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/16/21 Well ID: MW-27  
 Sampling Organization: Parametrix Samplers: T-Penny + MAB

Purge Data Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 8.05 Purge Water Disposal Method: oil separator  
 Purge Device dedicated bladder pump Pump Intake Depth: 15.0 ft  
 Begin Purge Time: 13:44 End Purge Time: 15:00

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1350	8.14	5/9	300 <sup>ml/min</sup>	0.25	12.5	5.50	310.2	6.22	63.9	158	yellow-brown
1355	8.14	"	"	0.50	12.5	2.85	279.8	6.14	69.0	511	
1400	8.14	"	"	0.75	12.6	1.81	268.8	6.11	74.1	430	
1405	8.14	"	"	1.0	12.6	1.43	265.6	6.10	77.6	366	
1410	8.14	"	"	1.25	12.6	1.27	263.8	6.09	79.7	228	
1415	8.14	"	"	1.50	12.6	1.06	263.1	6.08	81.2	96.2	
1420	8.14	"	"	1.75	12.6	0.88	263.2	6.08	82.3	81.1	
1425	8.14	"	"	2.00	12.6	0.81	264.3	6.08	83.3	44.7	
1430	8.14	"	"	2.25	12.6	0.73	264.8	6.07	83.5	51.0	
1435	8.14	"	"	2.50	12.6	0.73	266.1	6.06	85.1	30.3	
1440	8.14	"	"	2.75	12.6	0.75	267.7	6.08	84.5	26.6	
1445	8.14	"	"	3.00	12.6	0.69	268.9	6.08	84.6	25.6	
1450	8.14	"	"	3.25	12.6	0.60	270.7	6.09	84.8	21.5	
1455	8.14	"	"	3.50	12.6	0.57	273.0	6.09	84.7	19.5	
1500	8.14	"	"	3.75	12.6	0.50	275.1	6.10	84.6	21.6	
1505	-	-	-	-	-	-	-	-	-	-	
1510	-	-	-	-	-	-	-	-	-	-	

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW27- 1121 Time Collected: 15:05 Weather: clear sky with sun breaks.  
 Sample Description (Color, Turbidity, Odor, Other): Very faint yellow/orange  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

Some bubbles present in the purged water.

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/16/21 Well ID: MW-29  
 Sampling Organization: Parametrix Samplers: T. Parry + MAB

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 6.16 Purge Water Disposal Method: Oil separator  
 Purge Device peristaltic pump Pump Intake Depth: 25.0 ft  
 Begin Purge Time: 9:43 End Purge Time: 10:14

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:44	7.04	V3	350 ml/min	0.25	12.9	1.05	599.4	6.50	11.5	0.02	
9:49	7.05	"	"	0.50	13.0	0.42	591.0	6.57	-295	0.02	
9:54	7.11	"	"	1.00	13.0	0.31	599.2	6.60	-40.6	0.02	
9:59	7.12	"	"	1.50	13.0	0.27	617.1	6.63	-50.1	0.02	
10:04	7.21	"	20	2.23	12.9	0.24	631.0	6.65	-55.4	0.02	
10:09	7.24	"	"	2.5	12.9	0.21	634.7	6.66	-59.0	0.02	
10:14	7.25	"	"	3.0	13.0	0.20	635.6	6.66	-61.3	0.02	
10:19	-	-	-	-	-	-	-	-	-	-	
10:24											

Stabilization Criteria      3%      10% , or 3<0.5      3%      ± 0.1      ± 10 mv      10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW29-1121 Time Collected: 10:20 Weather: Overcast.  
 Sample Description (Color, Turbidity, Odor, Other): Faint yellow in color. Strong odor.  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

Poly tubing targeted pump intake depth (25 feet). Purged water has a strong and faint odor.



**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/16 Well ID: MW-30  
 Sampling Organization: Parametrix Samplers: T. Phay & MAB

Purge Data Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 9.61 Purge Water Disposal Method: Oil separator.  
 Purge Device peristaltic pump Pump Intake Depth: 10.5 ft  
 Begin Purge Time: 11:53 End Purge Time: 12:25

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1156	9.70	V3	220 ml/min	0.1	13.8	3.19	491.4	6.45	27.2	0.97	
1205	9.78	"	"	0.25	13.9	0.40	405.6	6.26	24.7	0.02	
1215	9.78	"	"	0.40	13.9	0.40	402.4	6.25	27.4	0.02	
1220	9.79	"	"	0.50	13.9	0.47	395.7	6.25	29.3	0.02	
1225	9.79	"	"	0.70	14.0	0.41	392.4	6.24	30.6	0.02	
1230	-	-	-	-	-	-	-	-	-	-	
1235											
1240											
1245											
1250											

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**  
 Sample ID: SPL-GW\_MW30- Time Collected: 1230 Weather: Scattered clouds  
 Sample Description (Color, Turbidity, Odor, Other): Clear w/ no obvious odor, though a faint smell is present.  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**  
Poly tubing with a target depth of 10.5;

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/16/21 Well ID: MW-31  
 Sampling Organization: Parametrix Samplers: T. Pomy + MAB

Purge Data Screened Interval (ft bgs): 18.0-23.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): ~~10.38~~ 9.38 10.38 Purge Water Disposal Method: oil separator  
 Purge Device dedicated bladder pump Pump Intake Depth: 20.5ft  
 Begin Purge Time: 12:34 End Purge Time: 13:15

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
12:45	10.45	5/9	3.0	0.6	14.3	0.34	373.2	6.30	-11.9	12.2	
12:50	10.44	"	"	1.25	14.3	0.25	374.4	6.30	-21.1	7.65	
12:55	10.44	"	"	1.75	14.2	0.24	375.3	6.31	-25.9	6.09	
13:00	10.44	"	"	2.20	14.2	0.19	374.5	6.31	-27.7	5.60	
13:05	10.45	"	"	2.60	14.2	0.24	374.3	6.31	-30.0	3.41	
13:10	10.45	"	"	2.8	14.2	0.22	374.6	6.31	-31.5	3.05	
13:15	10.45	"	"	3.25	14.1	0.19	374.2	6.31	-32.5	2.19	
-	-	-	-	-	-	-	-	-	-	-	

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW\_MW31- 1121 Time Collected: 1320 Weather: Scattered clouds with sun.  
 Sample Description (Color, Turbidity, Odor, Other): \_\_\_\_\_  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/16/21 Well ID: MW-32  
 Sampling Organization: Parametrix Samplers: T. Parry + MAB

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 10.28 Purge Water Disposal Method: Oil Separator  
 Purge Device: peristaltic pump Pump Intake Depth: 21.5 ft  
 Begin Purge Time: 10:42 End Purge Time: 11:08

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
10:42	10.28	V3	280	0.25	14.0	2.59	822	6.64	-11.2	4.7	
10:48	10.28	"	"	0.50	14.1	0.42	851	6.70	-69.9	4.7	
10:53	10.28	"	"	0.75	14.2	0.31	845	6.70	-76.1	0.02	
10:58	10.30	"	"	1.00	14.3	0.30	841	6.70	-77.5	0.02	
11:03	10.30	"	"	1.25	14.4	0.28	837	6.70	-78.6	0.02	
11:08	10.30	"	"	1.50	14.3	0.24	836	6.70	-79.3	0.02	
11:13	-	-	-	-	-	-	-	-	-	-	
11:18											
11:23											

Stabilization Criteria    3%    10% , or 3<0.5    3%    ± 0.1    ± 10 mv    10% or 3 < 5 NTU

**Sampling Data**  
 Sample ID: SPL-GW\_MW32-1121 Time Collected: 11:10 Weather: Scattered clouds  
 Sample Description (Color, Turbidity, Odor, Other): Faint odor  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes  No If yes, ID: \_\_\_\_\_  
 MS/MSD Collected:  Yes  No

**Additional Information/Comments**  
Poly tubing targeted a depth of 21.5 feet

**GROUNDWATER SAMPLE COLLECTION FORM**

**South Park Landfill**

Project No.: 553-1550-067 Date: 11/17/21 Well ID: MW-33  
 Sampling Organization: Parametrix Samplers: T. Parry + MAB.

Purge Data Screened Interval (ft bgs): 20.0-25.0 Well Casing/Diameter: PVC/2 in  
 Initial Depth of Water (Ft below TOC): 10.39 Purge Water Disposal Method: oil separator  
 Purge Device peristaltic pump Pump Intake Depth: 22.5ft  
 Begin Purge Time: 15:24 End Purge Time: 1551

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1526	10.39	1/4	230 ml/min	0.10	15.0	0.64	1457	6.64	-28.1	0.87	Slight yellowish
1531	10.39	"	"	0.25	15.0	0.32	1453	6.65	-58.0	1.09	
1536	10.39	"	"	0.50	15.1	0.26	1435	6.66	-66.1	2.24	
1541	10.39	"	"	0.80	15.0	0.24	1413	6.66	-73.2	2.82	
1546	10.39	"	"	1.00	15.1	0.21	1405	6.66	-76.7	0.13	
1551	10.39	"	"	1.50	15.1	0.19	1398	6.67	-79.6	1.12	
1556	-	-	-	-	-	-	-	-	-	-	
1601											
1606											
1611											
1616											
1619											
1616											

Stabilization Criteria      3%      10% , or 3<0.5      3%      ± 0.1      ± 10 mv      10% or 3 <5 NTU

**Sampling Data**

Sample ID: SPL-GW-MW33- 1121 Time Collected: 15:55 Weather: Sunny with clear sky  
 Sample Description (Color, Turbidity, Odor, Other): Yellow brownish, there are a lot of bubbles present.  
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic  
 Duplicate Sample Collected:  Yes     No    If yes, ID: SPL-GW-MW60-1121.  
 MS/MSD Collected:  Yes     No

**Additional Information/Comments**

Poly tubing inserted a depth of 22.5. Purged water has bubbles and a faint faint and foul odor.

D4

Laboratory Reports

Laboratory reports are contained in Volume II



D5

Data Validation Memoranda



# First Quarter 2021 Groundwater Sampling Event South Park Landfill Data Validation Report

*Prepared for*

**Seattle Public Utilities**

700 Fifth Avenue, Suite 4900  
Seattle, WA 98124-4018

*Prepared by*

**Parametrix**

719 2nd Avenue, Suite 200  
Seattle, WA 98104  
T. 206.394.3700 F. 1.855.542.6353  
[www.parametrix.com](http://www.parametrix.com)

*In Association with*



## CITATION

Parametrix and HWA GeoSciences, Inc., 2021. First Quarter 2021  
Groundwater Sampling Event South Park Landfill Data Validation Report .  
Prepared by Parametrix, Seattle, Washington.  
July 2021.



# TABLE OF CONTENTS

<b>1. PROJECT NARRATIVE .....</b>	<b>1-1</b>
1.1 Overview of Data Validation.....	1-1
<b>2. DATA VALIDATION REPORT SELECT VOCs BY EPA METHOD 8260D.....</b>	<b>2-1</b>
2.1 Data Package Completeness.....	2-1
2.2 Technical Data Validation .....	2-1
2.2.1 Matrix Spike/Matrix Spike Duplicate .....	2-1
2.3 Overall Assessment.....	2-1
<b>3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM .....</b>	<b>3-1</b>
3.1 Data Package Completeness.....	3-1
3.2 Technical Data Validation .....	3-1
3.2.1 Field Duplicates .....	3-1
3.3 Overall Assessment.....	3-1
<b>4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B.....</b>	<b>4-1</b>
4.1 Data Package Completeness.....	4-1
4.2 Technical Data Validation .....	4-1
4.2.1 Matrix Spike .....	4-1
4.3 Overall Assessment.....	4-1
<b>5. REFERENCES .....</b>	<b>5-1</b>

## APPENDICES

- A Data Qualifier Definitions and Criteria Tables
- B Field Duplicate Analysis
- C Qualified Data Summary Table

## ACRONYMS AND ABBREVIATIONS

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

# 1. PROJECT NARRATIVE

## 1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill First Quarter 2021 Groundwater Monitoring Event. A complete list of samples is provided below.

**Project Sample Index**

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn	6020B Dissolved As
SPL-GW-MW12-0221	21B0315-01	MW-12	X	X	X	
SPL-GW-MW12-0221	21B0315-02	MW-12				X
SPL-GW-MW14-0221	21B0315-03	MW-14	X	X	X	
SPL-GW-MW29-0221	21B0315-04	MW-29	X	X	X	
SPL-GW-MW18-0221	21B0315-05	MW-18	X	X	X	
SPL-GW-MW18-0221	21B0315-06	MW-18				X
SPL-GW-MW10-0221	21B0315-07	MW-10	X	X	X	
SPL-GW-MW10-0221	21B0315-08	MW-10				X
SPL-GW-MW60-0221	21B0315-09	MW-29 Dup	X	X	X	
SPL-GW-MW80-0221	21B0315-10	TRIP BLANK	X	X		
SPL-GW-MW25-0221	21B0315-11	MW-25	X	X	X	
SPL-GW-MW25-0221	21B0315-12	MW-25				X
SPL-GW-MW30-0221	21B0315-13	MW-30	X	X	X	
SPL-GW-MW31-0221	21B0315-14	MW-31	X	X	X	
SPL-GW-MW61-0221	21B0315-15	MW-31 Dup	X	X	X	
SPL-GW-MW24-0221	21B0328-01	MW-24	X	X	X	
SPL-GW-MW24-0221	21B0328-02	MW-24				X
SPL-GW-MW26-0221	21B0328-03	MW-26	X	X	X	
SPL-GW-MW26-0221	21B0328-04	MW-26				X
SPL-GW-MW08-0221	21B0328-05	MW-08	X	X	X	
SPL-GW-MW08-0221	21B0328-06	MW-08				X
SPL-GW-MW27-0221	21B0328-07	MW-27	X	X	X	
SPL-GW-MW27-0221	21B0328-08	MW-27				X
SPL-GW-MW32-0221	21B0328-09	MW-32	X	X	X	
SPL-GW-MW32-0221	21B0328-10	MW-32				X
SPL-GW-MW33-0221	21B0328-11	MW-33	X	X	X	
SPL-GW-MW33-0221	21B0328-12	MW-33				X
SPL-GW-MW81-0221	21B0328-13	TRIP BLANK	X	X		

Groundwater samples were collected between February 22 and 23, 2021 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 21B0315 and 21B0328. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (Total iron and manganese, and dissolved arsenic) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2017a), *National Functional Guidelines for Organic Data Review* (EPA 2017b), *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2018]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2002, 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

### **Field Duplicates**

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-0221 is a duplicate of SPL-GW-MW29-0221. Sample SPL-GW-MW61-0221 is a duplicate of SPL-GW-MW31-0221.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples.  $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$ , where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

### **Trip Blanks**

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-0221 and SPL-GW-MW81-0221).

