2020 Operations, Maintenance, and Monitoring Annual Report South Park Landfill

Prepared for

Seattle Public Utilities

March 2021

Prepared by

Parametrix

In Association with

HWA GeoSciences Inc.
DBE/MWBE

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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

In Association with

HWA GeoSciences Inc. DBE/MWBE

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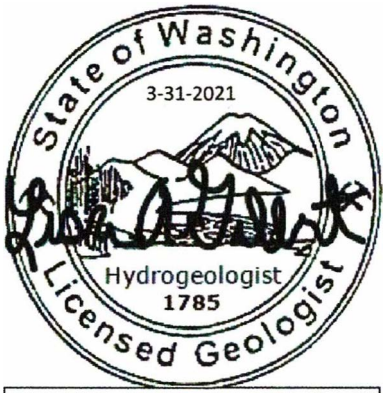
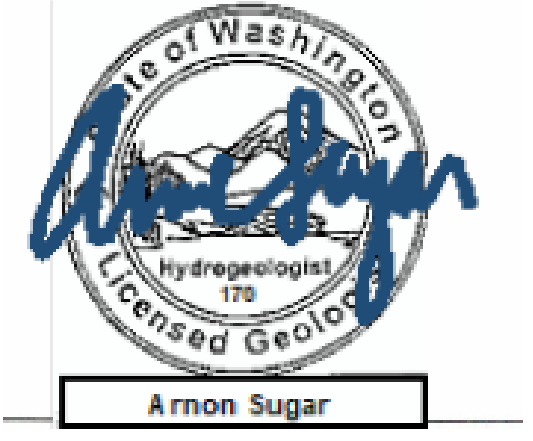
CERTIFICATION

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



Lisa A. Gilbert

Prepared by Lisa Gilbert, LHG, Parametrix



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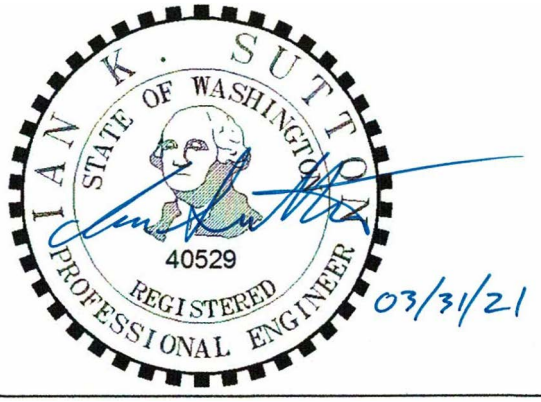

Approved by Ian Sutton, P.E., Parametrix

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APPENDICES

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, *cis*-1,2-DCE, and *trans*-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
PLP	potentially liable person
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
Work Plan	Cap Inspection Work Plan

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 show 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. The Settlement Area consists of the two largest parcels within the Edge of Refuse, the South Park Property Development (SPPD), the South Recycling and Disposal Station (SRDS), and certain adjacent City of Seattle (City) and Washington State rights-of-way (ROWs). The other landfill parcels within the Edge of Refuse are the Kenyon Industrial Park (KIP) and the 7901 2nd Avenue S parcels.

This report presents the results of the 2020 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 by the City, Seattle Public Utilities (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 the OMMP. Contact information for the responsible parties is presented in Table 1.

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 Remedial Investigation/Feasibility Study (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 parcels. 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 parcel. Until 2020, SPU planned to construct support facilities for the South Transfer Station on the SRDS parcel in conjunction with implementation of the remedial action requirements. In 2020, SPU chose to reevaluate the best use of the SRDS parcel and decoupled the redevelopment elements from the project. SPU will proceed with implementation of the required remedial action components defined in the CAP and will manage the SRDS parcel as a paved 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 Parcel

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 parcel 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 parcel was regraded.

In 2014 and 2015, the SPPD owner performed an IA for cleanup at the parcel 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 Parcel

The SRDS parcel 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 parcel 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.

The SRDS parcel operated from 1966 to 2013 as a transfer station for municipal solid waste and other recyclable materials. In Spring 2013, SPU opened a new solid waste transfer station to the north, across South Kenyon Street, and the transfer station on the SRDS parcel 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 majority of the facility is paved, except for some landscaped areas along the eastern edge of the property adjacent to 5th Avenue South, a few landscape planter islands along the western side of the parcel, and other small areas in the interior of the property.

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 flat 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 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. 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 parcel owners consists of continuous methane monitoring in on-site buildings as defined in the OMMP. The status of the 2020 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 parcel owners in accordance with the CAP and OMMP.

1.4.1 Annual Monitoring

A baseline inspection of the landfill cap is being conducted in 2020 and 2021 as described in Section 2 of this report. Subsequent, annual cap inspections will be conducted during the spring rainy season.

1.4.2 Quarterly Monitoring

Quarterly monitoring at LFG perimeter probes and sampling and analysis of groundwater from monitoring wells is being 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 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, would 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 parcel 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 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 parcel as follows:

SPPD Parcel. Stormwater capture on the SPPD parcel 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 parcel 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 Parcel. Stormwater on the SRDS parcel is collected 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 parcel 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 parcel and will require flow and quality mitigation using an above-grade stormwater treatment tank, anticipated to be located on the northern portion of the SRDS parcel. 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

A Cap Inspection Work Plan (Work Plan), presented as Appendix B1 of Appendix B, was prepared detailing the approach for the baseline year. The approach consists of conducting an initial baseline inspection in Fall 2020 during a rain event or shortly following a rain event. A secondary "wet-weather" baseline inspection will be completed in Spring 2021 and included in the baseline documentation for future use. After the baseline inspections are complete, annual inspections will commence. Once all improvements to the SRDS parcel are in place, a baseline inspection will take place on the redeveloped SRDS property.

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

The following types of observations will be 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 field inspection and maintenance form.

2.2 Landfill Cap Inspection Events

2.2.1 Baseline Inspection

The initial baseline inspection was conducted on September 21, 2020, and documented in a technical memorandum, presented as Appendix B2 in Appendix B. In accordance with the Work Plan, the objective of the baseline inspection was to document the current condition of the landfill cap and identify areas that may be compromised and need maintenance. The following is a summary of the baseline inspection results for each parcel.

SPPD Parcel. There were 31 locations of concern for one or more of the following conditions: exposed geotextile, exposed geomembrane (potential landfill cap geomembrane), ponding, minor pavement cracking, water flowing from asphalt, poor vegetative cover, and signs of erosion.

Of these 31 locations, six were recommended as higher priority, including one location where water was flowing up through the asphalt at about 0.5 gallons per minute; four locations where the landfill cap geomembrane was exposed; and the location of unknown vertical pipes. The area in which water was flowing up from the asphalt pavement required immediate action. The five other priority concerns are located around the perimeter of the SPPD property in the vegetated slope areas. These areas are of

higher 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.

SRDS Parcel. On the SRDS parcel, there were eight locations of concern for one or more of the following conditions: ponding and minor pavement cracking. These items are not considered as high priority.

2.2.2 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2020 that triggered an inspection to the landfill cap.

2.2.3 Landfill Cap Maintenance Completed

SPPD Parcel. In September 2020, a water leak was observed on the SPPD property. Photographs of the area observed during the initial baseline inspection are included in Appendix B2. The source of the water observed during the initial baseline inspection was found to be a broken water line, and according to the property owner, the leak was located and determined to be from a joint on the pipe that had come undone and repair to the pipe and cap restoration was completed in October 2020.

Incident and repair records were requested from the property owner, including a description of the maintenance area and type of repair, photographic documentation, and a field sketch and/or figure documenting the location. Forms to be used for documenting maintenance are presented in Appendix B3 of Appendix B.

The repair was reviewed in November 2020 during the fourth quarter monitoring event, and observations are presented in Appendix B3. The asphalt patch looked good and the asphalt surrounding the patch appeared solid and intact. No settlement to the cap was observed in the area of the water break.

SRDS Parcel. No cap maintenance was required or completed on the SRDS parcel.

2.3 Activities Planned for the Next One-Year Period

The initial baseline inspection conducted in September 2020, presented in Appendix B2, identified areas of concern at the Settlement Area. Actions planned for the 2021 calendar year include:

SPPD Parcel. There are 20 concerns identified that need to be further inspected, repaired, and/or restored in accordance with the approved 2013 IAWP of the Agreed Order. The following actions are recommended:

- At the four locations where exposed geomembrane was observed, inspect geomembrane during the spring cap inspection to confirm if it is part of the landfill cap, repair as needed, and restore the 18-inch cover in accordance with the IAWP within three months of the 2021 cap inspection.
- At the one location where unknown open vertical pipes were observed, determine relation to the landfill cap and repair as required in accordance with the IAWP. If pipes are not functional, excavate and remove within three months of the 2021 cap inspection.
- Regrade west bioswale for drainage before the 2022 cap inspection.
- Reestablish vegetation in areas of exposed geotextile within six months of the 2021 cap inspection.

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

SRDS Parcel. There are no areas identified for immediate maintenance or repair on SRDS property. The following activities are recommended:

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

The Site Coordinator will conduct a secondary baseline inspection in the Spring of 2021 during the rainy season in accordance with the Work Plan in Appendix B1, which will include reinspection of items identified during the initial baseline inspection.

3. LANDFILL GAS SYSTEM

The LFG control system consists of parcel-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 Parcel.** An active LFG control system was installed at the SPPD parcel as part of the IA development in 2014 and 2015 (Farallon 2013). The LFG system was designed to protect buildings on the SPPD parcel 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 parcel. It is operated by the SPPD owner in accordance with an Ecology-approved LFG Collection and Control System OMMP (Farallon 2016).
- **SRDS Parcel.** The buildings that are currently on the parcel 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 parcel, 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 parcel will be described in the 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 parcel.

3.1 Landfill Gas Monitoring Methodology

The LFG monitoring includes quarterly monitoring of perimeter probes conducted by the Site Coordinator and continuous monitoring of on-site buildings using methane detectors and alarms conducted by individual property owners. 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.

A technical memorandum was prepared to clarify the historical context for the LFG triggers and contingent actions for perimeter probe monitoring and is presented in Appendix C1 and summarized in the flow chart presented in Figure 4. 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 criteria for additional off-site building monitoring is 5 percent.

A Landtec GEM 5000 is used to measure barometric pressure at the beginning and end of each monitoring event, and static pressure and LFG concentrations in each gas probe. 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. 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 water level is above the top of the probe screen, the LFG measurements are not used.

3.2 Landfill Gas Monitoring Events

3.2.1 Perimeter Probe Monitoring

Quarterly perimeter probe monitoring events were conducted in May, August, and November 2020. The results are summarized in Table 2 and included on the gas probe monitoring field forms presented in Appendix C2.

Methane concentrations during all quarterly monitoring events were less than the 5 percent by volume regulatory action limit. Low levels of methane, between 1.25 and 5 percent by volume, were detected in probes GP-27 and GP-29. However, based on the trigger assessment (see Figure 4), no additional off-site building monitoring was required.

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

3.2.2 Building Monitoring

Building monitoring is required for occupied on-site buildings. Off-site building monitoring is required only if triggered by conditions in perimeter gas probes.

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. 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.

SPPD Parcel. The SPPD property owner did not report any incidences of methane detections inside on-site buildings or structures during 2020.

SRDS Parcel. Continuous monitoring is not required until the property is redeveloped and a new gas 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 and the flow chart presented in Figure A.2.6 of the OMMP. 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.

There were no incidences in 2020 where Settlement Area perimeter probe results triggered off-site building monitoring (see Table 2 and Figure 4).

3.2.3 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2020 that triggered an inspection to the perimeter gas probes or the LFG system.

3.2.4 Gas Probe Maintenance Completed

During the 2020 gas monitoring events, maintenance of the gas probes was completed. Weeds, blackberries, and other vegetation were cut back to allow access to wells. New locks were placed on all the gas probes with above-ground monuments. For the flush-mount monuments, many bolts were replaced, and the locking lid mounts rethreaded with a tap and die set to secure the steel monuments. Security bolts were added to each flush mount probe.

3.3 Activities Planned for the Next One-Year Period

During the year 2021, quarterly perimeter probe monitoring is planned during the months of February (completed), May, August, and November.

The SPPD property owner plans to install updated methane sensors with alarm systems in their on-site buildings during 2021. Monitoring records for on-site buildings will be provided on the form presented in Appendix C3.

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 related to heavy truck traffic. The condition of the probe will continue to be monitored to determine when actions are necessary to remediate the erosion near the probe. This area will be included in the Spring 2021 cap inspection.

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 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 8 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 included 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 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 8. The monitoring wells are purged using low-flow sampling procedures while measuring field parameters (temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential [redox]) 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.

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 (µg/L)
- Iron (Total) 27 milligrams per liter (mg/L) (A-Zone); 31 mg/L (B-Zone)
- Manganese (Total) 2.2 mg/L
- cis-1,2-DCE 16 µg/L
- Benzene 5.0 µg/L
- Arsenic (Dissolved) 5.0 µg/L (background; note that MW-27 is not a CPOC well for arsenic).

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 µg/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).

If either or both of the trigger conditions occur, the following actions will be implemented:

1. Ecology will be notified within 30 days of data validation to report that a trigger condition has occurred.
2. Within 90 days of the notification, the Subject Potentially Liable Persons (PLPs) will submit a written evaluation that considers the following:
    a. Is the cause of the trigger event (source of the contamination) known?
    b. Does it likely represent a transient condition or a new condition?
    c. Do the data indicate that the most likely source is the Settlement Area?
    d. Does a focused exposure assessment indicate an exposure threat to human health or the environment?
    e. If the source is likely within the Settlement Area, what actions are appropriate at this time? Actions may include, but are not limited to, one or more of the following:
        i. Continued monitoring to confirm that it is a transitory effect. For example, construction that disturbs the Silt Overbank Deposit may cause a short-term increase that may be acceptable to Ecology as part of the construction project.
        ii. Modified sampling to understand the cause or source.
        iii. Changes in operations of LFG systems.
        iv. Changes in some site-related activity, if practicable.
        v. Additional investigation at the Site.
        vi. Confirmation that natural attenuation conditions are stable and favorable and possible implementation of in situ modification (such as the addition of a reducing agent or microbial enhancement), if needed.
        vii. Pump and/or treat if determined to be appropriate and effective.
        viii. Other technologies that are appropriate to the situation.
    f. If additional remedial action beyond the above actions is considered, it will be evaluated in a manner consistent with a focused feasibility study under MTCA, leading to a proposed corrective action.

If a statistically significant increasing trend is observed for MW-31, the following actions will be implemented:

1. Ecology will be notified within 30 days of data validation to report that a trigger condition has occurred.
2. Because monitoring wells MW-25, MW-32, and MW-33 are between the Settlement Area and MW-31, if an increasing trend is observed in MW-31, the concentrations at these wells will be evaluated to determine whether the source could be the Settlement Area or another location. If concentrations at the Settlement Area indicate that the probable source is the Settlement Area, the Subject PLPs will proceed with the action in 2e above. If Ecology determines the data indicates that the Settlement Area is not the cause of the increasing trend, it is Ecology's expectation that no additional action is required under the Consent Decree.

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 parcel 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 2 years, analysis will be terminated.

4.2 Groundwater Monitoring Events

4.2.1 Long-Term Groundwater Monitoring

Quarterly long-term monitoring events were conducted in May, August, and November 2020. The measured groundwater levels, calculated gradients and interpreted flow direction, and groundwater quality results are presented in the following sections.

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 3.

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, and 8 show the interpreted gradients. The groundwater flow direction is generally to the northeast, toward the Lower Duwamish Waterway, with gradients ranging from 0.008 to 0.016 ft/ft measured in 2020 (42.2 to 84.4 ft per mile). This appears largely consistent with historical gradient trends to the northeast.

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 4.

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. Comparison of water levels in the shallow and deep wells show downward vertical gradients (water levels are higher in the shallower wells), with small to

moderate (0 to 0.007 ft/ft) vertical gradients in three of the well pairs, and a strong downward gradient of around 0.05 to 0.07 ft/ft in MW-30/MW-31.

Flow Velocity

Based on estimates of horizontal hydraulic conductivity and porosity determined in the remedial investigation (Floyd|Snider 2017) and the gradients measured in 2020, estimated horizontal groundwater flow velocities in the Duwamish Valley Alluvial Aquifer in the northern and southern regions of the Site are summarized in Table 5.

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 during the remedial investigation, due to steeper measured and interpreted gradients in 2020.

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 0.008 to 0.016 ft/ft, the calculated flow velocity ranged from 4.5 to 12.7 ft/day in the northern region of the Site to 1.2 to 5.4 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 6. 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 2020 monitoring events:

- Vinyl chloride concentrations exceeded the CUL of 0.29 µg/L in wells MW-25 and MW-32 (Q2, Q3, and Q4).
- Total iron concentrations exceeded the CUL of 27 mg/L in A-Zone wells MW-29 (upgradient; Q2 and Q3) and MW-27 (Q3) and the CUL of 31 mg/L in B-Zone well MW-10 (Q2, Q3, and Q4).
- Total manganese concentrations exceeded the CUL of 2.2 mg/L in A-Zone well MW-25 (Q2) and B-Zone well MW-10 (Q2, Q3, and Q4).
- There were no concentrations 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 (2020,) 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 2020, vinyl chloride concentrations exceeded the CUL in CPOC downgradient A-Zone wells MW-25 and MW-32 during at least one quarter, 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 2020 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 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 2013). 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 7.

Trends were evaluated for each well using the combined historical (through 2014) and three rounds of 2020 data, resulting in a 6-year gap in the time-series data for all analytes and wells. Iron and manganese data also had a minimum 7-year gap from late 2003 to early 2011 or 2013. 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-32, which showed statistically significant increasing trends. However, the calculations for wells MW-29 and MW-32 were conducted using a data set of only six and eight data points, respectively.

Although the Mann-Kendall test does not account for (i.e., is not sensitive to) time intervals, the trends should be evaluated with consideration of the gaps in the data. 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 newer (post-2020) data for trends will be conducted once a sufficient number of sampling events (typically eight) has been completed.

Since no wells that exceeded both of the contingency trigger conditions for vinyl chloride in 2020 (concentrations above the concentration trigger criteria for two consecutive sampling events and an increasing trend), no additional actions were required.

Iron and Manganese

In 2020, iron concentrations exceeded the CUL during at least one quarter in upgradient well MW-29 and in downgradient wells MW-27 (A-Zone) and MW-10 (B-Zone). Manganese concentrations exceeded the CUL during at least one quarter in downgradient wells MW-25 (A-Zone) and MW-10 (B-Zone). Time-series plots for iron and manganese show stable or decreasing trends for all wells over the history of monitoring. Following completion of 2 years of monitoring (five additional quarterly events), if there are no upward trends in iron and manganese, Ecology may approve a reduced frequency of monitoring.

Arsenic

The time-series plots show stable or decreasing trends for arsenic over the history of monitoring. In 2020, arsenic concentrations 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 for 2 years (five additional quarters).

4.2.2 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2020 that triggered an inspection to the groundwater monitoring wells.

4.2.3 Monitoring Well Maintenance Completed

During the May quarterly event, some of the wells required extended purging to achieve stabilization, and other conditions were observed including algal buildup and metal precipitation that were related to their inactivity since 2014. Therefore, prior to the August sampling event, the dedicated pumps were removed, cleaned, rinsed, and placed back into the wells. The bladder pump from MW-10 was removed entirely as it would not function. All of the wells were then redeveloped by a combination of surging, bailing, and pumping.

Additional maintenance of the wells was completed during the 2020 monitoring. New locks were placed on all the wells with above-ground monuments. Bolts were replaced and mounts rethreaded for several flush-mounted wells. Locks were added to all flush-mount wells with a locking J-plug. MW-31 could not be locked due to the existing dedicated bladder pump.

The locking lid for MW-27 was observed to be broken at the rear weld connection. The lid is secured in place with the lock placed; however, rewelding appears necessary to repair the lid mount.

Investigative derived waste (IDW) water was contained in 55-gallon steel drums. A total of eight 55-gallon drums of purge water were generated during the 2020 monitoring and well redevelopment. On November 11, 2020, the IDW was properly disposed and treated off-site by Marine Vacuum of Seattle, Washington.

4.3 Activities Planned for the Next One-Year Period

During the next one-year period, quarterly groundwater monitoring is planned during the months of February, May, August, and November.

The bladder pump from MW-10 should 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.

5. CONCLUSIONS AND RECOMMENDATIONS

The initial baseline landfill cap inspection was conducted on September 21, 2020, and identified some areas requiring additional monitoring, maintenance, and repairs. The Site Coordinator will conduct a secondary baseline inspection in the Spring of 2021 during the rainy season in accordance with the Work Plan in Appendix B1, which will include reinspection of items identified during the initial baseline inspection. The following is a summary of the baseline inspection results for each parcel.

SPPD Parcel. There were 31 locations of concern for one or more of the following conditions: exposed geotextile, exposed landfill cap geomembrane, ponding, minor pavement cracking, water flowing from asphalt, poor vegetative cover, and signs of erosion. The source of the water was further investigated as an immediate concern and was found to be a broken water line. Repair to the water line and cap restoration was completed in October 2020 and the repair was reviewed in November 2020. Twenty of the concerns identified need to be further inspected, repaired, and/or restored in accordance with the approved 2013 IAWP of the Agreed Order. In addition, minor surface cracks or ponding will be reinspected by the Site Coordinator every six months to assess if the condition is worsening. The following actions are recommended during 2021:

- At the four locations where exposed geomembrane was observed, inspect geomembrane during the spring cap inspection, repair as needed, and restore the 18-inch cover in accordance with the IAWP within three months of the 2021 cap inspection.
- At the one location where unknown open vertical pipes were observed, determine relation to the landfill cap and repair as required in accordance with the IAWP. If pipes are not functional, excavate and remove within three months of the 2021 cap inspection.
- Regrade west bioswale for drainage before the 2022 cap inspection.
- Reestablish vegetation in areas of exposed geotextile within six months of the 2021 cap inspection.

SRDS Parcel. On the SRDS parcel, there were eight locations of concern for one or more of the following conditions: ponding and minor pavement cracking. Minor surface cracks or ponding will be reinspected by the Site Coordinator every six months to assess if the condition is worsening.

None of the perimeter probe LFG monitoring results exceeded the regulatory criteria of 5 percent or the contingency trigger criteria for off-site building monitoring. The SPPD property owner did not report any incidences of methane detections inside on-site buildings or structures during 2020. The SPPD property owner plans to install updated methane sensors with alarm systems in their on-site buildings during 2021.

The groundwater flow direction indicated by 2020 groundwater monitoring was toward the northeast and generally consistent with historical measurements. Based on the observed gradients of 0.008 to 0.016 ft/ft, the calculated flow velocity ranged from 4.5 to 12.7 ft/day in the northern region of the Site to 1.2 to 5.4 ft/day in the southern region of the Site.

Comparison of water levels in the shallow and deep wells shows downward vertical gradients (water levels are higher in the shallower wells), with small to moderate vertical gradients in three of the well pairs, and a strong downward gradient in the MW-30/MW-31 well pair.

The following CPOC wells had at least one COC concentration that exceeded the CUL during 2020:

- Vinyl chloride: downgradient A-Zone wells MW-25 and MW-32
- Iron: upgradient well MW-29; downgradient wells MW-27 (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 trends were observed for upgradient well MW-29 and downgradient well MW-32. However, these trends were calculated using a limited data set of six and eight points, respectively, with a 6-year gap preceding the three 2020 data points. Since there were no wells that exceeded both of the contingency trigger conditions for vinyl chloride in 2020 (concentrations above the concentration trigger criteria for two consecutive sampling events and an increasing trend), no additional actions were required.

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 2020 data alone are not sufficient to evaluate recent trends. After completing 2 years of quarterly monitoring, 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 for 2 years (five additional quarters).

No unforeseen emergency or extreme weather events occurred during 2020 at the Settlement Area that triggered additional monitoring requirements.

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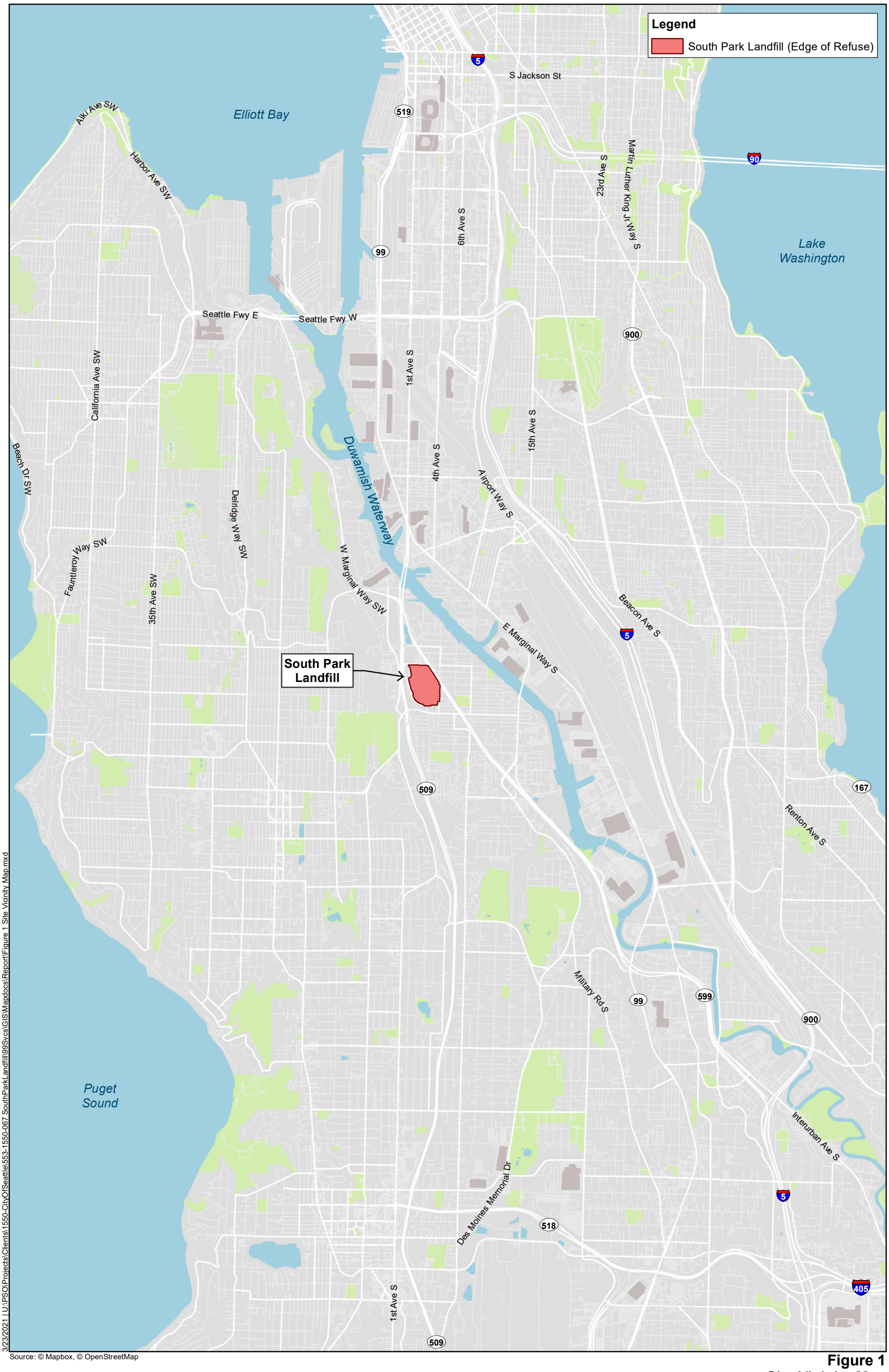
Figures



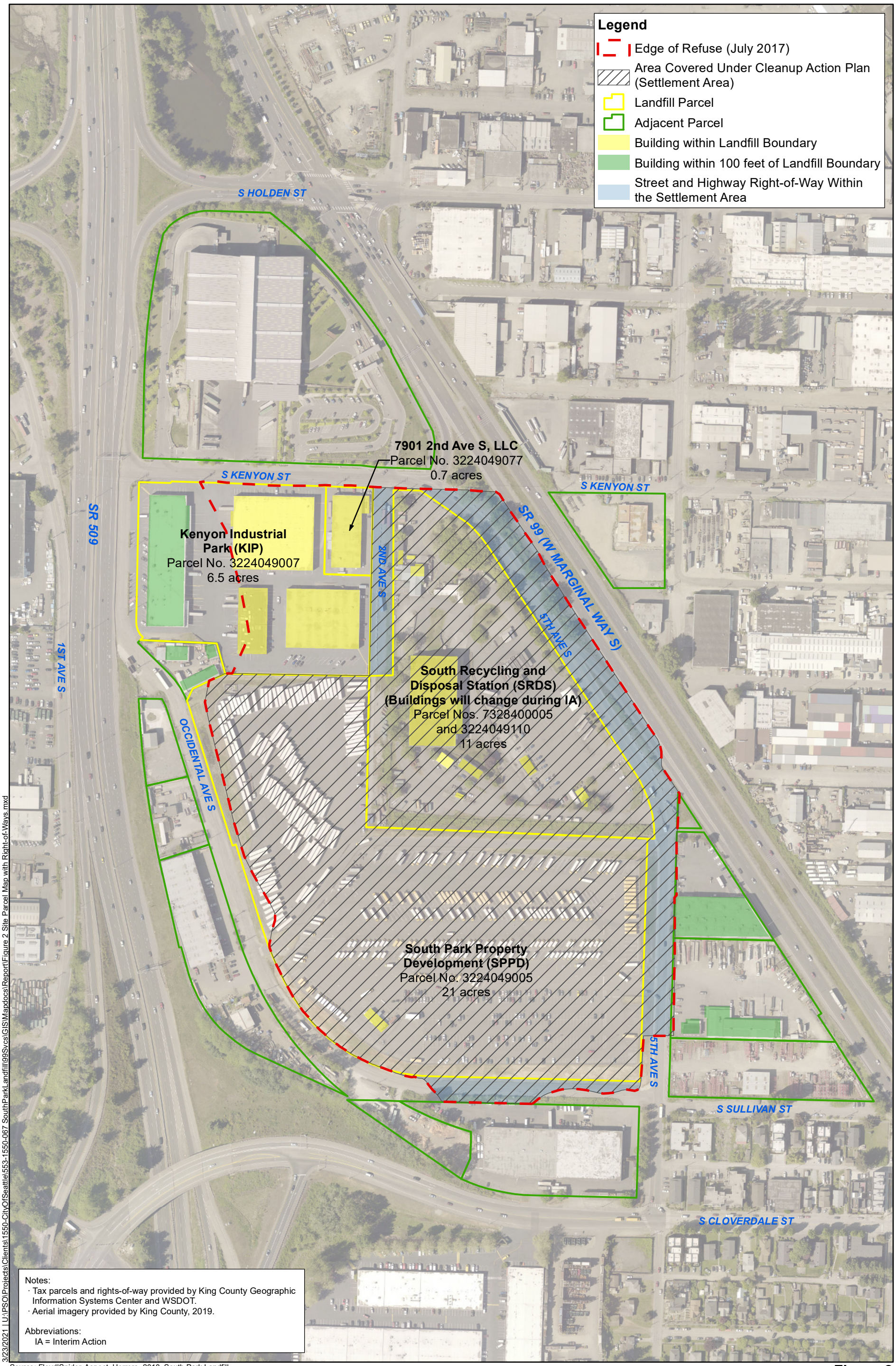
Source: © Mapbox, © OpenStreetMap

Figure 1
Site Vicinity Map
South Park Landfill

Parametrix

0 0.5 1 2 Miles

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



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

Parametrix

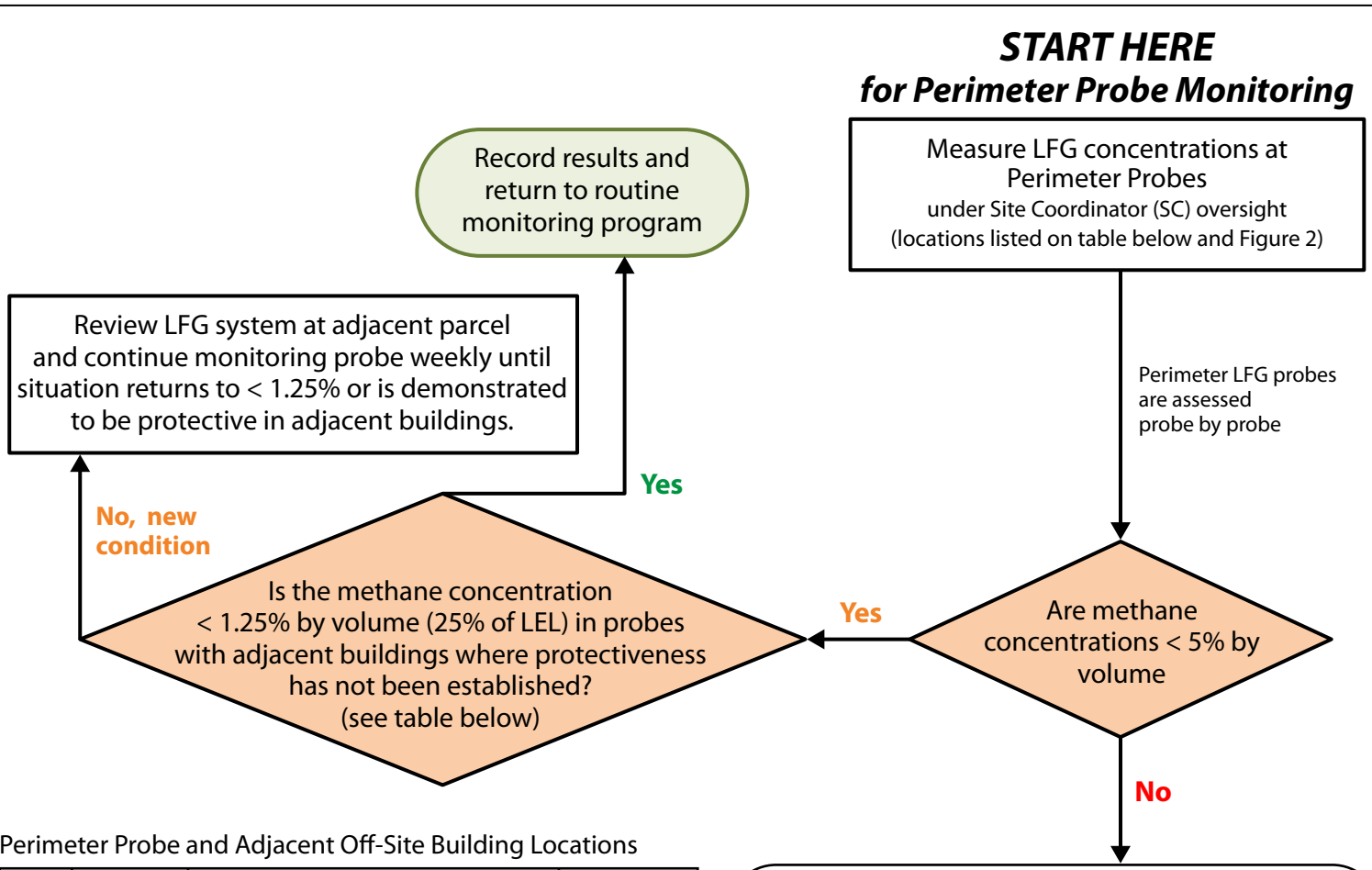
0 125 250 500 Feet

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

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



Perimeter Probe and Adjacent Off-Site Building Locations

Gas Probe	Adjacent LFG System	Adjacent Off-site Buildings within 100 ft[1]	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.

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.

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.

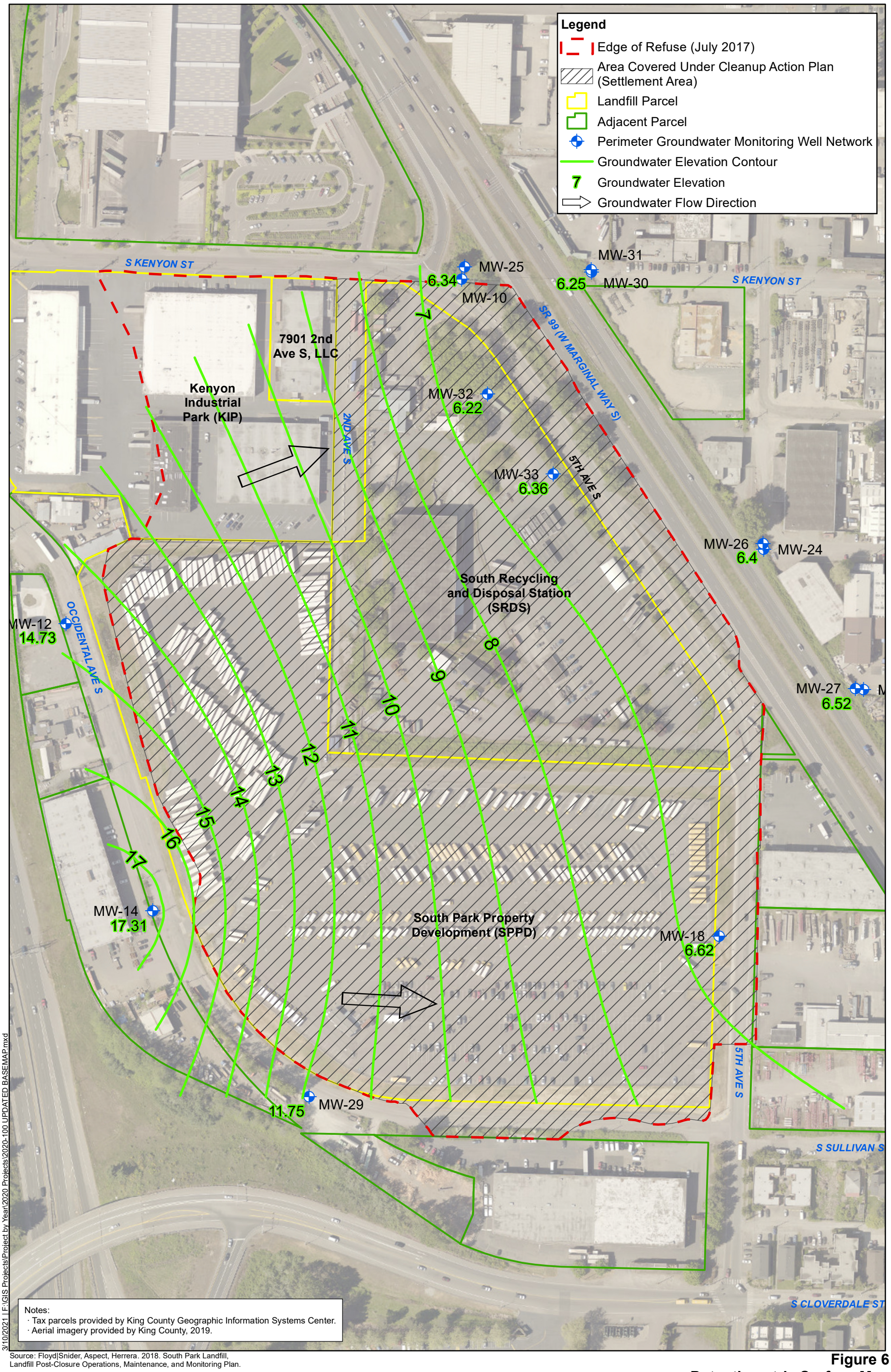
Figure 4
Flow Chart for Triggers and Contingent Actions for Perimeter Probe Monitoring
South Park Landfill

3/23/2021 | U:\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\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 5
Groundwater Monitoring Well Network
South Park Landfill



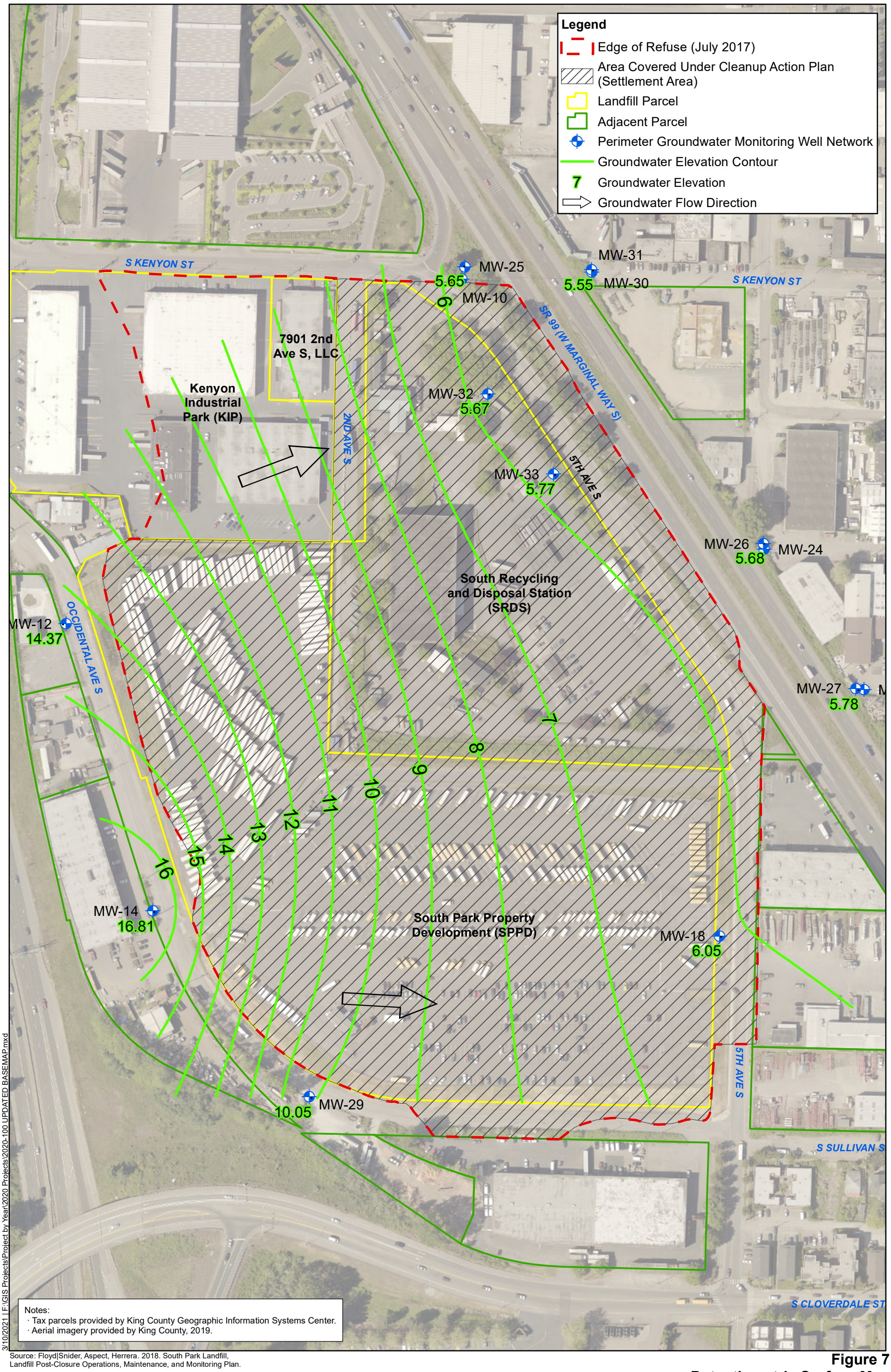
3/10/2021 | F:\GIS Projects\Project by Year\2020 Projects\2020-100 UPDATED BASEMAP.mxd

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

Parametrix

0 125 250 500 Feet

Figure 6
Potentiometric Surface Map
May 26, 2020
South Park Landfill

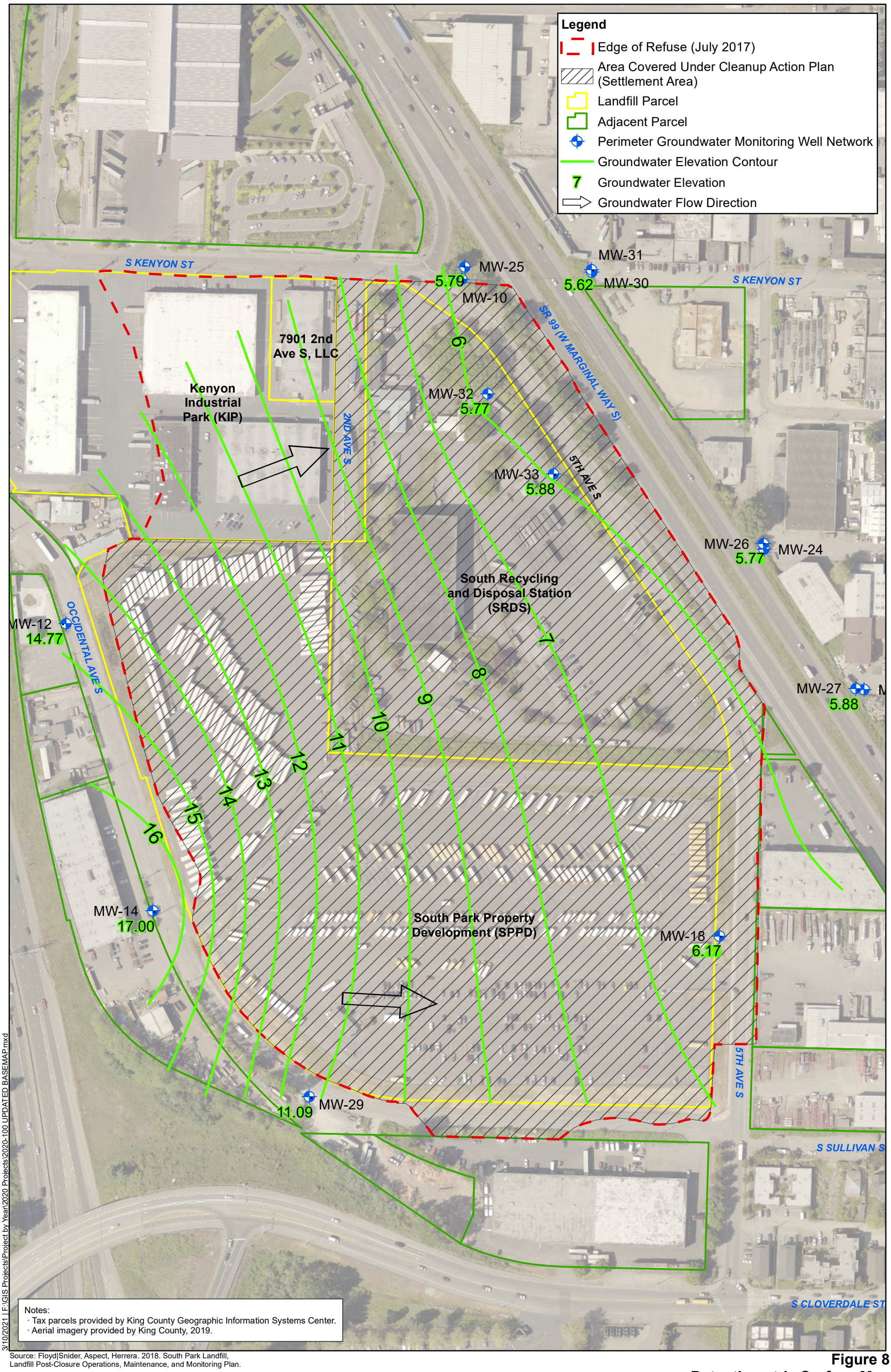


Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

Parametrix

0 125 250 500 Feet

Figure 7
Potentiometric Surface Map
August 24, 2020
South Park Landfill



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

Parametrix

Figure 8
Potentiometric Surface Map
November 9, 2020
South Park Landfill

Tables

Table 1. Project Contact Information, South Park Landfill

Contact	Title	Affiliation	Phone Number (s)	Mailing Address	Email Address
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, South Park Landfill

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc)[1]	Purge Duration (min) Purge rate = 550 ml/min	Date Monitored	Time of Measurement	Depth to Water (ft - btoc)	Pressure (in W.C.)	CH_4 (% Volume)	CO_2 (% Volume)	O_2 (% Volume)	H_2S (ppm)
GP-37	0.063	2.8 to 7.8	868	1.57	5/14/2020	NA	Dry	0.00	0.0	5.2	14.0	0
					8/24/2020	12:20	Dry	0.00	0.0	11.5	10.6	0
					11/9/2020	10:43	Dry	0.00	0.0	10.9	3.9	0
GP-09	0.063	6.62 to 10.62	899	1.63	5/14/2020	NA	Dry	0.00	0.0	6.9	15.0	0
					8/24/2020	12:07	Dry	0.00	0.0	4.8	18.6	0
					11/9/2020	11:15	Dry	0.00	0.0	4.9	17.1	0
GP-26	0.063	4.62 to 9.62	868	1.57	5/14/2020	NA	Probe was not found					
					8/24/2020	13:16	7.89	0.00	0.0	2.6	19.2	0
					11/9/2020	11:50	8.71	0.00	0.0	3.0	17.7	0
GP-23	0.167	6.05 to 7.05	4,940	8.98	5/14/2020	NA	Dry	0.00	0.0	6.6	14.0	0
					8/24/2020	13:35	7.42	0.00	0.0	7.7	14.6	0
					11/9/2020	11:31	7.34	0.00	0.0	6.5	15.1	0
GP-07	0.063	5.75 to 6.25	519	0.94	5/14/2020	NA	Dry	0.00	0.0	2.3	19.0	0
					8/24/2020	13:50	Dry	0.00	0.0	3.5	19.0	0
					11/9/2020	12:03	Dry	0.00	0.0	3.4	17.6	0
GP-27	0.063	8.57 to 13.57	1,216	2.21	5/14/2020	NA	12.23	0.00	0.0	0.0	21.0	0
					8/24/2020	11:40	12.29	0.00	0.5	12.9	0.0	5
					11/9/2020	10:18	12.35	0.00	0.6	12.4	0.0	6
GP-28	0.063	6.59 to 11.59	1,042	1.89	5/14/2020	NA	10.90	0.00	0.0	4.4	10.0	0
					8/24/2020	11:30	11.45	0.00	0.0	9.5	5.7	0
					11/9/2020	9:32	11.01	0.00	0.0	9.5	4.3	0
GP-29	0.063	4.62 to 9.62	868	1.57	5/14/2020	NA	8.61	0.00	1.4	11.8	3.0	0
					8/24/2020	11:19	9.23	0.00	1.8	14.8	2.0	0
					11/9/2020	9:48	9.05	0.00	2.9	14.3	1.6	0
GP-16	0.167	6.60 to 9	5,867	10.67	5/14/2020	NA	Dry	0.00	0.0	0.5	20.0	0
					8/24/2020	10:45	Dry	0.00	0.0	0.4	20.4	0
					11/9/2020	10:00	Dry	0.00	0.0	1.6	19.7	0
GP-31	0.063	4.64 to 9.64	868	1.57	5/14/2020	NA	6.21	0.00	0.0	4.0	15.0	0
					8/24/2020	9:45	5.81	0.00	0.0	15.4	3.6	0
					11/9/2020	8:56	6.03	0.00	0.0	10.0	5.6	0
GP-15	0.167	6.62 to 8.62	5,558	10.11	5/14/2020	NA	**3.31**	--	--	--	--	--
					8/24/2020	10:22	**6.08**	--	--	--	--	--
					11/9/2020	9:05	**4.87**	--	--	--	--	--
GP-32	0.063	4.72 to 9.72	868	1.57	5/14/2020	NA	**2.27**	--	--	--	--	--
					8/24/2020	10:10	**3.09**	--	--	--	--	--
					11/9/2020	9:13	**2.81**	--	--	--	--	--
GP-03	0.063	6.73 to 8.63	725	1.32	5/14/2020	NA	Dry	0.00	0.0	7.1	11.0	0
					8/24/2020	9:33	Dry	0.00	0.0	9.2	10.4	0
					11/9/2020	9:21	Dry	0.00	0.0	8.9	8.0	0
GP-13	0.167	4.91 to 5.41	4,014	7.29	5/14/2020	NA	**2.78**	--	--	--	--	--
					8/24/2020	9:15	**3.13**	--	--	--	--	--
					11/9/2020	8:25	**2.85**	--	--	--	--	--
GP-11	0.167	6.23 to 6.73	4,632	8.42	5/14/2020	NA	**5.84**	--	--	--	--	--
					8/24/2020	8:49	**6.13**	--	--	--	--	--
					11/9/2020	8:10	**5.81**	--	--	--	--	--
GP-38	0.063	3.8 to 8.8	882	1.6	5/14/2020	NA	Dry	0.00	0.0	6.6	13.0	0
					8/24/2020	12:37	Dry	0.00	0.0	17.7	0.8	0
					11/9/2020	11:07	Dry	0.00	0.0	13.8	2.5	0
GP-33	0.063	8.2 to 13.2	1,165	2.12	5/14/2020	NA	13.40	0.00	0.0	5.5	8.0	0
					8/24/2020	12:55	13.31	0.00	0.0	6.7	9.5	0
					11/9/2020	12:44	13.50	0.00	0.0	4.9	13.5	0

Notes:

Red font indicates entire screen is blocked by water

[1] purge volume assumes no water present within the probe screen

-- No measurement, screen blocked by water

NA Not available

btoc below top of casing

ppm parts per million

Table 3. Groundwater Elevation Summary, 2020, South Park Landfill

Well ID	TOC (ft NAVD 88)	Depth to Water (ft)			Groundwater Elevation (ft NAVD 88)		
		5/26/20	8/24/20	11/9/20	5/26/20	8/24/20	11/9/20
Perched Zone							
MW-30	17.07	10.32	10.95	10.78	6.75	6.12	6.29
Shallow / A-Zone wells							
MW-12	20.63	5.9	6.26	5.86	14.73	14.37	14.77
MW-14	19.85	2.54	3.04	2.85	17.31	16.81	17.00
MW-25	20.09	13.75	14.44	14.30	6.34	5.65	5.79
MW-26	15.94	9.54	10.26	10.17	6.40	5.68	5.77
MW-27	14.76	8.24	8.98	8.88	6.52	5.78	5.88
MW-29	19.16	7.41	9.11	8.07	11.75	10.05	11.09
MW-31	17.12	10.87	11.57	11.50	6.25	5.55	5.62
MW-32	17.07	10.85	11.40	11.30	6.22	5.67	5.77
MW-33	17.34	10.98	11.57	11.46	6.36	5.77	5.88
Deep / B Zone wells							
MW-08	14.76	8.4	8.99	8.90	6.36	5.77	5.86
MW-10	19.35	13.11	13.70	13.55	6.24	5.65	5.80
MW-18	22.03	15.41	15.98	15.86	6.62	6.05	6.17
MW-24	15.13	8.79	9.47	9.40	6.34	5.66	5.73

Table 4. Groundwater Vertical Gradients, 2020, South Park Landfill

Well Pairs	Zone	Groundwater Elevation (ft NAVD 88)			Mid-screen Elevation (ft btoc)	Vertical gradient (ft/ft)		
		5/26/20	8/24/20	11/9/20		5/26/20	8/24/20	11/9/20
MW-26	Shallow	6.40	5.68	5.77	20	0.003	0.001	0.002
MW-24	Deep	6.34	5.66	5.73	40			
MW-27	Shallow	6.52	5.78	5.88	15	0.006	0.000	0.001
MW-08	Deep	6.36	5.77	5.86	40			
MW-25	Shallow	6.34	5.65	5.78	25	0.007	0.000	-0.001
MW-10	Deep	6.24	5.65	5.80	40			
MW-30	Perched	6.75	6.12	6.29	11	0.050	0.057	0.067
MW-31	Shallow	6.25	5.55	5.62	21			

btoc = below top of well casing

Table 5. Groundwater Flow Velocity, South Park Landfill

Region	Horizontal Hydraulic Conductivity (ft/day)	2020 Horizontal Hydraulic Gradient (ft/ft)	Effective Porosity	Horizontal Groundwater Velocity (ft/day)
Northern Region	145 to 167	0.008 to 0.016	0.21 to 0.26	4.5 to 12.7
Southern Region	40 to 71	0.008 to 0.016	0.21 to 0.26	1.2 to 5.4

Table 6. Groundwater Quality Data Summary, 2020, South Park Landfill

			Upgradient Wells										Downgradient Wells							
			A-Zone										Perched Zone				A-Zone			
Parameter	Units	Cleanup Level	MW-12 5/26/20	MW-12 8/25/20	MW-12 11/9/20	MW-14 5/26/20	MW-14 8/25/20	MW-14 11/9/20	MW-60 (MW-14 Dup) 11/9/20	MW-29 5/27/20	MW-29 8/25/20	MW-60 (MW-29 Dup) 8/25/20	MW-29 11/10/20	MW-30 [1] 5/28/20	MW-30 [1] 8/26/20	MW-30 [1] 11/11/20	MW-61 (MW-30 Dup) 11/11/20	MW-25 5/27/20	MW-60 (MW-25 Dup) 5/27/20	MW-25 8/27/20	MW-25 11/10/20
Field Parameters																				
Temperature	C		13.2	14.5	14.4	14.4	17.2	15.1	--	12.4	13.8	--	12.6	15.6	15.3	14.2	--	14.3	--	17.0	13.7
Dissolved Oxygen	mg/L		1.82	0.26	0.00	1.41	0.05	0.00	--	1.49	0.00	--	0.00	2.17	0.27	0.00	--	1.43	--	0.34	0.01
Specific Conductivity	µS/cm		441.3	487	467.8	524	550	532.1	--	1029	878	--	663	612	639	582.1	--	965	--	970	1029
pH	units		6.50	6.30	6.08	6.79	6.56	6.51	--	6.64	6.65	--	6.54	6.30	6.22	6.19	--	6.62	--	6.49	6.44
Redox	mv		275.7	45.1	79.1	-40.8	-143.1	-23.7	--	-84.2	-118.7	--	-88.7	100.1	7.2	4.8	--	-65.3	--	-64.3	-74.0
Turbidity	NTU		9.72	40.02	0.02	27.88	67.82	1.73	--	26.84	119.9	--	0.02	22.09	3.34	1.23	--	12.25	--	4.11	2.84
Metals																				
Arsenic, Dissolved	µg/L	5.0	0.423	0.497	0.395	--	--	--	--	--	--	--	--	--	--	--	--	0.353	0.337	0.396	0.300
Iron, Total	mg/L	27 A-Zone 31 B-Zone	0.864	1.61	0.942	5.09	4.04	3.56	3.59	**37.1**	**32.4**	**34**	14.4	1.43	2.88	4.7	4.43	21.1	21.7	18.3	18.2
Manganese, Total	mg/L	2.2	0.0243	0.158	0.109	0.628	0.623	0.603	0.598	0.81	0.65	0.687	0.48	0.0919 J-	0.155	0.138	0.132	**2.21**	**2.28**	1.91	2.11
Volatile Organic Compounds																				
Vinyl Chloride	µg/L	0.29	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.020 U	0.103	0.124	0.132	0.0959	0.127	0.161	0.251 J	0.252	**0.349**	**0.347**	**0.345**	**0.505**
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.21	0.39	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.31	0.20 U	0.30	0.31	0.20 U	0.20 U	0.20 UJ	0.20 U
Benzene	µg/L	5.0	--	--	--	--	--	--		--	--	--	--	--	--	--	--	0.24	0.28	0.26 J	0.49

Table 6. Groundwater Quality Data Summary, 2020, South Park Landfill

Parameter	Units	Cleanup Level	Downgradient Wells (cont.) A-Zone (cont.) MW-26 5/28/20	MW-26 8/27/20	MW-26 11/11/20	MW-27 [2] 5/28/20	MW-61 (MW-27 Dup) 5/28/20	MW-27 [2] 8/26/20	MW-27 [2] 11/11/20	MW-31 [1] 5/28/20	MW-31 [1] 8/26/20	MW-31 [1] 11/11/20	MW-32 5/27/20	MW-32 8/27/20	MW-61 (MW-32 Dup) 8/27/20	MW-32 11/10/20	MW-33 5/27/20	MW-33 8/25/20	MW-33 11/10/20
Field Parameters																			
Temperature	C		13.4	13.6	12.2	12.0	--	16.3	13.0	16.3	16.0	13.8	14.2	14.4	--	14.2	15.4	16.0	15.3
Dissolved Oxygen	mg/L		1.59	0.30	0.00	1.68	--	0.16	0.00	1.56	0.22	0.01	1.38	0.03	--	0.00	1.32	0.00	0.00
Specific Conductivity	µS/cm		183.7	197	226.7	298.9	--	428	376.0	351.9	388	382.3	929	912	--	861	1484	1401	1388
pH	units		6.26	6.06	5.87	6.49	--	6.39	6.24	6.55	6.36	6.29	6.85	6.66	--	6.63	6.79	6.66	6.59
Redox	mv		14.0	22.4	37.9	196.2	--	-74.0	-16.8	-35.8	-62.6	-44.6	-93.5	-96.4	--	-90.4	-102.7	-107.8	-91.0
Turbidity	NTU		7.64	10.97	3.55	22.78	--	14.95	3.03	26.98	42.15	11.8	42.15	47.08	--	1.30	28.04	739.60	0.99
Metals																			
Arsenic, Dissolved	µg/L	5.0	0.793	0.816	0.865	4.89	5.23 [2]	13.3 [2]	8.34 [2]	--	--	--	1.34	1.52	1.50	1.51	1.08	1.04	1.01
Iron, Total	mg/L	27 A-Zone 31 B-Zone	7.19	8.12	8.13	5	5.97	**31.3**	15	10.6	12.3	13.4	13.7	13.2	13.4	11	13.5	14.1	15.8
Manganese, Total	mg/L	2.2	0.108	0.125	0.110	0.252 J	0.321	0.822	0.572	0.573	0.558	0.517	1.5	1.54	1.52	1.43	1.61	1.71	1.68
Volatile Organic Compounds																			
Vinyl Chloride	µg/L	0.29	0.0216	0.028	0.037	0.0782	0.0819	0.0769	0.0267	0.201	**0.475** [1]	**0.443** [1]	0.265	**0.344**	**0.347**	**0.472**	0.0582	0.0862	0.112
Cis-1,2-Dichloroethene	µg/L	16	1.11	0.41	0.31	0.22	0.26	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.97	0.50	0.54	0.75	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	--	--	--	--	0.20 U	--	--	--	--	--	--	--	--	--	--	--	--

Table 6. Groundwater Quality Data Summary, 2020, South Park Landfill

			Downgradient Wells (cont.)											Trip Blanks					
			B-Zone																
			MW-08	MW-08	MW-08	MW-10	MW-10	MW-10	MW-18	MW-18	MW-18	MW-24	MW-24	MW-24	MW-80	MW-81	MW-80	MW-81	MW-80	MW-81
Parameter	**Units**	**Cleanup Level**	5/28/20	8/26/20	11/11/20	5/27/20	8/27/20	11/10/20	5/27/20	8/25/20	11/10/20	5/28/20	8/26/20	11/11/20	5/28/20	5/28/20	8/25/20	8/27/20	11/9/20	11/11/20
Field Parameters																				
Temperature	C		12.8	13.9	12.3	14.4	14.6	13.8	15.0	16.0	13.8	13.4	13.9	12.0	- -	- -	- -	- -	- -	- -
Dissolved Oxygen	mg/L		1.50	0.77	0.00	1.41	0.03	0.20	1.43	0.07	0.00	1.51	1.89	0.05	- -	- -	- -	- -	- -	- -
Specific Conductivity	µS/cm		1284	1094	1045	1504	1482	1472	1233	1070	1029	1002	941	950	- -	- -	- -	- -	- -	- -
pH	units		6.73	6.53	6.50	6.79	6.61	6.62	6.64	6.55	6.48	6.73	6.47	6.39	- -	- -	- -	- -	- -	- -
Redox	mv		-60.3	-74.3	-60.6	-117.6	-112.3	-108.4	-63.4	-78.2	-58.4	-86.6	-56.3	-50.4	- -	- -	- -	- -	- -	- -
Turbidity	NTU		6.75	8.85	3.52	12.19	9.99	15.1	5.26	221.04	1.19	7.32	7.16	1.41	- -	- -	- -	- -	- -	- -
Metals																				
Arsenic, Dissolved	µg/L	5.0	0.200 U	0.254	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	12.7	15.3	17.4	**35.1**	**40.2**	**39.1**	20.1	18	21	20	17.9	27	- -	- -	- -	- -	- -	- -
Manganese, Total	mg/L	2.2	1.19	1.23	1.17	**2.28**	**2.67**	**2.55**	1.59	1.5	1.36	1.68	1.4	1.56	- -	- -	- -	- -	- -	- -
Volatile Organic Compounds																				
Vinyl Chloride	µg/L	0.29	0.0592	0.0712	0.0836	0.0778	0.0952	0.114	0.0357	0.0357	0.0363	0.020 U	0.0308	0.0438	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	1.07	0.73	1.28	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	0.20 U	0.20 U
Benzene	µg/L	5.0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.20 U	- -	0.20 U	0.20 U	0.20 U

Notes:

[1] MW-30 and MW-31 monitor the former Glitsa property and are not CPOC wells.

[2] 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.

= 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.

Units were converted from lab reports for iron (µg/L to mg/L), manganese (µg/L to mg/L), and vinyl chloride (ng/L to µg/L) to maintain consistency with historical data and established cleanup levels.

Abbreviations:

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

Table 7. Summary of Vinyl Chloride Trend Analyses, South Park Landfill

Well ID	# Samples	# NDs	% NDs	ND Method[1]	MK S Value[2]	MK Trend[3]
MW-08	40	4	10	use 1/2 DL	-651	decreasing
MW-10	42	2	5	use 1/2 DL	-596	decreasing
MW-12	41	3	7	use 1/2 DL	-269	decreasing
MW-14	39	39	100	none		
MW-18	38	22	58	ROS	55	no trend
MW-24	38	8	21	ROS	-369	decreasing
MW-25	17	1	6	use 1/2 DL	-50	decreasing
MW-26	14	6	43	ROS	-51	decreasing
MW-27	13	4	31	ROS	-42	decreasing
MW-29	6	3	50	ROS	11	increasing*
MW-30	7	0	0	none	-3	no trend
MW-31	7	0	0	none	-13	decreasing
MW-32	8	0	0	none	19	increasing*
MW-33	7	0	0	none	-9	no trend

Notes:

[1] ND = non-detected values; ROS = regression on order statistics

[2] MK S value = The Mann-Kendall test computes a S value for which a positive value indicates an increasing data trend, zero indicates no trend, and a negative S value indicates a decreasing trend.

[3] The statistical significance of the Mann-Kendall test S value is a function of the magnitude of S and the number of measurements compared to values (Gilbert 1987) with larger values of S and a greater number of measurements leading to higher statistical significance

*Trends based on limited data including 6 year data gap between 2014 and 2020; will be reevaluated after 2 years of quarterly data are available.

Table 8. Groundwater Monitoring Well Information, South Park Landfill

Well ID	North (NAD 83)	East (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	Notes
MW-08	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 39.32 ft btoc
MW-10	197659.19	1270559.83	17.7	19.35	1.65	45	35	45	-17.3	-27.3	B-Zone	Peristaltic	Bladder pump at 38.64 ft btoc removed, well currently sampled using peristaltic with intake at 30 ft btoc
MW-12	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
MW-14	196399.90	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
MW-18	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
MW-24	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
MW-25	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
MW-26	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
MW-27	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
MW-29	196034.29	1270270.91	19.45	19.16	-0.29	30	20	30	-0.55	-10.55	A-Zone	Peristaltic	
MW-30	197655.77	1270826.64	17.6	17.07	-0.53	13	8	13	9.6	4.6	Perched	Peristaltic	
MW-31	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
MW-32	197416.52	1270622.16	17.51	17.07	-0.44	24	19	24	-1.49	-6.49	A-Zone	Peristaltic	
MW-33	197257.91	1270751.02	17.81	17.34	-0.47	25	20	25	-2.19	-7.19	A-Zone	Peristaltic	

Notes:

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

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 Inspection and Maintenance

	Type of Activity	Date Completed	Form Completed	Comments
☒	Annual	September 21, 2020	☒	Baseline inspection
☒	Maintenance	October 2020	☒	SPPD repair from water break
☒	Reinspection	November 11, 2020	☒	Inspect SPPD repair to cap

2. Quarterly LFG Perimeter Probe Monitoring

		Date Completed	Field Forms	Comments
☐	Q1		☐	
☒	Q2	May 14, 2020	☒	
☒	Q3	August 24, 202	☒	
☒	Q4	November 9, 2020	☒	

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

		Date Completed	
		SPPD	SRDS
☐	Q1		Not required until redevelopment
☐	Q2		
☐	Q3		
☐	Q4		

Off-site building monitoring conducted? ☐ Yes ☒ No

4. Quarterly Groundwater Monitoring

		Date Completed	Field Forms	Uploaded into EIM
☐	Q1		☐	☐
☒	Q2	May 26 through 28, 2020	☒	☒
☒	Q3	August 25 through 27, 2020	☒	☒
☒	Q4	November 9 through 11, 2020	☒	☒

Site Coordinator Signature

March 31, 2021
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

Cap Inspection Work Plan

Parametrix
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719 2ND AVENUE, SUITE 200 | SEATTLE, WA 98104 | P 206.394.3700

TECHNICAL MEMORANDUM

DATE: August 5, 2020

TO: Jerome Cruz, Project Manager, Washington State Department of Ecology

FROM: Laura Lee, Project Manager, and Rhiannon Sayles, PE

SUBJECT: Cap Inspection Work Plan

CC: Jeff Neuner, SPU Landfill Closure Business Area Manager
Robert Howie, South Park Property Development LLC
Lee Momon, SPU, Solid Waste Transfer Station Manager
Suzanne Hildreth, SPU, Solid Waste Transfer Station Manager

PROJECT NUMBER: 553-1550-067

PROJECT NAME: South Park Landfill

BACKGROUND

A Consent Decree between Ecology and the South Park Landfill property owners Seattle Public Utilities (SPU) and South Park Property Development , LLC (SPPD) was signed on March 26, 2019. 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.

OBJECTIVE

The main objective of the annual inspection is to document areas of the cap that are compromised and require maintenance. This memorandum provides a work plan to perform landfill cap inspections per the Cap Inspection and Maintenance Plan (CIMP). The CIMP is an attachment to the Cleanup Action Plan (CAP) which fulfills a requirement of the Consent Decree. The CIMP states:

The purpose of this Landfill CIMP is to confirm that the landfill cap remedy is performing in a manner that protects human health and the environment. The landfill cap consists of pavement, buildings, and geomembrane/soil layers and must be maintained in such a manner to prevent contact with the solid waste/soil beneath the cap, prevent "short-circuiting" of the landfill gas (LFG) controls, and prevent interference with the stormwater controls; the cap is not required to entirely block the infiltration of stormwater. The cap must be inspected annually, and it must be repaired if it is damaged or becomes worn.

BASELINE INSPECTION

The first inspection will be considered a preliminary baseline event. Information beyond what was collected in the Remedial Investigation/Feasibility Study (RI/FS) for each parcel within the settlement area will be gathered for review. The review will include available as-built plans, maps and figures from the CAP and RI/FS, GIS information and aerial photographs.

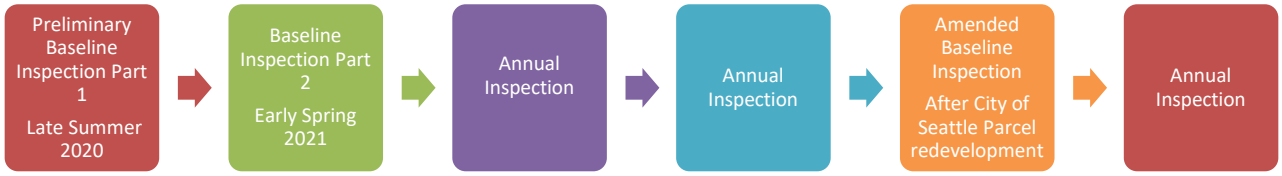
An inspection of the cap will include a visual survey of the entire cap surface exterior to buildings, including drainage features and surface components of stormwater conveyance (i.e., catch basins, swales). The integrity of the cap across the entire Settlement Area will be documented via notes, sketches, and photographs. A separate field inspection form will be completed for each property during the inspection (blank form attached). All information will be submitted to Ecology in the Year 1 Report.

Typically, inspections will occur during the spring . There are two reasons for this. First, maintenance and repair activities can be completed during the dry season. Second, groundwater levels are highest at the end of the wet weather season and stormwater management systems are exacerbated. This makes it easier for repairs to be identified.

Spring has passed, and the baseline inspection has yet to be completed. Additionally, the SPU parcel (former South Recycling and Disposal Station) is no longer being redeveloped this year. However, we feel it is still beneficial to perform a baseline inspection this year. There are several reasons for this including an unusually wet winter season in 2019-2020 and observation of potential erosion issues during the first monitoring event.

The preliminary baseline inspection will occur this year during a rain event or shortly following a rain event. A secondary “wet-weather” baseline inspection will be completed in early spring 2021 and will be included in the baseline documentation for future use.

After the baseline inspections are complete, annual inspections will commence. Annual inspections will occur every year until the SPU property is redeveloped. See section below for more information on annual inspections. Once the redevelopment occurs, a second baseline inspection will take place. This second baseline inspection will not be made until all improvements to the SPU parcel are in place. The second baseline inspection will amend the first inspection. A tentative schedule is shown below. The number of annual inspections between the preliminary baseline inspection and the amended baseline inspection is an estimate. Actual number of years may vary.



ANNUAL CAP INSPECTIONS

Following the baseline inspection, the landfill cap will be inspected annually in spring. During annual inspections, a site visit will be made to assess integrity of the cap surface exterior to buildings within all parcels of the Settlement Area. The inspections will also include a visual assessment of drainage features and surface components of stormwater conveyance (i.e., catch basins, swales). The inspection will be documented on the annual inspection forms, including notes, sketches, and photographs.

If the following disturbances to the cap are identified, they must be noted on the field inspection form and documented via sketches (for location) and photographs.

- Cracking
- Uneven settlement or potholes
- Pooling or ponding of stormwater
- Proper flow direction as designed

- Separation of pavement from curbs, gutters, or catch basins
- Sloughing or crumbling of edge materials
- Erosion
- Any other signs of cap damage, failure, deterioration, or disturbance

If any of the above are identified during an inspection, a recommendation for repairs should be included on the field inspection and maintenance form. If the cap requires maintenance or repairs the guidance listed in the CIMP will be followed.

NON-ROUTINE INSPECTIONS

An unforeseen emergency or extreme weather event, such as earthquakes, fires, or floods, or other natural or man-made disaster would trigger an out of sequence cap inspection to ensure that the cap integrity is maintained. Such unforeseen events could cause a sudden differential settlement of the cap that could affect the integrity of the cap, which may result in exposure to the underlying material or methane gas, or could affect safe operation of the LFG control system. The following criteria for unforeseen events would trigger an inspection of the landfill cap.

- 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 flood or 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 area of the Landfill observed by the Parcel Owners and facility workers or the public, such as damage sustained by high winds, facility, or vehicular accidents.

If any of the above unforeseen events occur, then a cap inspection will be scheduled with the appropriate personnel as soon as safe and practical (generally within 48 hours). Inspection and maintenance activities must be documented on an inspection and maintenance form, with any supporting sketches, figures, and photographs attached. If the integrity of the cap is significantly compromised as a result of an unforeseen event, Ecology must be notified within 1 business day of the discovery of the event and repairs initiated as soon as practicable.

SUMMARY

The proposed course of action is to perform a baseline inspection with site visit over the course of the next two months, ideally on a rainy day. The findings will be included in the 2020 annual report, including a plan for the early Spring 2021 baseline inspection part 2. After that, annual inspections will occur until the SPU property is fully redeveloped. At that time, a new baseline inspection will occur, and the original baseline will be amended. Following the new baseline inspection, the landfill cap will be inspected annually in spring.

Attachments

1. Cap Inspection, Form A
2. Cap Maintenance, Form B
3. Cleanup Action Plan Figure 6.1, Landfill Cap Requirements by Parcel

Attachments

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date: _____ **Location/Parcel:** _____

Inspector(s): _____ **Owner:** _____

Type of Inspection: ☐ Annual ☐ Non-Routine – Reason _____

VISUAL INSPECTION CHECKLIST

Asphalt Concrete	**Yes**	**No**	**Needs Repair**	**If yes, describe:**
Minor cracking	☐	☐	☐	
Open cracks/ruts	☐	☐	☐	
Differential settlement	☐	☐	☐	
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	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Recommended Maintenance or Repair Type/Location:

Low-Permeability Membrane	**Yes**	**No**	**Needs Repair**	**If yes, describe:**
Erosion of cover soil	☐	☐	☐	
Exposed geotextile barrier	☐	☐	☐	
Holes/signs of unauthorized digging	☐	☐	☐	
Poor vegetative cover	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Recommended Maintenance or Repair Type/Location:

VISUAL INSPECTION CHECKLIST (continued)

Stormwater Management Facilities	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	☐	☐	☐	
Erosion of soil	☐	☐	☐	
Exposed geotextile membrane	☐	☐	☐	
Holes/signs of unauthorized digging	☐	☐	☐	
Invasive/deep-rooted plants	☐	☐	☐	
Poor vegetative cover	☐	☐	☐	
Proper flow direction as designed	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Recommended Maintenance or Repair Type/Location:

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

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Date: _____ **Location/Parcel:** _____

Contractor: _____ **Owner:** _____

Reason for Maintenance:

Describe Maintenance Location (attach sketch and photos):

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

Is the maintenance activity complete? If ☐ Yes ☐ No

no, explain:

Approval/Inspection of Maintenance/Repair:

_____ _____

Site Coordinator 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.

DEPARTMENT OF ECOLOGY
State of Washington

Cleanup Action Plan
South Park Landfill
Seattle, Washington

Figure 6.1
Landfill Cap Requirements by Parcel

I:\GIS\Projects\COS-SPARK\MXD\CAP\2017 CAP-FEB18\Figure 6.1 Landfill Cap Requirements by Parcel.mxd
3/9/2018

B2

TM – 2020 Baseline Landfill Cap Inspection

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60 WASHINGTON AVENUE, SUITE 390 | BREMERTON, WA 98337 | P 360.377.0014

TECHNICAL MEMORANDUM

DATE:	March 30, 2021
TO:	Jeff Neuner, Seattle Public Utilities Rob Howie, South Park Property Development
FROM:	Laura Lee and Rhiannon Sayles, PE
SUBJECT:	2020 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 2020 Baseline Landfill Cap Inspection at South Park Landfill that was performed on Monday, September 21, 2020 by Rhiannon Sayles (Parametrix) and Austin York (HWA GeoSciences). 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. In accordance with the technical memorandum, dated August 5, 2020 from Parametrix to the Washington State Department of Ecology (Ecology), the main objective of the baseline inspection is to document the visual condition of the landfill cap and identify areas that are compromised and need maintenance. This initial baseline inspection will be supplemented with a secondary baseline inspection in early 2021 during the rainy season. The Cap Inspection Form A was completed and is included as Attachment A.

The inspection took place on the morning of September 21, 2020 from approximately 8:00 AM to 11:30 AM. The weather was clear and 65°F. The last substantial rain even was two days prior (Saturday, September 19) when approximately 0.39" of rain fell. The inspection started on the southern portion of the site on the South Park Property Development (SPPD) property and progressed north to the South Recycling and Disposal Station (SRDS) property. A landfill cap inspection site plan is included in Attachment B. Photographs were taken, and GIS points were collected using a Geode GPS sub-meter receiver at each location where a potential issue or concern was observed. The photographs are numbered and included in Attachment C with numbers mapped on the Attachment B site plan. Additionally, the GIS points and photographs were transposed onto a map which can be referenced here: https://arcg.is/ri5SO. The site is an interactive web map. The remainder of this memorandum is broken down by parcel to delineate the respective responsible party.

Corrective actions proposed for the property owners should be confirmed with Parametrix prior to taking action. Parametrix should perform verification inspections after corrective actions are complete to confirm the maintenance and repair are consistent with the intent of the regulatory requirements.

SPPD PARCEL

There were 31 locations on the SPPD parcel identified as points or lines of concern for one or more of the following conditions: exposed geotextile, exposed geomembrane (potential landfill cap geomembrane), ponding, minor pavement cracking, water flowing from asphalt, poor vegetative cover, and erosion. Each location of concern is identified by number on Attachment B and corresponding photographs are in Attachment C.

Table 1 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.

Table 1. Identified Locations of Concern on the SPPD Parcel

Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
1	Standing water in west bioswale	Regrade for drainage	12-months	SPPD Property Owner
2	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
3	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
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)	3-months	SPPD Property Owner
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	3-months	SPPD Property Owner
6	Ponding	Regrade for drainage	12-months	SPPD Property Owner
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	3-months	SPPD Property Owner
8	Potholes/pavement cracking	Follow-up inspection	6-months	SPPD Property Owner
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	3-months	SPPD Property Owner
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	3-months	SPPD Property Owner
11	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
12	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
13	Ponding	Follow-up inspection	6-months	Parametrix
14	Ponding	Follow-up inspection	6-months	Parametrix
15	Ponding	Follow-up inspection	6-months	Parametrix

Table 1. Identified Locations of Concern on the SPPD Parcel (continued)

Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
16	Ponding above LFG Collector Control Box V4	Confirm no infiltration into the control box. Raise control box and surrounding grade to prevent ponding.	6-months	SPPD Property Owner
17	Ponding	Follow-up inspection	6-months	Parametrix
18	Ponding	Follow-up inspection	6-months	Parametrix
19	Ponding	Follow-up inspection	6-months	Parametrix
20	Water flowing from asphalt	Determine source of water and take corrective action. Restore the area in accordance with the IAWP. Monitor the area for settlement impacts as a result of the water.	Immediate	SPPD Property Owner
21	Ponding	Follow-up inspection	6-months	Parametrix
22	Ponding above Sanitary Cleanout	Confirm no infiltration into or around the cleanout. Raise cleanout and surrounding grade to prevent ponding.	6-months	SPPD Property Owner
23	Ponding	Follow-up inspection	6-months	Parametrix
24	Ponding	Follow-up inspection	6-months	Parametrix
25	Ponding	Follow-up inspection	6-months	Parametrix
26	Minor pavement cracking/ponding	Follow-up inspection	6-months	Parametrix
33	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
34	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
35	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
36	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
37	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner
38	Exposed geotextile	Reestablish vegetation	6-months	SPPD Property Owner

.

Of these 31 locations, 6 are recommended as higher priority. The high priority items include: the location where water is flowing up through the asphalt at about 0.5 gpm (Point Location 20); four locations where the landfill cap geomembrane is exposed (Point Locations 4, 5, 7, 9); and the location of the unknown vertical pipes (Point Location 10).

The area in which water is flowing up from the asphalt pavement requires immediate action. In review of the SPPD as-built drawings, included as Attachment D, there appear to be two waterlines in the vicinity. Without intervention and repairs, the conditions will likely deteriorate further. Additionally, since the water source is below the asphaltic landfill cap, the water has potential to infiltrate the landfill waste and become contaminated groundwater. *[Update: SPPD and Ecology were immediately notified of this observation. SPPD located the source*

of the water leak, repaired it, and patched the asphalt. The repair to the cap was inspected during the 2020 fourth quarter compliance monitoring event. The patch looked good and the asphalt surrounding the patch appeared solid and intact.]

The five other priority concerns are located around the perimeter of the SPPD site in the vegetated slope areas. These areas are of higher 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. Attachment E includes a schematic cross-section of a vegetated slope area. Refer to the Agreed Order for complete requirements.

SRDS PARCEL

On the SRDS parcel, there were 8 locations identified as points or lines of concern for one or more of the following conditions: ponding and minor pavement cracking. Each location of concern is identified by number on Attachment B and corresponding photographs are in Attachment C.

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.