### **Sample Temperature**

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 1.6 and 2.7 degrees C, indicating adequate temperature control for sample preservation for both batches. No data were therefore qualified based on temperature issues.

### **VOC Sample Integrity**

The laboratory reported that all VOA vials were free of air bubbles. No data were therefore qualified based on VOC integrity issues.

## 2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

#### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicate
MS/MSD <sup>1</sup>	

Notes:

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 2.2.1 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 21B0315-04 (SPL-GW-MW29-0221) in batch BJC0053. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits. No data were therefore qualified based on MS/MSD integrity issues.

### 2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

### 3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

#### 3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

#### 3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

**QC Requirements**

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
LCS and LCSD	Field duplicates <sup>2</sup>
MS/MSD	

Notes:

QC requirement findings further discussed in following sections (if required):

- <sup>1</sup> Quality control results are discussed below, but no data were qualified.
- <sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

##### 3.2.1 Field Duplicates

The RPD between sample SPL-GW-MW31-0221 and its field duplicate SPL-GW-MW61-0221 was greater than the target precision of +/- 35 percent. Therefore, the vinyl chloride result for SPL-GW-MW31-0221 was qualified “J” as estimated in accordance with the criteria presented in Appendix A.

#### 3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

## 4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese, and dissolved arsenic) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

**QC Requirements**

Cooler temperature and preservation	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate
Blank contamination (method)	Target analyte list
Matrix Spike (MS) <sup>1</sup>	Reporting limits and reported results
	Field duplicates

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

#### 4.2.1 Matrix Spike

Sample specific QC was performed in association with sample 21B0315-04 (SPL-GW-MW29-0221) in Total Metals batch BJC0200. The duplicate and MS/MSD RPDs were within control limits. The lab noted that the natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. No data were qualified because the spike was less than 25 percent of the sample value.

### 4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs, with the except of manganese, as discussed above.

All data, as reported by the laboratory, are acceptable for use.



## 5. REFERENCES

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.
- ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.
- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
- ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.
- Ecology (Washington Department of Ecology). 2018. South Park Landfill Final Cleanup Action Plan. March.
- EPA (U.S. Environmental Protection Agency). 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA240R-02/004.
- EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use. EPA 540-R-08-005. January 13, 2009.
- EPA. 2017a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001.
- EPA. 2017b. National Functional Guidelines for Organic Superfund Data Review. EPA 540R- 2017-002.

# Appendix A

## Data Qualifier Definitions and Criteria Tables



## **DATA VALIDATION QUALIFIER CODES**

### **National Functional Guidelines (EPA 2020)**

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH $\leq 2$	If $>6^{\circ}\text{C}$ but $\leq 10^{\circ}\text{C}$ , use professional judgement J/UJ if greater than $10^{\circ}\text{C}$
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U report at CRQL</li> <li>If sample result <math>\geq</math> CRQL, use professional judgement</li> </ul>
		If blank $\geq$ CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U and report at CRQL</li> <li>If sample result <math>\geq</math> but &lt; blank result, qualify U and report at sample result</li> <li>If sample result <math>\geq</math> CRQL and <math>\geq 2x</math> blank results, report sample result and J+ qualify or no qualification</li> </ul>
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> <li>J if <math>\%R &lt; 20\%</math>, or <math>20\% &lt; \%R &lt; \text{Lower limit}</math>, or <math>\%R</math> or RPD <math>&gt; \text{Upper limit}</math></li> </ul> For non-detects: <ul style="list-style-type: none"> <li>R if <math>\%R &lt; 20\%</math>, UJ if <math>20\% &lt; \%R &lt; \text{Lower limit}</math></li> </ul>
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or $\%R$ not specified: use professional judgment For detects: <ul style="list-style-type: none"> <li><math>\%R &lt; \text{Lower Limit}</math>, qualify J-+; <math>\%R &gt; \text{Upper Limit}</math>, qualify J+-</li> </ul> For non-detects: <ul style="list-style-type: none"> <li><math>\%R &lt;</math>, qualify results R; If <math>\%R \geq</math> No qualification</li> </ul>
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded Lower Limit (10%), qualify results J-</li> <li>• Expanded Lower Limit <math>\leq</math> %R &lt; specified Lower Limit, qualify results J-</li> <li>• %R &gt; specified Upper Limit, qualify results J+</li> </ul> For non-detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded lower limit (10%), qualify results R</li> <li>• Expanded Lower Limit <math>\leq</math> %R &lt; specified Lower Limit, qualify results UJ</li> </ul>
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

**Validation Guidelines for Metals Analysis by ICP-MS  
 (Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	<p>If blank &lt;CRQL:</p> <ul style="list-style-type: none"> <li>Sample Detect &lt;QL: Report at QL and qualify U</li> <li>Sample <math>\geq</math> QL: J+ or no qualification</li> </ul> <p>If blank result <math>\leq</math> (-MDL) but &gt; (-QL):</p> <ul style="list-style-type: none"> <li>Sample Detect: qualify J- or no qualification</li> <li>Sample Non-detect: qualify UJ</li> </ul> <p>If blank result <math>\geq</math> CRQL:</p> <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL: Report at QL and qualify U</li> <li>Sample result <math>\geq</math> CRQL but &lt;10 x the Blank results: Report at Blank Result and qualify J+ or R</li> <li><math>\geq 10</math>x Blank results, no qualification</li> </ul> <p>If blank result <math>\leq</math> (-QL):</p> <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL or <math>\geq</math> CRQL but &lt;10x CRQL, qualify J-</li> <li>Sample Non-detect qualify UJ</li> <li>Sample result <math>\geq 10</math>x QL, no qualification</li> </ul>
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	<p>For detects:</p> <ul style="list-style-type: none"> <li>If %R &lt; 40% or 40-69%, J-</li> <li>If %R 70-130%, no qualification</li> <li>If %R 131-151%, J+</li> <li>If %R &gt;150%, R</li> </ul> <p>For non-detects:</p> <ul style="list-style-type: none"> <li>If %R &lt;40%, R</li> <li>If %R 40-69%, UJ</li> <li>If %R &gt;70%, no qualification</li> </ul>

**Validation Guidelines for Metals Analysis by GC/MS  
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If $\geq 4x$ the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> <li>• J- if %R &lt;30 to 74%</li> <li>• J+ if %R &gt;125%</li> <li>• No qualification if %R 75-125%</li> </ul> For Non-detects: <ul style="list-style-type: none"> <li>• R if %R &lt;30%,</li> <li>• UJ if %R &lt;75% or</li> </ul> No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples $\geq 5x$ CRQL OR CQRL if sample results <5x CRQL	If results $\geq 5x$ CRQL and RPD >20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> <li>• J if detect,</li> <li>• UJ if non-detect</li> </ul>
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

# Appendix B

## Field Duplicate Analysis





Date Completed: 3/11/2022  
 South Park Landfill  
 553-1550-167

Data Validation		South Park Landfill							
QA/QC completed by: Chris Bourgeois		4/2/2021							
ARI Work Order		21B0315							
Sample numbers:		SPL-GW-MW29-0221; SPL-GW-MW60-0221							
Sample Date:		2/23/2021							
Groundwater	units	sample	duplicate	avg	diff	RPD	=/<50%	RL	w/in RL?
		MW-29	MW-60						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ug/L	<0.02	<0.02	#DIV/0!	#VALUE!	#VALUE!		0.02	y
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
Groundwater		sample	duplicate	avg	diff	RPD	=/<20%	RL	w/in RL?
Iron	mg/L	17.6	20.2	18.9	-2.60	13.76	y	0.02	
Manganese	mg/L	0.578	0.598	0.588	-0.02	3.40	y	0.01	
Arsenic	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
<b>Comments:</b>	<b>No data qualified</b>								
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Date Completed: 3/11/2022  
 South Park Landfill  
 553-1550-167

<b>Data Validation</b>		<b>South Park Landfill</b>							
QA/QC completed by: Chris Bourgeois		4/2/2021							
ARI Work Order		21B0315							
Sample numbers:		SPL-GW-MW31-0221; SPL-GW-MW61-0221							
Sample Date:		2/23/2021							
<b>Groundwater</b>	<b>units</b>	<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;50%</b>	<b>RL</b>	<b>w/in RL?</b>
		<b>MW-31</b>	<b>MW-61</b>						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ug/L	<b>0.167</b>	<b>0.357</b>	<b>0.262</b>	<b>-0.19</b>	<b>72.52</b>	n	<b>0.02</b>	n
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	mg/L	11.8	12.3	12.05	-0.50	4.15	y	0.02	
Manganese	mg/L	0.537	0.513	0.525	0.02	4.57	y	0.01	
Arsenic	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
<b>Comments:</b>	<b>Vinyl chloride data for MW-31 qualified "J" as estimated</b>								
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

# Appendix C

## Qualified Data Summary Table



**Table C.1**  
**Qualified Data Summary Table First Quarter 2021 Groundwater Sampling Event**

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW31-0221	21B0315-14	EPA 8260DSIM	Vinyl Chloride	0.167	µg/L		J	J

Qualifiers:

J the result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

# Second Quarter 2021 Groundwater Sampling Event South Park Landfill Data Validation Report

*Prepared for*

**Seattle Public Utilities**

700 Fifth Avenue, Suite 4900  
Seattle, WA 98124-4018

*Prepared by*

**Parametrix**

719 2nd Avenue, Suite 200  
Seattle, WA 98104  
T. 206.394.3700 F. 1.855.542.6353  
[www.parametrix.com](http://www.parametrix.com)

*In Association with*



## CITATION

Parametrix and HWA GeoSciences, Inc., 2021. Second Quarter 2021  
Groundwater Sampling Event South Park Landfill Data Validation Report.  
Prepared by Parametrix, Seattle, Washington.  
July 2021.

# TABLE OF CONTENTS

<b>1. PROJECT NARRATIVE .....</b>	<b>1-1</b>
1.1 Overview of Data Validation.....	1-1
<b>2. DATA VALIDATION REPORT SELECT VOCs BY EPA METHOD 8260D .....</b>	<b>2-1</b>
2.1 Data Package Completeness.....	2-1
2.2 Technical Data Validation .....	2-1
2.2.1 Matrix Spike/Matrix Spike Duplicate .....	2-1
2.3 Overall Assessment.....	2-1
<b>3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM .....</b>	<b>3-1</b>
3.1 Data Package Completeness.....	3-1
3.2 Technical Data Validation .....	3-1
3.3 Overall Assessment.....	3-1
<b>4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B .....</b>	<b>4-1</b>
4.1 Data Package Completeness.....	4-1
4.2 Technical Data Validation .....	4-1
4.2.1 Blank Contamination.....	4-1
4.2.2 Matrix Spike .....	4-1
4.3 Overall Assessment.....	4-2
<b>5. REFERENCES .....</b>	<b>5-1</b>

## APPENDICES

- A Data Qualifier Definitions and Criteria Tables
- B Field Duplicate Analysis
- C Qualified Data Summary Table

## ACRONYMS AND ABBREVIATIONS

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound



# 1. PROJECT NARRATIVE

## 1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Second Quarter 2021 Groundwater Monitoring Event. A complete list of samples is provided below.