Table 2. Identified Points of Concern on the SRDS Parcel

Point #	Description	Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment
27	Minor pavement cracking	Follow-up inspection	6-months	Parametrix
28	Minor pavement cracking	Follow-up inspection	6-months	Parametrix
29	Ponding	Follow-up inspection	6-months	Parametrix
30	Ponding	Follow-up inspection	6-months	Parametrix
31	Ponding	Follow-up inspection	6-months	Parametrix
32	Minor pavement cracking	Follow-up inspection	6-months	Parametrix
39	Minor pavement cracking	Follow-up inspection	6-months	Parametrix

There are no items recommended as high priority on the SRDS parcel at this time.

ATTACHMENTS

A 2020 Cap Inspection Form A

B Landfill Cap Inspection – Site Plan

C Photographs

D SPPD As-Built

E 2013 Interim Action Work Plan – Figure 5

Attachment A

2020 Cap Inspection Form A

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date: September 21, 2020 8:00-11:30AM **Location/Parcel:** SPPD & SRDS

Inspector(s): Rhiannon Sayles & Austin York **Owner:**

Type of Inspection: ☒ Annual ☐ Non-Routine – Reason 2020 Baseline

Last Rain Event before Inspection: 0.39" on September 18th, 2020

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	**No**	**Needs Repair**	**If yes, describe:**
Minor cracking	☒	☐	☐	Minor cracking in a few locations. No major concerns at this time.
Open cracks/ruts	☐	☒	☐	
Differential settlement	☐	☒	☐	
Potholes	☐	☒	☐	
Pooling or ponding	☒	☐	☒	Small ponding areas (no larger than 100 sf) around SPPD site. One ponding location is directly above landfill gas collector control box V4 and another at a sewer cleanout.
Separation of pavement from curbs, gutters, or catch basins	☐	☒	☐	
Sloughing or crumbling of edge materials	☐	☒	☒	
Erosion	☐	☒	☐	
Other signs of cap damage, failure, or disturbance	☒	☐	☒	Significant amount of water is seeping from asphalt pavement on SPPD property in location of 6" water main. Needs immediate attention.
	☐	☐	☐	

Recommended Maintenance or Repair Type/Location:

Source of water leakage needs to be repaired immediately. Other recommendations per location have been included in the 2020 Baseline Landfill Cap Inspection memorandum.

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	**No**	**Needs Repair**	**If yes, describe:**
Erosion of cover soil	☒	☐	☒	Erosion is evident by the exposed geotextile and geomembrane in specific locations
Exposed geotextile	☒	☐	☒	On the slopes outside of the fence of the SPPD property there were numerous locations where the geotextile was exposed.
Holes/signs of unauthorized digging	☐	☒	☐	
Poor vegetative cover	☒	☐	☒	Poor vegetative cover on the slopes outside of the fence on the SPPD property.
Exposed geomembrane	☒	☒	☒	There are four locations (all on the SPPD property) where the black landfill cap geomembrane is exposed.
	☐	☐	☐	

Recommended Maintenance or Repair Type/Location:

All locations where the geomembrane (potential landfill cap geomembrane) is exposed need to be inspected and properly restored to the design condition. This includes adding protection from further erosion. Other recommendations per location have been included in the 2020 Baseline Landfill Cap Inspection memorandum.

VISUAL INSPECTION CHECKLIST (continued)

Stormwater Management Facilities				
	Yes	**No**	**Needs Repair**	**If yes, describe:**
Signs of water infiltration below structures	☐	☒	☐	
Erosion of soil	☒	☐	☐	North bioswale has erosion on the side slopes that exposes the geomembrane. 18" Cover must be restored in accordance with the IAWP
Holes/signs of unauthorized digging	☐	☒	☐	
Invasive/deep-rooted plants	☐	☒	☐	
Poor vegetative cover	☒	☐	☐	North bioswale is poorly vegetated.
Proper flow direction as designed	☒	☐	☐	Swales and conveyance structures appear to be flowing as designed. West bioswale has some standing water approximately 48 hours after end of last storm event.
	☐	☐	☐	

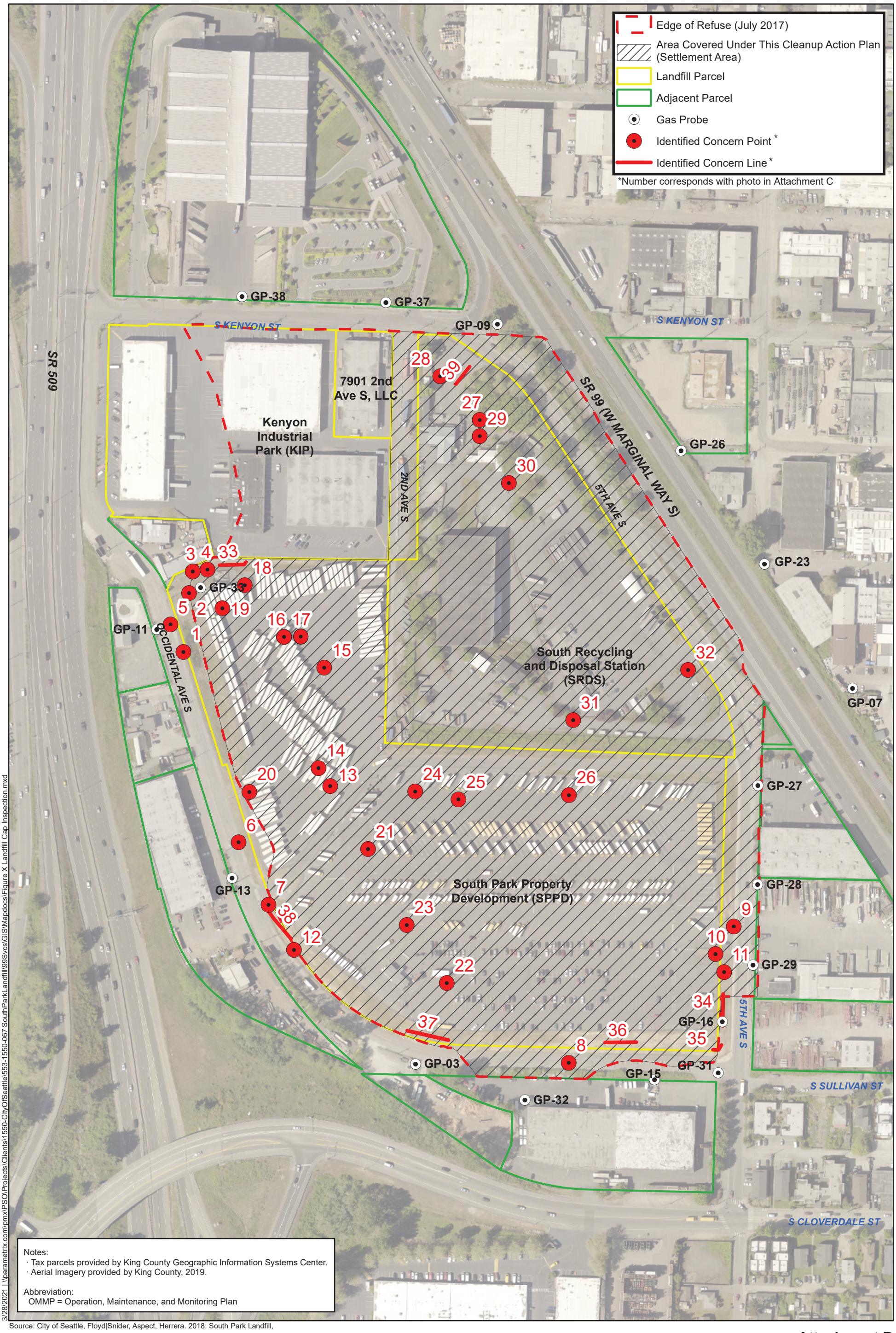
Recommended Maintenance or Repair Type/Location:

The source of standing water in the west bioswale needs to be further investigated. It could be a result of constant flow from water leakage, the swale outfall may be clogged, or there may be another issue. Other recommendations per location have been included in the 2020 Baseline Landfill Cap Inspection memorandum

Attach necessary documentation such as photographs, sketches, and additional notes.
See 2020 Baseline Landfill Cap Inspection memorandum site plan and photos.

Attachment B

Landfill Cap Inspection – Site Plan



3/28/2021 \\parametrix.com\pmx\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\GIS\Mapdocs\Figure X Landfill Cap Inspection.mxd

Source: City of Seattle, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill,

Parametrix

Attachment B
Landfill Cap Inspection - Site Plan

South Park Landfill

September 21, 2020

Attachment C

Photographs

Location 1. Standing Water in West Bioswale

Location 1. Standing Water in West Bioswale

Location 2. Exposed Geotextile

Location 2. Exposed Geotextile

Location 2. Exposed Geotextile

Location 3. Exposed Geotextile

Location 4. Exposed Geomembrane

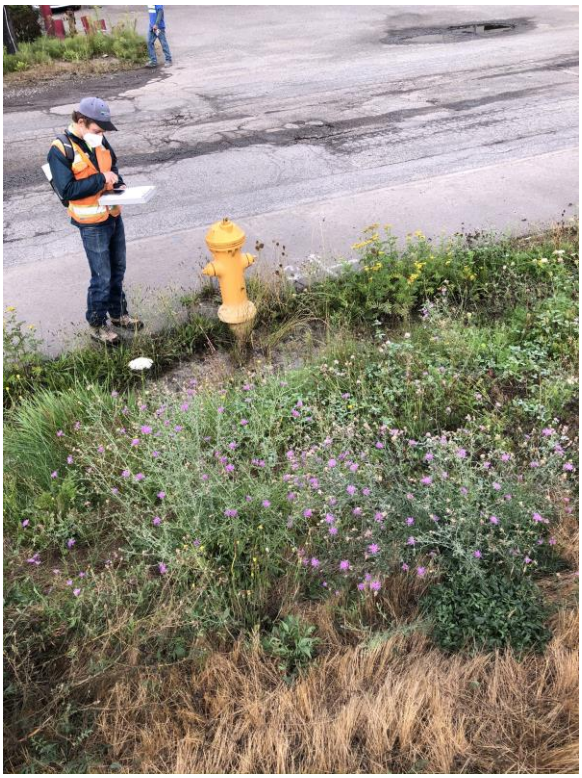
Location 4. Exposed Geomembrane

Location 4. Exposed Geomembrane

Location 5. Exposed Geomembrane

Location 5. Exposed Geomembrane

Location 5. Exposed Geomembrane



Location 6. Ponding

Location 7. Exposed Geomembrane

Location 7. Exposed Geomembrane

Location 8. Potholes/Pavement Cracking

Location 8. Potholes/Pavement Cracking

Location 9. Exposed Geomembrane

Location 10. Unknown Open Vertical Pipes

Location 11. Exposed Geotextile

Location 12. Exposed Geotextile

Location 13. Ponding

Location 14. Ponding

Location 15. Ponding

Location 16. Ponding above LFG Collector Control Box V4

Location 17. Ponding

Location 18. Ponding

Location 19. Ponding

Location 20. Water Flowing from Asphalt

Location 20. Water Flowing from Asphalt

Location 21. Ponding

Location 22. Ponding above Sanitary Cleanout

Location 23. Ponding


Location 24. Ponding


Location 25. Ponding


Location 26. Minor Pavement Cracking/Ponding

Location 27. Minor Pavement Cracking

Location 28. Minor Pavement Cracking

Location 29. Ponding

Location 30. Ponding

Location 31. Ponding

Location 32. Minor Pavement Cracking

Location 33. Exposed Geotextile

Location 34. Exposed Geotextile

Location 35. Exposed Geotextile

Location 36. Exposed Geotextile

Location 37. Exposed Geotextile

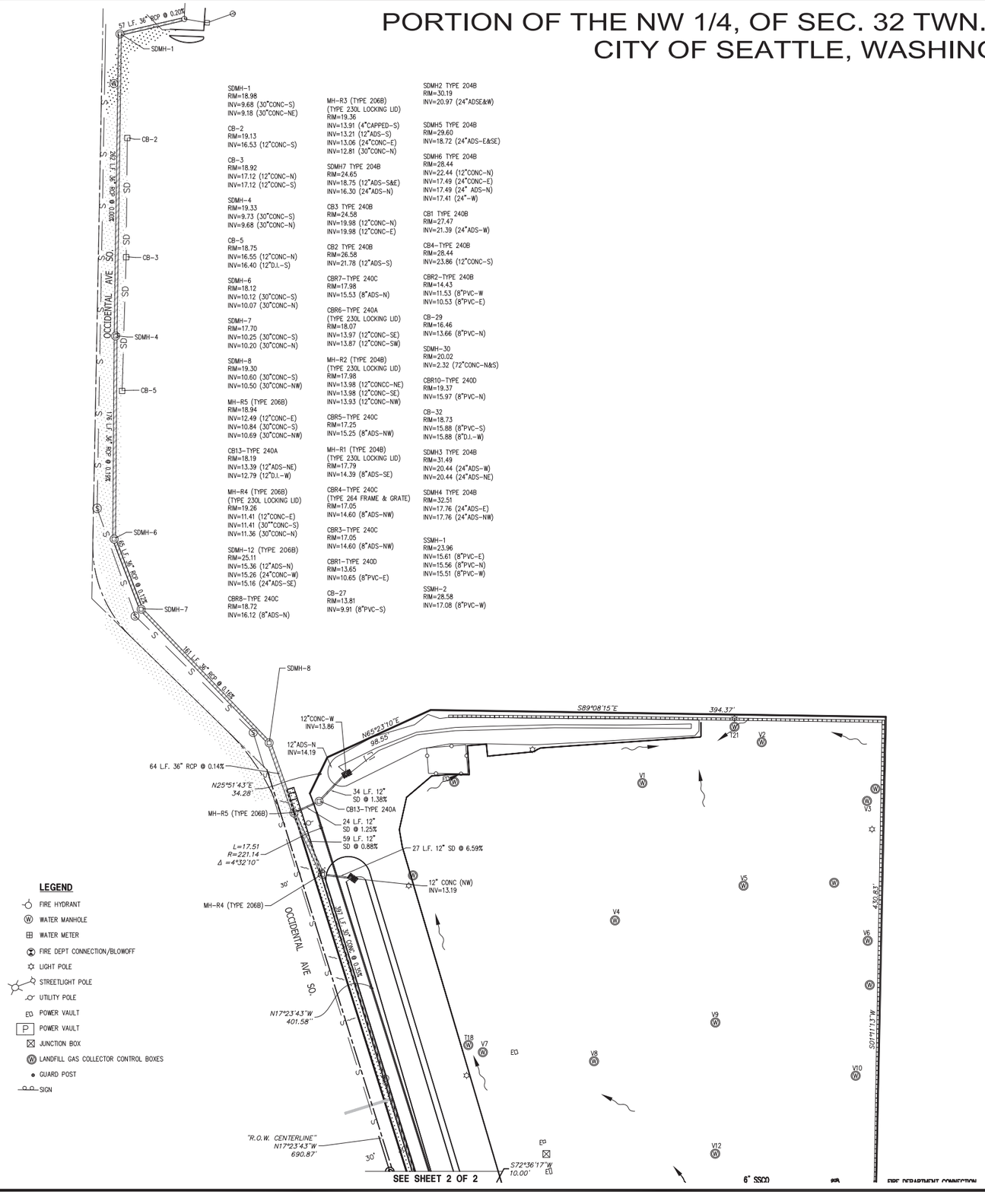
Location 38. Exposed Geotextile

Location 39. Minor Pavement Cracking

Attachment D

SPPD As-Built

PORTION OF THE NW 1/4, OF SEC. 32 TWN. 24 N., RNG 4 E., WM
CITY OF SEATTLE, WASHINGTON



LEGAL DESCRIPTION

PARCEL A

THAT PORTION OF GOVERNMENT LOTS 2 THROUGH 4, INCLUSIVE, AND OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 24 NORTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WEST LINE OF GEORGE HOLT'S DONATION CLAIM NO. 51, AS ESTABLISHED BY SUPERIOR COURT CASE NO. 14450, WHICH IS 400 FEET NORTH OF THE SOUTHWESTERLY CORNER THEREOF;
THENCE SOUTH ALONG SAID WEST LINE 400 FEET TO THE SOUTH LINE OF SAID DONATION CLAIM;
THENCE EAST ALONG SAID SOUTH LINE TO THE WEST LINE OF A. HOGRAVE'S DONATION CLAIM NO. 37;
THENCE SOUTH ALONG THE LAST DESCRIBED WEST LINE TO THE PRODUCTION WEST OF THE CENTERLINE OF SULLIVAN STREET;
THENCE WEST ALONG SAID PRODUCED LINE TO THE EAST LINE OF 1ST AVENUE SOUTH, AS ESTABLISHED BY ORDINANCE NO. 21498;
THENCE NORTH ALONG SAID EAST LINE 39.56 FEET;
THENCE NORTH 66°52'24" EAST 562.14 FEET;
THENCE NORTH 16°56'06" WEST 861.57 FEET;
THENCE NORTH 24°43'54" EAST 35.17 FEET;
THENCE NORTH 64°14'54" EAST 98 FEET;
THENCE EASTERLY ALONG A STRAIGHT LINE TO THE POINT OF BEGINNING;
EXCEPT THAT PORTION THEREOF DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF A LINE 794 FEET WEST OF AND PARALLEL WITH THE WEST LINE OF A. HOGRAVE'S DONATION CLAIM NO. 37 AND THE PRODUCTION WEST OF THE CENTERLINE OF SULLIVAN STREET;
THENCE WEST ALONG SAID PRODUCED LINE TO THE EAST LINE OF 1ST AVENUE SOUTH, AS ESTABLISHED BY ORDINANCE NO. 21498;
THENCE NORTH ALONG SAID EAST LINE 39.56 FEET;
THENCE NORTH 66°52'24" EAST 562.14 FEET;
THENCE SOUTHEASTERLY ALONG A STRAIGHT LINE TO THE POINT OF BEGINNING; AND
EXCEPT THOSE PORTIONS CONVEYED TO THE CITY OF SEATTLE BY DEEDS RECORDED UNDER RECORDING NUMBERS 5947050 AND 6240807; AND
EXCEPT THAT PORTION LYING SOUTHWESTERLY OF THE NORTHEASTERLY LINE OF OCCIDENTAL AVENUE SOUTH (ROAD NO. 51); AND
EXCEPT THAT PORTION THEREOF DESCRIBED AS FOLLOWS:

THAT PORTION OF GOVERNMENT LOT 4, SECTION 32, TOWNSHIP 24 NORTH. RANGE 4 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WEST LINE OF GEO. HOLT DONATION CLAIM NO. 51 WHICH IS 516.36 FEET SOUTH OF THE NORTH LINE OF SECTION 32, TOWNSHIP 24 NORTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON;
THENCE SOUTH 02°03'26" WEST ALONG SAID LINE 400 FEET;
THENCE NORTH 89°53'36" EAST ALONG THE SOUTH LINE OF SAID DONATION CLAIM 73.16 FEET;
THENCE SOUTH 00°35'49" WEST ALONG A LINE PARALLEL TO AND 794 FEET WEST OF THE WEST LINE OF A. HOGRAVE DONATION CLAIM NO. 37, A DISTANCE OF 350 FEET;
THENCE WESTERLY TO A CONCRETE MONUMENT ON THE EAST LINE OF CHAS. PRENTICE TRACTj
THENCE NORTH 16°56'06" WEST 705.57 FEET;
THENCE NORTH 24°43'54" EAST 35.17 FEET;
THENCE NORTH 64°14'54" EAST 98 FEET;
THENCE EASTERLY TO THE POINT OF BEGINNING.

PARCEL B

THAT PORTION OF GOVERNMENT LOT 4, SECTION 32, TOWNSHIP 24 NORTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WEST LINE OF GEO. HOLT DONATION CLAIM NO. 51 WHICH IS 516.36 FEET SOUTH OF THE NORTH LINE OF SECTION 32, TOWNSHIP 24 NORTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON;

THENCE SOUTH 02°03'26" WEST ALONG SAID LINE 400 FEET;

THENCE NORTH 89°53'36" EAST ALONG THE SOUTH LINE OF SAID DONATION CLAIM 73.16 FEET;

THENCE SOUTH 00°35'49" WEST ALONG A LINE PARALLEL TO AND 794 FEET WEST OF THE WEST LINE OF A. HOGRAVE DONATION CLAIM NO. 37, A DISTANCE OF 350 FEET;

THENCE WESTERLY TO A CONCRETE MONUMENT ON THE EAST LINE OF CHAS. PRENTICE TRACT;

THENCE NORTH 16°56'06" WEST 705.57 FEET;

THENCE NORTH 24°43'54" EAST 35.17 FEET;

THENCE NORTH 64°14'54" EAST 98 FEET;

THENCE EASTERLY TO THE POINT OF BEGINNING;

EXCEPT ANY PORTION THEREOF LYING WITHIN OCCIDENTAL AVENUE; AND

EXCEPT THAT PORTION CONVEYED TO THE CITY OF SEATTLE BY DEED RECORDED UNDER RECORDING NUMBER 5947050.

CURRENT ZONING: IG2 U/65 INDUSTRIAL GENERAL 2 UNLIMITED/65 AND INDUSTRIAL BUFFER UNLIMITED/45

GROSS LAND AREA: 849,163 SQ. FT.± 19.49 ACRES

FLOOD ZONE: NO FLOOD ZONE CLASSIFICATION PER FIRM PANEL 640 OF 1725 – 53033C0640F

BUILDING SETBACK: PER SMC 23.53.020(C)(1) THERE IS NO BUILDING SETBACK REQUIRED DUE TO THE EXISTING RIGHT-OF-WAY SURROUNDING THE PROPERTY

NOTES:

1. EARTH MOVING EVIDENCE IS CONSTRUCTION OF PRELOAD AS SHOWN ON PLAN.
2. NO KNOWN CHANGES IN STREET RIGHT-OF-WAY LINES.
3. NO OBSERVED EVIDENCE OF THE SITE AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.
4. NO WETLANDS ARE DELINEATED ON THE SITE.

REVISIONS		
DESCRIPTION	BY	DATE

STEVEN D. McCASKEY
STATE OF WASHINGTON
42676
REGISTERED
PROFESSIONAL LAND SURVEYOR

SEACON SOUTH PARK

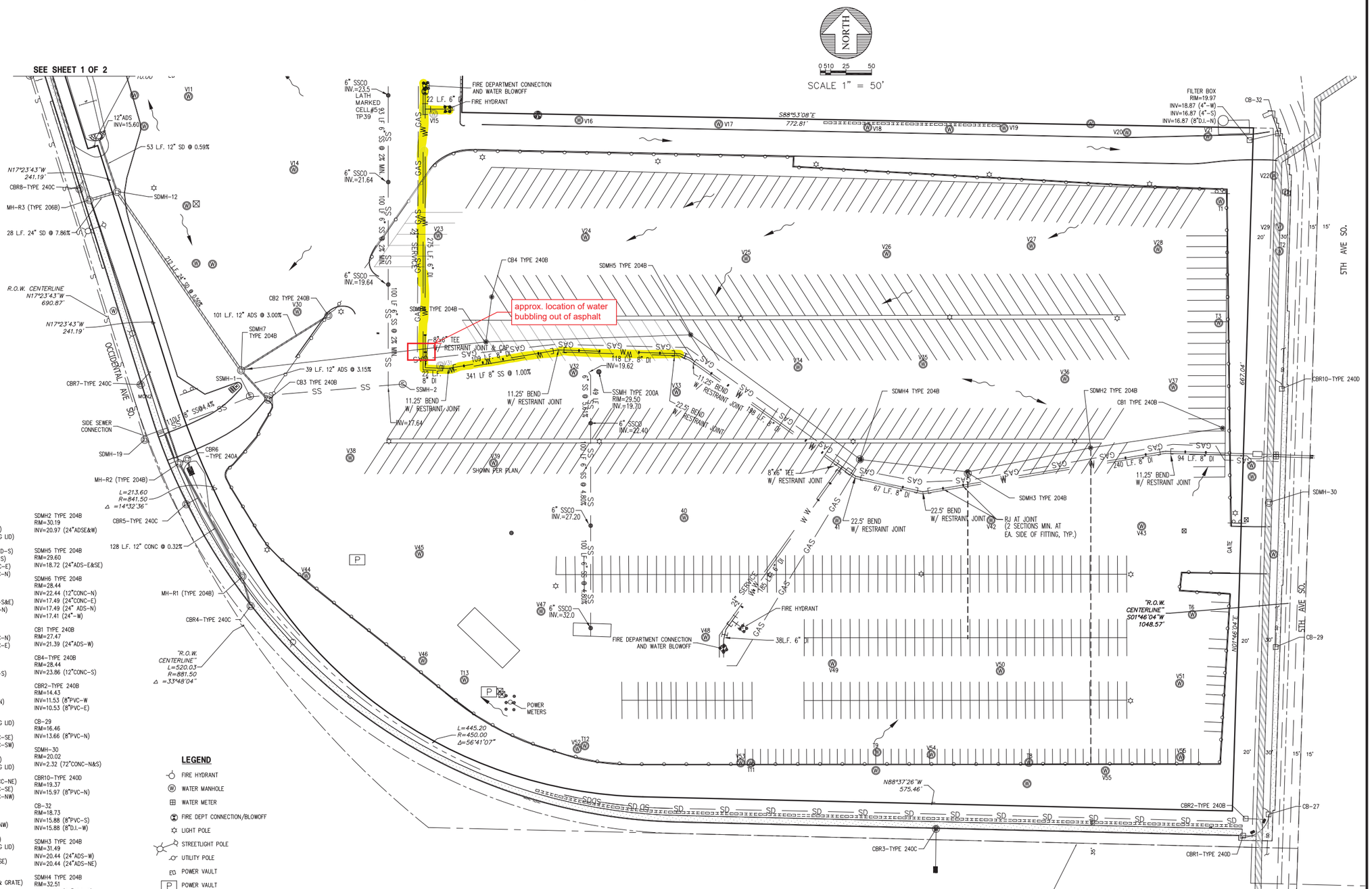
ASBUILT DRAWING

Encompass ENGINEERING & SURVEYING
Western Washington Division
165 NE Juniper Street, Suite 201 ▪ Issaquah, WA 98027 ▪ Phone: (425) 392-0250 ▪ Fax: (425) 391-3055
Eastern Washington Division
108 East 2nd Street ▪ Cle Elum, WA 98922 ▪ Phone: (509) 674-7433 ▪ Fax: (509) 674-7419

JOB NO.	10613
DATE	5/27/15
SCALE	1"=50'
DESIGNED	SDM
DRAWN	JEF
CHECKED	SDM
APPROVED	SDM

SHEET 1 OF 2

PORTION OF THE NW 1/4, OF SEC. 32 TWN. 24 N., RNG 4 E., WM
CITY OF SEATTLE, WASHINGTON



SDMH-1
RIM=18.98
INV=9.68 (30"CONC-S)
INV=9.18 (30"CONC-NE)

CB-2
RIM=19.13
INV=16.53 (12"CONC-S)

CB-3
RIM=18.92
INV=17.12 (12"CONC-N)
INV=17.12 (12"CONC-S)

SDMH-4
RIM=19.33
INV=9.73 (30"CONC-S)
INV=9.68 (30"CONC-N)

CB-5
RIM=18.75
INV=16.55 (12"CONC-N)
INV=16.40 (12"D.I.-S)

SDMH-6
RIM=18.12
INV=10.12 (30"CONC-S)
INV=10.07 (30"CONC-N)

SDMH-7
RIM=17.70
INV=10.25 (30"CONC-S)
INV=10.20 (30"CONC-N)

SDMH-8
RIM=19.30
INV=10.60 (30"CONC-S)
INV=10.50 (30"CONC-NW)

MH-R5 (TYPE 206B)
RIM=18.94
INV=12.49 (12"CONC-E)
INV=10.84 (30"CONC-S)
INV=10.69 (30"CONC-NW)

CB13-TYPE 240A
RIM=18.19
INV=13.39 (12"ADS-NE)
INV=12.79 (12"D.I.-W)

MH-R4 (TYPE 206B)
(TYPE 230L LOCKING LID)
RIM=19.26
INV=11.41 (12"CONC-E)
INV=11.41 (30"CONC-S)
INV=11.36 (30"CONC-N)

SDMH-12 (TYPE 206B)
RIM=25.11
INV=15.36 (12"ADS-N)
INV=15.26 (24"CONC-W)
INV=15.16 (24"ADS-SE)

CBR8-TYPE 240C
RIM=18.72
INV=16.12 (8"ADS-N)

MH-R3 (TYPE 206B)
(TYPE 230L LOCKING LID)
RIM=19.36
INV=13.91 (4"CAPPED-S)
INV=13.21 (12"ADS-S)
INV=13.06 (24"CONC-E)
INV=12.81 (30"CONC-N)

SDMH7 TYPE 204B
RIM=24.65
INV=18.75 (12"ADS-S&E)
INV=16.30 (24"ADS-N)

CB3 TYPE 240B
RIM=24.58
INV=19.98 (12"CONC-N)
INV=19.98 (12"CONC-E)

CB2 TYPE 240B
RIM=26.58
INV=21.78 (12"ADS-S)

CBR7-TYPE 240C
RIM=17.98
INV=15.53 (8"ADS-N)

CBR6-TYPE 240A
(TYPE 230L LOCKING LID)
RIM=18.07
INV=13.97 (12"CONC-SE)
INV=13.87 (12"CONC-SW)

MH-R2 (TYPE 204B)
(TYPE 230L LOCKING LID)
RIM=17.98
INV=13.98 (12"CONCC-NE)
INV=13.98 (12"CONC-SE)
INV=13.93 (12"CONC-NW)

CBR5-TYPE 240C
RIM=17.25
INV=15.25 (8"ADS-NW)

MH-R1 (TYPE 204B)
(TYPE 230L LOCKING LID)
RIM=17.79
INV=14.39 (8"ADS-SE)

CBR4-TYPE 240C
(TYPE 264 FRAME & GRATE)
RIM=17.05
INV=14.60 (8"ADS-NW)

CBR3-TYPE 240C
RIM=17.05
INV=14.60 (8"ADS-NW)

CBR1-TYPE 240D
RIM=13.65
INV=10.65 (8"PVC-E)

CB-27
RIM=13.81
INV=9.91 (8"PVC-S)

SDMH2 TYPE 204B
RIM=30.19
INV=20.97 (24"ADSE&W)

SDMH5 TYPE 204B
RIM=29.60
INV=18.72 (24"ADS-E&SE)

SDMH6 TYPE 204B
RIM=28.44
INV=22.44 (12"CONC-N)
INV=17.49 (24"CONC-E)
INV=17.49 (24" ADS-N)
INV=17.41 (24"-W)

CB1 TYPE 240B
RIM=27.47
INV=21.39 (24"ADS-W)

CB4-TYPE 240B
RIM=28.44
INV=23.86 (12"CONC-S)

CBR2-TYPE 240B
RIM=14.43
INV=11.53 (8"PVC-W
INV=10.53 (8"PVC-E)

CB-29
RIM=16.46
INV=13.66 (8"PVC-N)

SDMH-30
RIM=20.02
INV=2.32 (72"CONC-N&S)

CBR10-TYPE 240D
RIM=19.37
INV=15.97 (8"PVC-N)

CB-32
RIM=18.73
INV=15.88 (8"PVC-S)
INV=15.88 (8"D.I.-W)

SDMH3 TYPE 204B
RIM=31.49
INV=20.44 (24"ADS-W)
INV=20.44 (24"ADS-NE)

SDMH4 TYPE 204B
RIM=32.51
INV=17.76 (24"ADS-E)
INV=17.76 (24"ADS-NW)

SSMH-1
RIM=23.96
INV=15.61 (8"PVC-E)
INV=15.56 (8"PVC-N)
INV=15.51 (8"PVC-W)

SSMH-2
RIM=28.58
INV=17.08 (8"PVC-W)

LEGEND

- FIRE HYDRANT
- WATER MANHOLE
- WATER METER
- FIRE DEPT CONNECTION/BLOWOFF
- LIGHT POLE
- STREETLIGHT POLE
- UTILITY POLE
- POWER VAULT
- JUNCTION BOX
- LANDFILL GAS COLLECTOR CONTROL B
- GUARD POST
- SIGN

ALL STORM STRUCTURES WERE TYPE SHOWN ON CONSTRUCTION PLANS

REVISIONS

DESCRIPTION	BY	DATE

STEVEN D. McCASKEY — STATE OF WASHINGTON — 42676 — REGISTERED PROFESSIONAL LAND SURVEYOR

SEACON SOUTH PARK

ASBUILT DRAWING

Encompass ENGINEERING & SURVEYING
165 NE Juniper Street, Suite 201 • Issaquah, WA 98027 • Phone: (425) 392-0250 • Fax: (425) 391-3055
Western Washington Division
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108 East 2nd Street • Cle Elum, WA 98922 • Phone: (509) 674-7433 • Fax: (509) 674-7419

JOB NO.	10613
DATE	5/27/15
SCALE	1"=50'
DESIGNED	SDM
DRAWN	JEF
CHECKED	SDM
APPROVED	SDM
SHEET	2 OF 2

Attachment E

2013 Interim Action Work Plan – Figure 5

WEST BIOSWALE AT APPROXIMATE ROAD SECTION 27+00

WEST SLOPE COVER SYSTEM

WEST BIOSWALE 17'

EAST SLOPE LOW-PERMEABILITY MEMBRANE CAP

ASPHALTIC CONCRETE CAP

OCCIDENTAL AVENUE SOUTH

APPROXIMATE ROAD ELEVATION +19'

PROPOSED SHOULDER IMPROVEMENTS

1.5' TO 3' IMPORTED FILL

APPROXIMATE PROPERTY BOUNDARY

APPROXIMATE LANDFILL BOUNDARY

EXISTING ASPHALT CONCRETE

MARKER FABRIC PLACED ON PREPARED EXISTING GROUND SURFACE

2.5:1

1.5' IMPORTED FILL

APPROXIMATE FINISHED ELEVATION +12.9'

24" COLLECTOR STORM SEWER TO CAPTURE CURRENT TRIBUTARY INFLOWS TO WEST DITCH (APPROXIMATE INVERT ELEVATION +11.9')

PRE-CONSTRUCTION APPROXIMATE GROUNDWATER ELEVATION: +10.5'

SOLIDIFIED MATERIAL

APPROXIMATE ELEVATION = +5'

APPROXIMATE TOP-OF-ASPHALT ELEVATION +24'

PROPOSED SPPD PROPERTY IMPROVEMENTS

6" TOPSOIL

1' IMPORTED FILL DRAINAGE LAYER

6" BEDDING LAYER

3:1

APPROXIMATE EXISTING GRADE

50 mil MINIMUM TEXTURED GEOMEMBRANE

2' x 2' GRAVEL-FILLED GEOMEMBRANE ANCHOR

EXISTING SOIL COVER OVER SOLID WASTE (VARIABLE THICKNESS 0-48")

SOLID WASTE

NATIVE MATERIAL

DRAINAGE (4' WIDE BY 2' DEEP TRENCH CUT INTO TOP OF SOLIDIFIED MASS AND FILLED WITH DRAIN ROCK)

A-ZONE OF ALLUVIAL AQUIFER

ESTUARINE DEPOSIT (APPROXIMATE ELEVATION BELOW WEST DITCH -10')

NOT TO SCALE

DRAFT

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 5

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

B3

Cap Maintenance Documentation

B3-A

Example Form

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Location/Parcel: _____ **Owner Contact:** _____

Part 1: Maintenance **(Completed by Property Owner)**	
Date of Repair/ Maintenance:	**Repaired by:**
Reason for Maintenance:	
Describe Maintenance Location (attach sketch and photos):	
Describe Maintenance or Repair Performed (attach photos and documentation as necessary):	
Is the maintenance activity complete? ☐ Yes ☐ No **If no, explain:**	
_____ 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.	

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

Date of Observation/Review:	**Inspector(s):**
Observation Notes (attach photos):	
Is the maintenance activity complete? ☐ Yes ☐ No **If no, explain:**	
Site Coordinator Signature	Date

B3-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:	**Repaired by:**

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 — Date: 3/31/21

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 4th 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:

Site Coordinator Signature

March 31, 2021
Date

Appendix C

Landfill Gas Monitoring

C1

TM - Triggers and Contingent Actions for Perimeter Probe Monitoring

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

719 2ND AVENUE, SUITE 200 | SEATTLE, WA 98104 | P 206.394.3700

TECHNICAL MEMORANDUM

DATE: March 10, 2021
TO: Jeff Neuner, SPU Landfill Closure Business Area Manager
FROM: Laura Lee and Lisa Gilbert
SUBJECT: Triggers and Contingent Actions for Perimeter Probe Monitoring
CC: Robert Howie, South Park Property Development LLC
PROJECT NUMBER: 553-1550-067
PROJECT NAME: South Park Landfill

INTRODUCTION

The South Park Landfill Site is a former municipal solid waste landfill in the South Park neighborhood of Seattle, Washington. Long-term monitoring of landfill gas (LFG) probes at the South Park Landfill is being performed by the City of Seattle Public Utilities for the portion of the Site referred to as the Settlement Area under a Consent Decree with the Washington State Department of Ecology (Ecology).

The monitoring is described in the Post-Closure Operation, Maintenance, and Monitoring Plan (OMMP), presented as Appendix A of the Final Cleanup Action Plan (Ecology 2018). The Settlement Area includes the South Park Property Development Parcel (SPPD), the South Recycling and Disposal Station (SPDS) parcel, and certain adjacent right-of-ways. Parametrix has been designated as the Site Coordinator to perform the long-term monitoring and reporting required under the CAP and the OMMP.

OBJECTIVES

Figure A.2.4 of the Landfill Gas Monitoring and Contingency Plan in the OMMP (included as Attachment A) presents a flow chart for triggers and contingent actions for perimeter probe monitoring to be performed if certain levels of methane are detected during routine ongoing monitoring. The flow chart requires evaluating whether "concentrations between 1.25 and 5 percent have previously been shown to be protective for the probe (see table)." The objective of this technical memorandum is to summarize information used to determine the methane levels that have been shown to be protective and clarify the trigger criteria for contingent actions at each probe.

REGULATORY BACKGROUND

LFG mitigation criteria are defined in WAC 173-304-460 and King County Board of Health Title 10 regulations. The principal criteria relevant to the South Park Landfill are the following:

- Methane concentrations in soil at the Landfill Property boundary must not exceed 5 percent by volume, the LEL for methane. These concentrations are typically monitored at permanent LFG probes using calibrated field monitors.
- Methane concentrations inside buildings and structures at the Landfill Property must not exceed 1.25 percent by volume, or 25 percent of the LEL. These concentrations are typically measured by either calibrated hand-held monitors or installed building monitors/alarms.

- Methane concentrations inside buildings and structures beyond the Landfill Property boundary must not exceed 100 ppmv. These concentrations are typically measured by either calibrated hand-held monitors or installed building monitors/alarms.

LFG CONTROL SYSTEMS

In 2014 and 2015 an active LFG control system was installed at the SPPD parcel as part of the Interim Action redevelopment. The system consists of a network of vertical gas collection wells and horizontal gas collection trenches. LFG is extracted under an applied vacuum (via vacuum blower) and discharged out a vent stack in the surface component equipment enclosure, which is located on the northwest portion of the parcel. An LFG control system is also planned as part of the redevelopment of the SRDS parcel but has not yet been installed to date.

HISTORICAL MONITORING DATA SUMMARY

During the RI, methane levels above 5 percent were measured in some gas probes along the perimeter of the Settlement Area, including GP-27 and GP-29 along the eastern perimeter and GP-33 along the northwestern perimeter. Some of the perimeter probes are adjacent to off-site buildings, which are not being routinely monitored for methane.

In early 2011, elevated methane concentrations were detected at LFG probe locations GP-27, GP-28, and GP-29 (6.5, 2.8, and 8.5 percent [by volume], respectively). In response, indoor air studies were conducted at five adjacent buildings (within 100 ft) located east of 5th Avenue South and the SPPD to establish a baseline of methane gas monitoring data across the seasons and to support the existing safety of people and structures. Methane was measured quarterly during 2011 in perimeter gas probes and the indoor air of the buildings located at 8230 and 8250 5th Avenue South for 1-year in accordance with a monitoring plan (Herrera (2011), provided in Attachment B.

The results of the 2011 monitoring were summarized in the report (Herrera 2012) provided in Attachment C. No methane was detected in indoor air in any of the buildings. The highest 2011 methane readings measured in perimeter probes included in the long-term OMMP program are presented in Table 1. During the 2011 study, the only probes where methane concentrations were observed above 5 percent were GP-27 and GP-29. Table 1 also expands on the information presented in OMMP Figure A.2.4 related to adjacent LFG systems and buildings.

After the completion of the 2011 study, OMMP perimeter gas probes GP-33, GP-37, and GP-38 were installed in 2013 and 2015. Methane monitoring results for these probes through 2016 are presented in the RI (Floyd|Snider 2017). GP-33 is adjacent to buildings located on the W.G. Clark property, and in 2015 and 2016 there were several detections of methane above the LEL, with a maximum detection of 22 percent. These detections were attributed to a temporary shutdown of the SPPD LFG control system. Gas probes GP-37 and GP-38 are not adjacent to any off-site buildings and the highest detected methane concentrations were 0.4 and 0.5 ppm, respectively.

On September 26 and October 3, 2016, elevated concentrations of methane (ranging from 32.5 to 32.7 percent) were detected in perimeter probe GP-43 (this probe is not part of the current monitoring program). In response, methane monitoring was conducted in indoor air in the buildings located on the W.G. Clark property on October 17, 2016. No methane or VOCs were observed at concentrations greater than the detection limits.

Table 1. Maximum 2011 Methane Concentrations, South Park Landfill Perimeter Gas Probes Included in the OMMP Long Term Monitoring Program

Gas Probe	Indoor Air Protectiveness Established[6]	Highest Methane (percent by volume)	Number of 2011 Quarterly Events[5]	Number of Additional 2011 Events	Adjacent LFG System	Adjacent Off-site Buildings[3]
GP-37	NA	NA	NA	NA	SRDS[2]	No
GP-09	NA	0	3	1	SRDS[2]	No
GP-26	No	0.1	3	4	SRDS[2]	Yes (Rick Larson Enterprises, Inc.)
GP-23	No	0.1	4	0	SRDS[2]	Yes (Bank of America (2 buildings)
GP-07	No	0.2	4	0	SRDS[2]/SPPD	Yes (Eagle Eye Enterprises, LLC)
GP-27	Yes	6.5 (range 2.6 to 6.5)	4	5	SPPD	Yes, 5th Avenue S (JYS4, LLC)
GP-28	Yes	2.8 (range 0 to 2.8)	4	4	SPPD	Yes, 5th Avenue S (JYS4, LLC)
GP-29	Yes	8.5 (range 2.4 to 8.5)	4	5	SPPD	Yes, 5th Avenue S (Ness Manitowoc Property, LLC)
GP-16[1]	NA	0	4	2	SPPD	No
GP-31[1]	No	0	3	3	SPPD	Yes (Emerson Power Products)*
GP-15[1]	No	0	1	1	SPPD	Yes, Lenci/Emerson
GP-32[1,4]	No	0.1	4	3	SPPD	Yes (Emerson Power Products)*
GP-03[1]	NA	0.2	4	0	SPPD	No
GP-13	No	0	1	0	SPPD	Yes (NorthStar Ice Equipment)
GP-11	No	0.1	4	0	SPPD	Yes (International Construction Equipment, Inc.)
GP-38[7]	NA	NA	NA	NA	None	No
GP-33[7]	No	NA	NA	NA	SPPD	Yes (W.G. Clark Construction Co)

[1] Due to shallow groundwater, these probes are only measured when the water table is low enough for the probes to function. *shallow groundwater in this area likely limits the migration of LFG.

[2] SRDS LFG control system has not been installed to date.

[3] Floyd|Snider et al 2017

[4] Due to shallow groundwater, these measurements were made in adjacent barholes.

[5] Quarterly events were conducted in February, May, September, and December. Indoor air was measured within 1-week of the adjacent probe.

[6] Includes probes where an indoor air study was conducted; not applicable where no adjacent buildings within 100 ft.

[7] Not included in the 2011 study (probes installed after 2011). See text for discussion.

NA Not Applicable

CONCLUSIONS

The 2011 study established that methane concentrations in perimeter gas probes in existence at that time (including methane measurements between 1.25 and 5 percent in GP-28, and above 5 percent in GP-27 and GP-29) were not associated with any detections of methane in off-site buildings located at 8230 and 8250 Fifth Avenue South. Since that time, an active LFG control system has been installed at the adjacent SPPD property.

Gas probes GP-33, GP-37, and GP-38 were installed after the 2011 study. Of these, only GP-33 is adjacent to a building. Methane concentrations in GP-33 were periodically above 5 percent during the period between 2015 and 2016. 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.

RECOMMENDATIONS

We recommend modifying the flow chart to indicate that the criteria for additional off-site building monitoring should be 1.25 percent (25% of the LEL) for all probes other than GP-27 and GP-29. At probes GP-27 and GP-29, since methane concentrations of over 5 percent have been shown to be protective, the criteria for additional off-site building monitoring should be 5 percent.

The 1.25 percent criteria should include probes GP-28 and GP-33. At probe GP-28, methane concentrations were only shown to be protective at concentrations up to 2.8 percent, so it is recommended that 1.25 percent be used as the criterion. At probe GP-33, a definitive relationship between methane concentrations and the adjacent buildings was not established to determine protectiveness.

A revised flow chart reflecting these recommendations is presented as Figure 1. Figure 2 shows the locations of the LFG perimeter probes. Figure 3 shows the locations of buildings within 100 ft of the Landfill boundary.

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.

Herrera Environmental Consultants, Inc. 2011. Scope of Work for South Park Landfill Gas Monitoring. South Park Landfill – Interim Gas Probe and Building Monitoring Plan. Memorandum to Teri Floyd, Floyd|Snider. April 14.

Herrera Environmental Consultants, Inc. 2012. Gas probe and indoor air quarterly monitoring results at South Park Landfill, Seattle, Washington. Memorandum to Stephen Bentsen, Floyd|Snider. February 7.

FIGURES

1 Flow Chart for Triggers and Contingent Actions for Perimeter Probe Monitoring

2 Perimeter Landfill Gas Probe Network

3 Buildings within the Landfill and within 100 ft of the Landfill Boundary

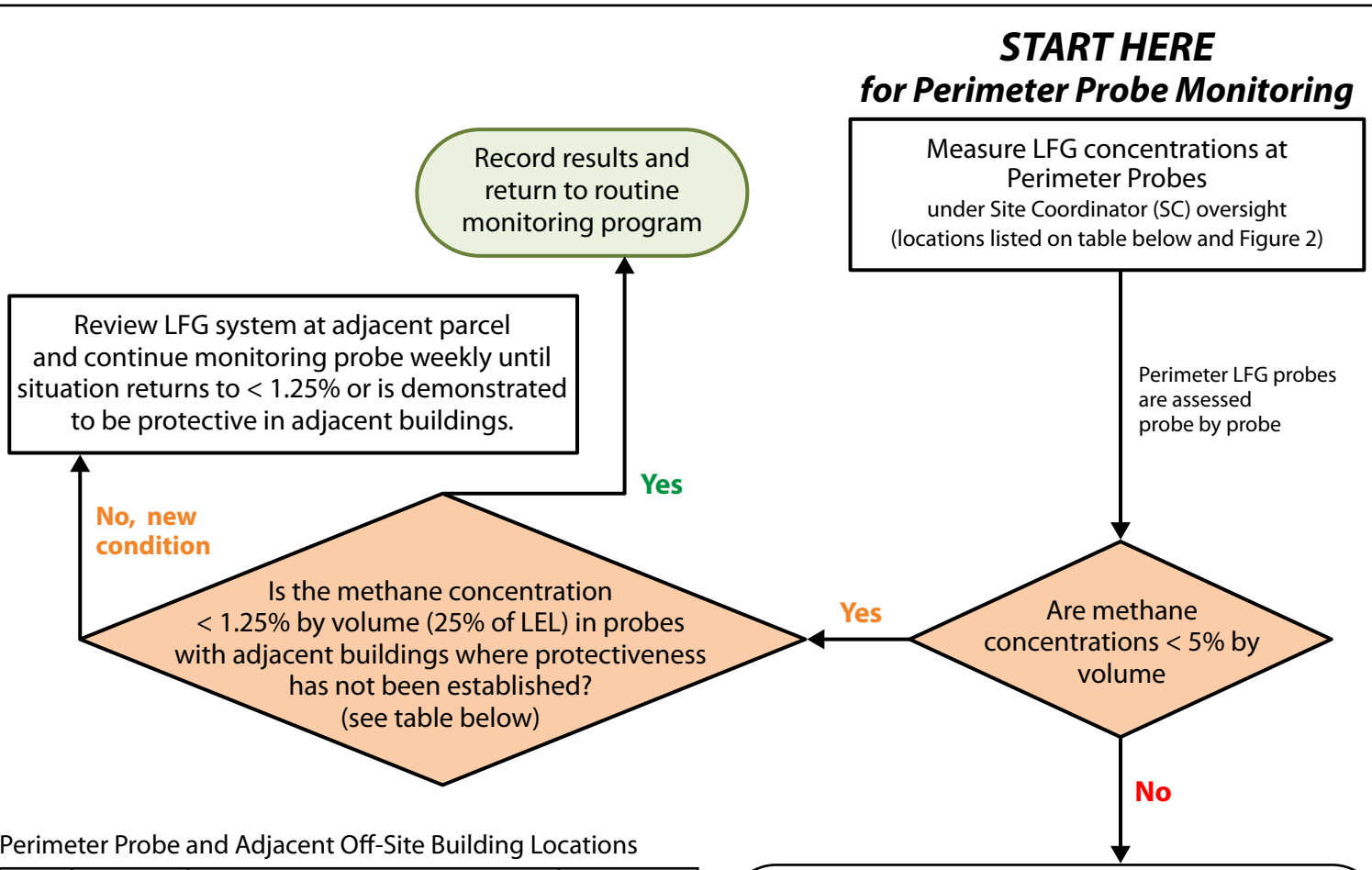
ATTACHMENTS

A Figure A.4.2 of OMMP

B Monitoring Plan (Herrera 2011)

C Off-Site Building Results (Herrera 2012)

FIGURES



Perimeter Probe and Adjacent Off-Site Building Locations

Gas Probe	Adjacent LFG System	Adjacent Off-site Buildings within 100 ft[1]	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.

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.

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.

Figure 1
Flow Chart for Triggers and Contingent Actions for Perimeter Probe Monitoring

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

9/3/2020 I:\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\GIS\Mapdocs\Figure 2 Perimeter Gas Probe Network.mxd

Parametrix

0 125 250 500 Feet

Figure 2
Perimeter Gas Probe Network
Cleanup Action Plan OMMP
South Park Landfill

Seattle, WA

9/3/2020 I:\JPSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\GIS\Mapdocs\Figure 3 Buildings within 100 feet of the Landfill Boundary.mxd

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

Parametrix

0 125 250 500 Feet

Figure 3
Buildings within the Landfill and within 100 feet of the Landfill Boundary
Cleanup Action Plan OMMP
South Park Landfill
Seattle, WA

Attachment A

Figure A.4.2 of OMMP

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%.

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

Yes

No, new condition

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

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.

Perimeter Probe Locations

Perimeter Probe	Adjacent LFG System	Adjacent Off-site Buildings [1]
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, 5th Avenue South
GP-28	SPPD	Yes, 5th Avenue South
GP-29	SPPD	Yes, 5th Avenue South
GP-16 [2]	SPPD	No
GP-31 [2]	SPPD	Yes
GP-15	SPPD	Yes, Lenci/Emerson
GP-32 [2]	SPPD	Yes
GP-03 [2]	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

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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

Attachment B

Monitoring Plan (Herrera 2011)

Herrera Environmental Consultants, Inc.

South Park Landfill – Interim Gas Probe and Building Monitoring Plan

To	Teri Floyd, Floyd|Snider
cc	Stephen Bentsen, Floyd|Snider and John Strunk, Aspect Consulting
From	Michael Spillane and Bruce Carpenter, Herrera Environmental Consultants
Date	April 14, 2011
Subject	Scope of Work for South Park Landfill Gas Monitoring

Project Understanding

South Park Landfill gas probes were monitored by Herrera Environmental Consultants in February, 2011 as a part of the Remedial Investigation. The locations of the gas probes are shown in Figure 1. Results indicated elevated methane levels outside the landfill footprint in probe GP-25 in the Kenyon Business Park and GP-27 and GP-29 east of Fifth Avenue South. Follow-up monitoring in nearby buildings indicated no methane detected in approximately 10 nearby buildings, including four in Kenyon Business Park (KBP), one outside of KBP, but adjacent to Kenyon Street, and five adjacent to 5th Avenue South.

The South Park PLP group has indicated an interest in continuing to monitor the perimeter gas probes and select buildings for one full year, beginning with the February sampling that was conducted as part of the RI. Further sampling will not be performed as part of the RI, as there is sufficient information available on landfill gas for the RI tasks to continue on their current schedule.

The technical consultants to the South Park PLP group and its members met on Thursday, March 17, 2011 and the entire PLP group met on Friday March 25, 2011 to confirm the scope presented in this document. This document is intended to describe the scope of work agreed to at those meetings.

Sampling Goals

- Support the existing safety of people and structures by gathering a full year of data from perimeter probes and adjacent building interiors.
- Establish baseline data across the seasons.

Scope of Work

The scope of sampling is as follows:

- Monitor nine (9) new landfill perimeter probes for one year at an interval of four and six weeks between events from April through December 2011 and monitor ten (10) probes with historical background data for three additional quarters. When combined with the Feb. 2011 event, this will constitute 1 year of monitoring.
- Monitoring 5 buildings along 5th Avenue at least once per quarter for the same 1-year period. Monitoring should be performed within 1 week of a perimeter probe monitoring event.
- The South Park Landfill PLP Group will notify the owners of properties of the Kenyon Industrial Park (Harsch Investment Properties), the owners of the 7901 2nd Avenue South building and owner of the W.G. Clark building of the ongoing sampling of probes at the industrial park. This notification will include previous probe and Kenyon building monitoring data.
- Quarterly reporting of the probe and building data in a format acceptable for transmittal to Ecology and Public Health of Seattle and King County.

Specific tasks to be performed by the Consultant Team are as follows:

Task 1 Access Coordination

- Contact property owners and tenants to schedule monitoring

Task 2 Probe Monitoring

- Monitor thirteen probes, including GP-05, GP-15, GP-16, GP-17 and GP-24 through GP-32 for six to nine periods spaced between four to six weeks from April to December 2011;
- Monitor six additional perimeter probes including: GP-03, GP-07, GP-09, GP-11, GP-13, and GP-23 quarterly for three seasonal periods through December 2011. The quarterly monitoring will coincide with the monthly monitoring.
- Monitor probes for water level, depth to bottom of probe, methane, carbon dioxide, oxygen, static pressure, and barometric pressure.
- Monitoring will be conducted following at least 12 hours of falling barometric pressure with a drop from peak of at least 0.25 inches mercury. If these conditions are not met within the four to six week desired interval, the probe monitoring will occur the next time the barometric conditions are met.
- If elevated groundwater levels preclude monitoring in probes GP-30, GP-31, and GP-32 barhole punch probes will be used for monitoring in the southeast corner to allow data collection.

- Contingency actions for methane concentrations greater than 5% at probes in areas where building monitoring is not already being conducted (excluding the KBP buildings), GP-05, GP-07, GP-11, GP-13, GP-15, GP-23, GP-26, GP-31, and GP-32 are shown in Figure 2.

Task 3 Building Monitoring

- Building interiors will be monitored three times, including once each quarter through December 2011. Building monitoring will be done concurrent with a probe monitoring event during a period of falling barometric pressure.
- A total of five buildings will be monitored on Fifth Avenue South, including one building with two interior spaces occupied by Timberwolf and Hudson at 8230; the remaining four buildings located at 8250 are comprised of three interior building spaces and one LFG mitigation vent at the fourth most westerly building.
- Contingency actions for methane detected in buildings are shown in Figure 3.

Task 4 Quarterly Reporting

The following documents will be prepared quarterly to document the findings of the probe and building monitoring.

- Table summarizing probe data (table would be cumulative since earliest data available for the probe)
- Letter report documenting methods, procedures, and results.
- Graphs of barometric pressure and equipment calibration for each event would be provided in appendices.
- Map showing probe and building monitoring locations. The building monitoring locations will be updated as needed.

Assumptions

- Contact SPPD consultant prior to beginning probe and building monitoring to review barometric pressure cycle and concur on monitoring schedule.
- Indoor gas monitoring equipment will have the ability to detect methane at concentrations of 100 ppm.
- Quarterly probe monitoring (19 locations) and barhole monitoring will be performed over a 9-hr period by one person.
- Monthly probe monitoring (13 locations) and barhole monitoring will be performed over a 7-hour period by one person.
- Indoor air monitoring includes six buildings over a 5-hr period by one person.

- Each monitoring period includes two hours to organize equipment and for travel.
- Reporting includes preparation of three quarterly letter reports documenting results (12-hours per event) and six monthly emails presenting results, including a cumulative data table after each non-quarterly monitoring period (2-hrs per event).

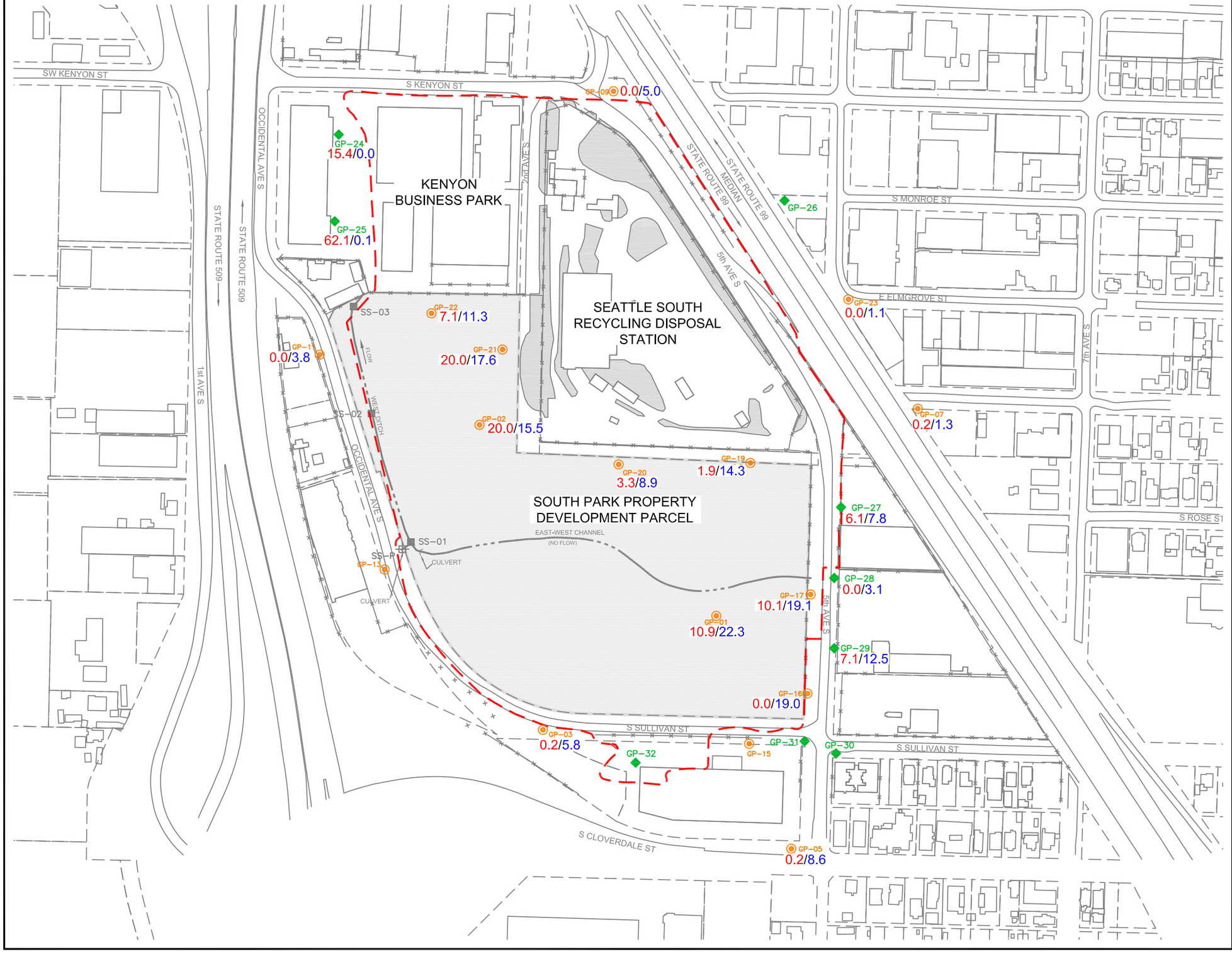

Figure 1.
Methane and Carbon Dioxide concentrations in gas probe monitoring, South Park Landfill, Seattle, Washington.

LEGEND

- FORMER LANDFILL BOUNDARY
- GP-## GAS PROBE NUMBER
- 0.0/0.0 PERCENT OF CARBON DIOXIDE (FEBRUARY 2011)
- PERCENT OF METHANE (FEBRUARY 2011)
- GP-25 GP-24 TO GP-32 ADDITIONAL GAS PROBE LOCATIONS APPROVED IN WORK PLAN

N

0 125 250 500

scale in feet

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Figure 2
South Park Landfill
Gas Probe Monitoring Process

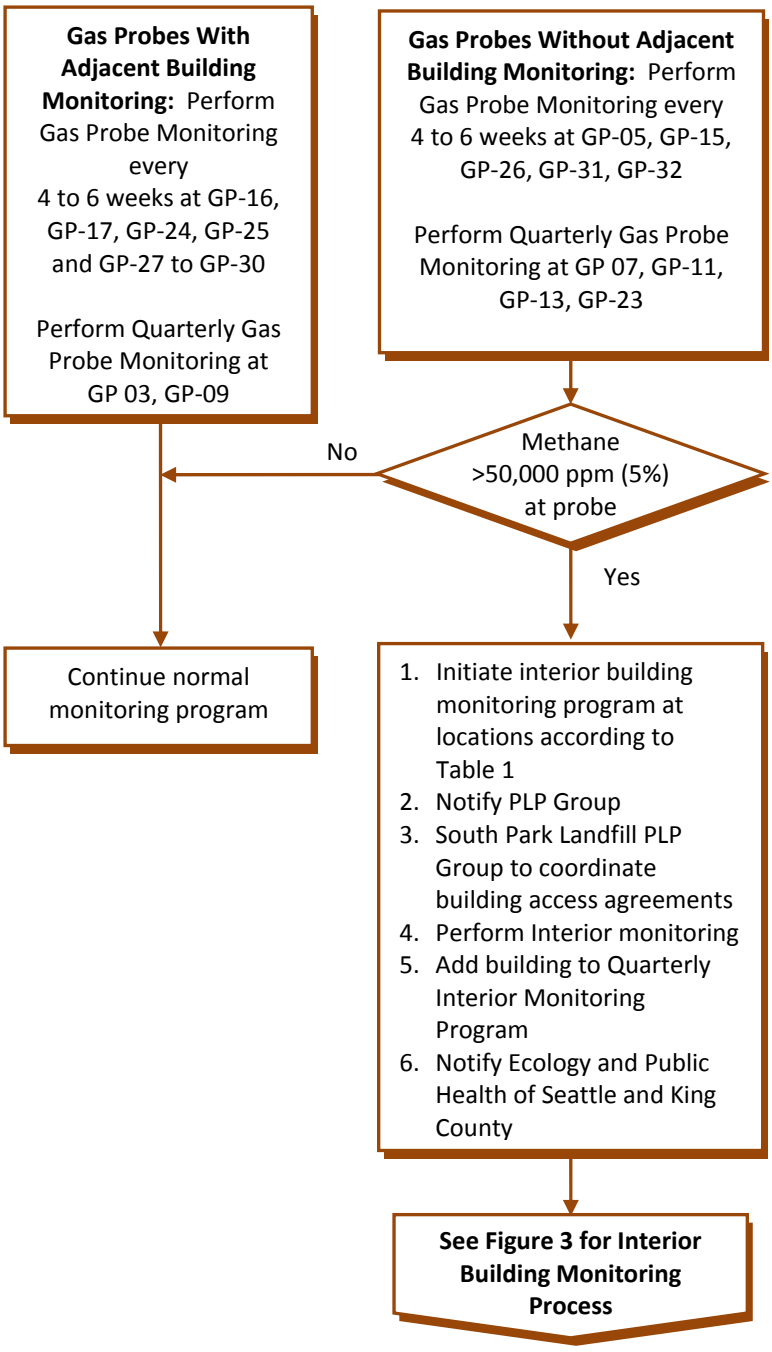

Table 1

GP Location	Adjacent Buildings
11	International Construction
13	North Star Ice Equipment
5, 15, 31, 32	Emerson Power Products
23	Bank of America Tre (Two Bldgs)
07	Eagle Eye Enterprises Corp
26	Rich Larson Enterprises

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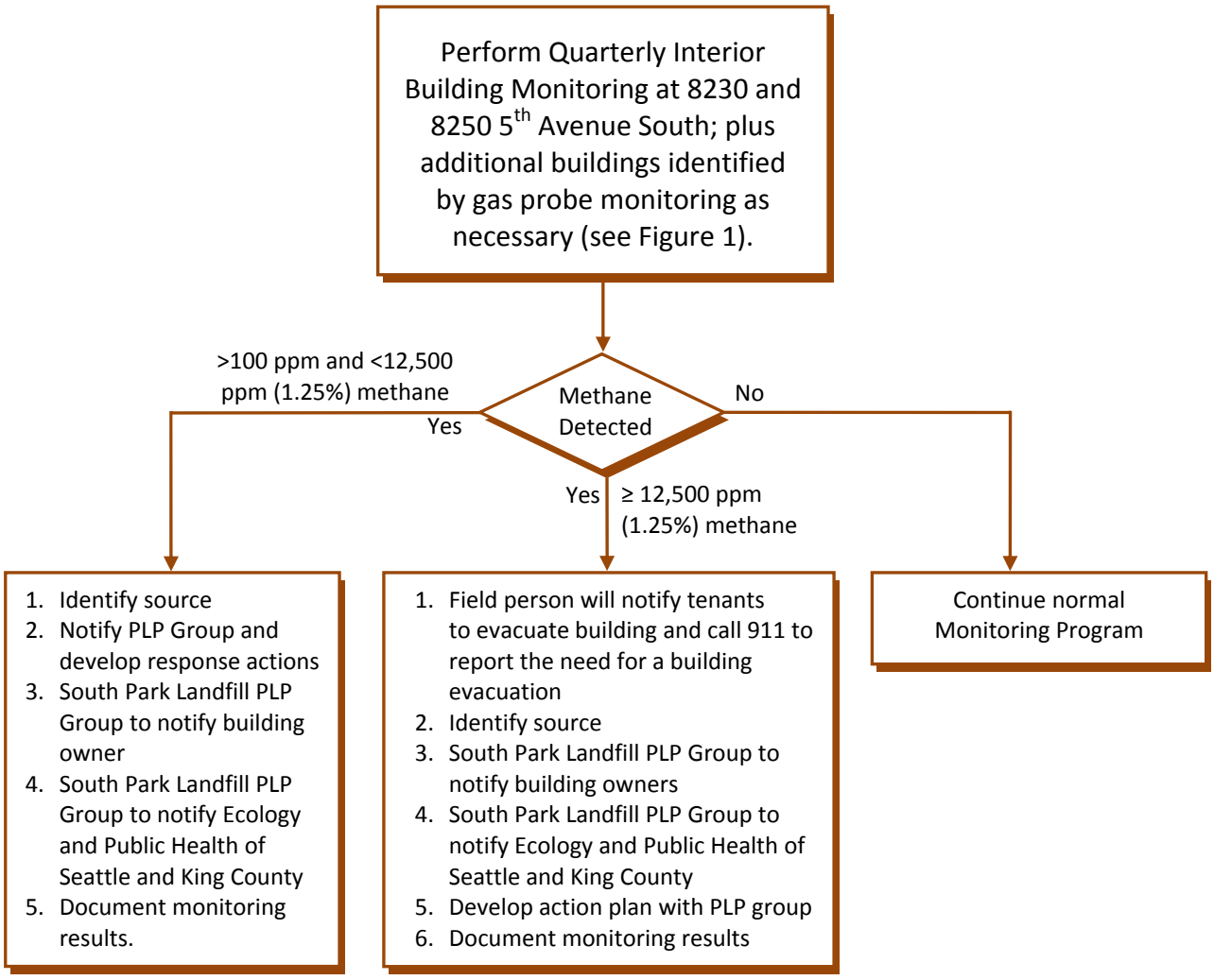
Figure 3
South Park Landfill
Interior Building Monitoring Process



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Attachment C

Off-Site Building Results (Herrera 2012)

Herrera Environmental Consultants, Inc.

Memorandum

To	Stephen Bentsen, Floyd|Snider
cc	Teri Floyd, Floyd|Snider and John Strunk, Aspect Consulting
From	Bruce Carpenter and Michael Spillane, Herrera Environmental Consultants
Date	February 7, 2012
Subject	Gas probe and indoor air quarterly monitoring results at South Park Landfill, Seattle, Washington

In accordance with the South Park Landfill – Interim Gas Probe and Building Monitoring Plan, Herrera Environmental Consultants (Herrera) monitored 19 gas probes at the South Park Landfill and conducted indoor air monitoring in five buildings located adjacent to the landfill on December 28 and 29, 2011 (Figure 1). In addition, two gas probes located north of Kenyon Industrial Park (KIP) (SV-2 and SV-3) were monitored to determine if landfill gas (LFG) has migrated north of the landfill.

This is the final report that describes the last monitoring event to be conducted under the monitoring plan. This report also summarizes data from five monitoring events and selective probe monitoring associated with indoor air monitoring performed in 2011.

Gas Probe Monitoring Procedure

Monitoring began during a period of falling barometric pressure, as specified in the South Park Landfill – Interim Gas Probe and Building Monitoring Plan prepared by Herrera in April 2011. Methane, carbon dioxide, and oxygen percentages were measured using a LandTec GEM 2000 Gas Analyzer. Prior to monitoring, the meter was calibrated in the field. The oxygen span calibration gas concentration was 4.0 percent and the methane calibration gas value was 50.1 percent on December 28, 2011, and these values were 1.3 percent and 46.4 percent, respectively, on December 29, 2011. The calibration gas standards are 4.0 percent for oxygen and 50.0 percent for methane.

The gas probes were monitored by connecting the meter using silicone and polyethylene tubing. A minimum of one probe volume was evacuated before recording final measurements. An SKC universal pump was used to evacuate the 2-inch diameter polyvinyl chloride (PVC) probes at a flow rate of 3,000 milliliters per minute (ml/min) and the GEM 2000 was used to evacuate the 0.75-inch diameter probes at a purge rate of 300 ml/min. To ensure that representative measurements were collected, the gas probes were purged until methane, carbon dioxide, and oxygen percentages stabilized (when they varied by less than 10 percent for three consecutive measurements).

Gas and barometric pressures were measured at each probe prior to purging. Methane, carbon dioxide, and oxygen percentages were monitored every 1/4 probe volume purged from the respective gas probe.

Gas Probe Monitoring Results

Methane concentrations ranged from 0.0 to a high of 50.9 percent in probe GP-25 at KIP, west of the former landfill boundary (Table 1 and Figure 1). As the measurements indicate, the highest methane concentrations tend to be observed at gas probes GP-24 and GP-25, both of which are located on the west portion of the KIP property and outside of the landfill boundary.

Probes GP-13, GP-15, GP-30, and GP-32 were not monitored, due to high water levels. Barhole measurements were taken adjacent to probes GP-30 and GP-32 and are reported in Table 1 as BH-30 and BH-32, respectively. No methane was detected in the two barholes. Barholes were not completed adjacent to probes GP-13 or GP-15 during gas probe monitoring, due to topographic conditions in the vicinity of these probes. Probe GP-13 is southwest of the West Ditch. Completion of a barhole several feet below ground surface at probe GP-13 would be above the bottom of the adjacent West Ditch invert and therefore would not provide meaningful data. A drainage ditch also exists north of GP-15 and completion of a barhole at this location would not provide meaningful data for the same reason described above.

Barometric pressure dropped approximately 0.6 inches mercury (″ Hg) over a 48-hour period prior to beginning the monitoring. It continued to drop from 29.78″ Hg to 29.51″ Hg while monitoring on December 28, 2011, but rose that night and then dropped from 29.96″ Hg to 29.92 ″ Hg during monitoring on December 29, 2011. A summary of barometric pressure during this monitoring period is provided in Attachment A.

Indoor Air Monitoring Procedures and Results

At 10:35 a.m. on December 29, 2011, Herrera staff began monitoring the interior of the buildings located at 8230 and 8250 5th Avenue South. A Photovac Micro Flame Ionization Detector (FID) was used to monitor the indoor air. The FID was calibrated to methane in the field.

A building location map with a summary of the monitoring points is provided in Attachment B.

The FID remained on while walking throughout all of the buildings. It was held over the cracks in the floor and adjacent to other monitoring points. Storm drain catchments also were monitored outside of the buildings.

The FID has a detection limit of 0.5 parts per million (ppm). No methane or FID measurements were found above background during the air monitoring, with the exception of very low readings fluctuating from 0.0 to a high of 4.3 ppm detected in the main office space of the lobby at 8250 5th Avenue South (building monitoring location 8). These readings were attributed to volatiles off-gassing from the carpeting.

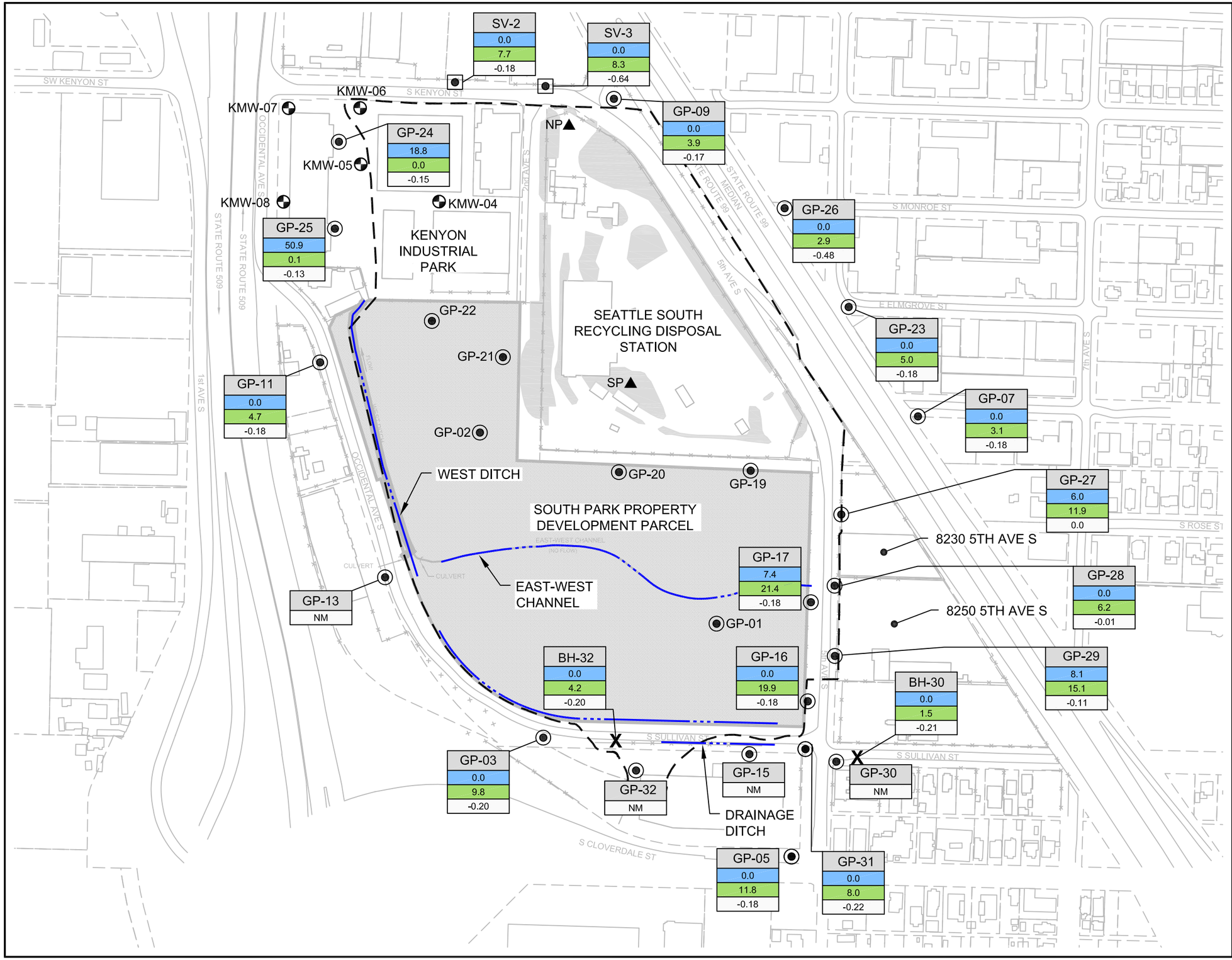


Figure 1.
Gas probe monitoring results, December 28-29, 2011, South Park Landfill, Seattle, Washington.

LEGEND

- FORMER LANDFILL BOUNDARY
- DITCH
- GP-01 — GAS PROBE NUMBER
- KMW-04 — MONITORING WELLS
- SP — PIEZOMETERS
- SV-3 — SOIL VAPOR PROBE
- BH-32 — BARHOLE
- GP-23 / 0.0 / 4.6 / -0.23 — PERCENT OF METHANE; PERCENT OF CO_2; WELL HEAD PRESSURE (INCHES - H20)
- NM — NOT MONITORED (HIGH WATER LEVEL)
- BH — BARHOLE MEASUREMENT

N

0 125 250 500

scale in feet

HERRERA ENVIRONMENTAL CONSULTANTS

O:\proj\Y2010\10-04850-000\CAD\Dwgs\Probe monitoring\Figure 1 Dec 28-29.dwg

Table 1. Summary of gas probe monitoring performed from February to December 2011 at South Park Landfill, Seattle, Washington.

Gas Probe Identification	Date of Measurement	Barometric Pressure (inches Hg)	Well Head Pressure (inches H20)	Methane (% volume)	Carbon Dioxide (% volume)	Oxygen (% volume)
GP-1	2/9/11	30.46	0.10	10.9	22.3	00.0
GP-2	2/9/11	30.44	-0.04	20.7	15.5	00.0
GP-3	2/9/11	30.41	0.00	00.2	05.8	09.5
GP-3	5/25/11	29.69	-0.01	00.1	03.5	14.9
GP-3	9/23/11	29.86	0.14	00.0	11.0	06.4
GP-3	12/28/11	29.66	-0.20	00.0	0.98	02.2
GP-5	2/9/11	30.41	-0.05	00.2	08.6	00.0
GP-5	5/25/11	29.69	-0.08	00.1	04.0	11.5
GP-5	6/27/11	29.65	0.10	00.0	09.2	01.4
GP-5	9/23/11	29.98	0.27	00.0	11.9	03.6
GP-5	11/17/11	29.55	-0.28	00.0	13.9	00.4
GP-5	12/28/11	29.51	-0.18	00.0	11.8	00.0
GP-7	2/9/11	30.42	0.00	00.2	01.3	18.3
GP-7	5/25/11	29.70	-0.08	00.1	01.4	18.5
GP-7	9/23/11	29.86	0.09	00.0	03.2	17.0
GP-7	12/28/11	29.74	-0.18	00.0	03.1	16.3
GP-9	2/7/11	30.11	0.00	00.0	05.0	14.2
GP-9	2/25/11	29.72	-0.04	00.0	02.0	18.1
GP-9	9/23/11	29.91	0.22	00.0	03.1	17.4
GP-9	12/28/11	29.76	-0.17	00.0	03.9	15.2
GP-11	2/8/11	30.34	-0.01	00.0	03.8	10.5
GP-11	5/25/11	29.68	-0.08	00.1	00.1	20.0
GP-11	9/23/11	29.88	0.17	00.0	04.9	09.3
GP-11	12/28/11	29.70	-0.18	00.0	04.7	04.9
GP-13	9/23/11	29.89	0.21	00.0	08.0	08.6
GP-15	9/23/11	29.99	0.28	00.0	11.8	07.7

Gas Probe Identification	Date of Measurement	Barometric Pressure (inches Hg)	Well Head Pressure (inches H20)	Methane (% volume)	Carbon Dioxide (% volume)	Oxygen (% volume)
GP-15	11/17/11	29.61	3.35	00.0	00.2	19.4
GP-16	2/8/11	30.29	0.00	00.0	19.0	19.0
GP-16	5/25/11	29.69	-0.06	00.0	00.1	20.2
GP-16	6/27/11	29.68	0.12	00.0	20.1	00.8
GP-16	9/23/11	29.91	0.25	00.0	17.6	02.9
GP-16	11/17/11	29.61	-0.29	00.0	21.4	00.0
GP-16	12/29/12	29.96	-0.18	00.0	19.9	00.0
GP-17	2/8/11	30.29	0.00	10.1	19.1	00.0
GP-17	5/25/11	29.70	-0.06	05.8	18.9	00.0
GP-17	6/27/11	29.67	-0.11	08.3	17.9	00.0
GP-17	9/23/11	29.97	0.31	01.0	18.5	00.0
GP-17	11/17/11	29.56	-0.30	02.1	22.9	00.0
GP-17	12/29/12	29.96	-0.18	07.4	21.4	00.0
GP-19	2/8/11	30.37	-0.02	01.9	14.3	00.0
GP-20	2/9/11	30.45	-0.06	03.3	08.9	00.0
GP-21	2/9/11	30.44	-0.07	20.0	17.6	00.0
GP-22	2/9/11	30.44	0.01	07.1	11.3	00.0
GP-23	2/8/11	30.36	0.01	00.0	01.1	19.7
GP-23	5/25/11	29.71	-0.08	00.1	00.4	19.8
GP-23	9/23/11	29.86	-0.23	00.0	04.6	15.7
GP-23	12/28/11	29.75	-0.18	00.0	05.0	06.9
GP-24	2/7/11	30.12	-	15.4	00.0	06.1
GP-24	2/9/11	30.45	0.00	14.4	00.0	05.4
GP-24	2/18/11	29.81	0.14	4.6	00.0	17.4
GP-24	2/21/11	29.93	0.11	04.7	00.0	16.1
GP-24	5/25/11	29.71	0.02	08.5	00.0	15.1
GP-24	6/27/11	29.65	0.13	34.9	00.0	00.0
GP-24	9/23/11	29.97	0.02	48.4	00.0	00.0
GP-24	11/17/11	29.72	-0.21	29.4	00.1	05.5

Gas Probe Identification	Date of Measurement	Barometric Pressure (inches Hg)	Well Head Pressure (inches H20)	Methane (% volume)	Carbon Dioxide (% volume)	Oxygen (% volume)
GP-24	12/28/11	29.78	-0.15	18.8	00.0	04.2
GP-25	2/7/11	30.11	-	62.1	00.1	00.0
GP-25	2/9/11	30.43	-0.03	56.1	00.1	00.4
GP-25	2/18/11	29.77	-3.22	30.2	00.0	09.7
GP-25	2/21/11	29.93	0.07	32.9	00.1	09.0
GP-25	5/11/11	29.75	0.02	72.5	00.1	00.1
GP-25	5/25/11	29.71	0.00	26.2	00.1	12.4
GP-25	6/27/11	29.65	0.13	75.8	00.0	00.0
GP-25	9/23/11	29.95	0.02	85.1	00.1	00.0
GP-25	11/17/11	29.74	-0.33	62.4	00.1	04.8
GP-25	12/28/11	29.76	-0.13	50.9	00.1	02.0
GP-26	3/8/11	29.86	0.14	00.0	00.8	18.8
GP-26	3/10/11	29.53	0.05	00.0	01.7	18.4
GP-26	5/25/11	29.71	-0.10	00.1	01.5	18.7
GP-26	6/27/11	29.66	0.12	00.0	03.1	16.6
GP-26	9/23/11	30.02	0.24	00.0	02.4	17.6
GP-26	11/17/11	29.67	-0.28	00.0	02.6	17.5
GP-26	12/28/11	29.76	-0.48	00.0	02.9	16.4
GP-27	2/7/11	30.09	-0.01	06.1	07.8	00.9
GP-27	2/17/11	29.73	0.13	02.9	04.7	09.1
GP-27	2/21/11	29.90	0.10	03.1	04.8	09.1
GP-27	5/11/11	29.73	0.05	06.5	08.3	00.1
GP-27	5/25/11	29.68	-0.08	02.6	04.0	11.1
GP-27	6/27/11	29.69	0.12	06.3	08.9	00.0
GP-27	9/23/11	29.98	0.10	04.3	11.4	00.0
GP-27	11/17/11	29.76	-0.17	03.3	08.4	05.2
GP-27	12/29/11	29.92	0.0	06.0	11.9	00.0
GP-28	2/7/11	30.11	0.01	00.0	03.1	08.1
GP-28	2/21/11	29.89	0.10	00.0	02.0	15.3

Gas Probe Identification	Date of Measurement	Barometric Pressure (inches Hg)	Well Head Pressure (inches H20)	Methane (% volume)	Carbon Dioxide (% volume)	Oxygen (% volume)
GP-28	5/11/11	29.73	0.05	00.5	05.4	00.4
GP-28	5/25/11	29.70	-0.05	00.6	03.1	11.7
GP-28	6/27/11	29.70	0.06	02.8	07.7	00.0
GP-28	9/23/11	29.99	0.06	00.2	08.9	02.8
GP-28	11/17/11	29.73	-0.19	00.1	08.9	04.2
GP-28	12/29/11	29.94	-0.01	00.0	06.2	04.9
GP-29	2/7/11	30.10	0.06	07.1	12.5	00.0
GP-29	2/21/11	29.89	0.09	03.6	06.9	09.0
GP-29	5/11/11	29.73	-0.03	06.9	12.2	00.3
GP-29	5/11/11	29.73	-0.03	06.9	12.2	00.3
GP-29	5/25/11	29.70	-0.06	02.4	04.1	12.6
GP-29	6/27/11	29.65	0.11	08.5	13.1	00.0
GP-29	9/23/11	29.99	0.03	07.2	14.2	00.0
GP-29	11/17/11	29.73	-0.22	07.1	12.2	03.7
GP-29	12/29/11	29.95	-0.11	08.1	15.1	00.0
BH-30	3/10/11	29.54	-0.03	00.0	00.7	15.2
GP-30	5/11/11	29.74	0.02	00.0	00.1	20.2
BH-30	5/25/11	29.68	-0.04	00.0	00.2	19.8
BH-30	6/28/11	29.61	0.05	00.0	01.6	18.5
BH-30	9/23/11	29.93	0.27	00.0	00.8	19.1
GP-30	11/17/11	29.58	-0.05	00.0	00.1	19.7
BH-30	12/28/11	29.59	-0.21	00.0	01.5	17.7
GP-31	5/11/11	29.75	0.02	00.0	00.1	19.9
GP-31	5/25/11	29.72	-0.05	00.0	00.1	20.3
GP-31	6/27/11	29.72	0.08	00.0	09.6	06.6
GP-31	9/23/11	29.97	0.05	00.0	14.7	04.4
GP-31	11/17/11	29.61	-0.42	00.0	10.4	07.5
GP-31	12/28/11	29.56	-0.22	00.0	08.0	03.7
BH-32	3/10/11	29.54	0.00	00.0	01.4	17.5

Gas Probe Identification	Date of Measurement	Barometric Pressure (inches Hg)	Well Head Pressure (inches H20)	Methane (% volume)	Carbon Dioxide (% volume)	Oxygen (% volume)
BH-32	5/25/11	29.70	-0.08	00.1	00.3	19.9
BH-32	5/28/11	29.63	0.03	00.0	05.9	13.9
BH-32	6/28/11	29.63	0.03	00.0	05.9	13.7
BH-32	9/23/11	29.99	0.31	00.0	03.4	16.7
BH-32	11/17/11	29.62	-0.29	00.0	01.2	18.8
BH-32	12/28/11	29.64	-0.20	00.0	04.2	15.3
SP	5/11/11	29.76	0.00	21.4	05.5	10.3
NP	5/12/11	30.09	0.02	00.0	00.1	20.3
NP	5/26/11	29.88	-0.04	00.0	00.1	20.4
KMW-04	5/12/11	30.11	0.06	00.0	00.1	20.2
KMW-04	5/26/11	29.88	-0.06	00.0	00.1	20.3
KMW-05	5/11/11	29.84	0.00	50.4	00.0	02.0
KMW-06	11/17/11	29.66	-0.24	12.0	01.7	0.0
KMW-07	11/17/11	29.69	-0.26	00.0	05.4	12.0
KMW-08	11/17/11	29.71	-0.26	00.2	00.1	08.3
SV-2	12/28/11	29.76	-0.18	00.0	07.7	00.7
SV-3	12/28/11	29.77	-0.64	00.0	08.3	03.2

Notes: Periodic results for probes GP-13, GP-15, GP-30, GP-31, and GP-32 are not reported, due to high water levels.