**Project Sample Index**

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn	6020B Dissolved As
SPL-GW-MW12-0521	21E0228-01	MW-12	X	X	X	
SPL-GW-MW12-0521	21E0228-02	MW-12				X
SPL-GW-MW14-0521	21E0228-03	MW-14	X	X	X	
SPL-GW-MW29-0521	21E0228-04	MW-29	X	X	X	
SPL-GW-MW18-0521	21E0228-05	MW-18	X	X	X	
SPL-GW-MW18-0521	21E0228-06	MW-18				X
SPL-GW-MW32-0521	21E0228-07	MW-32	X	X	X	
SPL-GW-MW32-0521	21E0228-08	MW-32				X
SPL-GW-MW60-0521	21E0228-09	MW-18 Dup	X	X	X	
SPL-GW-MW60-0521	21E0228-10	MW-18 DUP				X
SPL-GW-MW80-0521	21E0228-11	TRIP BLANK	X	X		
SPL-GW-MW24-0521	21E0228-12	MW-24	X	X	X	
SPL-GW-MW24-0521	21E0228-13	MW-24				X
SPL-GW-MW26-0521	21E0228-14	MW-26	X	X	X	
SPL-GW-MW26-0521	21E0228-15	MW-26	X	X	X	
SPL-GW-MW08-0521	21E0228-16	MW-08	X	X	X	
SPL-GW-MW08-0521	21E0228-17	MW-08				X
SPL-GW-MW27-0521	21E0228-18	MW-27	X	X	X	
SPL-GW-MW27-0521	21E0228-19	MW-27				X
SPL-GW-MW61-0521	21E0228-20	MW-24 DUP	X	X	X	
SPL-GW-MW61-0521	21E0228-21	MW-24 DUP				X
SPL-GW-MW33-0521	21E0243-01	MW-33	X	X	X	
SPL-GW-MW33-0521	21E0243-02	MW-33				X
SPL-GW-MW10-0521	21E0243-03	MW-10	X	X	X	
SPL-GW-MW10-0521	21E0243-04	MW-10				X
SPL-GW-MW25-0521	21E0243-05	MW-25	X	X	X	
SPL-GW-MW25-0521	21E0243-06	MW-25				X
SPL-GW-MW30-0521	21E0243-07	MW-30	X	X	X	
SPL-GW-MW31-0521	21E0243-08	MW-31	X	X	X	
SPL-GW-MW81-0521	21E0243-09	TRIP BLANK	X	X		

Groundwater samples were collected between May 18 and 20, 2021 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 21E0228 and 21E0243. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (Total iron and manganese, and dissolved arsenic) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2017a), *National Functional Guidelines for Organic Data Review* (EPA 2017b), *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2002, 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

### **Field Duplicates**

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-0521 is a duplicate of SPL-GW-MW18-0521. Sample SPL-GW-MW61-0521 is a duplicate of SPL-GW-MW24-0521.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples.  $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$ , where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

### **Trip Blanks**

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-0521 and SPL-GW-MW81-0521).

### **Sample Temperature**

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 3.4 and 4.8 degrees C, indicating adequate temperature control for sample preservation for both batches. No data were therefore qualified based on temperature issues.

### **VOC Sample Integrity**

All VOA vials samples submitted on May 20, 2021 (laboratory report ID 21E0243) were free of air bubbles. The laboratory reported that VOA vials submitted on May 19, 2021 (laboratory report ID 21E0228) were not all free of air bubbles but did not specify which VOA vial sample(s) included air bubbles. This could possibly be due to sample collection methods or in some cases (particularly at landfills), dissolved methane present in groundwater forms bubbles in the VOA vials after collection. Therefore, no data were qualified based on VOC integrity issues.

## 2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

#### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicate
MS/MSD <sup>1</sup>	

Notes:

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 2.2.1 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 21E0228-05 (SPL-GW-MW18-0521) and 21E0228-12 (SPL-GW-MW24-0521) in batch BJE0508. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits. No data were therefore qualified based on MS/MSD integrity issues.

### 2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values.

Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

### 3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

#### 3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

#### 3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

##### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
LCS and LCSD	Field duplicates
MS/MSD	

Notes:

QC requirement findings further discussed in following sections (if required):

- <sup>1</sup> Quality control results are discussed below, but no data were qualified.
- <sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

## 4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese, and dissolved arsenic) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

**QC Requirements**

Cooler temperature and preservation	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate
Blank contamination (method) <sup>2</sup>	Target analyte list
Matrix Spike (MS) <sup>1</sup>	Reporting limits and reported results
	Field duplicates

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

#### 4.2.1 Blank Contamination

The blank spike (BS/LCS) percent recoveries were within control limits except Manganese in 21E0228, which was detected in the blank at a concentration of 0.00103 mg/L. All samples that contain manganese were flagged by the lab with a "B" qualifier. The B qualifiers were removed from the final data table because all sample concentrations are >10X the blank detection.

#### 4.2.2 Matrix Spike

Sample specific QC for total iron and manganese was performed in association with sample 21E0228-05 (SPL-GW-MW18-0521) and 21E0228-12 (SPL-GW-MW24-0521) in batch BJF0108. The lab noted that the natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible, and therefore no data were qualified.

Sample specific QC for dissolved arsenic was performed in association with samples 21E0228-06 (SPL-GW-MW18-0521) and 21E0228-13 (SPL-GW-MW24-0521) in batch BJE0511. The matrix spike (MS)

percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

### 4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs, with the exception of manganese, as discussed above.

All data, as reported by the laboratory, are acceptable for use.

## 5. REFERENCES

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.
- ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.
- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
- ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.
- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
- EPA (U.S. Environmental Protection Agency). 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA240R-02/004.
- EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use. EPA 540-R-08-005. January 13, 2009.
- EPA. 2017a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001.
- EPA. 2017b. National Functional Guidelines for Organic Superfund Data Review. EPA 540R- 2017-002.



# Appendix A

## Data Qualifier Definitions and Criteria Tables



## **DATA VALIDATION QUALIFIER CODES**

### **National Functional Guidelines (EPA 2020)**

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH $\leq 2$	If $>6$ deg. C but $\leq 10$ deg. C, use professional judgement J/UJ if greater than 10 deg. C
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U report at CRQL</li> <li>If sample result <math>\geq</math> CRQL, use professional judgement</li> </ul>
		If blank $\geq$ CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U and report at CRQL</li> <li>If sample result <math>\geq</math> but &lt; blank result, qualify U and report at sample result</li> <li>If sample result <math>\geq</math> CRQL and <math>\geq 2x</math> blank results, report sample result and J+ qualify or no qualification</li> </ul>
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> <li>J if <math>\%R &lt; 20\%</math>, or <math>20\% &lt; \%R &lt; \text{Lower limit}</math>, or <math>\%R</math> or RPD <math>&gt; \text{Upper limit}</math></li> </ul> For non-detects: <ul style="list-style-type: none"> <li>R if <math>\%R &lt; 20\%</math>, UJ if <math>20\% &lt; \%R &lt; \text{Lower limit}</math></li> </ul>
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: <ul style="list-style-type: none"> <li><math>\%R &lt; \text{Lower Limit}</math>, qualify J-+; <math>\%R &gt; \text{Upper Limit}</math>, qualify J+-</li> </ul> For non-detects: <ul style="list-style-type: none"> <li><math>\%R &lt;</math>, qualify results R; If <math>\%R \geq</math> No qualification</li> </ul>
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded Lower Limit (10%), qualify results J-</li> <li>• Expanded Lower Limit &lt;= %R &lt; specified Lower Limit, qualify results J-</li> <li>• %R &gt; specified Upper Limit, qualify results J+</li> </ul> For non-detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded lower limit (10%), qualify results R</li> <li>• Expanded Lower Limit &lt;= %R &lt; specified Lower Limit, qualify results UJ</li> </ul>
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

**Validation Guidelines for Metals Analysis by ICP-MS  
 (Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	<p>If blank &lt;CRQL:</p> <ul style="list-style-type: none"> <li>Sample Detect &lt;QL: Report at QL and qualify U</li> <li>Sample <math>\geq</math> QL: J+ or no qualification</li> </ul> <p>If blank result <math>\leq</math> (-MDL) but &gt; (-QL):</p> <ul style="list-style-type: none"> <li>Sample Detect: qualify J- or no qualification</li> <li>Sample Non-detect: qualify UJ</li> </ul> <p>If blank result <math>\geq</math> CRQL:</p> <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL: Report at QL and qualify U</li> <li>Sample result <math>\geq</math> CRQL but &lt;10 x the Blank results: Report at Blank Result and qualify J+ or R</li> <li><math>\geq 10</math>x Blank results, no qualification</li> </ul> <p>If blank result <math>\leq</math> (-QL):</p> <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL or <math>\geq</math> CRQL but &lt;10x CRQL, qualify J-</li> <li>Sample Non-detect qualify UJ</li> <li>Sample result <math>\geq 10</math>x QL, no qualification</li> </ul>
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	<p>For detects:</p> <ul style="list-style-type: none"> <li>If %R &lt; 40% or 40-69%, J-</li> <li>If %R 70-130%, no qualification</li> <li>If %R 131-151%, J+</li> <li>If %R &gt;150%, R</li> </ul> <p>For non-detects:</p> <ul style="list-style-type: none"> <li>If %R &lt;40%, R</li> <li>If %R 40-69%, UJ</li> <li>If %R &gt;70%, no qualification</li> </ul>

**Validation Guidelines for Metals Analysis by GC/MS  
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If $\geq 4x$ the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> <li>• J- if %R &lt;30 to 74%</li> <li>• J+ if %R &gt;125%</li> <li>• No qualification if %R 75-125%</li> </ul> For Non-detects: <ul style="list-style-type: none"> <li>• R if %R &lt;30%,</li> <li>• UJ if %R &lt;75% or</li> </ul> No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples $\geq 5x$ CRQL OR CQRL if sample results <5x CRQL	If results $\geq 5x$ CRQL and RPD >20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> <li>• J if detect,</li> <li>• UJ if non-detect</li> </ul>
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

# Appendix B

## Field Duplicate Analysis



Date Completed: 3/11/2022  
 South Park Landfill  
 553-1550-167

Data Validation		South Park Landfill							
QA/QC completed by: Lisa Gilbert		6/24/2021							
ARI Work Order		21E0228							
Sample numbers:		SPL-GW-MW18-0521; SPL-GW-MW60-0521							
Sample Date:		5/18/21							
<b>Groundwater</b>	<b>units</b>	<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;50%</b>	<b>RL</b>	<b>w/in RL?</b>
<b>units = ug/L</b>		<b>MW-18</b>	<b>MW-60</b>						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ug/L	0.0459	0.0454	0.04565	0.00	1	y	0.02	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	y
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	mg/L	22.6	23.9	23.25	-1.30	5.59	y	0.02	
Manganese	mg/L	1.33	1.40	1.365	-0.07	5.13	y	0.01	
Arsenic	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
<b>Comments:</b>	<b>No data qualified</b>								
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									



Date Completed: 3/11/2022  
 South Park Landfill  
 553-1550-167

Data Validation		South Park Landfill							
QA/QC completed by: Lisa Gilbert		6/24/2021							
ARI Work Order		21E0228							
Sample numbers:		SPL-GW-MW24-0521; SPL-GW-MW61-0521							
Sample Date:		5/19/21							
<b>Groundwater</b>	<b>units</b>	<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;50%</b>	<b>RL</b>	<b>w/in RL?</b>
<b>units = ug/L</b>		<b>MW-24</b>	<b>MW-61</b>						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ug/L	0.0214	0.0255	0.02345	0.00	17.48	y	0.02	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	y
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	mg/L	12.5	14.7	13.6	-2.20	16.18	y	0.02	
Manganese	mg/L	0.913	0.910	0.9115	0.00	0.33	y	0.01	
Arsenic	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	
<b>Comments:</b>	<b>No data qualified</b>								
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

# Appendix C

## Qualified Data Summary Table



**Table C.1**  
**Qualified Data Summary Table Second Quarter 2021 Groundwater Sampling Event**

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW12-0521	21E0228-01	EPA 6020B	Manganese	0.141	mg/L	B		
SPL-GW-MW14-0521	21E0228-03	EPA 6020B	Manganese	0.655	mg/L	B		
SPL-GW-MW29-0521	21E0228-04	EPA 6020B	Manganese	0.778	mg/L	B		
SPL-GW-MW18-0521	21E0228-05	EPA 6020B	Manganese	1.33	mg/L	B		
SPL-GW-MW32-0521	21E0228-07	EPA 6020B	Manganese	1.50	mg/L	B		
SPL-GW-MW60-0521	21E0228-09	EPA 6020B	Manganese	1.40	mg/L	B		
SPL-GW-MW24-0521	21E0228-12	EPA 6020B	Manganese	0.913	mg/L	B		
SPL-GW-MW26-0521	21E0228-14	EPA 6020B	Manganese	0.0744	mg/L	B		
SPL-GW-MW08-0521	21E0228-16	EPA 6020B	Manganese	1.27	mg/L	B		
SPL-GW-MW27-0521	21E0228-18	EPA 6020B	Manganese	0.386	mg/L	B		
SPL-GW-MW61-0521	21E0228-20	EPA 6020B	Manganese	0.910	mg/L	B		

Qualifiers:

B – The analyte was detected in the method blank.

# Third Quarter 2021 Groundwater Sampling Event South Park Landfill Data Validation Report

*Prepared for*

**Seattle Public Utilities**

700 Fifth Avenue, Suite 4900  
Seattle, WA 98124-4018

*Prepared by*

**Parametrix**

719 2nd Avenue, Suite 200  
Seattle, WA 98104  
T. 206.394.3700 F. 1.855.542.6353  
[www.parametrix.com](http://www.parametrix.com)

*In Association with*



## CITATION

Parametrix and HWA GeoSciences, Inc., 2021. Third Quarter 2021  
Groundwater Sampling Event South Park Landfill Data Validation Report.  
Prepared by Parametrix, Seattle, Washington.  
October 2021.

# TABLE OF CONTENTS

<b>1. PROJECT NARRATIVE .....</b>	<b>1-1</b>
1.1 Overview of Data Validation .....	1-1
<b>2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260D .....</b>	<b>2-1</b>
2.1 Data Package Completeness .....	2-1
2.2 Technical Data Validation .....	2-1
2.2.1 Matrix Spike/Matrix Spike Duplicate .....	3-1
2.3 Overall Assessment .....	2-1
<b>3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM .....</b>	<b>3-1</b>
3.1 Data Package Completeness .....	3-1
3.2 Technical Data Validation .....	3-1
3.3 Overall Assessment .....	3-2
<b>4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B .....</b>	<b>4-1</b>
4.1 Data Package Completeness .....	4-1
4.2 Technical Data Validation .....	4-1
4.2.1 Blank Contamination.....	<b>Error! Bookmark not defined.</b>
4.2.2 Matrix Spike .....	4-1
4.3 Overall Assessment .....	4-2
<b>5. REFERENCES .....</b>	<b>5-1</b>

## APPENDICES

- A Data Qualifier Definitions and Criteria Tables
- B Field Duplicate Analysis
- C Qualified Data Summary Table

## ACRONYMS AND ABBREVIATIONS

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

# 1. PROJECT NARRATIVE

## 1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Third Quarter 2021 Groundwater Monitoring Event. A complete list of samples is provided below.