Hg – mercury.

ppmv – parts per million by volume.

BH – barhole (typically located immediately adjacent to gas probe, except for BH-32).

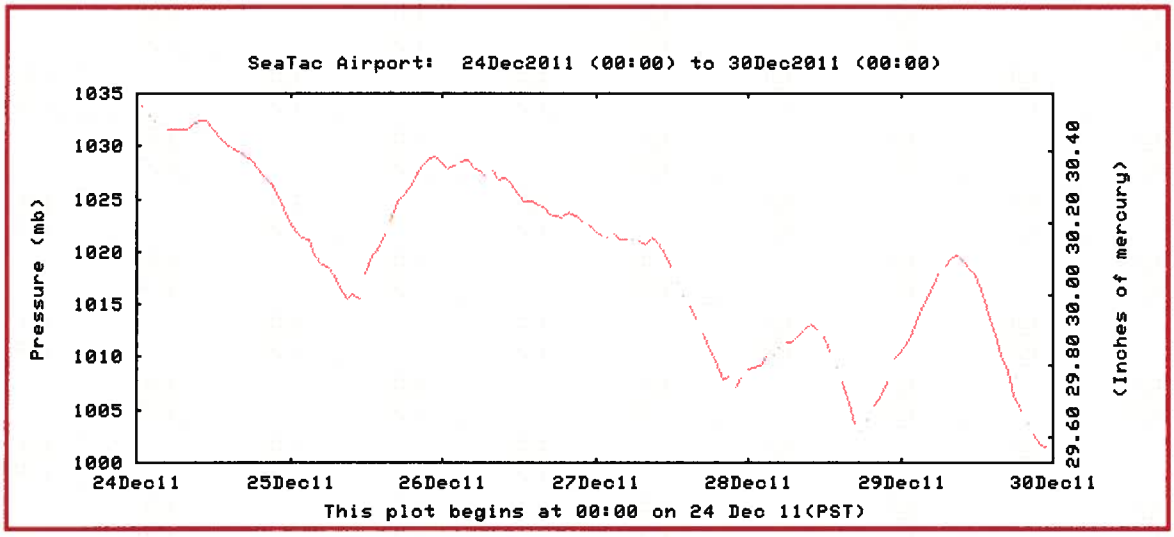
The most recent monitoring results are highlighted.

ATTACHMENT A

Weather Data and Plots

Weather data from: SeaTac Airport

Pressure (millibars)



Created by:

Rich Edgerton
Harry Edmon
Neal Johnson
Jim Tillman
David Warren
Fred Weller

University of Washington
Seattle, Washington USA

Clicking on a plot brings up the data file that was used to create that plot and available station information.