**Project Sample Index**

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn	6020B Dissolved As
SPL-GW-MW12-0821	21H0296-01	MW-12	X	X	X	
SPL-GW-MW12-0821	21H0296-02	MW-12				X
SPL-GW-MW14-0821	21H0296-03	MW-14	X	X	X	
SPL-GW-MW29-0821	21H0296-04	MW-29	X	X	X	
SPL-GW-MW18-0821	21H0296-05	MW-18	X	X	X	
SPL-GW-MW18-0821	21H0296-06	MW-18				X
SPL-GW-MW32-0821	21H0296-07	MW-32	X	X	X	
SPL-GW-MW32-0821	21H0296-07RE1 <sup>1</sup>	MW-32			X	
SPL-GW-MW32-0821	21H0296-08	MW-32				X
SPL-GW-MW33-0821	21H0296-09	MW-33	X	X	X	
SPL-GW-MW33-0821	21H0296-10	MW-33				X
SPL-GW-MW60-0821	21H0296-11	MW-32 DUP	X	X	X	
SPL-GW-MW60-0821	21H0296-12	MW-32 DUP				X
SPL-GW-MW80-0821	21H0296-13	TRIP BLANK	X	X		
SPL-GW-MW30-0821	21H0308-01	MW-30	X	X	X	
SPL-GW-MW31-0821	21H0308-02	MW-31	X	X	X	
SPL-GW-MW24-0821	21H0308-03	MW-24	X	X	X	
SPL-GW-MW24-0821	21H0308-04	MW-24				X
SPL-GW-MW26-0821	21H0308-05	MW-26	X	X	X	
SPL-GW-MW26-0821	21H0308-06	MW-26				X
SPL-GW-MW08-0821	21H0308-07	MW-08	X	X	X	
SPL-GW-MW08-0821	21H0308-08	MW-08				X
SPL-GW-MW27-0821	21H0308-09	MW-27	X	X	X	
SPL-GW-MW27-0821	21H0308-10	MW-27				X
SPL-GW-MW61-0821	21H0308-11	MW-26 DUP	X	X	X	
SPL-GW-MW61-0821	21H0308-12	MW-26 DUP				X
SPL-GW-MW81-0821	21H0308-13	TRIP BLANK	X	X		

Notes:

<sup>1</sup> Laboratory assigned a separate extraction ID for manganese analysis of this sample.



Groundwater samples were collected on August 24 and 25, 2021 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 21H0296 and 21H0308. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (Total iron and manganese, and dissolved arsenic) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2017a), *National Functional Guidelines for Organic Data Review* (EPA 2017b), *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2002, 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

### **Field Duplicates**

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-0821 is a duplicate of SPL-GW-MW32-0821. Sample SPL-GW-MW61-0821 is a duplicate of SPL-GW-MW26-0821.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples.  $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$ , where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

### **Trip Blanks**

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-0821 and SPL-GW-MW81-0821).

### **Sample Temperature**

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 5.2 and 7.4 degrees C, indicating adequate temperature control for sample preservation for batch 21H0308, and slightly elevated temperature for batch 21H0296, i.e., above the recommended 6 degrees C, but below 10 degrees C, in which case professional judgement may be used per EPA guidance. No data were therefore qualified based on temperature issues.

### **VOC Sample Integrity**

The laboratory reported that all VOA vials samples submitted in batch 21H0308 were free of air bubbles, but two VOA vials (laboratory Container IDs 21H0296-03 B and 21H0296-04 B) submitted in batch 21H0296 contained air bubbles. This could possibly be due to sample collection methods or in some cases (particularly at landfills), dissolved methane present in groundwater forms bubbles in the VOA vials after collection. Therefore, no data were qualified based on VOC integrity issues.

## 2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

#### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicate
MS/MSD <sup>1</sup>	

Notes:

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 2.2.1 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 21H0296-07 (SPL-GW-MW32-0821) and 21H0308-05 (SPL-GW-MW26-0821) in batches BJI0099 and BJI0079, respectively. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits. No data were therefore qualified based on MS/MSD integrity issues.

### 2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

### 3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

#### 3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

#### 3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

##### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
LCS and LCSD	Field duplicates
MS/MSD <sup>1,2</sup>	

Notes:

QC requirement findings further discussed in following sections (if required):

- <sup>1</sup> Quality control results are discussed below, but no data were qualified.
- <sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Four of the 14 vinyl chloride results (MW-18, MW-24, MW-16, and MW-61), with one result being a duplicate sample result, were flagged “M” by the laboratory, as “estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters”. All of these were low detections, ranging from 0.0294 to 0.0540 µg/L, and were all less than the cleanup level by a factor of at least 5, therefore the final data were not qualified.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

##### 3.2.1 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 21H0296-07 (SPL-GW-MW32-0821) in batch BJH0680. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits. No data were therefore qualified based on MS/MSD integrity issues.

Sample specific QC was performed in association with sample 21H0308-05 (SPL-GW-MW26-0821) in batch BJH0680. The MS and MSD percent recoveries were outside advisory control limits high (178 % for vinyl chloride in the MS compared to the acceptable upper limit of 141, and 172 for the MSD). The MS/MSD RPD was within control limits.

Qualifiers were added to the data as follows: J for detected values in the original sample only. Because the detected concentration was below the cleanup level, qualification of the data as estimated should not affect their use in evaluating project objectives.

### 3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

## 4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese, and dissolved arsenic) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

#### QC Requirements

Cooler temperature and preservation	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate
Blank contamination (method)	Target analyte list
Matrix Spike (MS) <sup>1</sup>	Reporting limits and reported results
	Field duplicates

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 4.2.1 Matrix Spike

Sample specific for Manganese was performed in association with sample 21H0296-07 (SPL-GW-MW32-0821) in batch BJH0808. The lab noted that the natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. No data were qualified because the spike was less than 25 percent of the sample value.

Sample specific QC for Total Metals was performed in association with samples 21H0296-07 (SPL-GW-MW32-0821) and 21H0308-05 (SPL-GW-MW26-0821) in batch BJH0808. The duplicate (DUP) relative percent difference (RPD) and matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Sample specific QC for Dissolved Arsenic was performed in association with sample 21H0296-08 (SPL-GW-MW32-0821) in batch BJI0160. The duplicate (DUP) relative percent difference (RPD) and matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Sample specific QC for Dissolved Metals was performed in association with sample 21H0308-06 (SPL-GW-MW26-0821) in batch BJI0163. The duplicate (DUP) relative percent difference (RPD) and matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

### 4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs, with the exception of manganese, as discussed above.

All data, as reported by the laboratory, are acceptable for use.

## 5. REFERENCES

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.
- ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.
- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
- ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.
- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
- EPA (U.S. Environmental Protection Agency). 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA240R-02/004.
- EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use. EPA 540-R-08-005. January 13, 2009.
- EPA. 2017a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001.
- EPA. 2017b. National Functional Guidelines for Organic Superfund Data Review. EPA 540R- 2017-002.



# Appendix A

## Data Qualifier Definitions and Criteria Tables



## **DATA VALIDATION QUALIFIER CODES**

### **National Functional Guidelines (EPA 2020)**

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH $\leq 2$	If $>6$ deg. C but $\leq 10$ deg. C, use professional judgement J/UJ if greater than 10 deg. C
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U report at CRQL</li> <li>If sample result <math>\geq</math> CRQL, use professional judgement</li> </ul>
		If blank $\geq$ CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U and report at CRQL</li> <li>If sample result <math>\geq</math> but &lt; blank result, qualify U and report at sample result</li> <li>If sample result <math>\geq</math> CRQL and <math>\geq 2x</math> blank results, report sample result and J+ qualify or no qualification</li> </ul>
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> <li>J if <math>\%R &lt; 20\%</math>, or <math>20\% &lt; \%R &lt; \text{Lower limit}</math>, or <math>\%R</math> or RPD <math>&gt; \text{Upper limit}</math></li> </ul> For non-detects: <ul style="list-style-type: none"> <li>R if <math>\%R &lt; 20\%</math>, UJ if <math>20\% &lt; \%R &lt; \text{Lower limit}</math></li> </ul>
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or $\% R$ not specified: use professional judgment For detects: <ul style="list-style-type: none"> <li><math>\%R &lt; \text{Lower Limit}</math>, qualify J-+; <math>\%R &gt; \text{Upper Limit}</math>, qualify J+-</li> </ul> For non-detects: <ul style="list-style-type: none"> <li><math>\%R &lt;</math>, qualify results R; If <math>\%R \geq</math> No qualification</li> </ul>
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded Lower Limit (10%), qualify results J-</li> <li>• Expanded Lower Limit <math>\leq</math> %R &lt; specified Lower Limit, qualify results J-</li> <li>• %R &gt; specified Upper Limit, qualify results J+</li> </ul> For non-detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded lower limit (10%), qualify results R</li> <li>• Expanded Lower Limit <math>\leq</math> %R &lt; specified Lower Limit, qualify results UJ</li> </ul>
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

**Validation Guidelines for Metals Analysis by ICP-MS  
 (Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	<p>If blank &lt;CRQL:</p> <ul style="list-style-type: none"> <li>Sample Detect &lt;QL: Report at QL and qualify U</li> <li>Sample <math>\geq</math> QL: J+ or no qualification</li> </ul> <p>If blank result <math>\leq</math> (-MDL) but &gt; (-QL):</p> <ul style="list-style-type: none"> <li>Sample Detect: qualify J- or no qualification</li> <li>Sample Non-detect: qualify UJ</li> </ul> <p>If blank result <math>\geq</math> CRQL:</p> <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL: Report at QL and qualify U</li> <li>Sample result <math>\geq</math> CRQL but &lt;10 x the Blank results: Report at Blank Result and qualify J+ or R</li> <li><math>\geq 10</math>x Blank results, no qualification</li> </ul> <p>If blank result <math>\leq</math> (-QL):</p> <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL or <math>\geq</math> CRQL but &lt;10x CRQL, qualify J-</li> <li>Sample Non-detect qualify UJ</li> <li>Sample result <math>\geq 10</math>x QL, no qualification</li> </ul>
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	<p>For detects:</p> <ul style="list-style-type: none"> <li>If %R &lt; 40% or 40-69%, J-</li> <li>If %R 70-130%, no qualification</li> <li>If %R 131-151%, J+</li> <li>If %R &gt;150%, R</li> </ul> <p>For non-detects:</p> <ul style="list-style-type: none"> <li>If %R &lt;40%, R</li> <li>If %R 40-69%, UJ</li> <li>If %R &gt;70%, no qualification</li> </ul>

**Validation Guidelines for Metals Analysis by GC/MS  
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If $\geq 4x$ the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> <li>• J- if %R &lt;30 to 74%</li> <li>• J+ if %R &gt;125%</li> <li>• No qualification if %R 75-125%</li> </ul> For Non-detects: <ul style="list-style-type: none"> <li>• R if %R &lt;30%,</li> <li>• UJ if %R &lt;75% or</li> </ul> No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples $\geq 5x$ CRQL OR CQRL if sample results <5x CRQL	If results $\geq 5x$ CRQL and RPD >20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> <li>• J if detect,</li> <li>• UJ if non-detect</li> </ul>
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

# Appendix B

## Field Duplicate Analysis



QA/QC Completed by: Lisa Gilbert

Date Completed: 3/11/2022  
 South Park Landfill  
 553-1550-167

<b>Data Validation</b>	South Park Landfill							
QA/QC completed by: Chris Bourgeoi	9/20/2021							
ARI Work Order	21H0296							
Sample numbers:	SPL-GW-MW32-0821; SPL-GW-MW60-0821							
Sample Date:	8/24/21							
<b>Groundwater</b>	<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>rpd</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
<b>units = ug/L</b>	<b>MW-32</b>	<b>MW-60</b>						
cis-1,2-DCE	1.06	0.92	0.99	0.14	14	y	0.2	
Vinyl chloride	0.465	0.477	0.471	-0.01	3	y	0.02	
Benzene	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	0.2	NA
<b>Groundwater</b>	<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>rpd</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	12.1	12.1	12.1	0.00	0.00	y	0.036	
Manganese	1.43	1.44	1.435	-0.01	0.70	y	0.005	
Arsenic	1.29	1.22	1.255	0.07	6	y	0.2	
<b>Comments:</b>								
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100								



<b>Data Validation</b>		South Park Landfill							
QA/QC completed by: Chris Bourgeois		9/16/2021							
ARI Work Order		21H0308							
Sample numbers:		SPL-GW-MW26-0821; SPL-GW-MW61-0821							
Sample Date:		8/25/21							
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
<b>units = ug/L</b>		<b>MW-26</b>	<b>MW-61</b>						
cis-1,2-DCE	ug/L	0.37	0.35	0.36	0.02	5.56	y	0.2	
Vinyl chloride	ug/L	0.031	0.0294	0.0302	0.00	5.30	y	0.02	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>RPD</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	mg/L	8.43	8.54	8.485	-0.11	1.30	y	0.036	
Manganese	mg/L	0.127	0.127	0.127	0.00	0.00	y	0.005	
Arsenic	ug/L	0.813	0.868	0.8405	-0.06	7	y	0.2	
<b>Comments:</b>									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									

# Appendix C

## Qualified Data Summary Table



**Table C.1**  
**Qualified Data Summary Table Third Quarter 2021 Groundwater Sampling Event**

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW26-0821	21H0308-05	EPA 8260D-SIM	Vinyl Chloride	0.0310	µg/L	M	J	J

Qualifiers:

M – Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.

J – The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

# Fourth Quarter 2021 Groundwater Sampling Event South Park Landfill Data Validation Report

*Prepared for*

**Seattle Public Utilities**

700 Fifth Avenue, Suite 4900  
Seattle, WA 98124-4018

*Prepared by*

**Parametrix**

719 2nd Avenue, Suite 200  
Seattle, WA 98104  
T. 206.394.3700 F. 1.855.542.6353  
[www.parametrix.com](http://www.parametrix.com)

*In Association with*



## CITATION

Parametrix and HWA GeoSciences, Inc., 2021. Fourth Quarter 2021  
Groundwater Sampling Event South Park Landfill Data Validation Report.  
Prepared by Parametrix, Seattle, Washington.  
January 2022.

# TABLE OF CONTENTS

<b>1. PROJECT NARRATIVE .....</b>	<b>1-1</b>
1.1 Overview of Data Validation .....	1-1
<b>2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260D .....</b>	<b>2-1</b>
2.1 Data Package Completeness .....	2-1
2.2 Technical Data Validation .....	2-1
2.2.1 Matrix Spike/Matrix Spike Duplicate .....	2-1
2.3 Overall Assessment .....	2-1
<b>3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM .....</b>	<b>3-1</b>
3.1 Data Package Completeness .....	3-1
3.2 Technical Data Validation .....	3-1
3.2.1 Lab Control Sample and Lab Control Sample Duplicate.....	3-1
3.2.2 Matrix Spike/Matrix Spike Duplicate .....	3-1
3.3 Overall Assessment .....	3-2
<b>4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B .....</b>	<b>4-1</b>
4.1 Data Package Completeness .....	4-1
4.2 Technical Data Validation .....	4-1
4.2.1 Cooler Temperature and Preservation .....	4-1
4.2.2 Matrix Spike .....	4-1
4.3 Overall Assessment .....	4-2
<b>5. REFERENCES .....</b>	<b>5-1</b>

## APPENDICES

- A Data Qualifier Definitions and Criteria Tables
- B Field Duplicate Analysis
- C Qualified Data Summary Table

## ACRONYMS AND ABBREVIATIONS

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

# 1. PROJECT NARRATIVE

## 1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Fourth Quarter 2021 Groundwater Monitoring Event. A complete list of samples is provided below.

**Project Sample Index**

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn	6020B Dissolved As
SPL-GW-MW30-1121	21K0307-01	MW-30	X	X	X	
SPL-GW-MW31-1121	21K0307-02	MW-31	X	X	X	
SPL-GW-MW27-1121	21K0307-03	MW-27	X	X	X	
SPL-GW-MW27-1121	21K0307-04	MW-27				X
SPL-GW-MW12-1121	21K0307-05	MW-12	X	X	X	
SPL-GW-MW12-1121	21K0307-06	MW-12				X
SPL-GW-MW29-1121	21K0307-07	MW-29	X	X	X	
SPL-GW-MW32-1121	21K0307-08	MW-32	X	X	X	
SPL-GW-MW32-1121	21K0307-09	MW-32				X
SPL-GW-MW80-1121	21K0307-10	TRIP BLANK	X	X		
SPL-GW-MW25-1121	21K0331-01	MW-25	X	X	X	
SPL-GW-MW25-1121	21K0331-02	MW-25				X
SPL-GW-MW24-1121	21K0331-03	MW-24	X	X	X	
SPL-GW-MW24-1121	21K0331-04	MW-24				X
SPL-GW-MW26-1121	21K0331-05	MW-26	X	X	X	
SPL-GW-MW26-1121	21K0331-06	MW-26				X
SPL-GW-MW08-1121	21K0331-07	MW-08	X	X	X	
SPL-GW-MW08-1121	21K0331-08	MW-08				X
SPL-GW-MW61-1121	21K0331-09	MW-08 DUP	X	X	X	
SPL-GW-MW61-1121	21K0331-10	MW-08 DUP				X
SPL-GW-MW81-1121	21K0331-11	TRIP BLANK	X	X		
SPL-GW-MW14-1121	21K0331-12	MW-14	X	X	X	
SPL-GW-MW18-1121	21K0331-13	MW-18	X	X	X	
SPL-GW-MW18-1121	21K0331-14	MW-18				X
SPL-GW-MW33-1121	21K0331-15	MW-33	X	X	X	
SPL-GW-MW33-1121	21K0331-16	MW-33				X
SPL-GW-MW10-1121	21K0331-17	MW-10	X	X	X	
SPL-GW-MW10-1121	21K0331-18	MW-10				X
SPL-GW-MW60-1121	21K0331-19	MW-33 DUP	X	X	X	
SPL-GW-MW60-1121	21K0331-20	MW-33 DUP				X



Groundwater samples were collected on November 16 and 17, 2021 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 21K0307 and 21K0331. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese, and dissolved arsenic) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2002, 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

### **Field Duplicates**

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-1121 is a duplicate of SPL-GW-MW33-1121. Sample SPL-GW-MW61-1121 is a duplicate of SPL-GW-MW08-1121.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples.  $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$ , where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

### **Trip Blanks**

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-1121 and SPL-GW-MW81-1121). The lab reported that VOA vial 21K0331-11 B (SPL-GW-MW81-1121) used to assess data quality for vinyl chloride analyses by EPA method 8260D-SIM was not free of bubbles. However, the laboratory did not flag the corresponding analysis, indicating the bubble was <6mm in diameter and acceptable for analysis per EPA 2020b. Therefore, no data were qualified based on trip blank integrity issues.

### **Sample Temperature**

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 3.9 and 5.7 degrees C, indicating adequate temperature control for sample preservation for both batches. No data were therefore qualified based on temperature issues.

### **VOC Sample Integrity**

All VOA vials samples submitted on November 16, 2021 (laboratory report ID 21E0228) were free of air bubbles. The laboratory reported that VOA vials 21K0331-03 G, 21K0331-09 D, 21K0331-11 B, 21K0331-13 F, 21K0331-13 G, 21K0331-15 D, 21K0331-15 M, and 21K0331-19 G, all submitted on November 17, 2021 (laboratory report ID 21K0331), were not free of air bubbles. This could possibly be due to sample collection methods or in some cases (particularly at landfills), dissolved methane present in groundwater forms bubbles in the VOA vials after collection. At the time of sample collection, it is believed that the landfill gas collection and control system (LFGCCS) was not in operation, which may have led to an increase in dissolved methane in groundwater; however, there was at least one bubble-free vial for each location and the laboratory did not flag any VOC analyses based on VOC integrity issues. Therefore, no data were qualified based on VOC sample integrity issues.

## 2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

#### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicate
MS/MSD <sup>1</sup>	

Notes:

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 2.2.1 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with samples 21K0331-07/21K0331-08 (SPL-GW-MW08-1121) and 21K0331-15/21K0331-16 (SPL-GW-MW33-1121) in batch BJK0622. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and RPD were within advisory control limits. No data were therefore qualified based on MS/MSD integrity issues.

### 2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

### 3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

#### 3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

#### 3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

##### QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
LCS and LCSD <sup>1</sup>	Field duplicates
MS/MSD <sup>1</sup>	

Notes:

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

The instrument malfunctioned during the initial run for samples 21K0331-13 (SPL-GW-MW18-1121), 21K0331-17 (SPL-GW-MW10-1121), and 21K0331-19 (SPL-GW-MW60-1121), which were reanalyzed. All unpreserved vials for 21K0331-19 (SPL-GW-MW60-1121/SPL-GW-MW33-1121 field duplicate) were compromised after injects, therefore the samples were analyzed out of a preserved vial. Analysis of vinyl chloride by Method 8260D is acceptable with or without acid preservation. No analyses were flagged by the laboratory as a result, and therefore the final data were not qualified.

##### 3.2.1 Lab Control Sample and Lab Control Sample Duplicate

The percent recovery for laboratory control sample duplicate (LCSD) (BJK0666-BSD1) surrogate was just below established control limits (79.2%, with a lower control limit of 80%). EPA 2020 does not provide LCSD QC guidance for volatiles data review. However since surrogates for the samples, LCS, and MS/MSD were within control limits, no data were qualified based on LCS/LCSD integrity issues.

##### 3.2.2 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 21K0331-08 (SPL-GW-MW08-1121) and 21K0331-15 (SPL-GW-MW33-1121) in batch BJK0588. The MS/MSD spike recoveries and RPD were within advisory control limits. No data were therefore qualified based on MS/MSD integrity issues.

### 3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

## 4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese, and dissolved arsenic) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

### 4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

### 4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

#### QC Requirements

Cooler temperature and preservation <sup>2</sup>	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate
Blank contamination (method)	Target analyte list
Matrix Spike (MS) <sup>1,2</sup>	Reporting limits and reported results
	Field duplicates

QC requirement findings further discussed in following sections (if required):

<sup>1</sup> Quality control results are discussed below, but no data were qualified.

<sup>2</sup> Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

#### 4.2.1 Cooler Temperature and Preservation

The laboratory reported that HNO<sub>3</sub>-preserved bottles 21K0331-16 A (FF) (SPL-GW-MW33-1121) and 21K0331-19 A (SPL-GW-MW60-1121/SPL-GW-MW33-1121 field duplicate) submitted on November 17, 2021 did not meet pH preservation requirements. The lab reduced sample pH to preservation criteria on 12/1/2021 with 0.5 mL concentrated HNO<sub>3</sub>. EPA 2020 guidance recommends professional judgement be used to qualify samples based on the pH of samples and chemistry of the metals of interest. At the time of collection, sample pH was recorded as 6.67. The metals of interest (total iron, manganese, and dissolved arsenic) are not considered to be highly sensitive to sample pH. Therefore, no data were qualified based on sample preservation issues.

#### 4.2.2 Matrix Spike

Sample specific QC for manganese was performed in association with sample 21K0331-15 (SPL-GW-MW33-0821) in batch BJL0028. The lab noted that the natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. No data were qualified because the spike was less than 25 percent of the sample value.

Sample specific QC for total metals was performed in association with samples 21K0331-08 (SPL-GW-MW08-1121) and 21K0331-15 (SPL-GW-MW33-1121) in batch BJL0028. The MS/MSD percent recoveries and RPDs were within advisory control limits except Total Iron which was out of control low in the MS/MSD (BKL0028-MS1, BKL0028-MS2, BKL0028-MSD1 and BKL0028-MSD2). Therefore, the Total Iron results for all samples associated with batch BJL0028 were qualified “J-” as estimated in accordance with the criteria presented in Appendix A.

Sample specific QC for Dissolved Arsenic was performed in association with 21K0331-09 (SPL-GW-MW61-1121/SPL-GW-MW08-1121 field duplicate) and 21K0331-16 (SPL-GW-MW33-1121) in batch BJL0029. The duplicate (DUP) RPD and MS/MSD percent recoveries and RPD were within advisory control limits.

### 4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

## 5. REFERENCES

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.
- ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.
- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
- ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.
- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
- EPA (U.S. Environmental Protection Agency). 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA240R-02/004.
- EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use. EPA 540-R-08-005. January 13, 2009.
- EPA. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.
- EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.



# Appendix A

## Data Qualifier Definitions and Criteria Tables



## **DATA VALIDATION QUALIFIER CODES**

### **National Functional Guidelines (EPA 2020)**

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH $\leq 2$	If $>6$ deg. C but $\leq 10$ deg. C, use professional judgement J/UJ if greater than 10 deg. C
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U report at CRQL</li> <li>If sample result <math>\geq</math> CRQL, use professional judgement</li> </ul>
		If blank $\geq$ CRQL: <ul style="list-style-type: none"> <li>If sample result &lt;CRQL, qualify U and report at CRQL</li> <li>If sample result <math>\geq</math> but &lt; blank result, qualify U and report at sample result</li> <li>If sample result <math>\geq</math> CRQL and <math>\geq 2x</math> blank results, report sample result and J+ qualify or no qualification</li> </ul>
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> <li>J if <math>\%R &lt; 20\%</math>, or <math>20\% &lt; \%R &lt; \text{Lower limit}</math>, or <math>\%R</math> or RPD <math>&gt; \text{Upper limit}</math></li> </ul> For non-detects: <ul style="list-style-type: none"> <li>R if <math>\%R &lt; 20\%</math>, UJ if <math>20\% &lt; \%R &lt; \text{Lower limit}</math></li> </ul>
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: <ul style="list-style-type: none"> <li><math>\%R &lt; \text{Lower Limit}</math>, qualify J-+; <math>\%R &gt; \text{Upper Limit}</math>, qualify J+-</li> </ul> For non-detects: <ul style="list-style-type: none"> <li><math>\%R &lt;</math>, qualify results R; If <math>\%R \geq</math> No qualification</li> </ul>
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS  
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded Lower Limit (10%), qualify results J-</li> <li>• Expanded Lower Limit <math>\leq</math> %R &lt; specified Lower Limit, qualify results J-</li> <li>• %R &gt; specified Upper Limit, qualify results J+</li> </ul> For non-detects: <ul style="list-style-type: none"> <li>• %R &lt; Expanded lower limit (10%), qualify results R</li> <li>• Expanded Lower Limit <math>\leq</math> %R &lt; specified Lower Limit, qualify results UJ</li> </ul>
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