Current time GMT/UTC Wed Jan 4 00:11:09 2012
Local (Pacific Standard Time) Tue Jan 3 16:11:09 2012

```
#
#       This data is from: SeaTac Airport (stn. code sea)
#
#
#
# Sea-Tac Site and Instrument specifications
# Seatac, WA
# NWS: This site is a National Weather Service site.
#
# Archived data available via this UW link since: 01 Jul 1996
#
# STATION NAME              ID      LAT      LON     ELEV M ELEV FT      WMO
# ------------------------------------------------------------------------
# SEATTLE-TACOMA  WA US  KSEA    47.45 -122.30      137 m  449 ft    72793
#
#
#  Station precip:  maximum and  daily avg (inches) over entire period of record ----------------------------------------*
#                                                                                                                       |
#  Station extrema:  daily hi/lo temperatures over entire period of record ------------------------------------*        |
#                                                                                                             |         |
#  Station average:  daily hi/lo temperatures over entire period of record ----------------------------*     |         |
#                                                                                                       |     |         |
#  Station 6-hour  hi/lo temperatures ----------------------------------------------------------*      |     |         |
#                                                                                                 |     |     |         |
#  Rain Gauge (inches) ------------------------------------------------------------------*       |     |     |         |
#  Relative humidity (%) ---------------------------------------------------------*       |     |     |     |         |
#  Solar irradiance (W/m^2) ----------------------------------------------------*       |     |     |     |     |         |
#  Visibility (miles) ---------------------------------------------------*       |     |     |     |     |     |         |
#  Cloud height (100's of feet) -----------------------------------*       |     |     |     |     |     |     |         |
#  Cloud cover (1/8ths of sky) ------------------------------*       |     |     |     |     |     |     |     |         |
#  Wind gust (nautical miles per hour) ----------------*       |     |     |     |     |     |     |     |     |         |
#  Wind speed (nautical miles per hour) ----------*       |     |     |     |     |     |     |     |     |     |         |
#  Wind direction (clockwise degrees from North) --*     |     |     |     |     |     |     |     |     |     |     |         |
#  Dewpoint temperature (F) ----------*     |     |     |     |     |     |     |     |     |     |     |     |         |
#  Air temperature (F) ----------*     |     |     |     |     |     |     |     |     |     |     |     |     |         |
#  Pressure (millibars) ----------*     |     |     |     |     |     |     |     |     |     |     |     |     |         |
#                                 |     |     |     |     |     |     |     |     |     |     |     |     |     |         |
#                                 |     |     |     |     |     |     |     |     |     |     |     |     |     |         |
#    Date(GMT)     Julian date    Pres  Tair Tdew Dir Spd  Gust  Cc Cht Vis  Radn   RelH Rain  hi  lo  hi  lo  hi  lo  max   avg
# -------------- -------------- ------ ---- ---- --- ---- ---- --- --- --- ------ ----- ---- --- --- --- --- --- --- ---- -----
#
2011-12-24 08:53 2455920.3701389 1033.8 45.0 41.0 150  4.0  M     8  20  10    M    85.8  M    M   M     M     M   M   M    M     M
2011-12-24 09:09 2455920.3812500      M  45.0 41.0 140  5.0  M     8  12   7    M    85.8  M    M   M     M     M   M   M    M     M
2011-12-24 09:44 2455920.4055556      M  45.0 41.0 130  7.0  M     8  23  10    M    85.8  M    M   M     M     M   M   M    M     M
2011-12-24 09:53 2455920.4118056 1032.9 43.0 41.0 120  6.0  M     8  23  10    M    92.6  M    M   M     M     M   M   M    M     M
2011-12-24 10:23 2455920.4326389      M  45.0 39.0 150  6.0  M     8  30  10    M    79.3  M    M   M     M     M   M   M    M     M
2011-12-24 10:53 2455920.4534722 1032.5 45.0 40.0 140  4.0  M     8  35  10    M    82.5  M    M   M     M     M   M   M    M     M
2011-12-24 11:30 2455920.4791667      M  45.0 39.0   0  0.0  M     8  25  10    M    79.3  M    M   M     M  35.1   M   9    M     M
2011-12-24 11:53 2455920.4951389 1032.1 44.0 40.0 160  5.0  M     8  25  10    M    85.7 0.02   46  43     M  35.1   M   9    M     M
2011-12-24 12:20 2455920.5138889      M  45.0 39.0 170  6.0  M     8  33  10    M    79.3  M    M   M     M     M   M   M    M     M
2011-12-24 12:53 2455920.5368056 1031.5 45.0 40.0 170  3.0  M     8  37  10    M    82.5  M    M   M     M     M   M   M    M     M
2011-12-24 13:53 2455920.5784722 1031.6 46.0 41.0   0  0.0  M     8  30  10    M    82.6  M    M   M     M     M   M   M    M     M
2011-12-24 14:53 2455920.6201389 1031.6 45.0 41.0 200  3.0  M     8  34  10    M    85.8  M    M   M     M     M   M   M    M     M
2011-12-24 15:53 2455920.6618056 1031.6 45.0 40.0 160  5.0  M     8  36  10    M    82.5  M    M   M     M     M   M   M    M     M
2011-12-24 16:53 2455920.7034722 1032.1 45.0 40.0 140  7.0  M     8  36  10    M    82.5  M    M   M     M     M   M   M    M     M
2011-12-24 17:53 2455920.7451389 1032.5 47.0 41.0 160  6.0  M     8  36  10    M    79.5  M   47  44     M     M   M   M    M     M
2011-12-24 18:53 2455920.7868056 1032.4 48.0 38.0 160  6.0  M     8 110  10    M    68.1  M    M   M     M     M   M   M    M     M
2011-12-24 19:53 2455920.8284722 1031.6 49.0 37.0 170  4.0  M     6 160  10    M    63.1  M    M   M     M     M   M   M    M     M
2011-12-24 20:53 2455920.8701389 1030.9 50.0 36.0 200  4.0  M     6 170  10    M    58.4  M    M   M     M     M   M   M 1.14 0.162
2011-12-24 21:53 2455920.9118056 1030.3 51.0 37.0 220  5.0  M     6 190  10    M    58.5  M    M   M     M     M   M   M    M     M
2011-12-24 22:53 2455920.9534722 1029.8 50.0 37.0 190  3.0  M     6 200  10    M    60.8  M    M   M     M     M   M   M    M     M
2011-12-24 23:53 2455920.9951389 1029.5 49.0 37.0 150  3.0  M     6 200  10    M    63.1  M   52  47  44.5     M  58   M    M     M
2011-12-25 00:53 2455921.0368056 1029.2 47.0 36.0 170  5.0  M     6 200  10    M    65.4  M    M   M     M     M   M   M    M     M
2011-12-25 01:53 2455921.0784722 1028.7 48.0 37.0 150  3.0  M     6 200  10    M    65.5  M    M   M     M     M   M   M    M     M
2011-12-25 02:53 2455921.1201389 1028.0 47.0 40.0 100  3.0  M     6 200  10    M    76.5  M    M   M     M     M   M   M    M     M
2011-12-25 03:53 2455921.1618056 1027.1 48.0 42.0 120  3.0  M     6 200  10    M    79.6  M    M   M     M     M   M   M    M     M
2011-12-25 04:53 2455921.2034722 1026.4 47.0 41.0   0  0.0  M     3 120  10    M    79.5  M    M   M     M     M   M   M    M     M
2011-12-25 05:53 2455921.2451389 1025.4 48.0 41.0  50  3.0  M     6 120  10    M    76.6  M   50  46     M     M   M   M    M     M
2011-12-25 06:53 2455921.2868056 1024.0 49.0 39.0   0  0.0  M     6 110  10    M    68.2  M    M   M     M     M   M   M    M     M
2011-12-25 07:53 2455921.3284722 1022.9 46.0 39.0   0  0.0  M     6 110  10    M    76.4  M    M   M     M     M   M   M    M     M
2011-12-25 08:53 2455921.3701389 1021.9 44.0 40.0   0  0.0  M     6 120  10    M    85.7  M    M   M     M     M   M   M    M     M
2011-12-25 09:53 2455921.4118056 1021.3 42.0 40.0 160  4.0  M     6 110  10    M    92.5  M    M   M     M     M   M   M    M     M
2011-12-25 10:53 2455921.4534722 1021.2 43.0 41.0 160  5.0  M     8 110  10    M    92.6  M    M   M     M     M   M   M    M     M
2011-12-25 11:53 2455921.4951389 1019.7 43.0 40.0 120  8.0  M     8 110  10    M    89.0 0.00   50  42     M  35.0   M  16    M     M
2011-12-25 12:53 2455921.5368056 1018.7 43.0 38.0 140  5.0  M     8  90  10    M    82.3  M    M   M     M     M   M   M    M     M
2011-12-25 13:53 2455921.5784722 1018.6 45.0 37.0 170  5.0  M     8 140  10    M    73.3  M    M   M     M     M   M   M    M     M
2011-12-25 14:53 2455921.6201389 1017.8 44.0 36.0 190  8.0  M     8 100  10    M    73.2  M    M   M     M     M   M   M    M     M
2011-12-25 15:53 2455921.6618056 1016.5 43.0 34.0 170  6.0  M     6 140  10    M    70.3  M    M   M     M     M   M   M    M     M
2011-12-25 16:53 2455921.7034722 1015.6 44.0 34.0 160  9.0  M     8 100  10    M    67.6  M    M   M     M     M   M   M    M     M
2011-12-25 17:53 2455921.7451389 1016.1 45.0 34.0 180  7.0  M     8  55  10    M    65.1  M   45  42     M     M   M   M    M     M
2011-12-25 18:53 2455921.7868056 1015.6 49.0 38.0 180 22.0 34.0     8  47  10    M    65.6  M    M   M     M     M   M   M    M     M
2011-12-25 19:41 2455921.8201389      M  46.0 39.0 200 28.0 42.0     8  26   9    M    76.4  M    M   M     M     M   M   M    M     M
2011-12-25 19:53 2455921.8284722 1017.9 46.0 40.0 210 25.0 37.0     8  21  10    M    79.4  M    M   M     M     M   M   M    M     M
2011-12-25 20:53 2455921.8701389 1019.7 45.0 40.0 200 13.0  M      8  18  10    M    82.5  M    M   M     M     M   M   M    M     M
2011-12-25 21:53 2455921.9118056 1020.2 44.0 41.0 200 16.0 25.0     8  23  10    M    89.1  M    M   M     M     M   M   M 0.75 0.125
2011-12-25 22:53 2455921.9534722 1021.7 45.0 40.0 220 16.0 24.0     6  20  10    M    82.5  M    M   M     M     M   M   M    M     M
2011-12-25 23:04 2455921.9611111      M  45.0 39.0 220 16.0 29.0     6  95  10    M    79.3  M    M   M  44.4     M  55   M    M     M
2011-12-25 23:53 2455921.9951389 1022.8 45.0 39.0 210 21.0 26.0     6  95  10    M    79.3  M   50  44  44.4     M  55   M    M     M
2011-12-26 00:53 2455922.0368056 1024.7 44.0 38.0 210 15.0 22.0     3 120  10    M    79.3  M    M   M     M     M   M   M    M     M
2011-12-26 01:53 2455922.0784722 1025.2 44.0 37.0 220 16.0 24.0     3 120  10    M    76.2  M    M   M     M     M   M   M    M     M
2011-12-26 02:53 2455922.1201389 1026.1 43.0 37.0 210 18.0 24.0     1 120  10    M    79.2  M    M   M     M     M   M   M    M     M
2011-12-26 03:53 2455922.1618056 1027.5 42.0 37.0 190 14.0  M      1 120  10    M    82.3  M    M   M     M     M   M   M    M     M
2011-12-26 04:53 2455922.2034722 1028.2 41.0 35.0 190 14.0  M      3 120  10    M    79.0  M    M   M     M     M   M   M    M     M
2011-12-26 05:53 2455922.2451389 1028.9 41.0 36.0 190 11.0  M      6  50  10    M    82.2  M   45  40     M     M   M   M    M     M
2011-12-26 06:53 2455922.2868056 1029.0 39.0 35.0 180  9.0  M     3 120  10    M    85.4  M    M   M     M     M   M   M    M     M
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2011-12-26	07:53	2455922.3284722	1028.4	37.0	34.0	170	7.0	M		1	120	10	M	88.8	M		M	M		M	M	M	M		M
2011-12-26	08:53	2455922.3701389	1027.9	38.0	33.0	160	10.0	M		1	120	10	M	82.0	M		M	M		M	M	M	M		M
2011-12-26	09:53	2455922.4118056	1028.1	39.0	34.0	190	5.0	M		3	120	10	M	82.1	M		M	M		M	M	M	M		M
2011-12-26	10:25	2455922.4340278		M	41.0	34.0	180	8.0	M		6	28	10	M	75.9	M		M	M		M	M	M	M		M
2011-12-26	10:53	2455922.4534722	1028.5	41.0	34.0	180	10.0	M			6	28	10	M	75.9	M		M	M		M	M	M	M		M
2011-12-26	11:53	2455922.4951389	1028.6	41.0	35.0	200	10.0	M			6	28	10	M	79.0	0.03		41	37	M	34.9	M	24	M		M
2011-12-26	12:53	2455922.5368056	1028.0	40.0	35.0	170	8.0	M			8	28	10	M	82.1	M		M	M		M	M	M	M		M
2011-12-26	13:53	2455922.5784722	1027.6	41.0	34.0	170	9.0	M			8	29	10	M	75.9	M		M	M		M	M	M	M		M
2011-12-26	14:53	2455922.6201389	1027.2	40.0	33.0	150	7.0	M			8	29	10	M	75.8	M		M	M		M	M	M	M		M
2011-12-26	15:32	2455922.6472222		M	39.0	34.0	0	0.0	M		8	31	10	M	82.1	M		M	M		M	M	M	M		M
2011-12-26	15:53	2455922.6618056	1027.7	40.0	33.0	0	0.0	M			8	31	10	M	75.8	M		M	M		M	M	M	M		M
2011-12-26	16:53	2455922.7034722	1026.8	40.0	33.0	150	5.0	M		8	100	10	M	75.8	M		M	M		M	M	M	M		M
2011-12-26	17:53	2455922.7451389	1027.0	40.0	34.0	140	3.0	M		8	120	10	M	78.9	M		41	39	M	M	M	M	M		M
2011-12-26	18:53	2455922.7868056	1026.4	42.0	34.0	170	3.0	M		8	100	10	M	73.0	M		M	M	M	M	M	M	M		M
2011-12-26	19:53	2455922.8284722	1025.5	42.0	34.0	200	5.0	M		8	90	10	M	73.0	M		M	M	M	M	M	M	M		M
2011-12-26	20:53	2455922.8701389	1024.8	42.0	34.0	190	3.0	M		8	90	10	M	73.0	M		M	M	M	M	M	M	M	1.06	0.177
2011-12-26	21:53	2455922.9118056	1024.8	42.0	35.0	180	6.0	M		8	85	10	M	76.0	M		M	M	M	M	M	M	M		M
2011-12-26	22:53	2455922.9534722	1024.6	42.0	34.0	170	3.0	M		8	39	10	M	73.0	M		M	M	M	M	M	M	M		M
2011-12-26	23:53	2455922.9951389	1024.3	41.0	34.0	150	7.0	M		8	46	10	M	75.9	M		42	40	44.3	M	60	M	M		M
2011-12-27	00:53	2455923.0368056	1023.6	41.0	35.0	170	3.0	M		8	41	10	M	79.0	M		M	M	M	M	M	M	M		M
2011-12-27	01:53	2455923.0784722	1023.4	40.0	36.0	210	3.0	M		8	48	10	M	85.5	M		M	M	M	M	M	M	M		M
2011-12-27	02:53	2455923.1201389	1023.3	41.0	35.0	180	8.0	M		8	55	10	M	79.0	M		M	M	M	M	M	M	M		M
2011-12-27	03:53	2455923.1618056	1023.8	42.0	36.0	210	7.0	M		8	37	10	M	79.1	M		M	M	M	M	M	M	M		M
2011-12-27	04:53	2455923.2034722	1023.4	41.0	36.0	160	8.0	M		8	50	10	M	82.2	M		M	M	M	M	M	M	M		M
2011-12-27	05:53	2455923.2451389	1022.9	41.0	36.0	180	8.0	M		8	30	10	M	82.2	M		42	40	M	M	M	M	M		M
2011-12-27	06:48	2455923.2833333		M	41.0	37.0	170	6.0	M		8	27	10	M	85.5	M		M	M	M	M	M	M	M		M
2011-12-27	06:53	2455923.2868056	1022.5	41.0	37.0	170	8.0	M		8	27	10	M	85.5	M		M	M	M	M	M	M	M		M
2011-12-27	07:53	2455923.3284722	1022.0	40.0	37.0	170	6.0	M		8	27	10	M	88.9	M		M	M	M	M	M	M	M		M
2011-12-27	08:53	2455923.3701389	1021.5	40.0	38.0	0	0.0	M		8	29	10	M	92.5	M		M	M	M	M	M	M	M		M
2011-12-27	09:12	2455923.3833333		M	39.0	37.0	180	4.0	M		8	31	10	M	92.4	M		M	M	M	M	M	M	M		M
2011-12-27	09:53	2455923.4118056	1021.4	40.0	38.0	150	5.0	M		8	31	7	M	92.5	M		M	M	M	M	M	M	M		M
2011-12-27	10:35	2455923.4409722		M	43.0	37.0	130	7.0	M		8	26	10	M	79.2	M		M	M	M	M	M	M	M		M
2011-12-27	10:53	2455923.4534722	1021.7	42.0	38.0	140	4.0	M		8	26	10	M	85.6	M		M	M	M	M	M	M	M		M
2011-12-27	11:53	2455923.4951389	1021.2	42.0	38.0	160	5.0	M		8	31	10	M	85.6	0.08		42	40	M	34.8	M	22	M		M
2011-12-27	12:53	2455923.5368056	1021.1	43.0	39.0	190	6.0	M		8	27	10	M	85.6	M		M	M	M	M	M	M	M		M
2011-12-27	13:32	2455923.5638889		M	43.0	39.0	180	8.0	M		8	31	10	M	85.6	M		M	M	M	M	M	M	M		M
2011-12-27	13:53	2455923.5784722	1021.1	43.0	40.0	190	5.0	M		8	31	9	M	89.0	M		M	M	M	M	M	M	M		M
2011-12-27	14:03	2455923.5854167		M	43.0	39.0	190	6.0	M		8	27	10	M	85.6	M		M	M	M	M	M	M	M		M
2011-12-27	14:53	2455923.6201389	1021.0	44.0	41.0	200	8.0	M		8	23	10	M	89.1	M		M	M	M	M	M	M	M		M
2011-12-27	15:53	2455923.6618056	1020.7	44.0	41.0	180	7.0	M		8	22	10	M	89.1	M		M	M	M	M	M	M	M		M
2011-12-27	16:53	2455923.7034722	1021.4	45.0	42.0	200	8.0	M		8	21	7	M	89.1	M		M	M	M	M	M	M	M		M
2011-12-27	17:53	2455923.7451389	1020.8	46.0	43.0	200	7.0	M		8	27	10	M	89.2	M		46	42	M	M	M	M	M		M
2011-12-27	18:53	2455923.7868056	1019.8	46.0	43.0	200	7.0	M		8	40	7	M	89.2	M		M	M	M	M	M	M	M		M
2011-12-27	19:53	2455923.8284722	1018.6	47.0	44.0	220	6.0	M		8	45	6	M	89.2	M		M	M	M	M	M	M	M		M
2011-12-27	20:15	2455923.8437500		M	46.0	45.0	200	5.0	M		8	45	3	M	96.3	M		M	M	M	M	M	M	2.14	0.246
2011-12-27	20:53	2455923.8701389	1017.1	47.0	46.0	0	0.0	M		8	45	3	M	96.3	M		M	M	M	M	M	M	2.14	0.246
2011-12-27	21:40	2455923.9027778		M	46.0	46.0	190	3.0	M		8	26	2	M	100.0	M		M	M	M	M	M	M	M		M
2011-12-27	21:46	2455923.9069444		M	46.0	46.0	190	3.0	M		8	7	2	M	100.0	M		M	M	M	M	M	M	M		M
2011-12-27	21:53	2455923.9118056	1015.8	47.0	46.0	0	0.0	M		8	7	1	M	96.3	M		M	M	M	M	M	M	M		M
2011-12-27	22:16	2455923.9277778		M	46.0	45.0	170	3.0	M		8	24	2	M	96.3	M		M	M	M	M	M	M	M		M