**Validation Guidelines for Metals Analysis by ICP-MS  
 (Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH $\geq 2$ and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> <li>Sample Detect &lt;QL: Report at QL and qualify U</li> <li>Sample <math>\geq</math> QL: J+ or no qualification</li> </ul> If blank result $\leq$ (-MDL) but > (-QL): <ul style="list-style-type: none"> <li>Sample Detect: qualify J- or no qualification</li> <li>Sample Non-detect: qualify UJ</li> </ul> If blank result $\geq$ CRQL: <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL: Report at QL and qualify U</li> <li>Sample result <math>\geq</math> CRQL but &lt;10 x the Blank results: Report at Blank Result and qualify J+ or R</li> <li><math>\geq 10</math>x Blank results, no qualification</li> </ul> If blank result $\leq$ (-QL): <ul style="list-style-type: none"> <li>Sample Detect &lt; CRQL or <math>\geq</math> CRQL but &lt;10x CRQL, qualify J-</li> <li>Sample Non-detect qualify UJ</li> <li>Sample result <math>\geq 10</math>x QL, no qualification</li> </ul>
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	For detects: <ul style="list-style-type: none"> <li>If %R &lt; 40% or 40-69%, J-</li> <li>If %R 70-130%, no qualification</li> <li>If %R 131-151%, J+</li> <li>If %R &gt;150%, R</li> </ul> For non-detects: <ul style="list-style-type: none"> <li>If %R &lt;40%, R</li> <li>If %R 40-69%, UJ</li> <li>If %R &gt;70%, no qualification</li> </ul>

**Validation Guidelines for Metals Analysis by GC/MS  
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If $\geq 4x$ the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> <li>• J- if %R &lt;30 to 74%</li> <li>• J+ if %R &gt;125%</li> <li>• No qualification if %R 75-125%</li> </ul> For Non-detects: <ul style="list-style-type: none"> <li>• R if %R &lt;30%,</li> <li>• UJ if %R &lt;75% or</li> </ul> No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples $\geq 5x$ CRQL OR CQRL if sample results <5x CRQL	If results $\geq 5x$ CRQL and RPD >20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> <li>• J if detect,</li> <li>• UJ if non-detect</li> </ul>
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

# Appendix B

## Field Duplicate Analysis



<b>Data Validation</b>		South Park Landfill							
QA/QC completed by: Chris Bourgeois		12/27/2021							
ARI Work Order		21K0331							
Sample numbers:		SPL-GW-MW33-1121; SPL-GW-MW60-1121							
Sample Date:		11/17/21							
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>rpd</b>	<b>=/&lt;35%</b>	<b>RL</b>	<b>w/in RL?</b>
<b>units = ug/L</b>		<b>MW-33</b>	<b>MW-60</b>						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!	NA	0.2	y
Vinyl chloride	ug/L	0.124	0.109	0.1165	0.02	13	y	0.02	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	0.2	NA
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>rpd</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	mg/L	14.8	14.5	14.65	0.30	2	y	0.036	
Manganese	mg/L	1.83	1.82	1.825	0.01	1	y	0.005	
Arsenic	ug/L	0.863	0.842	0.8525	0.02	2	y	0.2	
<b>Comments:</b>									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									



<b>Data Validation</b>		South Park Landfill							
QA/QC completed by: Chris Bourgeois		12/27/2021							
ARI Work Order		21K0331							
Sample numbers:		SPL-GW-MW08-1121; SPL-GW-MW61-1121							
Sample Date:		11/17/21							
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>rpd</b>	<b>=/&lt;35%</b>	<b>RL</b>	<b>w/in RL?</b>
<b>units = ug/L</b>		<b>MW-08</b>	<b>MW-61</b>						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!	NA	0.20	y
Vinyl chloride	ug/L	0.0863	0.0819	0.0841	0.0044	5	y	0.0200	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	0.20	NA
<b>Groundwater</b>		<b>sample</b>	<b>duplicate</b>	<b>avg</b>	<b>diff</b>	<b>rpd</b>	<b>=/&lt;20%</b>	<b>RL</b>	<b>w/in RL?</b>
Iron	mg/L	15.2	14.8	15.0	0.40	3	y	0.036	
Manganese	mg/L	0.991	0.991	0.991	0.000	0	y	0.005	
Arsenic	ug/L	<0.200	<0.200	#DIV/0!	#VALUE!	#VALUE!	NA	0.2	y
<b>Comments:</b>									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									

# Appendix C

## Qualified Data Summary Table



**Table C.1**  
**Qualified Data Summary Table Fourth Quarter 2021 Groundwater Sampling Event**

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW25-1121	21K0331-01	EPA 6020B	Total Iron	32.9	mg/L	D	J-	J-
SPL-GW-MW24-1121	21K0331-03	EPA 6020B	Total Iron	19.7	mg/L		J-	J-
SPL-GW-MW26-1121	21K0331-05	EPA 6020B	Total Iron	7.81	mg/L		J-	J-
SPL-GW-MW08-1121	21K0331-07	EPA 6020B	Total Iron	15.2	mg/L		J-	J-
SPL-GW-MW61-1121	21K0331-09	EPA 6020B	Total Iron	14.8	mg/L		J-	J-
SPL-GW-MW14-1121	21K0331-12	EPA 6020B	Total Iron	3.06	mg/L		J-	J-
SPL-GW-MW18-1121	21K0331-13	EPA 6020B	Total Iron	13.8	mg/L		J-	J-
SPL-GW-MW33-1121	21K0331-15	EPA 6020B	Total Iron	14.8	mg/L		J-	J-
SPL-GW-MW10-1121	21K0331-17	EPA 6020B	Total Iron	34.8	mg/L	D	J-	J-
SPL-GW-MW60-1121	21K0331-19	EPA 6020B	Total Iron	14.5	mg/L		J-	J-

Qualifiers:

J- -- The result is an estimated quantity, but the result may be biased low. The associated numerical value is the approximate concentration of the analyte in the sample.

D6

Purge Water Technical Memorandum



## TECHNICAL MEMORANDUM

**DATE:** June 28, 2021  
**TO:** Jeff Neuner  
**FROM:** Laura Lee and Lisa Gilbert, LHG  
**SUBJECT:** Groundwater Monitoring Well Purge Water Discharge to Sewer  
**PROJECT NUMBER:** 553-1550-067  
**PROJECT NAME:** South Park Landfill

---

This Technical Memorandum was prepared to request authorization to discharge groundwater generated during purging of monitoring wells at the South Park Landfill (Site) into the King County sewer at the City of Seattle (City) Seattle Public Utilities (SPU) South Recycling and Disposal Station (SRDS).

### INTRODUCTION

The Site is a former municipal solid waste landfill in the South Park neighborhood of Seattle, Washington (Figure 1). Groundwater monitoring is being conducted quarterly in accordance with the Final Cleanup Action Plan (CAP) for the Settlement Area (Ecology 2018) at the locations on Figure 2. The Settlement Area consists of the two largest parcels within the Edge of Refuse, SRDS and the South Park Property Development (SPPD), and certain adjacent City and Washington State rights-of-way (ROWS). Two other landfill parcels within the Edge of Refuse are the Kenyon Industrial Park (KIP) and the 7901 2nd Avenue S parcels and these parcels will be added to the Settlement Area in a future amendment to the CAP.

Site coordination is being performed by SPU for the Settlement Area under a Consent Decree with the Washington State Department of Ecology (Ecology). Parametrix has been designated as the Site Coordinator to perform the long-term monitoring and reporting required under the CAP and has conducted monitoring since Second Quarter 2020 (Parametrix 2021). The monitoring generates less than 100 gallons of purged water quarterly that is currently temporarily stored in drums and disposed of off-site following each monitoring event.

### COMPARISON OF DATA FOR PURGED WATER TO DISCHARGE AUTHORIZATION CONDITIONS

Discharge of wastewater generated by the Solid Waste Transfer Facility operation located at 8100 Second Avenue South, Seattle, to the King County sewer system at Manhole 'M' (see location on Figure 2) is regulated by Discharge Authorization No. 400-05 issued by the King County Industrial Waste Program (KCIW) effective July 17, 2018 (Attachment A). The Discharge Authorization sets forth effluent limitations and monitoring requirements and states that "As long as you maintain compliance with regulations and do not change the nature and volume of your discharge, KCIW will not require you to apply for an industrial wastewater discharge permit."

Quarterly discharge quantities and water quality results for SRDS wastewater since the effective date of the Discharge Authorization (Third Quarter 2018 through Fourth Quarter 2020) are summarized in Attachment B. Discharge volumes ranged from 4,296 gpd to 21,725 gpd, and were below the maximum allowable volume of 38,000 gpd. The results for all water quality parameters were within discharge limitations.

The attached Table 1 compares purge water quality data for the May 2020 and February 2021 Site groundwater monitoring events to the Discharge Authorization limitations. The following conclusions can be made:

- The purge water would add less than 100 gallons quarterly to the SRDS wastewater discharge and would represent a very small percentage of the allowable discharge of 38,000 gallons per day.
- Concentrations of the required discharge monitoring parameters measured in purge water (May 2020 and Feb 2021) were very low compared to Discharge Authorization limitations.

## RECOMMENDATIONS

Based on this information, it does not appear that adding the purge water to the discharge would “change the nature and volume” of the discharge. SPU should request the County’s authorization to discharge the purged groundwater to the sewer system at the SRDS facility under the existing Discharge Authorization.

## REFERENCES

Ecology. 2018. South Park Landfill Final Cleanup Action Plan. Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.

Parametrix. 2021. 2020 Operations, Maintenance, and Monitoring Annual Report, South Park Landfill. Prepared for Seattle Public Utilities. March.

## FIGURES

- 1 Site Vicinity Map
- 2 Groundwater Monitoring Well Network

## TABLE

- 1 Comparison of South Park Landfill Purge Water Results with SRDS Discharge Authorization Limits

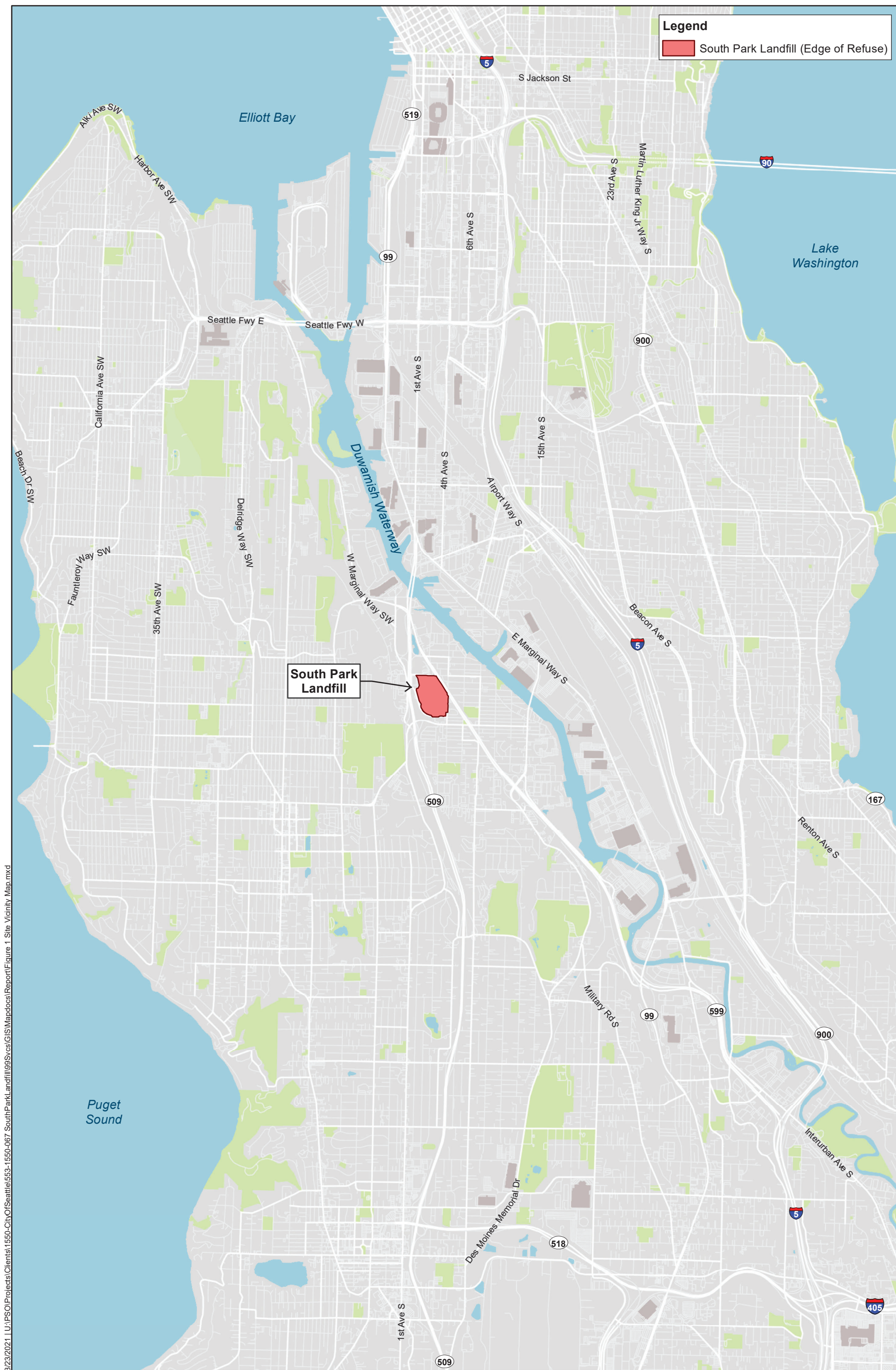
## ATTACHMENTS

Attachment A Discharge Authorization

Attachment B Discharge Analyses and Quantities Third Quarter 2018 to Fourth Quarter 2020