2011-12-27	22:53	2455923.9534722	1014.8	47.0	46.0	170	4.0	M		8	25	2	M	96.3	M		M	M	M	M	M	M	M		M
2011-12-27	23:53	2455923.9951389	1013.7	48.0	46.0	140	6.0	M		8	27	2	M	92.7	M		48	46	44.1	M	62	M	M		M
2011-12-28	00:09	2455924.0062500		M	48.0	46.0	140	6.0	M		8	31	2	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	00:12	2455924.0083333		M	48.0	46.0	140	6.0	M		8	31	3	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	00:40	2455924.0277778		M	48.0	46.0	150	7.0	M		8	26	3	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	00:53	2455924.0368056	1012.3	48.0	46.0	150	6.0	M		8	24	3	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	01:53	2455924.0784722	1010.9	48.0	46.0	160	7.0	M		8	25	3	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	02:53	2455924.1201389	1009.8	48.0	47.0	160	9.0	M		8	23	3	M	96.3	M		M	M	M	M	M	M	M		M
2011-12-28	03:53	2455924.1618056	1007.9	48.0	46.0	160	9.0	M		8	29	3	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	04:53	2455924.2034722	1008.2	48.0	47.0	180	6.0	M		8	21	6	M	96.3	M		M	M	M	M	M	M	M		M
2011-12-28	05:07	2455924.2131944		M	48.0	46.0	170	7.0	M		8	13	4	M	92.7	M		M	M	M	M	M	M	M		M
2011-12-28	05:53	2455924.2451389	1007.1	49.0	48.0	190	10.0	M		8	16	6	M	96.3	M		49	47	M	M	M	M	M		M
2011-12-28	06:53	2455924.2868056	1008.0	51.0	49.0	190	17.0	24.0		8	15	8	M	92.8	M		M	M	M	M	M	M	M		M
2011-12-28	07:15	2455924.3020833		M	52.0	48.0	190	17.0	24.0	8	13	10	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	07:53	2455924.3284722	1008.8	51.0	50.0	200	17.0	22.0		8	11	10	M	96.4	M		M	M	M	M	M	M	M		M
2011-12-28	08:53	2455924.3701389	1009.0	51.0	48.0	200	18.0	25.0		8	13	10	M	89.4	M		M	M	M	M	M	M	M		M
2011-12-28	09:53	2455924.4118056	1009.3	51.0	48.0	190	18.0	24.0		8	13	10	M	89.4	M		M	M	M	M	M	M	M		M
2011-12-28	10:53	2455924.4534722	1010.1	52.0	48.0	200	15.0	24.0		8	13	10	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	11:13	2455924.4673611		M	52.0	48.0	200	17.0	22.0		8	27	10	M	86.2	M		M	M	M	34.7	M	20	M		M
2011-12-28	11:53	2455924.4951389	1010.2	52.0	49.0	200	16.0	24.0		8	25	9	M	89.5	0.89		52	49	M	34.7	M	20	M		M
2011-12-28	12:16	2455924.5111111		M	52.0	48.0	200	16.0	23.0		8	11	10	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	12:53	2455924.5368056	1010.9	52.0	49.0	210	16.0	28.0		8	19	10	M	89.5	M		M	M	M	M	M	M	M		M
2011-12-28	13:11	2455924.5493056		M	52.0	48.0	200	18.0	27.0		8	11	10	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	13:53	2455924.5784722	1011.4	51.0	49.0	200	15.0	23.0		8	12	10	M	92.8	M		M	M	M	M	M	M	M		M
2011-12-28	14:53	2455924.6201389	1011.5	52.0	48.0	200	15.0	25.0		8	10	10	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	15:53	2455924.6618056	1012.1	51.0	49.0	210	12.0	M		8	12	10	M	92.8	M		M	M	M	M	M	M	M		M
2011-12-28	16:53	2455924.7034722	1012.7	52.0	48.0	190	11.0	M		8	12	10	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	17:53	2455924.7451389	1013.1	52.0	49.0	200	12.0	M		8	14	8	M	89.5	M		53	51	M	M	M	M	M		M
2011-12-28	18:53	2455924.7868056	1012.6	52.0	49.0	180	13.0	M		8	14	7	M	89.5	M		M	M	M	M	M	M	M		M
2011-12-28	19:35	2455924.8159722		M	52.0	48.0	190	13.0	17.0	8	12	6	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	19:53	2455924.8284722	1012.0	52.0	49.0	190	12.0	M		8	12	7	M	89.5	M		M	M	M	M	M	M	M		M
2011-12-28	20:53	2455924.8701389	1010.6	52.0	48.0	180	12.0	M		8	15	10	M	86.2	M		M	M	M	M	M	M	M	1.53	0.187
2011-12-28	21:47	2455924.9076389		M	52.0	46.0	170	9.0	M		8	32	10	M	79.9	M		M	M	M	M	M	M	M		M
2011-12-28	21:53	2455924.9118056	1009.0	52.0	47.0	160	9.0	M		8	32	9	M	83.0	M		M	M	M	M	M	M	M		M
2011-12-28	22:07	2455924.9215278		M	52.0	46.0	160	10.0	M		8	28	6	M	79.9	M		M	M	M	M	M	M	M		M
2011-12-28	22:35	2455924.9409722		M	52.0	48.0	150	9.0	M		8	30	7	M	86.2	M		M	M	M	M	M	M	M		M
2011-12-28	22:53	2455924.9534722	1007.7	50.0	48.0	140	9.0	M		8	49	8	M	92.8	M		M	M	M	M	M	M	M		M
2011-12-28	23:53	2455924.9951389	1005.6	50.0	48.0	140	12.0	19.0		8	50	6	M	92.8	M		52	50	44.0	M	58	M	M		M
2011-12-29	00:53	2455925.0368056	1003.7	50.0	49.0	160	8.0	M		8	35	4	M	96.3	M		M	M	M	M	M	M	M		M
2011-12-29	01:08	2455925.0472222		M	50.0	48.0	160	5.0	M		8	29	4	M	92.8	M		M	M	M	M	M	M	M		M
2011-12-29	01:48	2455925.0750000		M	52.0	50.0	170	14.0	21.0		8	19	5	M	92.9	M		M	M	M	M	M	M	M		M
2011-12-29	01:53	2455925.0784722	1003.1	51.0	50.0	170	14.0	21.0		8	19	3	M	96.4	M		M	M	M	M	M	M	M		M
2011-12-29	02:06	2455925.0875000		M	52.0	50.0	190	14.0	M		8	13	4	M	92.9	M		M	M	M	M	M	M	M		M
2011-12-29	02:27	2455925.1020833		M	52.0	52.0	200	17.0	23.0		8	5	6	M	100.0	M		M	M	M	M	M	M	M		M
2011-12-29	02:53	2455925.1201389	1004.1	52.0	52.0	210	20.0	27.0		8	7	6	M	100.0	M		M	M	M	M	M	M	M		M

2011-12-29	03:30	2455925.1458333		M	54.0	52.0	210	15.0	29.0	8	12	10	M	92.9	M	M	M	M	M	M	M	M	M
2011-12-29	03:53	2455925.1618056	1005.5	53.0	52.0	210	18.0	30.0	8	12	10	M	96.4	M	M	M	M	M	M	M	M	M	M
2011-12-29	04:53	2455925.2034722	1006.5	52.0	47.0	220	19.0	31.0	6	16	10	M	83.0	M	M	M	M	M	M	M	M	M	M
2011-12-29	05:53	2455925.2451389	1007.7	50.0	44.0	220	22.0	28.0	3	120	10	M	79.7	M	53	50	M	M	M	M	M	M	M
2011-12-29	06:06	2455925.2541667		M	50.0	45.0	220	19.0	30.0	6	18	10	M	82.8	M	M	M	M	M	M	M	M	M	M
2011-12-29	06:53	2455925.2868056	1009.9	50.0	43.0	230	12.0	24.0	8	19	10	M	76.7	M	M	M	M	M	M	M	M	M	M
2011-12-29	08:53	2455925.3701389	1011.3	48.0	42.0	210	19.0	29.0	8	22	10	M	82.7	M	M	M	M	M	M	M	M	M	M
2011-12-29	08:53	2455925.3701389	1011.3	48.0	42.0	210	19.0	29.0	8	22	10	M	79.6	M	M	M	M	M	M	M	M	M	M
2011-12-29	09:53	2455925.4118056	1012.5	48.0	41.0	220	19.0	31.0	6	20	10	M	76.6	M	M	M	M	M	M	M	M	M	M
2011-12-29	10:53	2455925.4534722	1014.2	47.0	41.0	220	18.0	28.0	8	18	10	M	79.5	M	M	M	M	M	M	M	M	M	M
2011-12-29	11:53	2455925.4951389	1015.3	46.0	40.0	210	14.0	25.0	6	17	10	M	79.4	0.61	50	46	M	34.5	M	12	M	M	M
2011-12-29	12:53	2455925.5368056	1016.6	46.0	41.0	210	14.0	25.0	8	19	10	M	82.6	M	M	M	M	M	M	M	M	M	M
2011-12-29	13:53	2455925.5784722	1017.9	46.0	39.0	200	7.0	M	6	19	10	M	76.4	M	M	M	M	M	M	M	M	M	M
2011-12-29	14:46	2455925.6152778		M	45.0	39.0	190	9.0	M	3	120	10	M	79.3	M	M	M	M	M	M	M	M	M
2011-12-29	14:53	2455925.6201389	1018.6	45.0	39.0	190	9.0	M	3	120	10	M	79.3	M	M	M	M	M	M	M	M	M	M
2011-12-29	15:53	2455925.6618056	1019.3	44.0	39.0	190	9.0	M	6	200	10	M	82.4	M	M	M	M	M	M	M	M	M	M
2011-12-29	16:53	2455925.7034722	1019.7	45.0	40.0	180	9.0	M	8	180	10	M	82.5	M	M	M	M	M	M	M	M	M	M
2011-12-29	17:53	2455925.7451389	1019.1	45.0	40.0	190	7.0	M	8	160	10	M	82.5	M	47	44	M	M	M	M	M	M	M
2011-12-29	18:53	2455925.7868056	1018.3	45.0	40.0	200	7.0	M	8	40	10	M	82.5	M	M	M	M	M	M	M	M	M	M
2011-12-29	19:53	2455925.8284722	1017.7	46.0	41.0	200	7.0	M	8	60	10	M	82.6	M	M	M	M	M	M	M	M	M	M
2011-12-29	20:53	2455925.8701389	1015.8	46.0	42.0	160	4.0	M	8	45	10	M	85.8	M	M	M	M	M	M	M	0.89	0.123	
2011-12-29	21:53	2455925.9118056	1014.1	46.0	40.0	140	8.0	M	8	44	10	M	79.4	M	M	M	M	M	M	M	M	M	M
2011-12-29	22:53	2455925.9534722	1012.1	46.0	40.0	100	4.0	M	8	35	10	M	79.4	M	M	M	M	M	M	M	M	M	M
2011-12-29	23:53	2455925.9951389	1010.3	46.0	40.0	90	3.0	M	8	34	10	M	79.4	M	46	45	43.9	M	56	M	M	M	M
2011-12-30	00:53	2455926.0368056	1008.7	45.0	41.0	130	5.0	M	8	33	10	M	85.8	M	M	M	M	M	M	M	M	M	M
2011-12-30	01:53	2455926.0784722	1006.4	44.0	41.0	120	11.0	17.0	8	50	10	M	89.1	M	M	M	M	M	M	M	M	M	M
2011-12-30	02:53	2455926.1201389	1004.9	45.0	41.0	100	8.0	M	8	28	10	M	85.8	M	M	M	M	M	M	M	M	M	M
2011-12-30	03:45	2455926.1562500		M	45.0	41.0	120	6.0	M	8	31	9	M	85.8	M	M	M	M	M	M	M	M	M	M
2011-12-30	03:53	2455926.1618056	1003.8	44.0	41.0	130	6.0	M	8	31	10	M	89.1	M	M	M	M	M	M	M	M	M	M
2011-12-30	04:17	2455926.1784722		M	45.0	41.0	150	9.0	M	8	24	10	M	85.8	M	M	M	M	M	M	M	M	M	M
2011-12-30	04:53	2455926.2034722	1002.7	44.0	41.0	160	8.0	M	8	20	9	M	89.1	M	M	M	M	M	M	M	M	M	M
2011-12-30	05:53	2455926.2451389	1001.7	45.0	44.0	160	10.0	M	8	20	10	M	96.3	M	46	44	M	M	M	M	M	M	M
2011-12-30	06:53	2455926.2868056	1001.6	50.0	49.0	190	13.0	21.0	8	26	10	M	96.3	M	M	M	M	M	M	M	M	M	M
2011-12-30	07:27	2455926.3104167		M	50.0	48.0	210	13.0	29.0	8	13	5	M	92.8	M	M	M	M	M	M	M	M	M	M
2011-12-30	07:38	2455926.3180556		M	50.0	48.0	250	18.0	23.0	8	15	5	M	92.8	M	M	M	M	M	M	M	M	M	M
2011-12-30	07:53	2455926.3284722	1002.8	49.0	46.0	240	17.0	26.0	8	15	6	M	89.3	M	M	M	M	M	M	M	M	M	M

ATTACHMENT B

Building Monitoring Locations

Building Monitoring Locations

8230 5th Avenue South
Timberwolf Offices and Warehouse

Warehouse concrete slab on grade.
Very good condition. Joints are sealed and tight.

1. watermain floor penetration - annular space
2. natural gas penetration - wall
3. rear storage room
4. crack at wall column/slab interface
5. rear south wall
6. upstairs office open space
7. bathroom floor drains - womens
8. bathroom floor drains - mens
9. utility room - open area
10. open warehouse

8230 5th Avenue South
Hudson Bay Offices and Warehouse

Warehouse concrete slab on grade.
Very good condition. Joints are sealed and tight.

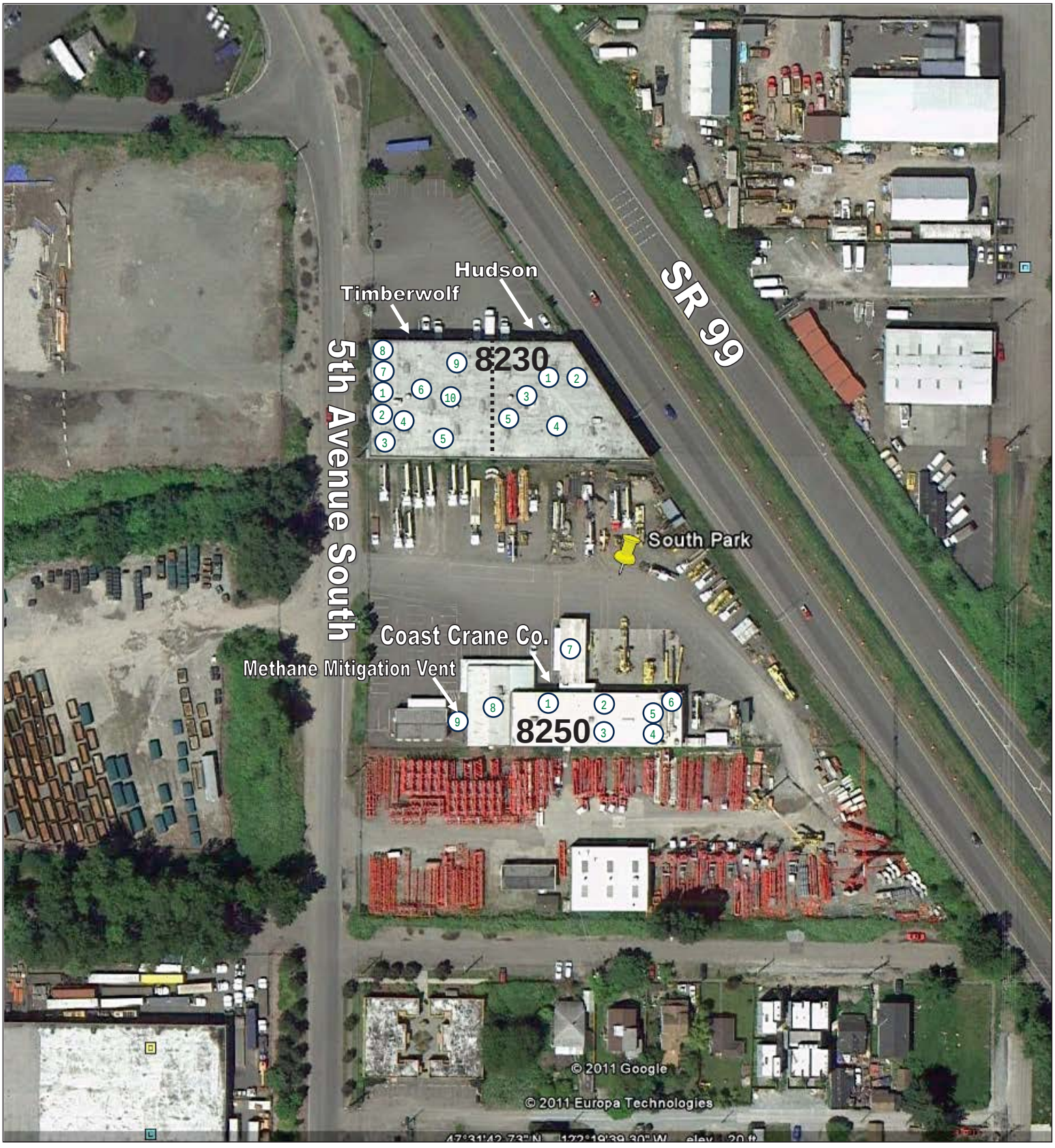
1. women's bathroom
2. men's bathroom
3. slab on grade floor crack
4. floor drain
5. slab on grade floor crack

8250 5th Avenue South
Coast Crane Company - Gerry Knierem Office Manager

Warehouse concrete slab on grade.
Very good condition. Joints are sealed and tight.

1. bathroom space
2. floor drain
3. slab on grade construction joint
4. water meter vault
5. restroom space - east
6. shop space
7. skirted crawl space - elevated building
8. open area -interior
9. methane mitigation PVC vent at roof-line

South Park


Hudson
Timberwolf
SR 99
8230
5th Avenue South
South Park
Coast Crane Co.
Methane Mitigation Vent
8250
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C2

Perimeter Probe Monitoring Field Forms

SOUTH PARK LANDFILL

Gas Probe Monitoring Field Form

Sampling Organization: Parametrix **Field Personnel:** Steve Emge, Mike Brady, & Trey Parry

Date and Time: 5/14/2020 and 0720 to 1400 **Project Number:** 553-1550-067 (03.00)

Gas Probe	Probe Diameter (ft)	Purge Volume (cc)	Purge Rate (ml/min)	Purge Time		Pressure (in W.C.)	Depth to Water (ft)	CH_4 (% Volume)	CO_2 (% Volume)	O_2 (% Volume)	H_2S / CO (ppm)
GP-37	.063	868	550	1.57	min	0	Dry	0	5.2	14	0/0
GP-09	.063	899	550	1.63	min	0	Dry	0	6.9	15	0/1
GP-26	.063	868	550	1.57	min	Probe was	not found.				
GP-23	.167	4,940	550	8.98	min	0	Dry	0	6.6	14	0/0
GP-07	.063	519	550	0.94	min	0	Dry	0	2.3	19	0/0
GP-27	.063	1,216	550	2.21	min	0	12.23	0	0	21	0/0
GP-28	.063	1,042	550	1.89	min	0	10.90	0	4.4	10	0/0
GP-29	.063	868	550	1.57	min	0	8.61	1.4	11.8	3	0/0
GP-16	.167	5,867	550	10.67	min	0	Dry	0	0.5	20	0/0
GP-31	.063	868	550	1.57	min	0	6.21	0	4.0	15	0/0
GP-15	.167	5,558	550	10.11	min	0	3.31	0	3.8	15	0/0
GP-32	.063	868	550	1.57	min	0	2.27	0	0	21	0/0
GP-03	.063	725	550	1.32	min	0	Dry	0	7.1	11	0/0
GP-13	.167	4,014	550	7.29	min	0	2.78	0	0	21	0/0
GP-11	.167	4,632	550	8.42	min	0	5.84	0	0	21	0/0
GP-38	.063	882	550	1.6	min	0	Dry	0	6.6	13	0/0
GP-33	.063	1,165	550	2.12	min	0	13.40	0	5.5	8	0/5

Comments/Special Instructions:

Barometer ("Hg) (Start): 29.97 @ 0710 **Barometer ("Hg) (Finish):** 29.96 @ 1400

Temperature: 52 deg F **Weather:** Overcast with rain until 0900 then overcast to mostly cloudy

Equipment Used: LandGem TM 5000 and Water Level Meter: Rented and Calibrated by GeoTech

South Park Landfill

GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number:

Date: 8/24/20

Field Personnel: T. Parry + A. York

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_4 (% Volume)	CO_2 (% Volume)	O_2 (% Volume)	H_2S (ppm)	
GP-37	.063	2.8 to 7.8	868	1.57	Dry	0.0	12:20	0.0	11.5	10.6	0	
GP-09	.063	6.62 to 10.62	899	1.63	Dry	0.0	12:07	0.0	4.8	18.6	0	
GP-26	.063	4.62 to 9.62	868	1.57	7.89	0.0	13:16	0.0	7.6	19.2	0	
GP-23	.167	6.05 to 7.05	4,940	8.98	7.42	0.0	13:35	0.0	7.7	14.6	0	
GP-07	.063	5.75 to 6.25	519	0.94	Dry	0.0	13:50	0.0	3.5	19.0	0	
GP-27	.063	8.57 to 13.57	1,216	2.21	12.29	0.0	11:40	0.5	12.9	0.0	5	O_2 read <<<<, which was interpreted as 0.0
GP-28	.063	6.59 to 11.59	1,042	1.89	11.45	0.0	11:30	0.0	9.5	5.7	0	
GP-29	.063	4.62 to 9.62	868	1.57	9.23	0.0	11:19	1.8	14.8	2.0	0	
GP-16	.167	6.60 to 9	5,867	10.67	Dry	0.0	10:45	0.0	0.4	20.4	0	
GP-31	.063	4.64 to 9.64	868	1.57	5.81	0.0	9:45	0.0	15.4	3.6	0	
GP-15	.167	6.62 to 8.62	5,558	10.11	6.08	0.0	10:22	0.0	3.1	18.5	0	Blocked screen.
GP-32	.063	4.72 to 9.72	868	1.57	3.09	0.0	10:10	No reading; screen covered.				Blocked screen.
GP-03	.063	6.73 to 8.63	725	1.32	Dry	0.0	9:33	0.0	9.2	10.4	0	
GP-13	.167	4.91 to 5.41	4,014	7.29	3.13	0.0	9:15	0.0	0.1	21.9	0	Blocked screen.
GP-11	.167	6.23 to 6.73	4,632	8.42	6.13	0.0	8:49	0.0	0.1	21.9	0	
GP-38	.063	3.8 to 8.8	882	1.6	Dry	0.0	12:37	0.0	17.7	0.8	0	
GP-33	.063	8.2 to 13.2	1,165	2.12	13.31	0.0	12:55	0.0	6.7	9.5	0	

Comments: All casings were maintained, however, they still need locking bolts.

Barometer ("Hg) (Start): 30.03 (recorded from Landtec) Barometer ("Hg) (Finish): 30.02

Temperature: Start: 62°F End: 72°F Weather: Sunny with clear skies

Equipment Used: Landtec 5000

Parametrix

South Park Landfill

GAS PROBE MONITORING FIELD FORM

Sampling Organization: Parametrix

Project Number: 553-1550-067

Date: 11/9/20

Field Personnel: Tracy Perry + Austin York.

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_4 (% Volume)	CO_2 (% Volume)	O_2 (% Volume)	H_2S (ppm)
GP-37	.063	2.8 to 7.8	868	1.57	Dry	0.00	10:43	0.0	10.9	3.9	0
GP-09	.063	6.62 to 10.62	899	1.63	Dry	0.00	11:15	0.0	4.9	17.1	0
GP-26	.063	4.62 to 9.62	868	1.57	8.71	0.00	11:50	0.0	3.0	17.7	0
GP-23	.167	6.05 to 7.05	4,940	8.98	7.34	0.00	11:31	0.0	6.5	15.1	0
GP-07	.063	5.75 to 6.25	519	0.94	Dry	0.00	12:03	0.0	3.4	17.6	0
GP-27	.063	8.57 to 13.57	1,216	2.21	12.35	0.00	10:18	0.6	12.4	0.0	6
GP-28	.063	6.59 to 11.59	1,042	1.89	11.01	0.00	9:32	0.0	9.5	4.3	0
GP-29	.063	4.62 to 9.62	868	1.57	9.05	0.00	9:48	2.9	14.3	1.6	0
GP-16	.167	6.60 to 9	5,867	10.67	Dry	0.00	10:00	0.0	1.6	19.7	0
GP-31	.063	4.64 to 9.64	868	1.57	6.03	0.00	8:56	0.0	10.0	5.6	0
GP-15	.167	6.62 to 8.62	5,558	10.11	4.87	-	9:05	-	-	-	-
GP-32	.063	4.72 to 9.72	868	1.57	2.81	-	9:13	-	-	-	-
GP-03	.063	6.73 to 8.63	725	1.32	Dry	0.00	9:21	0.0	8.9	8.0	0
GP-13	.167	4.91 to 5.41	4,014	7.29	2.85	-	8:25	-	-	-	-
GP-11	.167	6.23 to 6.73	4,632	8.42	5.81	-	8:10	-	-	-	-
GP-38	.063	3.8 to 8.8	882	1.6	Dry	0.00	11:07	0.0	13.8	2.5	0
GP-33	.063	8.2 to 13.2	1,165	2.12	13.50	0.00	12:44	0.0	4.9	13.5	0

Comments: Revisited GP-11 to see if water level dropped. Instead, it rose to a DTW of 4.92 at 12:30.

Barometer ("Hg) (Start): 30.06

Barometer ("Hg) (Finish): 30.09

Temperature: 42°F

Weather: Overcast

Equipment Used: Landtec GEM 5000

Parametrix

C3

Building Monitoring Forms

SPPD ON-SITE BUILDING METHANE ALARM INSPECTION CHECKLIST

Building Location: _____

Make and Model of Detector: _____

Monthly Check: Press test button and confirm indicator light is illuminated.

- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____

Quarterly Test: 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.

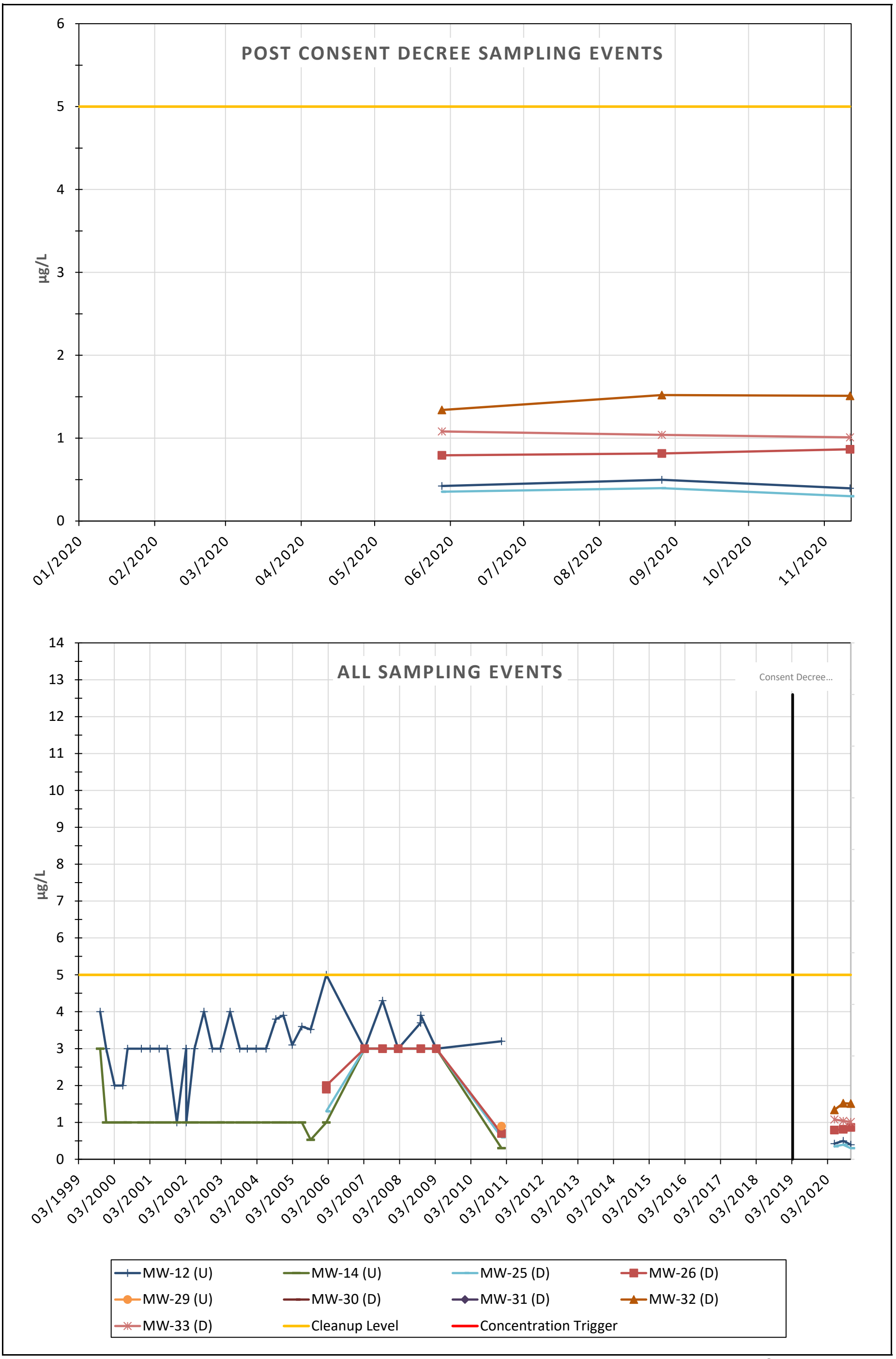
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____
- ☐ Date: _____ Initials: _____

Appendix D

Groundwater Monitoring

D1

Time-Series Plots



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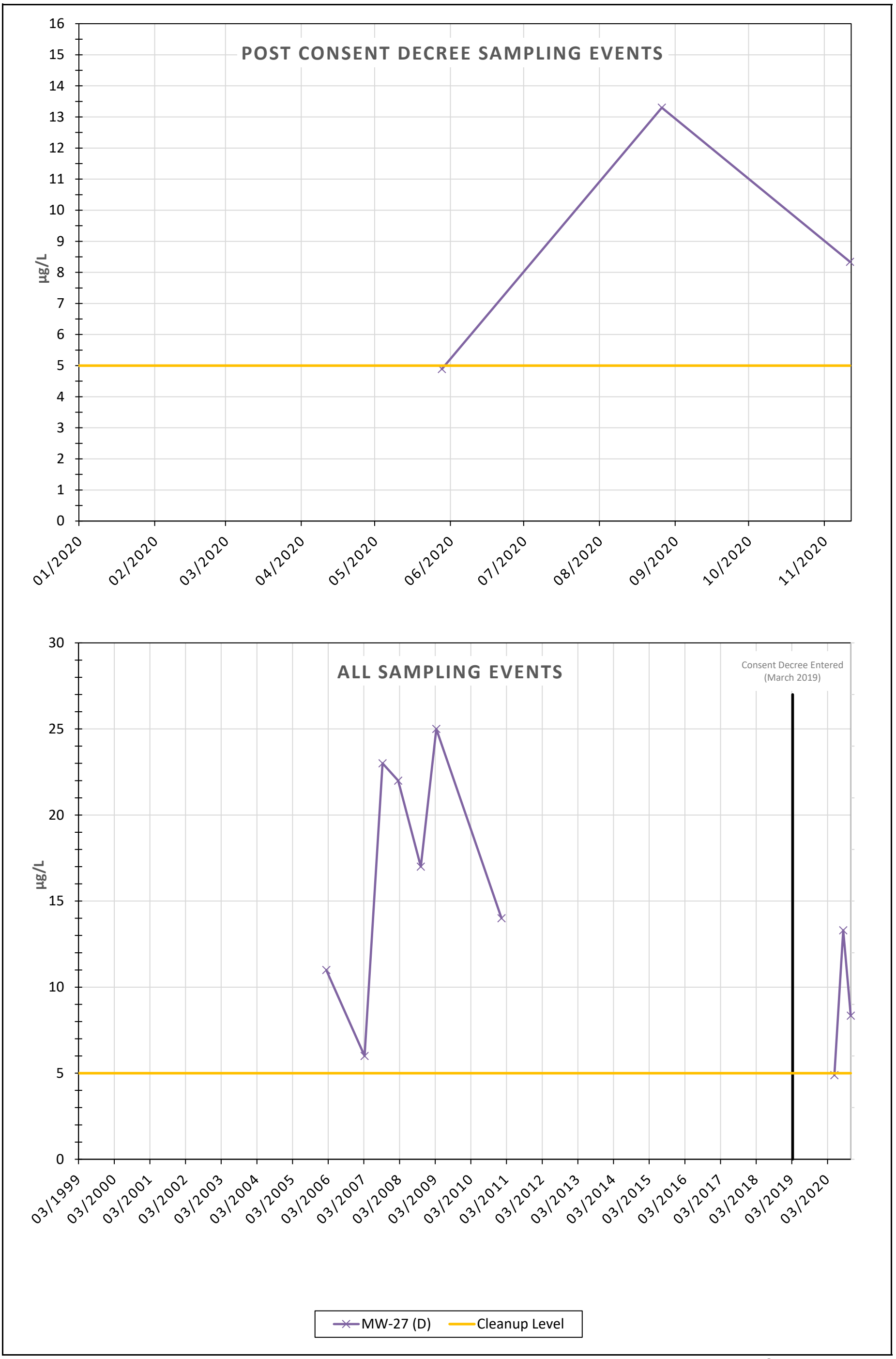
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

Dissolved Arsenic Concentrations
A-Zone CPOC Wells
South Park Landfill



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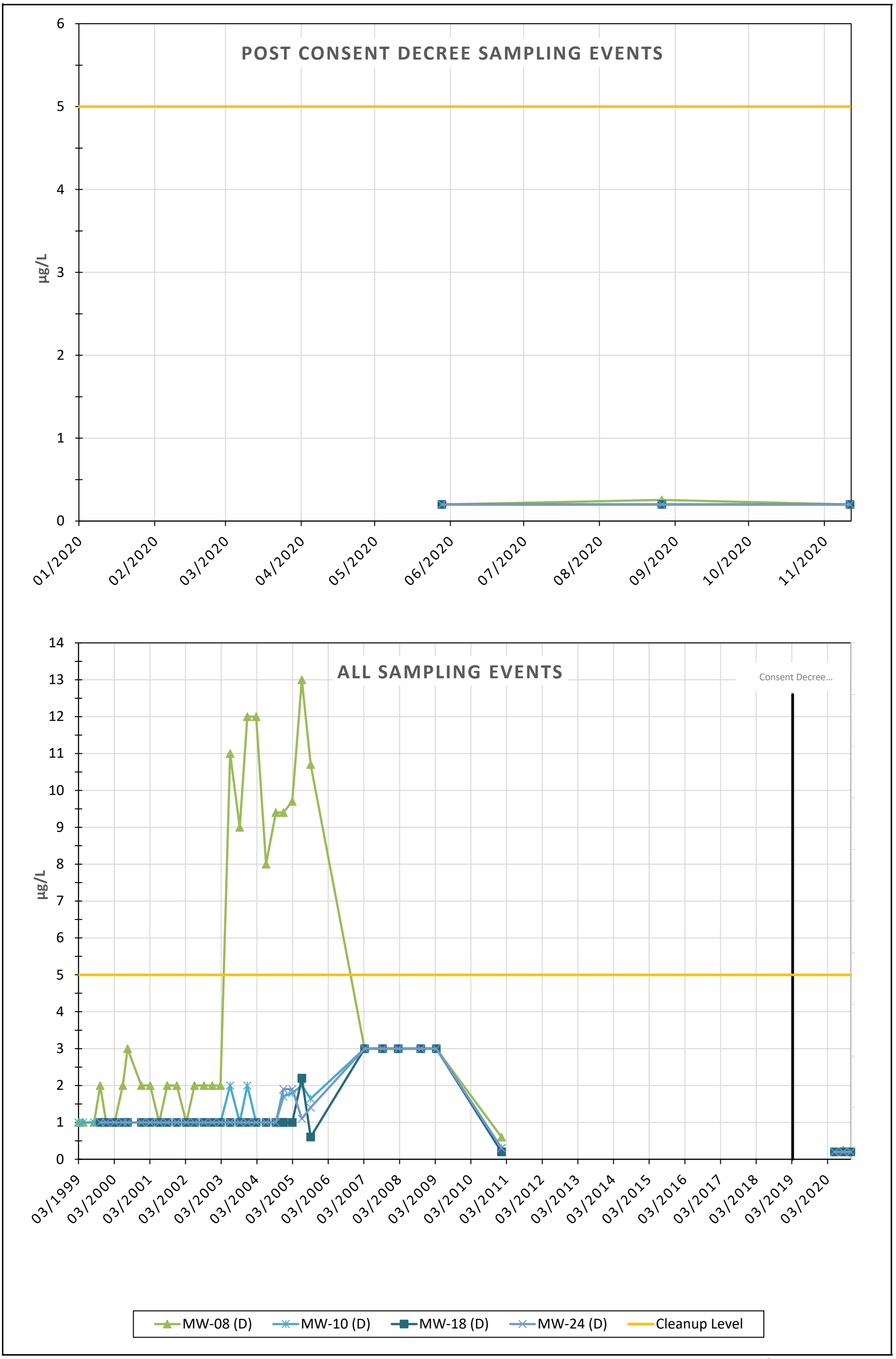
U = Upgradient

Dissolved Arsenic Concentrations
A-Zone Non-CPOC Wells
South Park Landfill



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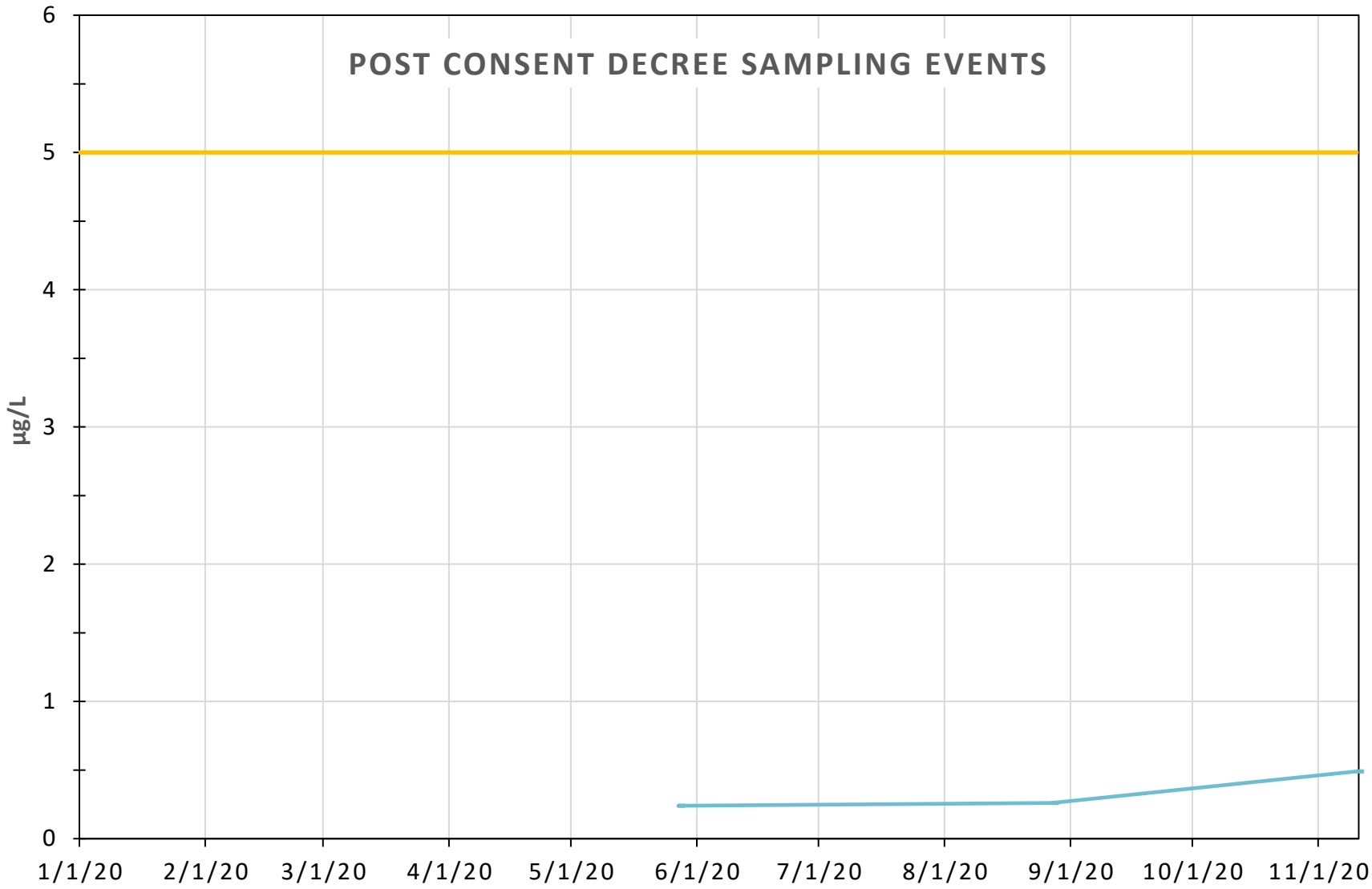
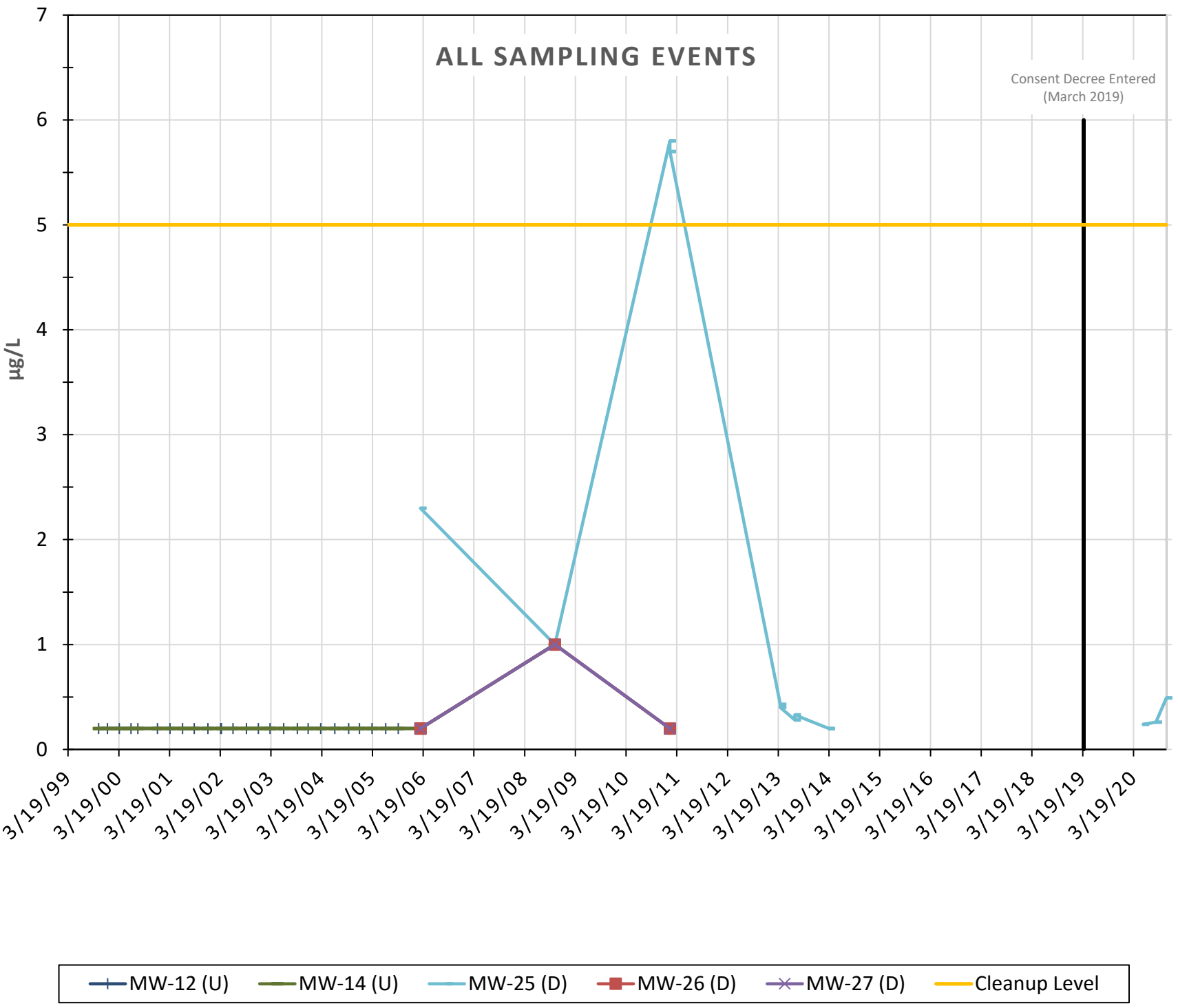
D = Downgradient
U = Upgradient

Dissolved Arsenic Concentrations
B-Zone CPOC Wells
South Park Landfill





Parametrix
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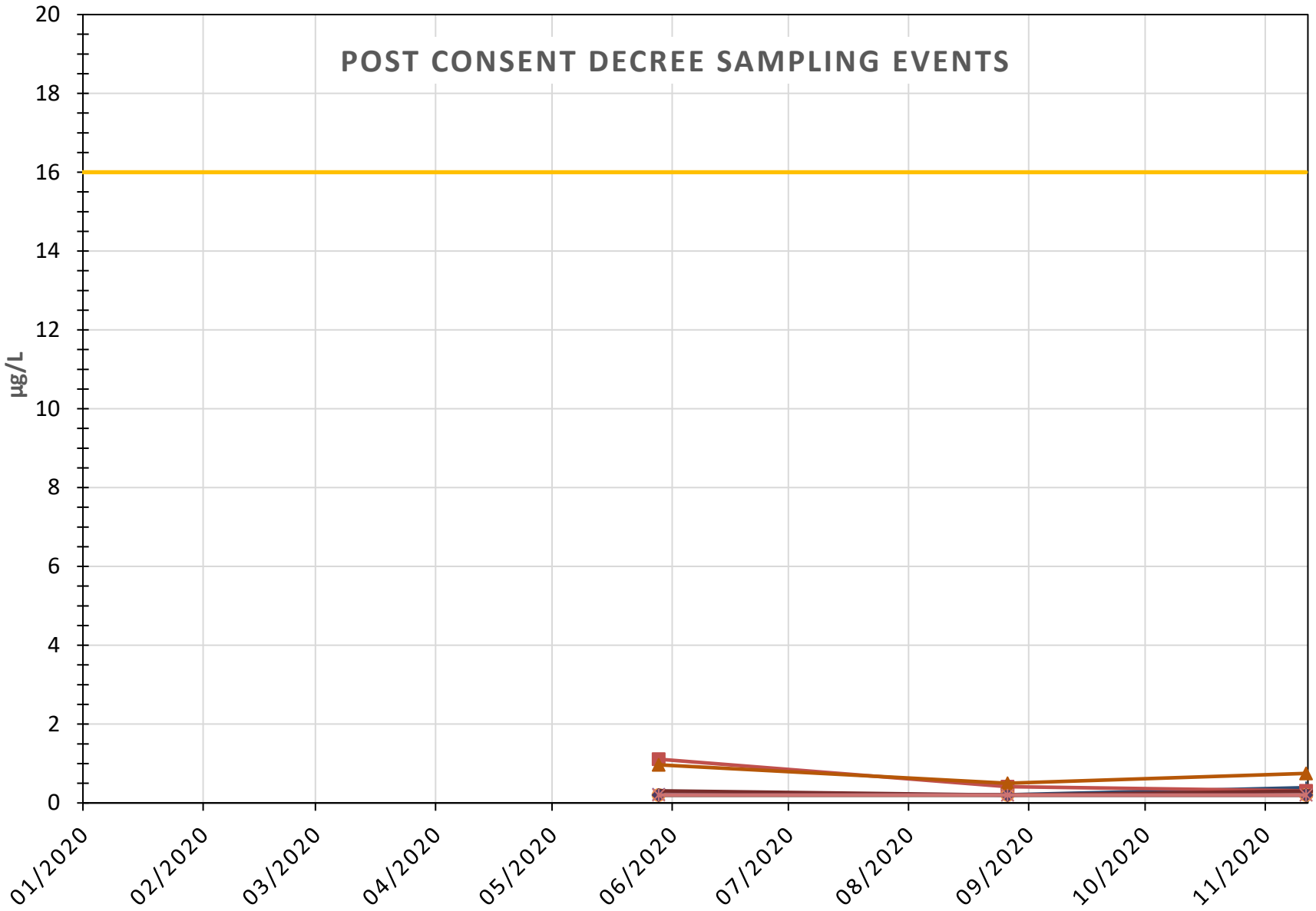