## Figures





3/23/2021 1:11:50 PM \\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067-SouthParkLandfill\99\Svcs\GIS\Mapdocs\Report\Figure 1 Site Vicinity Map.mxd

Source: © Mapbox, © OpenStreetMap

**Parametrix**



**Figure 1**  
**Site Vicinity Map**  
 South Park Landfill

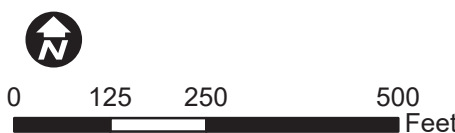




6/28/2021 1:U:\PSO\Projects\Clients\1550-CityOfSeattle\1550-067 SouthParkLandfill\99\Svcs\GIS\Mapdocs\Report\Figure 5 Groundwater Monitoring Well Network.mxd

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

**Parametrix**



**Figure 2**  
**Groundwater Monitoring Well Network**  
 South Park Landfill

Table



**Table 1. Comparison of South Park Landfill Purge Water Results with SRDS Discharge Authorization Limits**

Date	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Nickel (mg/L)	Zinc (mg/L)	Silver (mg/L)	Arsenic (mg/L)	Mercury (mg/L)	SGT- HEM	Total	TTO (mg/L)	pH (s.u.)
										Nonpolar Oil and Grease (mg/L)	Cyanide (mg/L)		
<b>SRDS EFFLUENT LIMITATIONS FROM DISCHARGE AUTHORIZATION 400-05</b>													
<b>Daily Average (mg/L)</b>													<b>Min.</b>
	0.5	2.75	3.0	2.0	2.5	5.0	1	1	0.1		2	0.1	5.0
<b>Instantaneous Maximum (mg/L)</b>													<b>Max.</b>
	0.6	5.0	8.0	4.0	5.0	10.0	3.0	4	0.2	100	3	0.1	12.0
5/28/2020	0.0020 U	0.0050 U	0.002	0.0200 U	0.0100 U	0.0100 U	0.0030 U	0.0500 U	0.000100 U	NT	NT	0.07526	6.26 to 6.85**
2/24/2021	0.000100 U	0.00273	NT	0.00038	NT	NT	0.000200 U	0.00206	0.00010 U	5 U	0.0050 U	0.00262	6.70

**Notes:**

U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.

NT = Not tested

TTO = Sum of total toxic organics detected values

\*Includes additional VOCs that are not on the TTO list

\*\*Range of pH measured in groundwater samples

Attachment A  
Discharge Authorization





**King County**

**Wastewater Treatment Division**

Industrial Waste Program

Department of Natural Resources and Parks

201 South Jackson Street, Suite 513

Seattle, WA 98104-3855

**206-477-5300** Fax 206-263-3001

TTY Relay: 711

RECEIVED

JUL 13

SPU/STS

July 12, 2018

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

Ben Whitley  
Seattle Public Utilities  
130 S. Kenyon Street  
Seattle, WA 98108

Issuance of Wastewater Discharge Authorization No. 400-05 to City of Seattle - Seattle Public Utilities - South Recycling and Disposal Station

---

Dear Mr. Whitley:

The King County Industrial Waste Program (KCIW) has reviewed your application to discharge industrial wastewater to the sewer system from the City of Seattle - Seattle Public Utilities - South Recycling and Disposal Station facility located at 8100 Second Avenue South, Seattle, Washington, and has issued the enclosed Major Discharge Authorization. The enclosed Discharge Authorization No. 400-05 supersedes and cancels Discharge Authorization No. 400-04, effective July 17, 2018.

This authorization permits you to discharge limited amounts of industrial wastewater into King County's sewer system in accordance with the effluent limitations and other requirements and conditions set forth in the document and the regulations outlined in King County Code 28.84.060 (enclosed). As long as you maintain compliance with regulations and do not change the nature and volume of your discharge, KCIW will not require you to apply for an industrial wastewater discharge permit, a type of approval that would result in additional requirements and increased fees.

If you propose to increase the volume of your discharge or change the type or quantities of substances discharged, you must contact KCIW at least 60 days before making these changes.

The major changes to this authorization are:

1. A switch in sample collection method for metals analysis. You are required to collect composite samples for analysis and determination of compliance for daily average limits.

Ben Whitley  
July 12, 2018  
Page 2

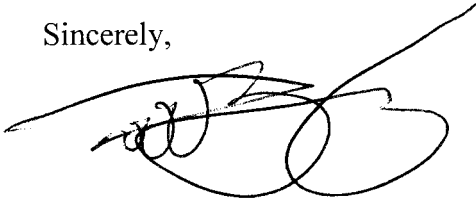
2. Increased maximum daily discharge from 25,000 gallons per day (gpd) at A43221 to 37,000 gpd based on your application and site inspection.

King County Code 28.84 authorizes a fee for each Major Discharge Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Major Discharge Authorization is \$3,000. King County will send you an invoice for this amount.

If you have any questions about this discharge authorization or your wastewater discharge, please call me at 206-477-5426 or email me at [todd.gowing@kingcounty.gov](mailto:todd.gowing@kingcounty.gov). You may also wish to visit our program's Internet pages at: [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste).

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

A handwritten signature in black ink, appearing to read 'Todd Gowing', with a long horizontal line extending to the left.

Todd Gowing  
Compliance Investigator

Enclosures

cc: Julie Howell, Seattle Public Utilities



**King County**

**MAJOR DISCHARGE AUTHORIZATION**

King County Industrial Waste Program  
201 S. Jackson Street, Suite 513  
Seattle, WA 98104-3855

**NUMBER 400-05**

for

**City of Seattle - Seattle Public Utilities - South Recycling and Disposal Station**

**Facility address:** 8100 2nd Avenue S.  
Seattle, WA 98106

**Mailing address:** 130 S. Kenyon Street  
Seattle, WA 98108

**Phone:** 206-684-5518

**Emergency (24-hour) phone:** 206-786-4605

**Industry type:** Solid Waste - Transfer Facility

**SIC code:** 4053, 4963                      **EPA Id. No.:** WAD980833826

**Discharge to:** West Point

\*Note: This authorization is valid only for the specific discharges shown below:

**Discharge process:** Wastewater generated by Solid Waste Transfer Facility operation

**Effective date:** July 17, 2018

**Expiration date:** July 16, 2023

**DESCRIPTION OF SAMPLE SITES AND DISCHARGE VOLUMES**

Sample Site No.	Description	Maximum Volume (gallons per day)	
		Industrial	Total
A43221	Manhole 'M'	37,000	38,000

Permission is hereby granted to discharge industrial wastewater from the above-identified facility into the King County sewer system in accordance with the effluent limitations and monitoring requirements set forth in this authorization.

If the industrial user wishes to continue to discharge after the expiration date, an application must be filed for re-issuance of this discharge authorization at least 90 days prior to the expiration date. For information concerning this King County Discharge Authorization, please call Industrial Waste Compliance Investigator Todd Gowing at 206-477-5426.

**24-HOUR EMERGENCY NOTIFICATION**

**West Point Treatment Plant: 206-263-3801**  
**Washington State Department of Ecology: 425-649-7000**

## SPECIAL CONDITIONS

### **A. Screening Level for Soluble Sulfide**

1. Discharges that exceed the soluble sulfide screening level of 0.1 milligrams per liter (mg/L) have the potential to cause occupational health hazards in the sewage collection system or indicate that treatment has not been sufficient enough to remove hazardous waste characteristics.
2. Determination of the soluble sulfide concentration using an approved field test kit is acceptable.
3. For each exceedance of the screening level the permittee shall:
  - a. Take immediate action to stop the exceedance and notify KCIW within 24 hours of learning of the exceedance
  - b. Collect a sample and submit new data to KCIW within 14 days of becoming aware of the exceedance (or the next time discharge occurs if greater than 14 days)
  - c. Submit a written report within 14 days of learning of the exceedance (14-Day Report)
  - d. The report should explain the cause of the exceedance and corrective actions taken to respond to the sulfide exceedance and ensure ongoing compliance
4. The following conditions apply whenever KCIW monitoring or the permittee's self-monitoring results exceed the screening level for three out of four sampling events:
  - a. The permittee shall submit a plan indicating the steps that will be taken to ensure that discharges do not exceed screening levels.
  - b. This plan shall be submitted within 30 days from the third measurement indicating that the discharge exceeded the screening level, and indicate the steps that will be taken to reduce soluble sulfide concentrations so that they remain consistently below screening levels within 60 days.
5. If submitted plan (required in condition 4) does not result in continued compliance with screening limit, King County may require further action which can include performing atmospheric hydrogen sulfide monitoring at a manhole designated by King County to assess for compliance with the King County local discharge limit of 10.0 ppm, and/or establishing a soluble sulfide limit.

### **B. Best Management Practices (BMPs)**

The amount of contaminated industrial stormwater entering the sanitary sewer shall be minimized to the greatest extent practical. Best Management Practices (BMPs) shall be implemented both to reduce the amount of contaminated stormwater and minimize the degree of contamination.



**SELF-MONITORING REQUIREMENTS**

A. The following self-monitoring requirements shall be met for this discharge authorization:

Sample Site No.	Parameter	Sample Type	Frequency
A43221	Arsenic, Total	Composite	Quarterly
	Cadmium, Total	Composite	Quarterly
	Chromium, Total	Composite	Quarterly
	Copper, Total	Composite	Quarterly
	Lead, Total	Composite	Quarterly
	Nickel, Total	Composite	Quarterly
	Silver, Total	Composite	Quarterly
	Zinc, Total	Composite	Quarterly
	Dissolved Sulfide	Grab	Quarterly
	Non-polar fats, oils and grease	3 Grabs	Quarterly
	Discharge Volume	Meter reading	Quarterly
	Total Monthly Flow	Meter reading	Quarterly
	pH	Grab	Quarterly
	Settleable solids	Grab (by Imhoff cone)	Quarterly
	Hydrogen sulfide	Meter reading	Only if <b>Operating Criteria</b> for rotten egg odor are exceeded
Explosivity	Meter reading	Only if <b>Operating Criteria</b> for visible sheen or odor of solvents/gasoline are exceeded	

B. The settleable solids field test by Imhoff cone must be performed as follows:

1. Fill Imhoff cone to one-liter mark with well-mixed sample
2. Allow 45 minutes to settle
3. Gently stir sides of cone with a rod or by spinning; settle 15 minutes longer
4. Record volume of settleable matter in the cone as mL/L

C. The three nonpolar fats, oils, and grease (FOG) grab samples shall be of equal volume, collected at least five minutes apart, and analyzed separately. When using U.S. Environmental Protection Agency approved protocols specified in 40 CFR Part 136, the individual grab samples may be composited (at the laboratory) prior to analysis. The result of the composite sample or the average of the concentrations of the three grab samples may be reported as Total FOG unless the value is 100 mg/L or greater, in which case the concentration of nonpolar FOG must be reported.

D. If a violation of any discharge limits or operating criteria is detected in monitoring, you shall notify KCIW immediately upon receipt of analytical data.

E. A self-monitoring report shall be filed with KCIW no later than the 15th day of the time period following the sample collection (i.e., the 15th day of the following month for monthly, weekly, daily samples; the 15th day of the following quarter for quarterly samples). If no discharge takes place during any monitoring period, it shall be noted on the report.

- F. All self-monitoring data submitted to KCIW, which required a laboratory analysis, must have been performed by a laboratory accredited by the Washington State Department of Ecology for each parameter tested, using procedures approved by 40 CFR 136. This does not apply to field measurements performed by the industrial user such as pH, temperature, flow, atmospheric hydrogen sulfide, total dissolved sulfides, total settleable solids by Imhoff cone, or process control information.
- G. All sampling data collected by the permittee and analyzed using procedures approved by 40 CFR 136 or approved alternatives shall be submitted to KCIW whether required as part of this authorization or done voluntarily by the permittee.
- H. Self-monitoring reports shall be signed by an authorized representative of the industrial user. The authorized representative of the industrial user is defined as:
1. The president, secretary, treasurer, or a vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation
  2. The manager of one or more manufacturing, production, or operating facilities, but only if the manager:
    - a. Is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiate and direct other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations
    - b. Can ensure that the necessary systems are established or actions taken to gather complete and accurate information for control mechanism requirements and knowledgeable of King County reporting requirements
    - c. Has been assigned or delegated the authority to sign documents, in accordance with corporate procedures
  3. A general partner or proprietor if the industrial user is a partnership or proprietorship, respectively
  4. A director or highest official appointed or designated to oversee the operation and performance of the industry if the industrial user is a government agency
  5. The individuals described in one through four above may designate an authorized representative if:
    - a. The authorization is submitted to King County in writing.
    - b. The authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company or agency.

## **GENERAL DISCHARGE LIMITATIONS**

### **Operating criteria**

There shall be no odor of solvents, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or unusual turbidity. You must collect additional monitoring samples in accordance with Part A of the Self-Monitoring Requirements if you observe any of the preceding conditions. If any of the discharge limits are exceeded, you must stop discharging and notify KCIW at 206-477-5300. You may resume discharging when you have verified a return to compliance with the discharge limitations. Any additional monitoring samples collected in accordance with Part A of the Self-Monitoring Requirements must be submitted to King County on your self-monitoring report. Failure to collect additional samples in accordance with Part A will result in a violation of your permit conditions and result in potential enforcement action.

### **Corrosive substances**

#### **Limits**

Maximum:	pH 12.0 (s.u.)
Instantaneous minimum:	pH 5.0 (s.u.)
Daily minimum:	pH 5.5 (s.u.)

The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0. The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

Discharges of more than 50 gallons per day of caustic solutions equivalent to more than 5 percent NaOH by weight or greater than pH 12.0 are prohibited unless authorized by KCIW and subject to special conditions to protect worker safety, the collection system, and treatment works.

### **Fats, oils, and grease**

Discharge of FOG shall not result in significant accumulations that either alone or in combination with other wastes are capable of obstructing flow or interfere with the operation or performance of sewer works or treatment facilities.

Dischargers of polar FOG (oil and grease from animal and/or vegetable origin) shall minimize free-floating polar FOG. Dischargers may not add emulsifying agents exclusively for the purpose of emulsifying free-floating FOG.

Nonpolar FOG limit:	100 mg/L
---------------------	----------

The limit for nonpolar FOG is violated when the arithmetic mean of the concentration of three grab samples, taken no more frequently than at five minute intervals, or when the results of a composite sample exceed the limitation.

**Flammable or explosive materials**

No person shall discharge any pollutant, as defined in 40 CFR 403.5, that creates a fire or explosion hazard in any sewer or treatment works, including, but not limited to, waste streams with a closed cup flashpoint of less than 140° Fahrenheit or 60° Centigrade using the test methods specified in 40 CFR 261.21.

At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than 5 percent nor any single reading be more than 10 percent of the lower explosive limit (LEL) of the meter.

Pollutants subject to this prohibition include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides, and any other substances that King County, the fire department, Washington State, or the U.S. Environmental Protection Agency has notified the user are a fire hazard or a hazard to the system.

**Heavy metals/cyanide**

The industrial user shall not discharge wastes, which exceed the following limitations:

<b>Heavy Metals &amp; Cyanide</b>	<b>Instantaneous Maximum ppm (mg/L)<sup>1</sup></b>	<b>Daily Average ppm (mg/L)<sup>2</sup></b>
Arsenic	4.0	1.0
Cadmium	0.6	0.5
Chromium	5.0	2.75
Copper	8.0	3.0
Lead	4.0	2.0
Mercury	0.2	0.1
Nickel	5.0	2.5
Silver	3.0	1.0
Zinc	10.0	5.0
Cyanide	3.0	2.0

<sup>1</sup> The instantaneous maximum is violated whenever the concentration of any sample, including a grab within a series used to calculate daily average concentrations, exceeds the limitation.

<sup>2</sup> The daily average limit is violated: a) for a continuous flow system when a composite sample consisting of four or more consecutive samples collected during a 24-hour period over intervals of 15 minutes or greater exceeds the limitation, or b) for a batch system when any sample exceeds the limitation. A composite sample is defined as at least four grab samples of equal volume taken throughout the processing day from a well-mixed final effluent chamber, and analyzed as a single sample.

**High temperature**

The industrial user shall not discharge material with a temperature in excess of 65° C (150° F).

**Hydrogen sulfide**

Atmospheric hydrogen sulfide: 10.0 ppm  
(As measured at a monitoring manhole designated by KCIW)

Soluble sulfide limits may be established on a case-by-case basis depending upon volume of discharge and conditions in the receiving sewer, including oxygen content and existing sulfide concentrations.

**Organic compounds**

No person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public or private sewer or treatment works in a quantity that may cause worker health and safety problems.

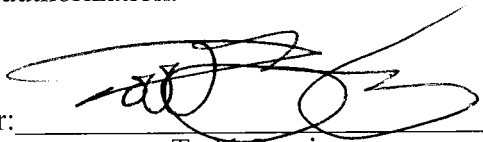
Organic pollutants subject to this restriction include, but are not limited to: Any organic pollutants compound listed in 40 CFR Section 433.11 (e) (total toxic organics [TTO] definition), acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), and xylenes.

**Settleable solids**

Settleable solids concentrations: 7.0 ml/L

**GENERAL CONDITIONS**

- A. All requirements of King County Code pertaining to the discharge of wastes into the municipal sewer system are hereby made a condition of this discharge authorization.
- B. The industrial discharger shall implement measures to prevent accidental spills or discharges of prohibited substances to the municipal sewer system. Such measures include, but are not limited to, secondary containment of chemicals and wastes, elimination of connections to the municipal sewer system, and spill response equipment.
- C. Any facility changes, which will result in a change in the character or volume of the pollutants discharged to the municipal sewer system, must be reported to your KCIW representative. Any facility changes that will cause the violation of the effluent limitations specified herein will not be allowed.
- D. In the event the permittee is unable to comply with any of the conditions of this discharge authorization because of breakdown of equipment or facilities, an accident caused by human error, negligence, or any other cause, such as an act of nature the company shall:
  - 1. Take immediate action to stop, contain, and clean up the unauthorized discharges and correct the problem.
  - 2. Immediately notify KCIW and, if after 5 p.m. weekdays and on weekends, call the emergency King County treatment plant phone number on Page 1 so steps can be taken to prevent damage to the sewer system.
  - 3. Submit a written report within 14 days of the event (*14-Day Report*) describing the breakdown, the actual quantity and quality of resulting waste discharged, corrective action taken, and the steps taken to prevent recurrence.
- E. Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this discharge authorization or the resulting liability for failure to comply.
- F. The permittee shall, at all reasonable times, allow authorized representatives of KCIW to enter that portion of the premises where an effluent source or disposal system is located or in which any records are required to be kept under the terms and conditions of this authorization.
- G. Nothing in this discharge authorization shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including discharge into waters of the state. Any such discharge is subject to regulation and enforcement action by the Washington State Department of Ecology.
- H. This discharge authorization does not authorize discharge after its expiration date. If the permittee wishes to continue to discharge after the expiration date, an application must be filed for reissuance of this discharge authorization at least 90 days prior to the expiration date. If the permittee submits its reapplication in the time specified herein, the permittee shall be deemed to have an effective wastewater discharge authorization until KCIW issues or denies the new wastewater discharge authorization. If the permittee fails to file its reapplication in the time period specified herein, the permittee will be deemed to be discharging without authorization.

Compliance Investigator:  Date: July 12, 2018  
Todd Gowing



# Industrial Waste Quarterly Self-Monitoring Report

King County

Mail or FAX to:  
King County Industrial Waste  
201 S Jackson Street, Suite 513  
Seattle, WA 98104-3855  
Phone 206-477-5300/ FAX 206-263-3001

Company Name: Seattle, City of - SPU - South Recycling and Disposal Station This form is available at [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste).

Please specify year: 20      QUARTER 4 Sample Site No.: A43221 Permit/DA No.: 400-05

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag); delete or ignore FOG or SS, if not required.

Month	Sample Date	Sample Type	Hd	Arsenic, As	Cadmium, Cd	Chromium, Cr	Copper, Cu	Lead, Pb	Nickel, Ni	Silver, Ag	Zinc, Zn	Settable Solids (m/L)	Non-Polar fats, oils & grease (FOG) (Record average only)	Dissolved Sulfide (mg/L)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
October																
	Total volume discharged for October															
November																
	Total volume discharged for November															
December																
	Total volume discharged for December															

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

Signature of Principal Executive or Authorized Agent \_\_\_\_\_  
Date \_\_\_\_\_

**Due Date:** Fourth Quarter Report is due by January 15 of each year.



# Industrial Waste Quarterly Self-Monitoring Report

King County

Mail or FAX to:  
King County Industrial Waste  
201 S Jackson Street, Suite 513  
Seattle, WA 98104-3855  
Phone 206-477-5300/ FAX 206-263-3001

Company Name: Seattle, City of - SPU - South Recycling and Disposal Station This form is available at [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste).

Please specify year: 20      QUARTER 3 Sample Site No.: A43221 Permit/DA No.: 400-05

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag); delete or ignore FOG or SS, if not required.

Month	Sample Date	Sample Type G (Grab)	pH	Arsenic, As	Cadmium, Cd	Chromium, Cr	Copper, Cu	Lead, Pb	Nickel, Ni	Silver, Ag	Zinc, Zn	Settable Solids (m/L)	Non-Polar fats, oils & grease (FOG) (Record average only)	Dissolved Sulfide (mg/L)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)	
July																	
	Total volume discharged for July																
August																	
	Total volume discharged for August																
September																	
	Total volume discharged for September																

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested

Signature of Principal Executive or Authorized Agent \_\_\_\_\_  
Date \_\_\_\_\_

**Due Date:** Third Quarter Report is due by October 15 of each year.





# Industrial Waste Quarterly Self-Monitoring Report

King County

Mail or FAX to:

King County Industrial Waste  
201 S Jackson Street, Suite 513  
Seattle, WA 98104-3855  
Phone 206-477-5300/ FAX 206-263-3001

Company Name: Seattle, City of - SPU - South Recycling and Disposal Station This form is available at [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste).

Please specify year: 20      QUARTER 2 Sample Site No.: A43221 Permit/DA No.: 400-05

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag); delete or ignore FOG or SS, if not required.

Month	Sample Date	Sample Type	Hd	Arsenic, As	Cadmium, Cd	Chromium, Cr	Copper, Cu	Lead, Pb	Nickel, Ni	Silver, Ag	Zinc, Zn	Settable Solids (m/L)	Non-Polar fats, oils & grease (FOG) (Record average only)	Dissolved Sulfide (mg/L)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)	
April																	
	Total volume discharged for April																
May																	
	Total volume discharged for May																
June																	
	Total volume discharged for June																

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

Signature of Principal Executive or Authorized Agent \_\_\_\_\_ Date \_\_\_\_\_

**Due Date:** Second Quarter Report is due by July 15 of each year.



King County

# Industrial Waste Quarterly Self-Monitoring Report

Mail or FAX to:

King County Industrial Waste  
201 S Jackson Street, Suite 513  
Seattle, WA 98104-3855  
Phone 206-477-5300/ FAX 206-263-3001

Company Name: Seattle, City of - SPU - South Recycling and Disposal Station This form is available at [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste).

Please specify year: 20      **QUARTER 1** Sample Site No.: A43221 Permit/DA No.: 400-05

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag); delete or ignore FOG or SS, if not required.

Month	Sample Date	Sample Type G (Grab)	Hd	Arsenic, As	Cadmium, Cd	Chromium, Cr	Copper, Cu	Lead, Pb	Nickel, Ni	Silver, Ag	Zinc, Zn	Settable Solids (m/L)	Non-Polar fats, oils & grease (FOG) (Record average only)	Dissolved Sulfide (mg/L)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)	
January																	
	Total volume discharged for January																
February																	
	Total volume discharged for February																
March																	
	Total volume discharged for March																

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

Date

Signature of Principal Executive or Authorized Agent

**Due Date:** First Quarter Report is due by April 15 of each year.

## Attachment B

Discharge Analyses and Quantities Third Quarter 2018  
to Fourth Quarter 2020



**SRDS Metro Sample Data Trend**

Quarter	Sample Date	Method C/G/BC	pH	As	Cd	Cr	Cu	Pb	Ni	Ag	Zn	Settleable Solid	NP-FOG	Soluble Sulfide	Flow	Non-Polar Oil/Grease			Polar Oil/Grease				
			S.U.	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Gal	(mg/L)			(mg/L)				
Bench mark			5 - 12	4.0	0.6	5.0	8.0	4.0	5	3	10	7.0	100	0.1	37,000	100							
2018 3qt	8/31/2018	G	7.42	ND	ND	ND	ND	ND	ND	ND	0.0131		<4.7	<0.1	6,446	ND	ND	ND	0.0	ND	ND	ND	0.0
2018 4qt	11/30/2018	C	7.43	ND	ND	ND	0.0046	ND	ND	ND	0.05	<1	<4.7	<0.1	13,233	ND	ND	ND	0.0	ND	ND	ND	0.0
2019 1qt	3/8/2019	C	7.07	ND	ND	ND	0.0077	ND	ND	ND	0.111	<1	<4.7	<0.1	12,232	ND	ND	5	1.7	ND	ND	ND	0.0
2019 2qt	5/9/2019	C	7.36	ND	ND	0.005	ND	ND	ND	ND	0.0147	<1	<4.7	<0.1	8,199	ND	ND	ND	0.0	ND	ND	ND	0.0
2019 3qt	8/30/2019	C	7.73	ND	ND	0.0057	0.0091	ND	ND	ND	0.0618	<1	<4.7	<0.1	4,296	ND	ND	ND	0.0	ND	ND	ND	0.0
2019 4qt	12/13/2019	C	7.32	ND	ND	ND	ND	ND	ND	ND	0.0246	<1	<4.7	<0.1	4,840	ND	ND	ND	0.0	ND	ND	ND	0.0
2020 1qt	3/6/2020	C	7.17	ND	ND	ND	0.0139	ND	ND	ND	0.0651	<1	<4.7	<0.1	21,725	ND	ND	ND	0.0	ND	ND	ND	0.0
2020 2qt	5/27/2020	C	7.27	ND	ND	ND	0.0036	ND	ND	ND	0.0363	<1	<4.7	<0.1	5,220	ND	ND	ND	0.0	ND	ND	ND	0.0
2020 3qt	9/17/2020	C	7.24	ND	ND	ND	0.0031	ND	ND	ND	0.0257	<1	<4.7	<0.1	4,717	ND	ND	ND	0.0	ND	ND	ND	0.0
2020 4qt	12/4/2020	C	7.13	ND	ND	ND	0.0067	ND	ND	ND	0.0757	<1	<4.7	<0.1	NA	ND	ND	ND	0.0	ND	ND	ND	0.0