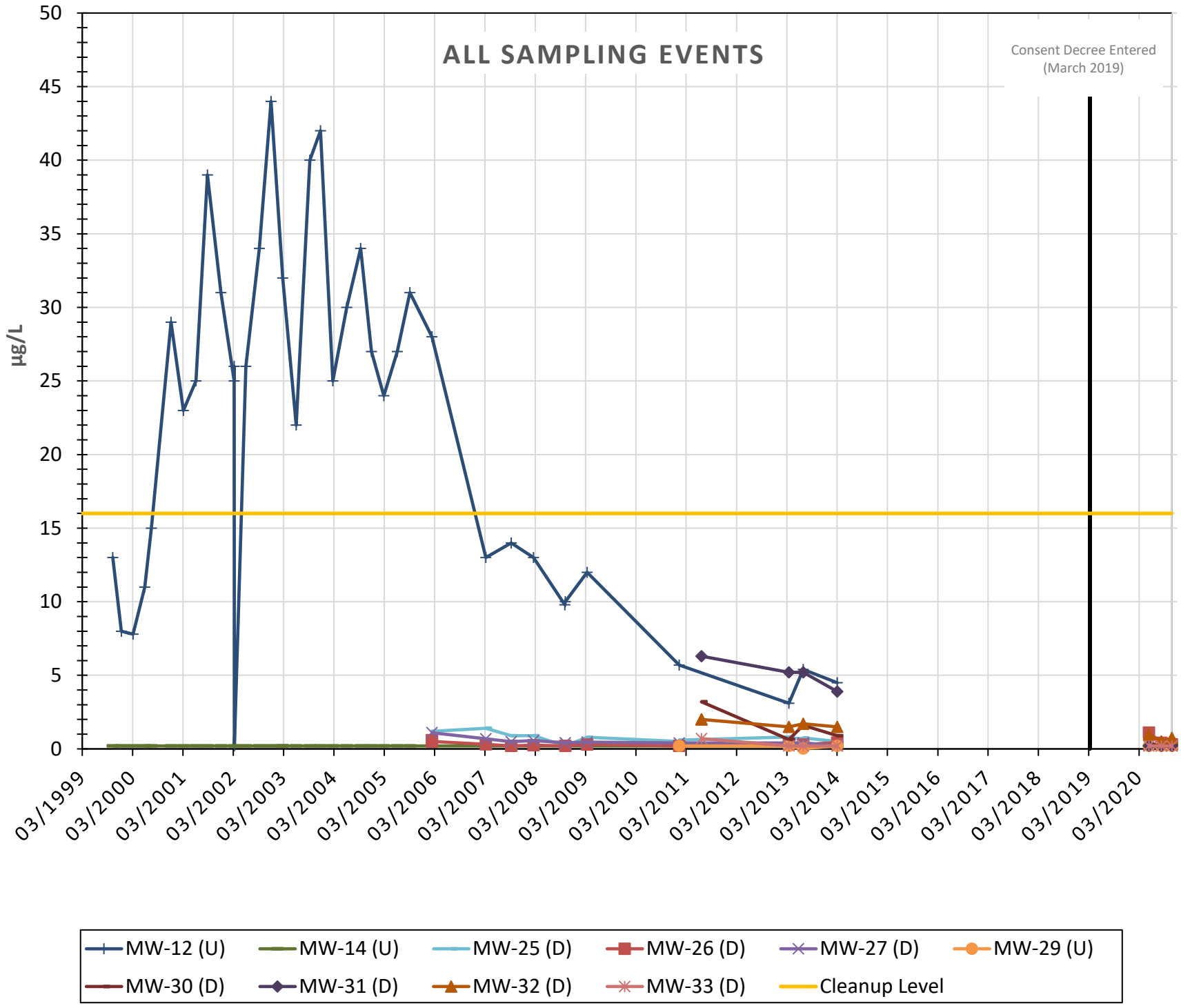
D = Downgradient
U = Upgradient

Benzene Concentrations
A-Zone CPOC Wells
South Park Landfill

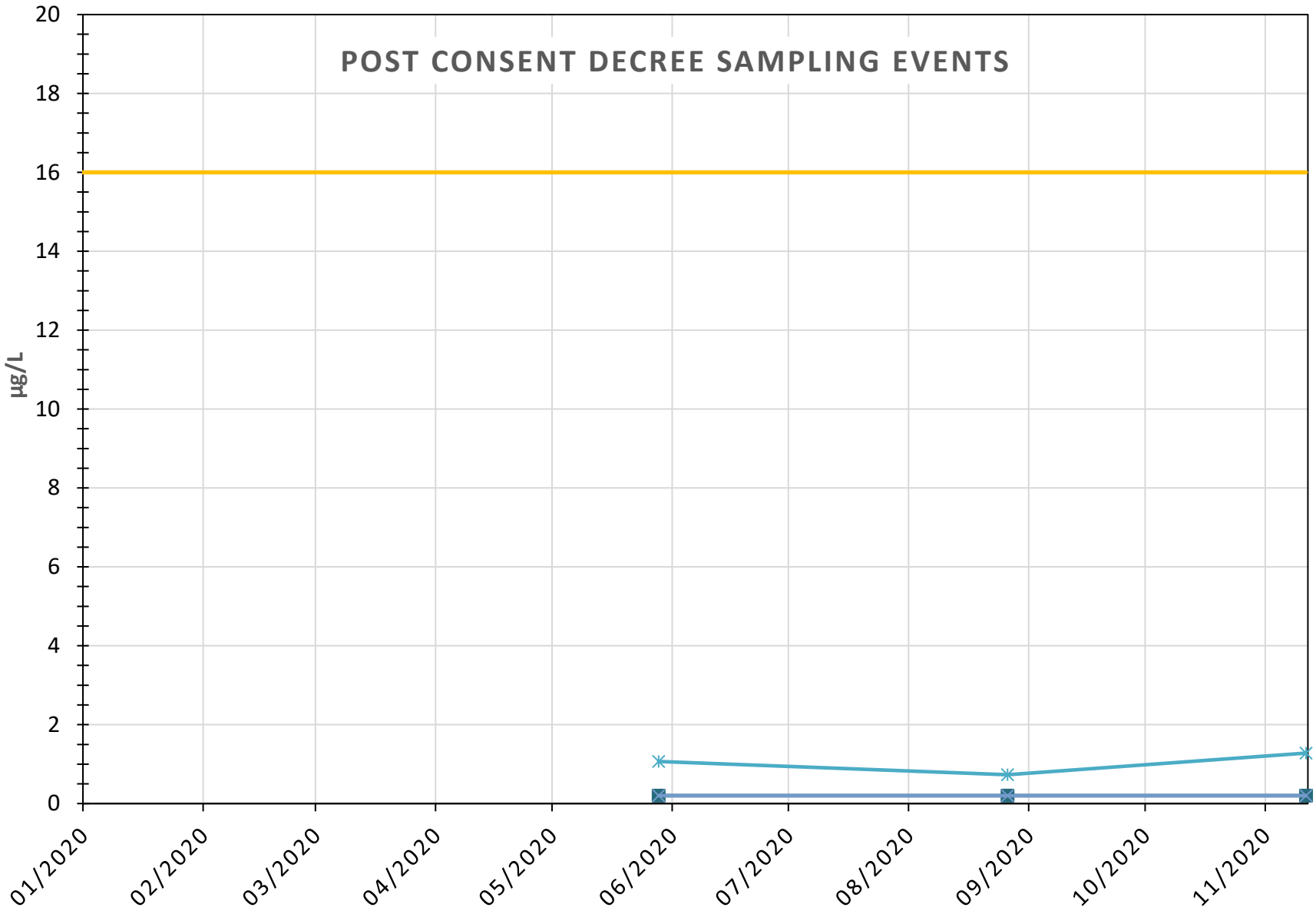


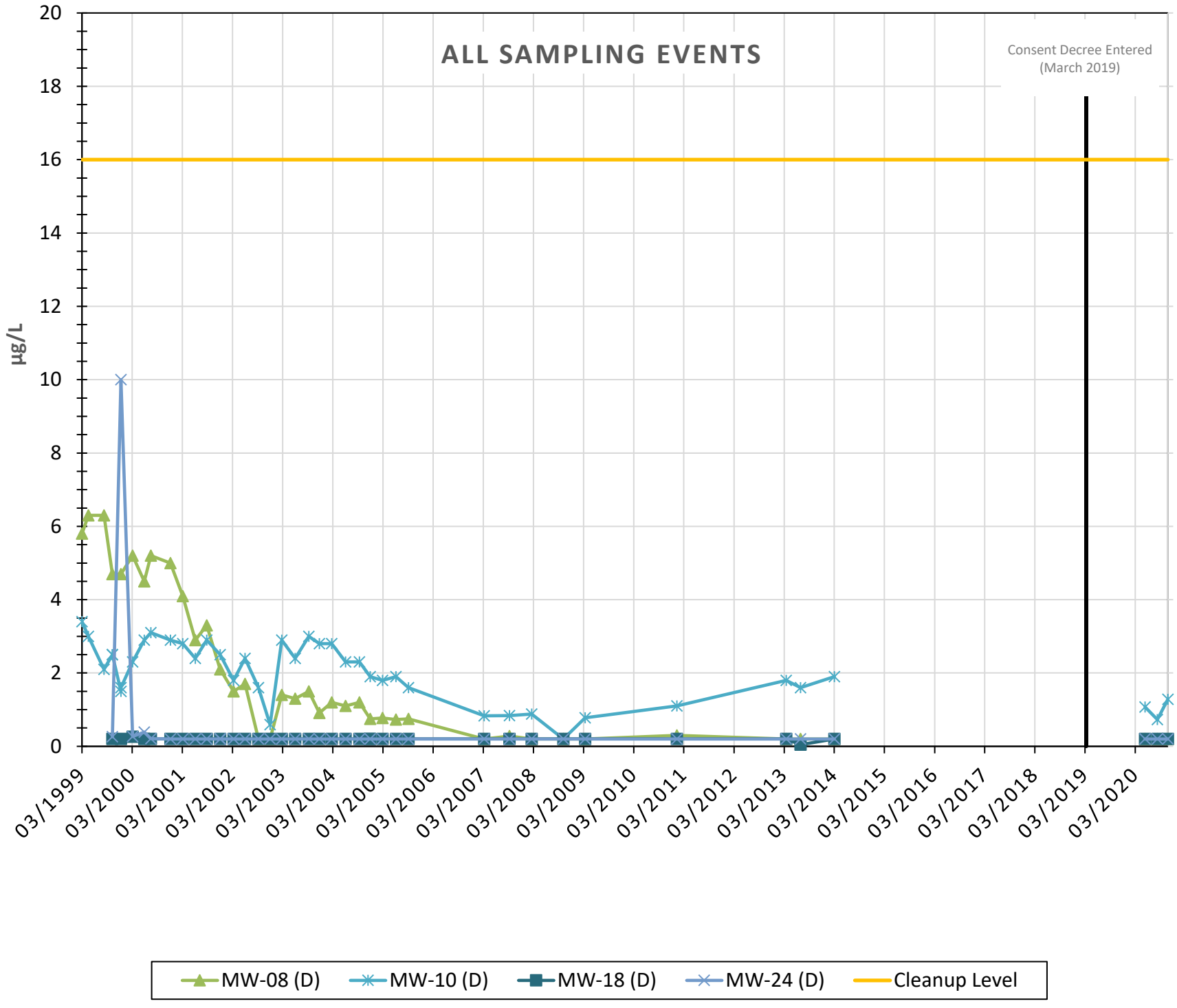


Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

Cis-1,2-Dichloroethene Concentrations
A-Zone CPOC Wells
South Park Landfill





Parametrix
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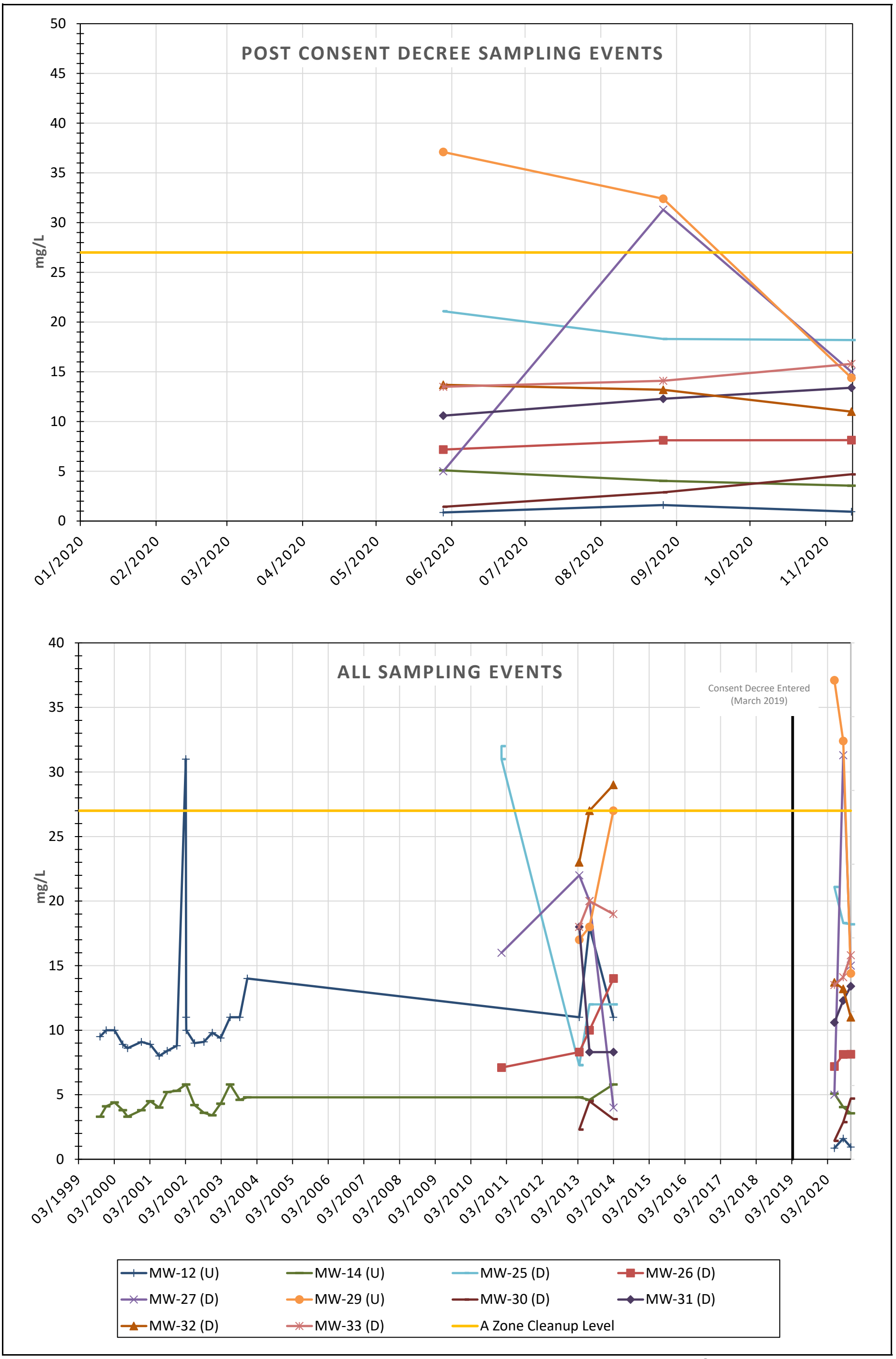
D = Downgradient
U = Upgradient

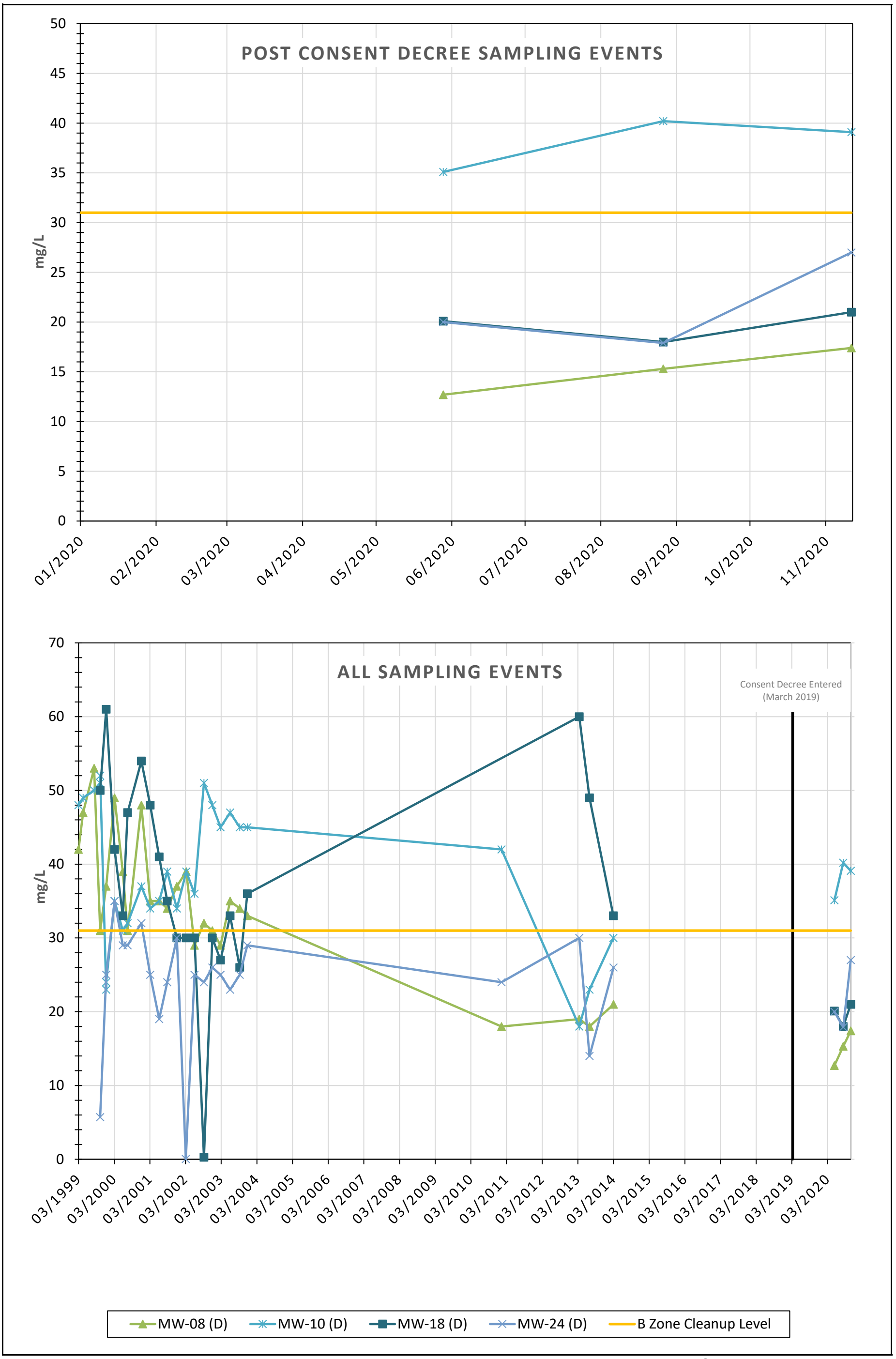
Cis-1,2-Dichloroethene Concentrations
B-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

Total Iron Concentrations
A-Zone CPOC Wells
South Park Landfill



Parametrix
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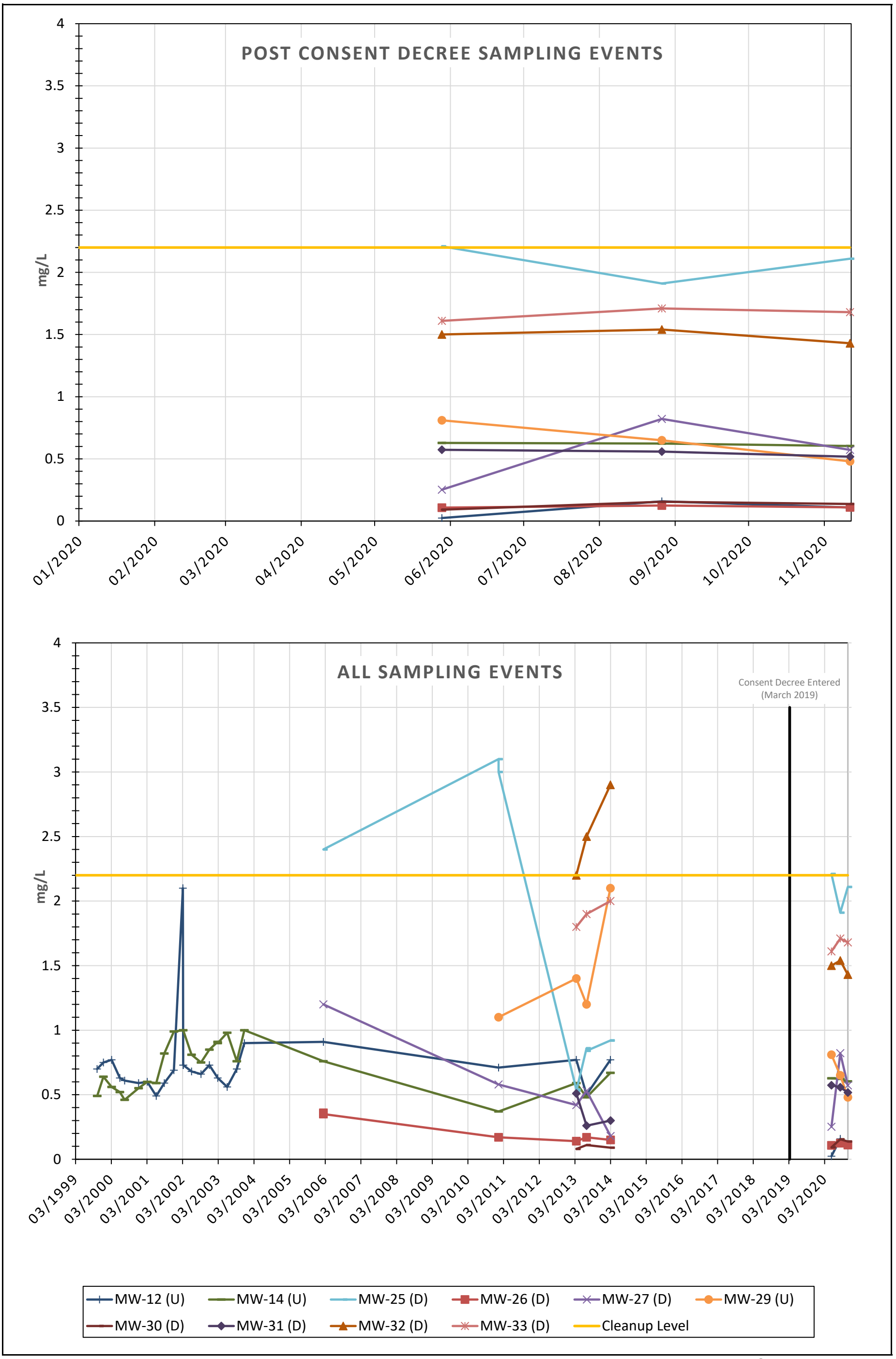
D = Downgradient
U = Upgradient

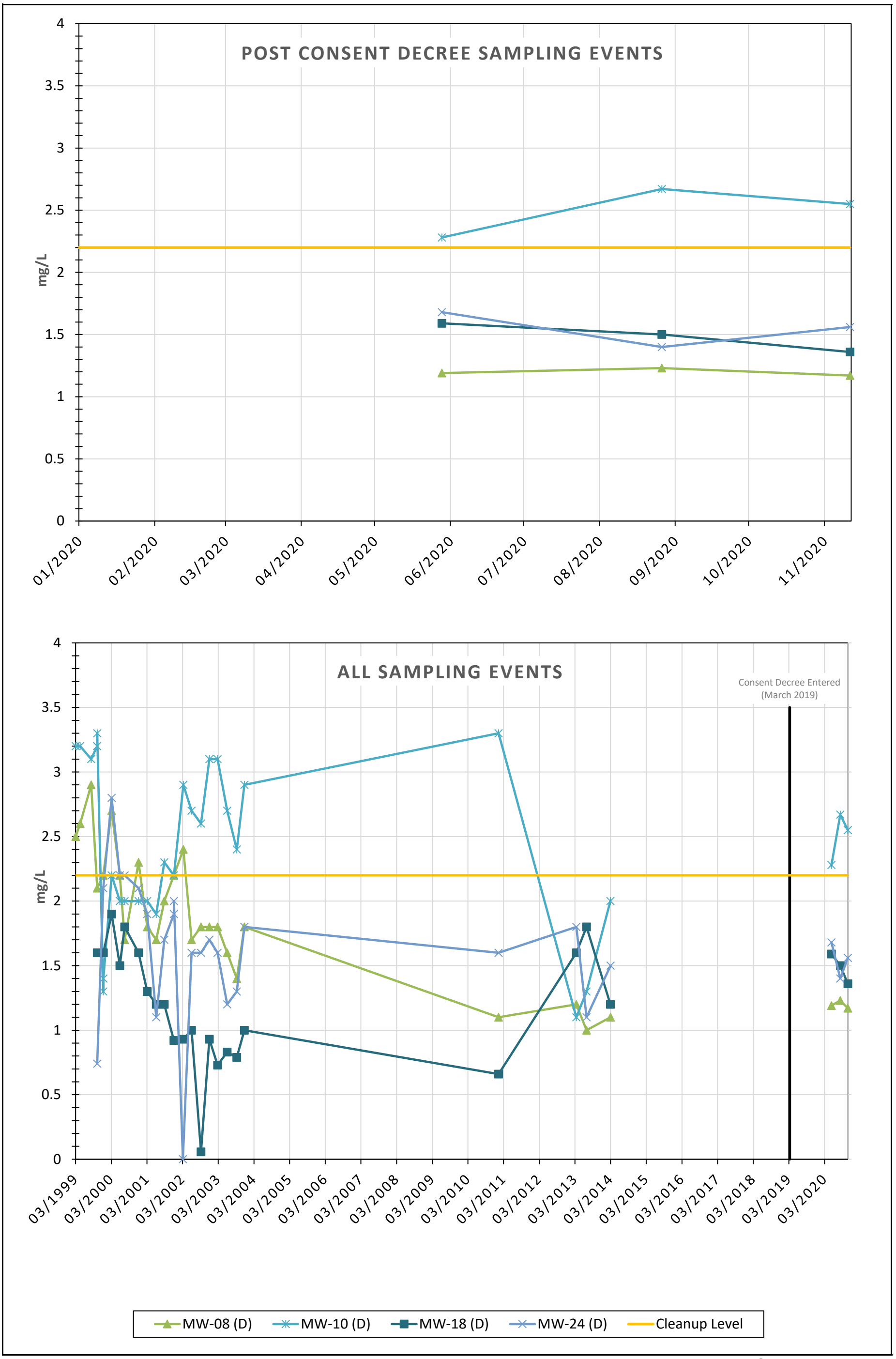
Total Iron Concentrations
B-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

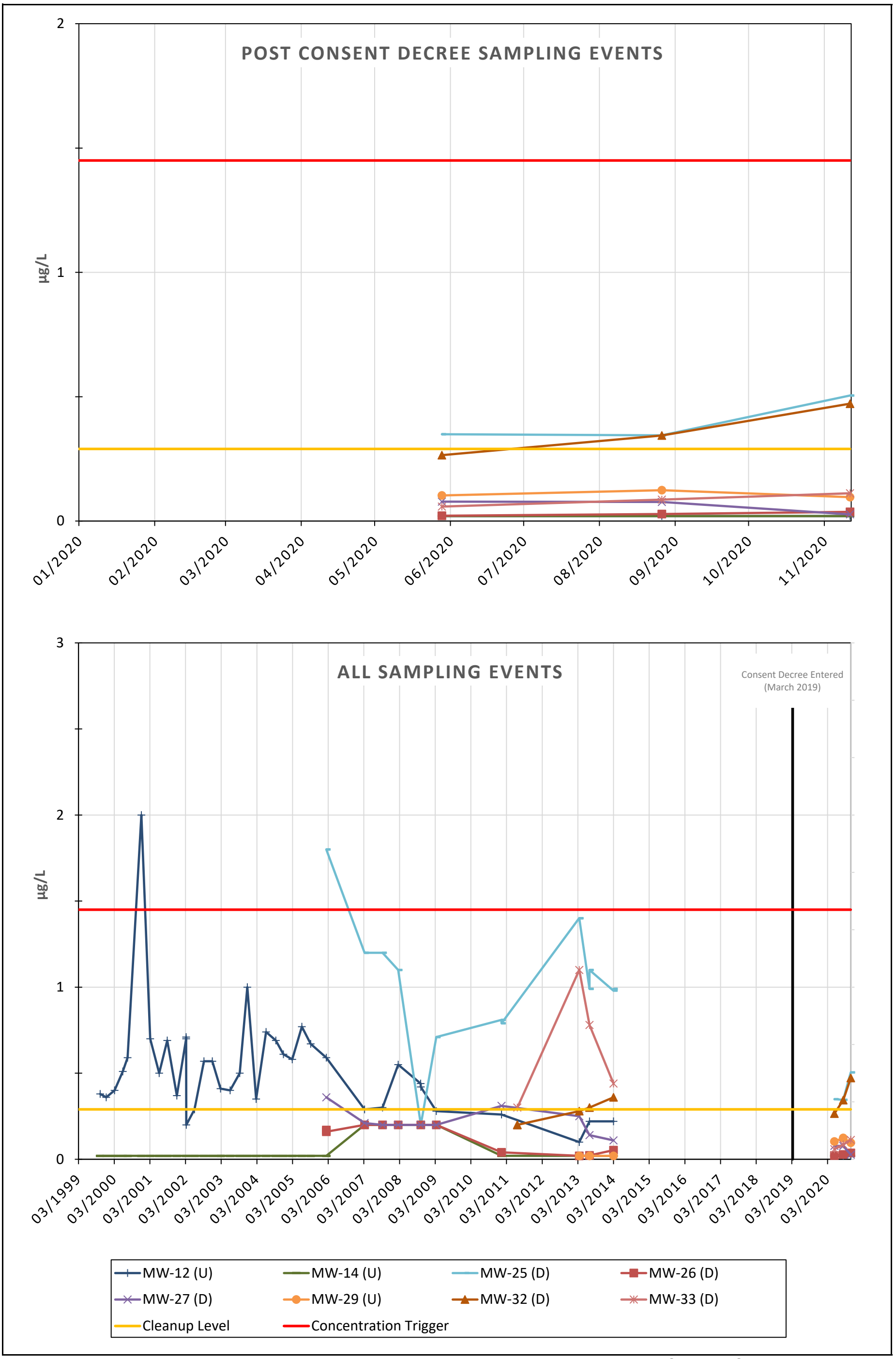
Total Manganese Concentrations
A-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

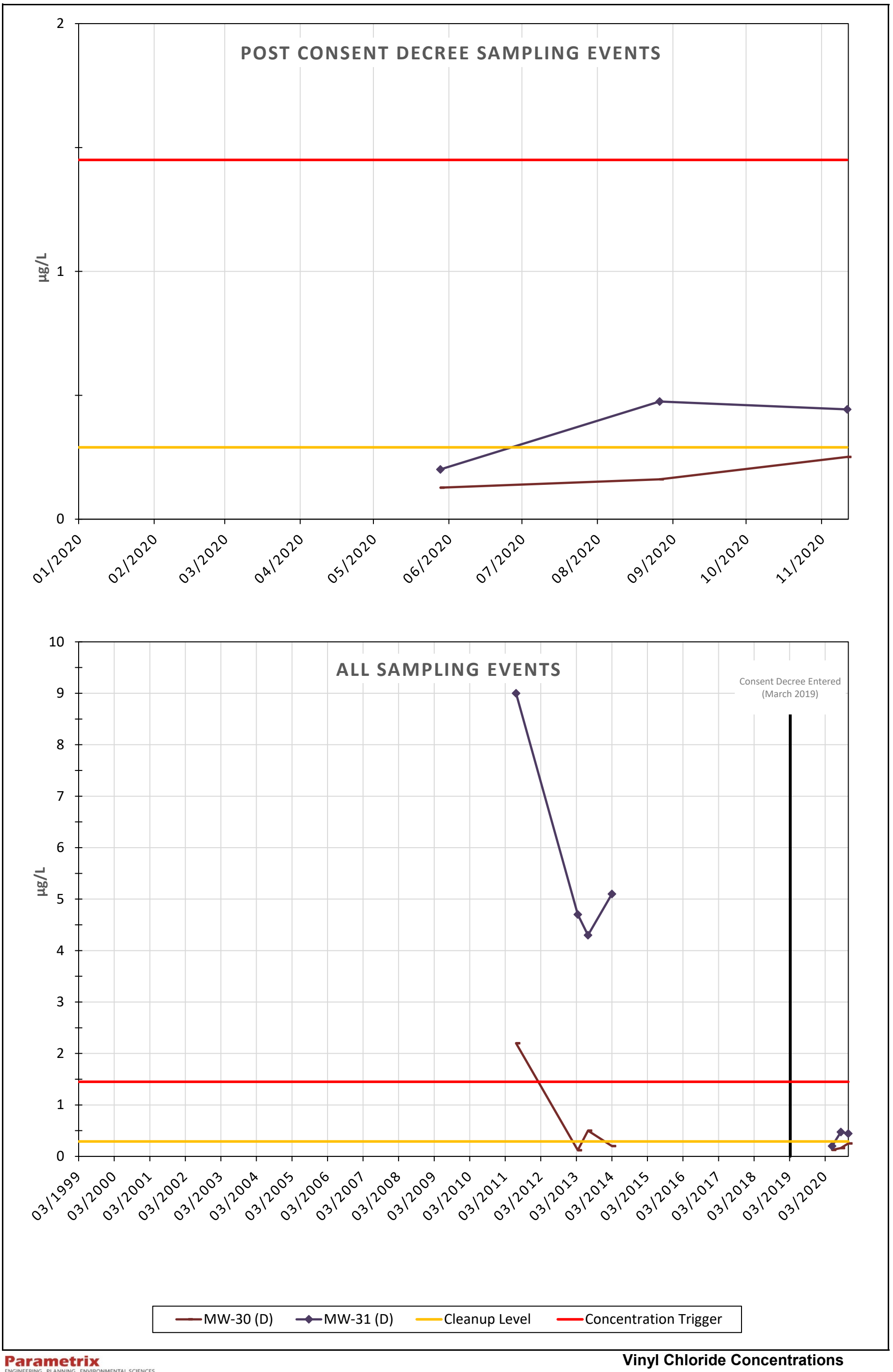
Total Manganese Concentrations
B-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

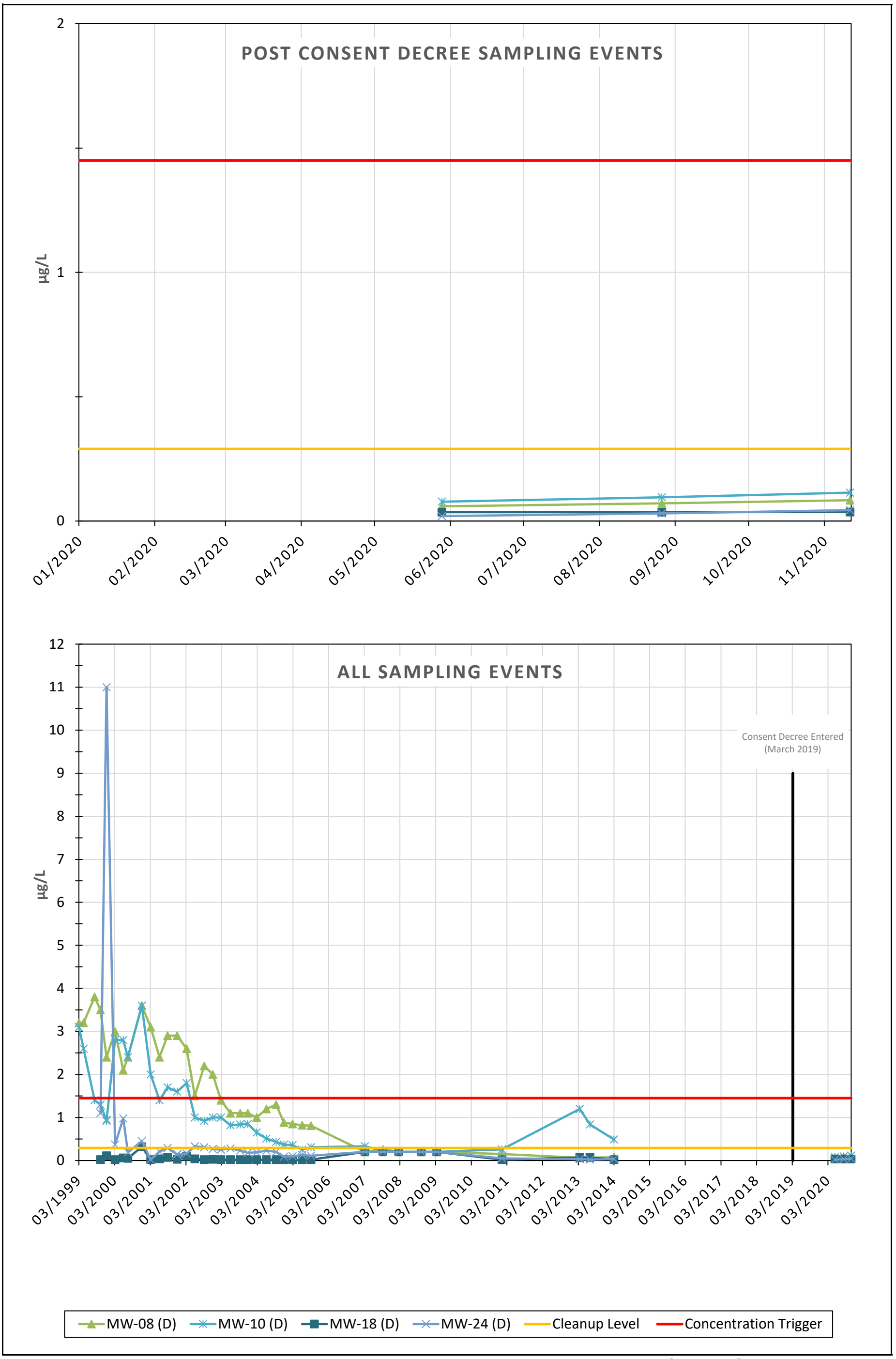
Vinyl Chloride Concentrations
A-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

Vinyl Chloride Concentrations
A-Zone Non-CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

Vinyl Chloride Concentrations
B-Zone CPOC Wells
South Park Landfill

D2

Trend Analyses

APPENDIX D2

Trend Analyses

Per the CAP, the nonparametric Mann-Kendall test was used to statistically evaluate water quality trends. The Mann-Kendall test is a nonparametric data trend evaluation procedure that allows missing values and data that do not conform to any particular distribution. The Mann-Kendall test only uses the relative magnitudes 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 is of no trend, i.e., the observations are randomly ordered in time, against the alternative hypothesis, where there is an increasing or decreasing monotonic trend (Salmi et al. 2002).

An assumption underlying the Mann-Kendall test is that the time-sequenced data are monotonic (Salmi et al. 2002), i.e., the successive members of the data set consistently increase or decrease but not necessarily in a linear manner, and 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 (years, decades, etc.) Statistical power is the strength of a test to identify an actual release of contaminated groundwater or difference from a compliance standard (EPA 2009).

The Mann-Kendall test computes a S value for which a positive value indicates an increasing data trend, zero indicates no trend, and a negative S 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).

The statistical significance of the Mann-Kendall test S value is a function of the magnitude of S and the number of measurements compared to values presented in Table A18 in Gilbert (1987), with larger values of S and a greater number of measurements leading to higher statistical significance (Gilbert 1987).

To evaluate Mann-Kendall trends in the monitoring data, the Excel-based program ProUCL was used (EPA 2013). Per the CAP and Washington Department of Ecology guidance (Ecology 2005) groundwater monitoring data were evaluated at a 95 percent significance level.

Of the 14 wells:

- One well had all non-detects
- Four wells had no non-detects
- Four wells had 1 to 15 percent non-detects
- Four wells had 16 to 50 percent non-detects
- One well had 51 to 99 percent non-detects (MW-18 at 58 percent)

For data sets with censored, or "non detect" results, per the Ecology *Guidance for Monitoring at Landfills and Other Facilities* (Ecology 2018b), the censored data was handled as follows:

- For wells with fewer than 15 percent non-detects, a value of half the detection level was used.
- For wells with 16 to 50 percent non-detects, fitted empirical cumulative distributive functions were constructed using regression on order statistics to transform the non-detect data for further statistical analysis. Under this method, a distribution is fit to the uncensored data for estimating the concentration of the censored observations. The observed uncensored values are then combined with the modeled censored values to evaluate statistical parameters for the entire population.
- The one well with more than 50 percent non-detects (MW-18) was analyzed using the Mann-Kendall method, with caution, as significance of the analysis may be diminished due the large number of non-detects. 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 and often repeated values.

Vinyl chloride was detected in well MW-24 in 1999 at a concentration of 11 µg/L, an order of magnitude higher than any prior or subsequent results (see time-series plot in Appendix D1) suggesting a possible statistical outlier. The Mann Kendall test was run with and without this value, yielding similar S value (-321) and trend results (i.e., still significantly decreasing trend without the possible outlier).

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.

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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). 2013. 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. September 2013. 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.

Salmi, T., A. Määttä, P. Anttila, T. Ruoho-Airola, T. Amnell, and I. Laitos. 2002. Detecting Trends of Annual Values of Atmospheric Pollutants by the Mann-Kendall Test and Sen's Slope Estimates – the Excel Template Application MAKESENS, Finnish Meteorological Institute, Helsinki, Finland Available at: http://en.ilmatieteenlaitos.fi/makesens. Accessed March 16, 2021.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	ProUCL 5.13/10/2021 10:41:27 AM
From File	VC input w ROS values 3 9 20.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

LnROS_VC-mw-08

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	40
Number Values Reported (n)	40
Minimum	0.0592
Maximum	3.8
Mean	1.49
Geometric Mean	0.753
Median	1.15
Standard Deviation	1.23
Coefficient of Variation	0.826

Mann-Kendall Test

M-K Test Value (S)	-651
Critical Value (0.05)	-1.645
Standard Deviation of S	85.72
Standardized Value of S	-7.583
Approximate p-value	1.689E-14

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-10

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	42
Number Values Reported (n)	42
Minimum	0.0778
Maximum	3.6
Mean	1.072
Geometric Mean	0.693
Median	0.885
Standard Deviation	0.913
Coefficient of Variation	0.852

Mann-Kendall Test

M-K Test Value (S)	-596
Critical Value (0.05)	-1.645
Standard Deviation of S	92.22
Standardized Value of S	-6.452
Approximate p-value	5.522E-11

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-12

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	41
Number Values Reported (n)	41
Minimum	0.01
Maximum	2
Mean	0.487
Geometric Mean	0.347
Median	0.44
Standard Deviation	0.33
Coefficient of Variation	0.679

Mann-Kendall Test

M-K Test Value (S)	-269
Critical Value (0.05)	-1.645
Standard Deviation of S	88.97
Standardized Value of S	-3.012
Approximate p-value	0.0013

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-18

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	38
Number Values Reported (n)	38
Minimum	0.00341
Maximum	0.32
Mean	0.0384
Geometric Mean	0.0241
Median	0.0211
Standard Deviation	0.0534
Coefficient of Variation	1.392

Mann-Kendall Test

M-K Test Value (S)	55
Critical Value (0.05)	1.645
Standard Deviation of S	79.52
Standardized Value of S	0.679
Approximate p-value	0.249

Insufficient evidence to identify a significant trend at the specified level of significance.

LnROS_VC-mw-24

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	35
Number Values Reported (n)	35
Minimum	0.0243
Maximum	11
Mean	0.524
Geometric Mean	0.156
Median	0.18
Standard Deviation	1.838
Coefficient of Variation	3.505

Mann-Kendall Test

M-K Test Value (S)	-369
Critical Value (0.05)	-1.645
Standard Deviation of S	70.4
Standardized Value of S	-5.227
Approximate p-value	8.6057E-8

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-25

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	17
Number Values Reported (n)	17
Minimum	0.1
Maximum	1.8
Mean	0.928
Geometric Mean	0.785
Median	0.99
Standard Deviation	0.436
Coefficient of Variation	0.47

Mann-Kendall Test

M-K Test Value (S)	-50
Tabulated p-value	0.021
Standard Deviation of S	24.19
Standardized Value of S	-2.025
Approximate p-value	0.0214

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-26

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0216
Maximum	0.17
Mean	0.0712
Geometric Mean	0.0569
Median	0.0617
Standard Deviation	0.0489
Coefficient of Variation	0.686

Mann-Kendall Test

M-K Test Value (S)	-51
Tabulated p-value	0.002
Standard Deviation of S	18.27
Standardized Value of S	-2.737
Approximate p-value	0.0031

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-27

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.0267
Maximum	0.36
Mean	0.162
Geometric Mean	0.134
Median	0.14
Standard Deviation	0.096
Coefficient of Variation	0.594

Mann-Kendall Test

M-K Test Value (S)	-42
Tabulated p-value	0.005
Standard Deviation of S	16.39
Standardized Value of S	-2.501
Approximate p-value	0.00619

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-29

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.0281
Maximum	0.124
Mean	0.0685
Geometric Mean	0.0561
Median	0.0633
Standard Deviation	0.0438
Coefficient of Variation	0.639

Mann-Kendall Test

M-K Test Value (S)	11
Tabulated p-value	0.028
Standard Deviation of S	5.323
Standardized Value of S	1.879
Approximate p-value	0.0301

Statistically significant evidence of an increasing trend at the specified level of significance.

LnROS_VC-mw-30

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	0.12
Maximum	2.2
Mean	0.508
Geometric Mean	0.28
Median	0.2
Standard Deviation	0.757
Coefficient of Variation	1.489

Mann-Kendall Test

M-K Test Value (S)	-3
Tabulated p-value	0.386
Standard Deviation of S	6.658
Standardized Value of S	-0.3
Approximate p-value	0.382

Insufficient evidence to identify a significant trend at the specified level of significance.

LnROS_VC-mw-31

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	0.201
Maximum	9
Mean	3.46
Geometric Mean	1.689
Median	4.3
Standard Deviation	3.273
Coefficient of Variation	0.946

Mann-Kendall Test

M-K Test Value (S)	-13
Tabulated p-value	0.035
Standard Deviation of S	6.658
Standardized Value of S	-1.802
Approximate p-value	0.0358

Statistically significant evidence of a decreasing trend at the specified level of significance.

LnROS_VC-mw-32

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.2
Maximum	0.472
Mean	0.303
Geometric Mean	0.291
Median	0.29
Standard Deviation	0.09
Coefficient of Variation	0.297

Mann-Kendall Test

M-K Test Value (S)	19
Tabulated p-value	0.016
Standard Deviation of S	8.021
Standardized Value of S	2.244
Approximate p-value	0.0124

Statistically significant evidence of an increasing trend at the specified level of significance.

LnROS_VC-mw-33

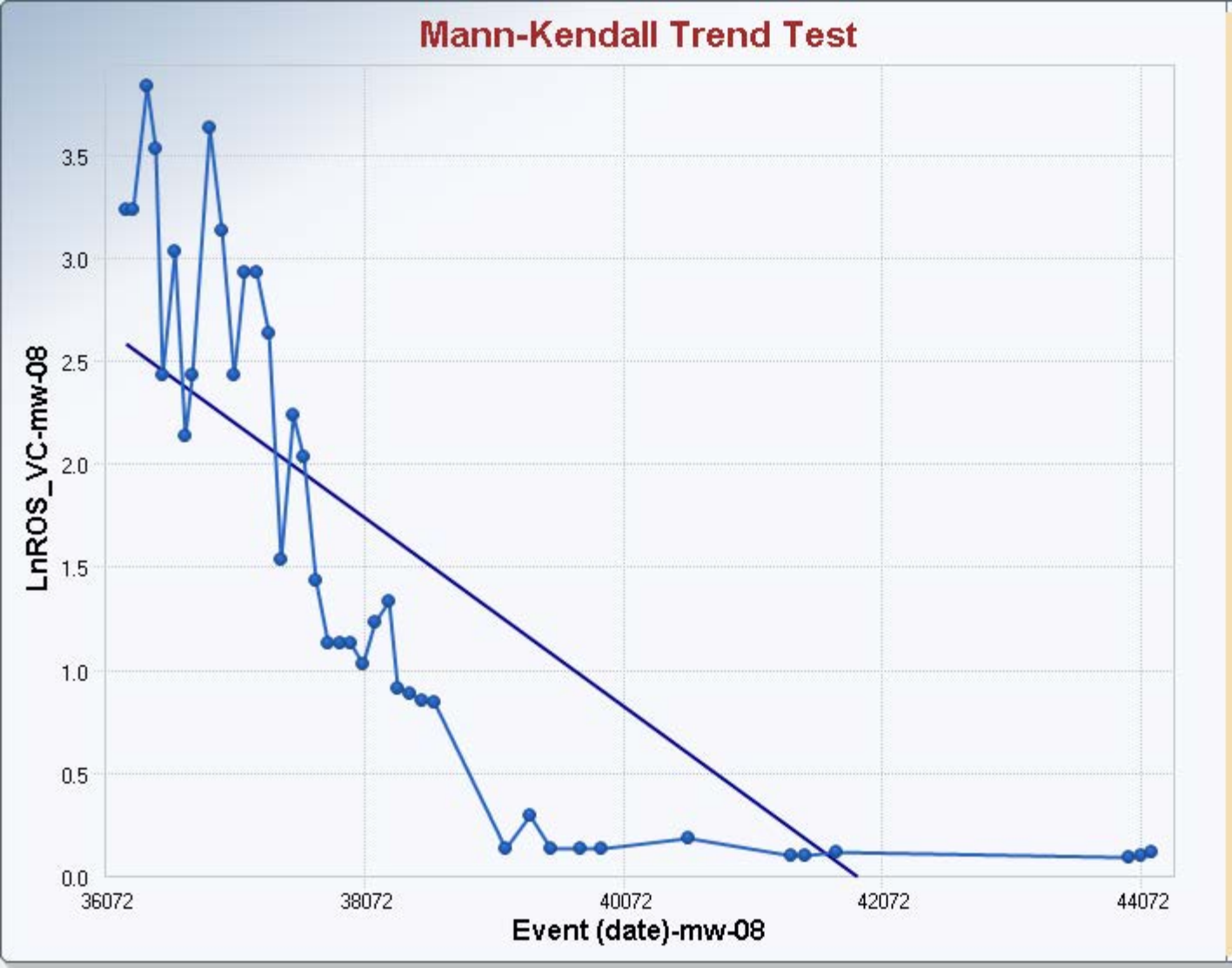
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	0.0582
Maximum	1.1
Mean	0.411
Geometric Mean	0.251
Median	0.3
Standard Deviation	0.397
Coefficient of Variation	0.965

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.119
Standard Deviation of S	6.658
Standardized Value of S	-1.202
Approximate p-value	0.115

Insufficient evidence to identify a significant trend at the specified level of significance.



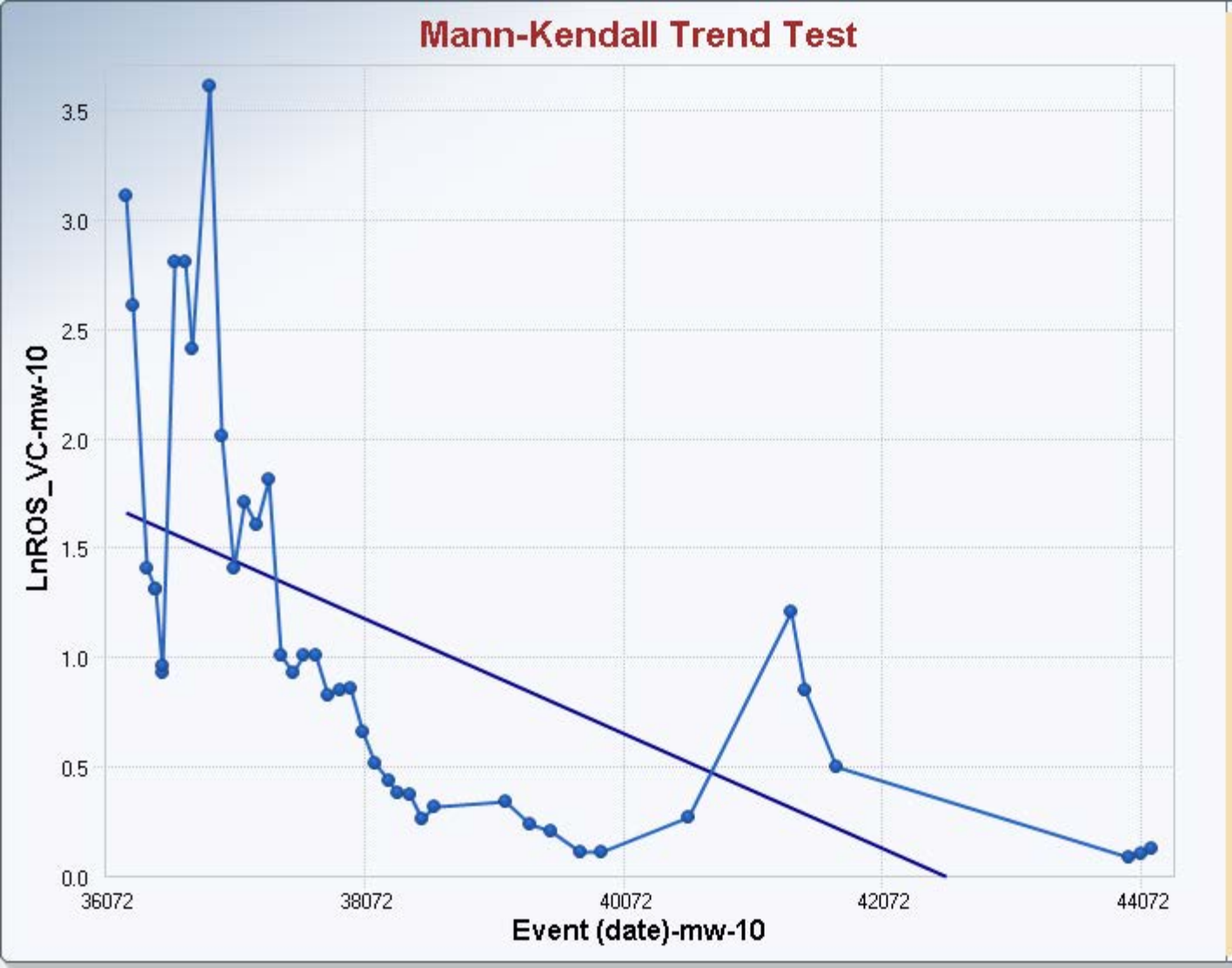
Mann-Kendall Trend Analysis

n	40
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	85.7185
Standardized Value of S	-7.5830
M-K Test Value (S)	-651
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.0005
OLS Regression Intercept	19.1883

Statistically significant evidence of a decreasing trend at the specified level of significance.



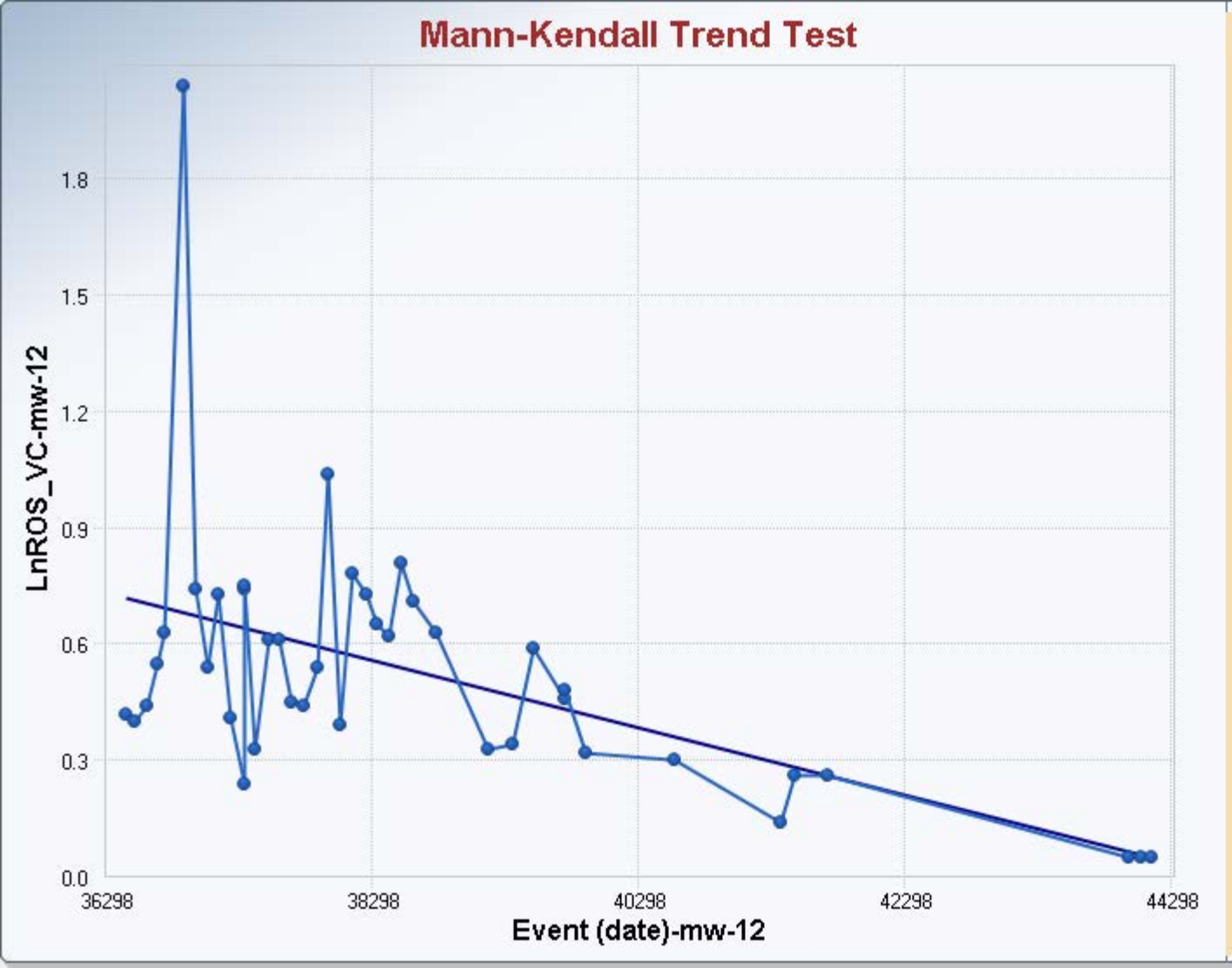
Mann-Kendall Trend Analysis

n	42
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	92.2207
Standardized Value of S	-6.4519
M-K Test Value (S)	-596
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.0003
OLS Regression Intercept	11.2296

Statistically significant evidence of a decreasing trend at the specified level of significance.



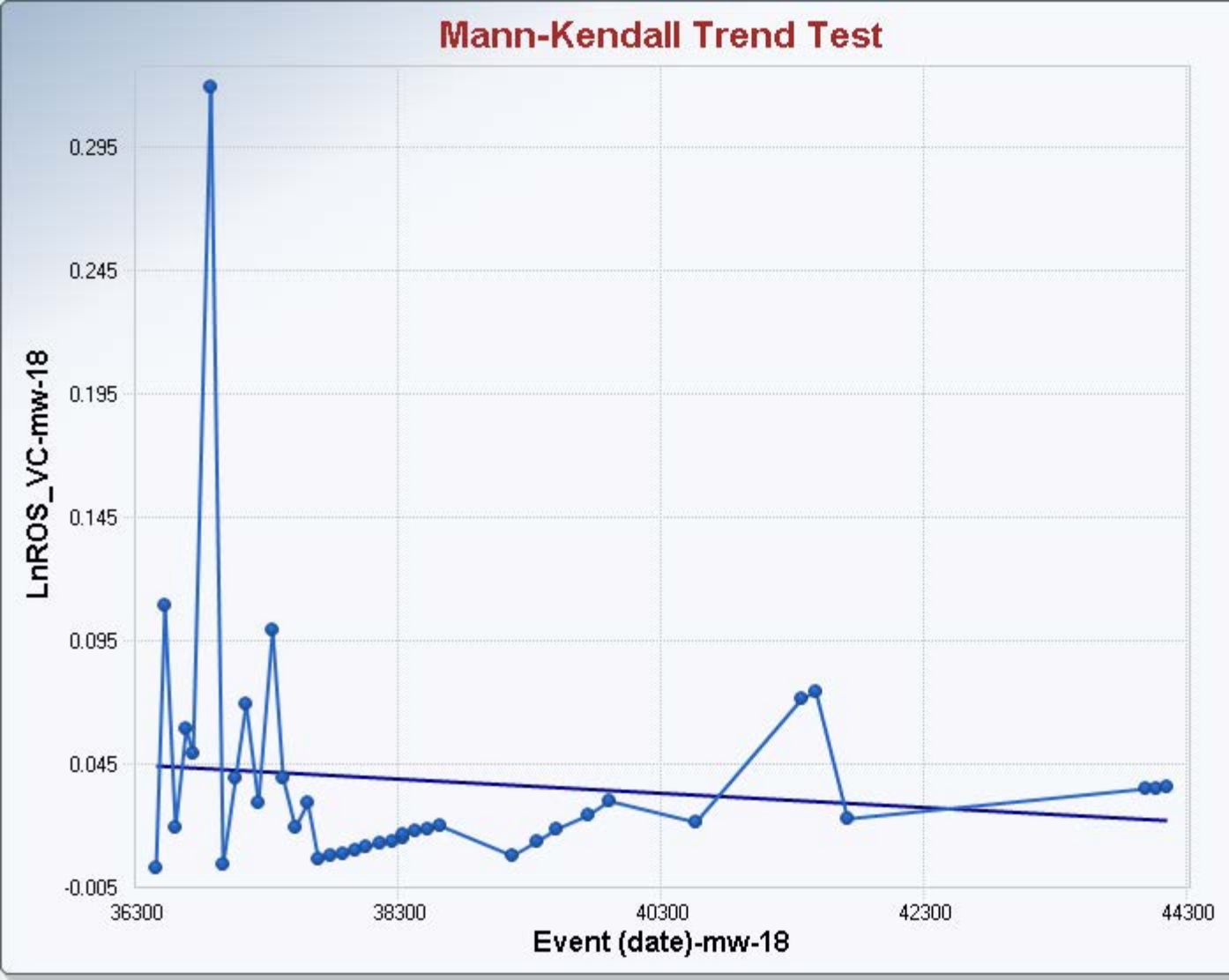
Mann-Kendall Trend Analysis

n	41
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	88.9663
Standardized Value of S	-3.0124
M-K Test Value (S)	-269
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0013

OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	3.8659

Statistically significant evidence of a decreasing trend at the specified level of significance.



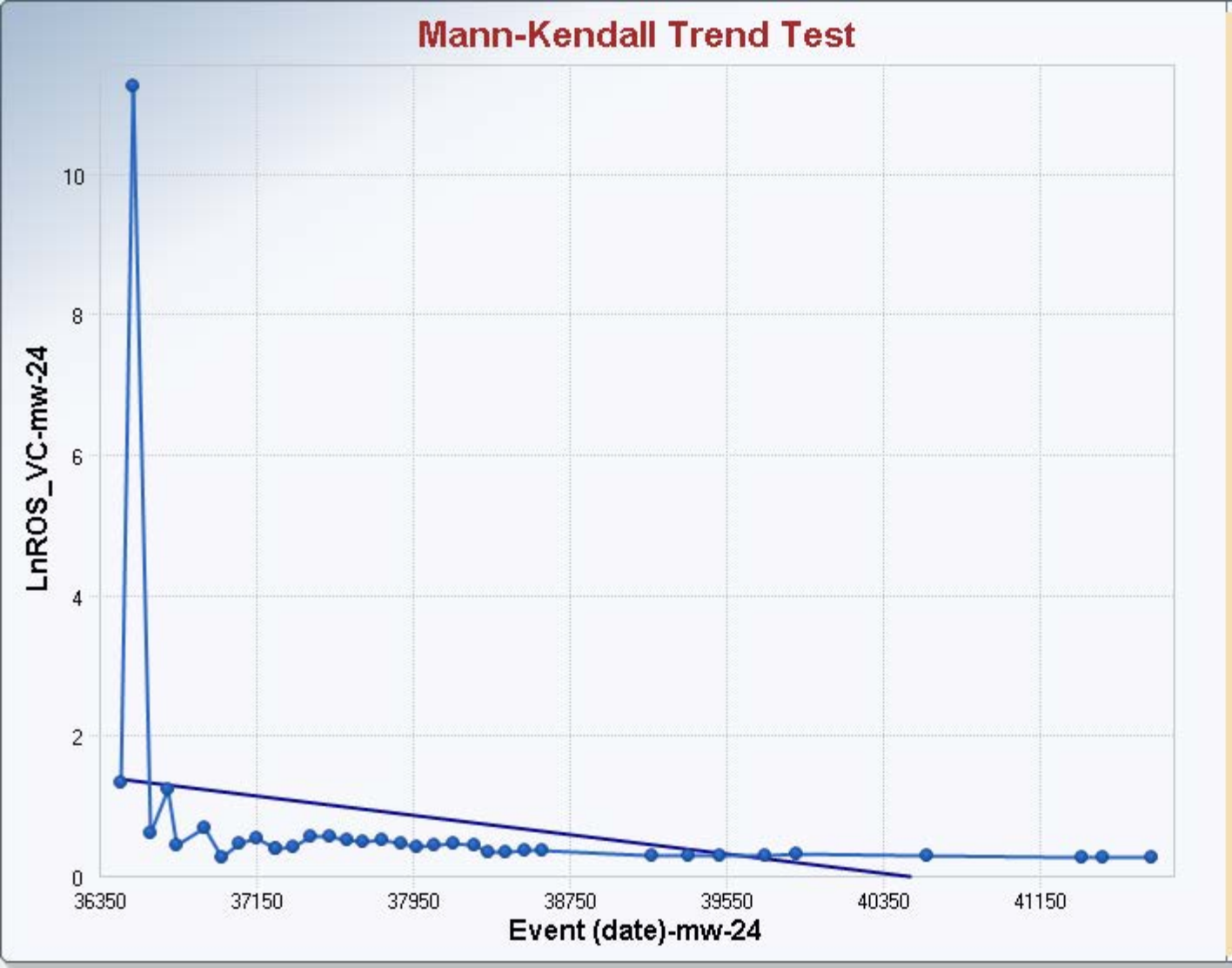
Mann-Kendall Trend Analysis

n	38
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	79.5173
Standardized Value of S	0.6791
M-K Test Value (S)	55
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.2485

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.1519

Insufficient statistical evidence of a significant trend at the specified level of significance.



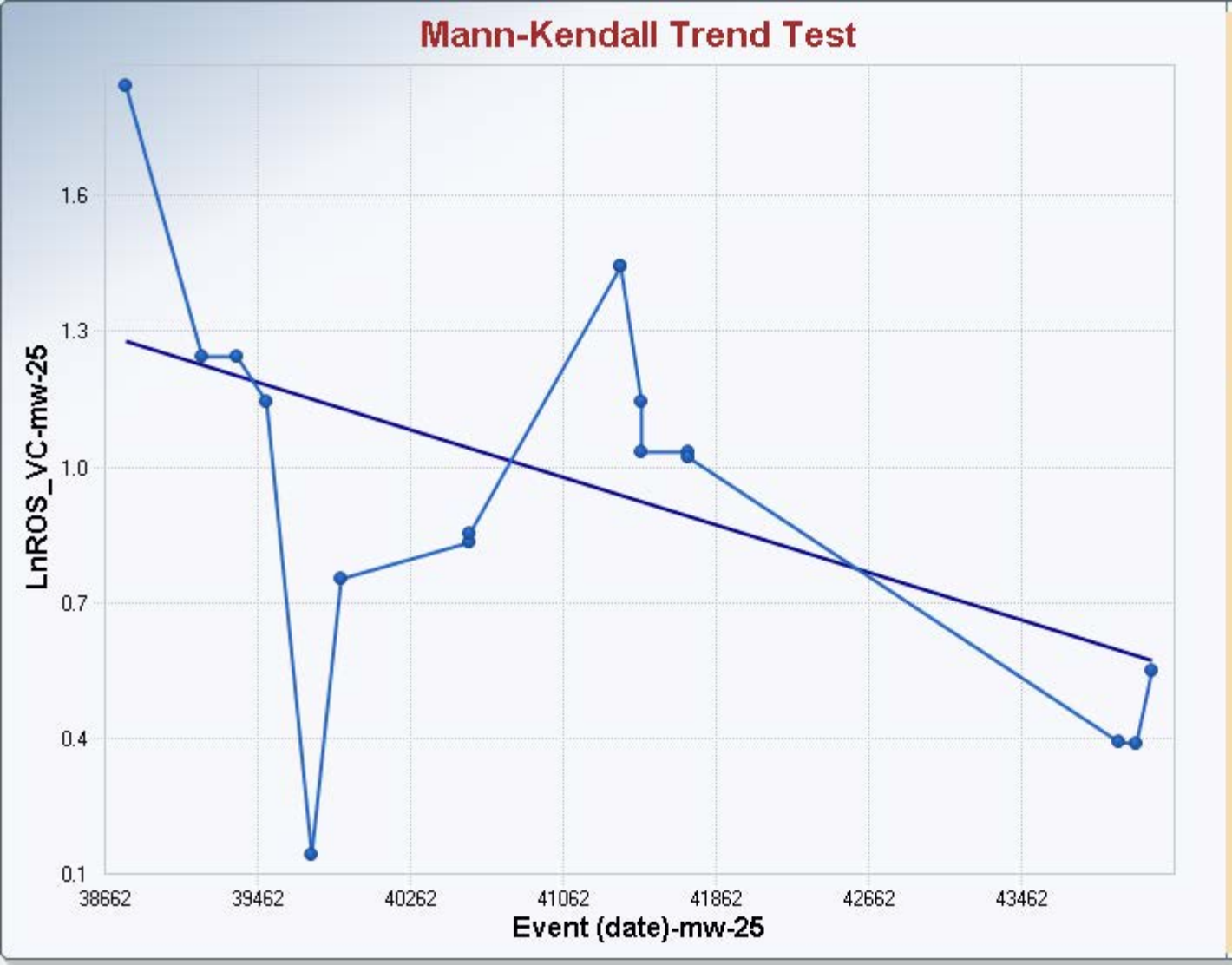
Mann-Kendall Trend Analysis

n	35
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	70.4012
Standardized Value of S	-5.2272
M-K Test Value (S)	-369
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.0003
OLS Regression Intercept	13.8982

Statistically significant evidence of a decreasing trend at the specified level of significance.



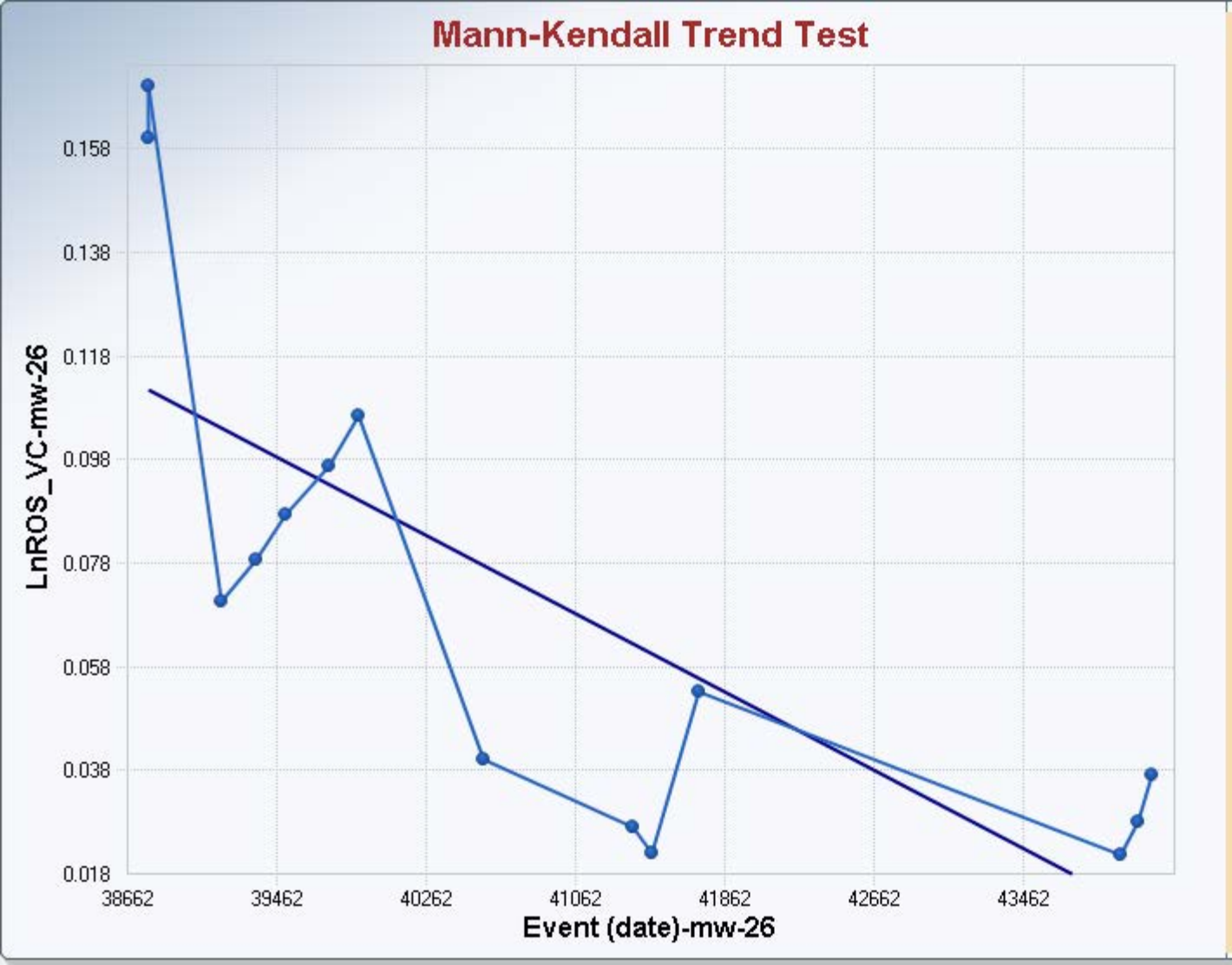
Mann-Kendall Trend Analysis

n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.1937
Standardized Value of S	-2.0253
M-K Test Value (S)	-50
Tabulated p-value	0.0210
Approximate p-value	0.0214

OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	6.3326

Statistically significant evidence of a decreasing trend at the specified level of significance.



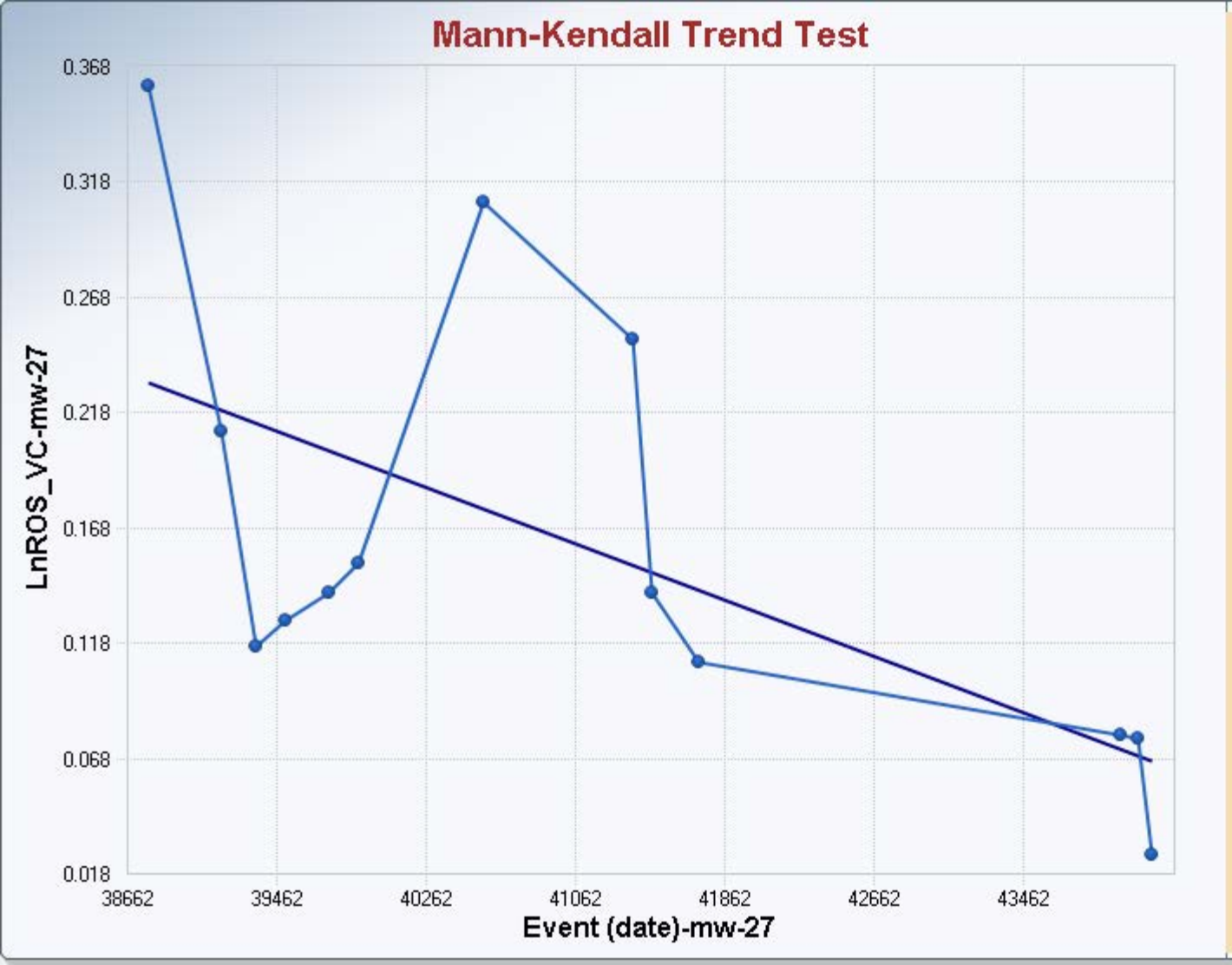
Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.2665
Standardized Value of S	-2.6278
M-K Test Value (S)	-49
Tabulated p-value	0.0030
Approximate p-value	0.0043

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.8466

Statistically significant evidence of a decreasing trend at the specified level of significance.



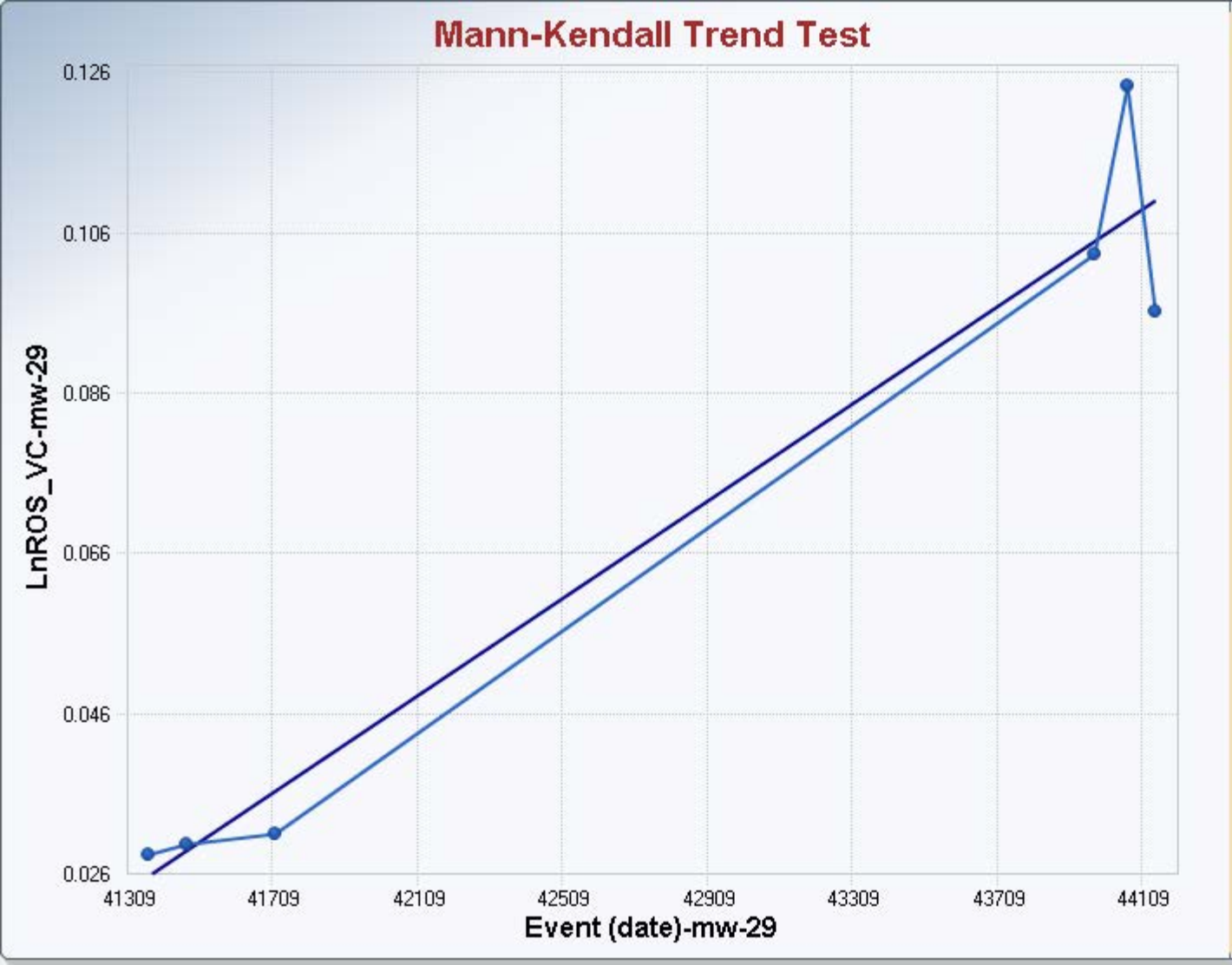
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3911
Standardized Value of S	-2.5014
M-K Test Value (S)	-42
Tabulated p-value	0.0050
Approximate p-value	0.0062

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	1.4168

Statistically significant evidence of a decreasing trend at the specified level of significance.



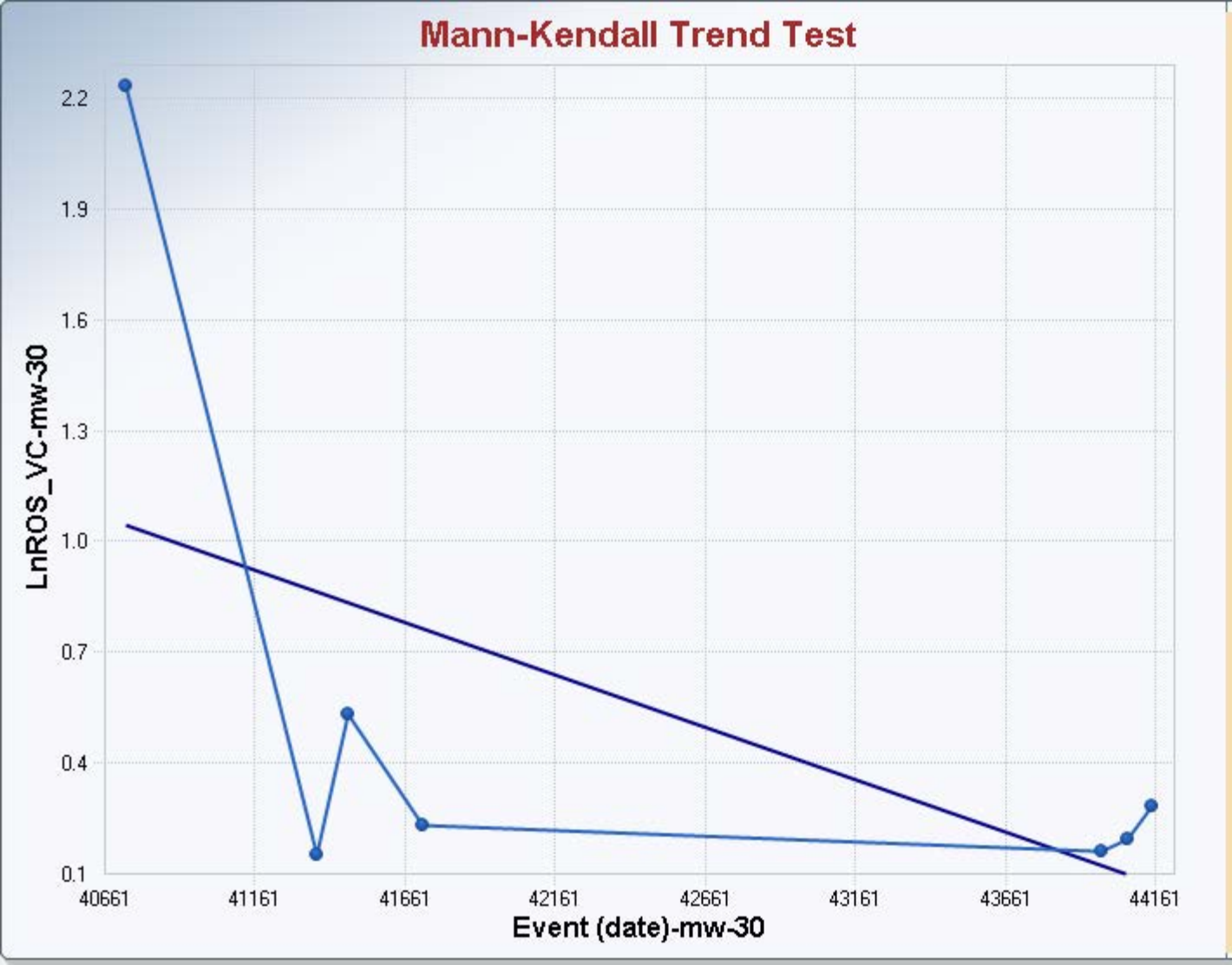
Mann-Kendall Trend Analysis

n	6
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	5.3229
Standardized Value of S	1.8787
M-K Test Value (S)	11
Tabulated p-value	0.0280
Approximate p-value	0.0301

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.2358

Statistically significant evidence of an increasing trend at the specified level of significance.



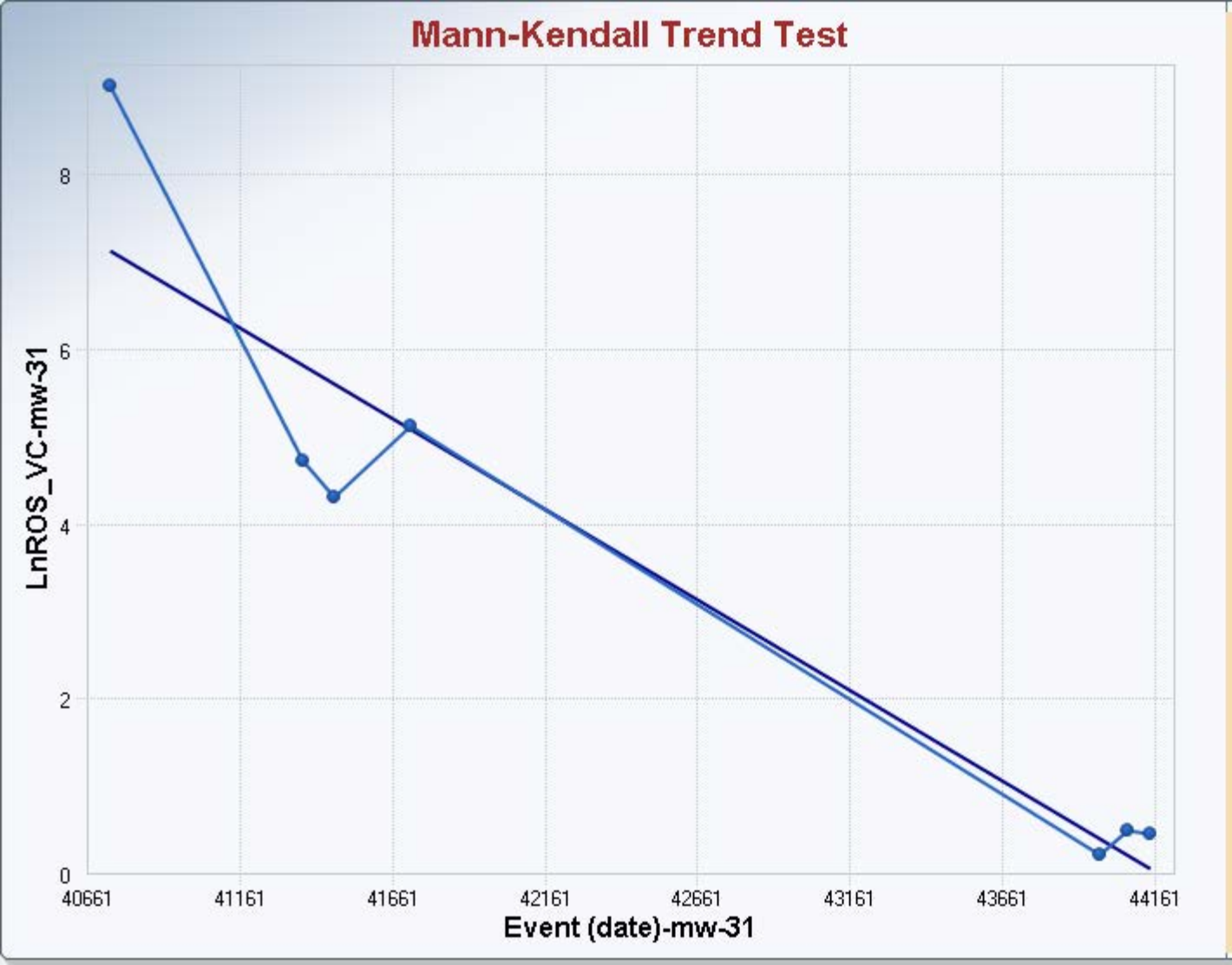
Mann-Kendall Trend Analysis

n	7
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	6.6583
Standardized Value of S	-0.3004
M-K Test Value (S)	-3
Tabulated p-value	0.3860
Approximate p-value	0.3819

OLS Regression Line (Blue)

OLS Regression Slope	-0.0003
OLS Regression Intercept	12.6284

Insufficient statistical evidence of a significant trend at the specified level of significance.



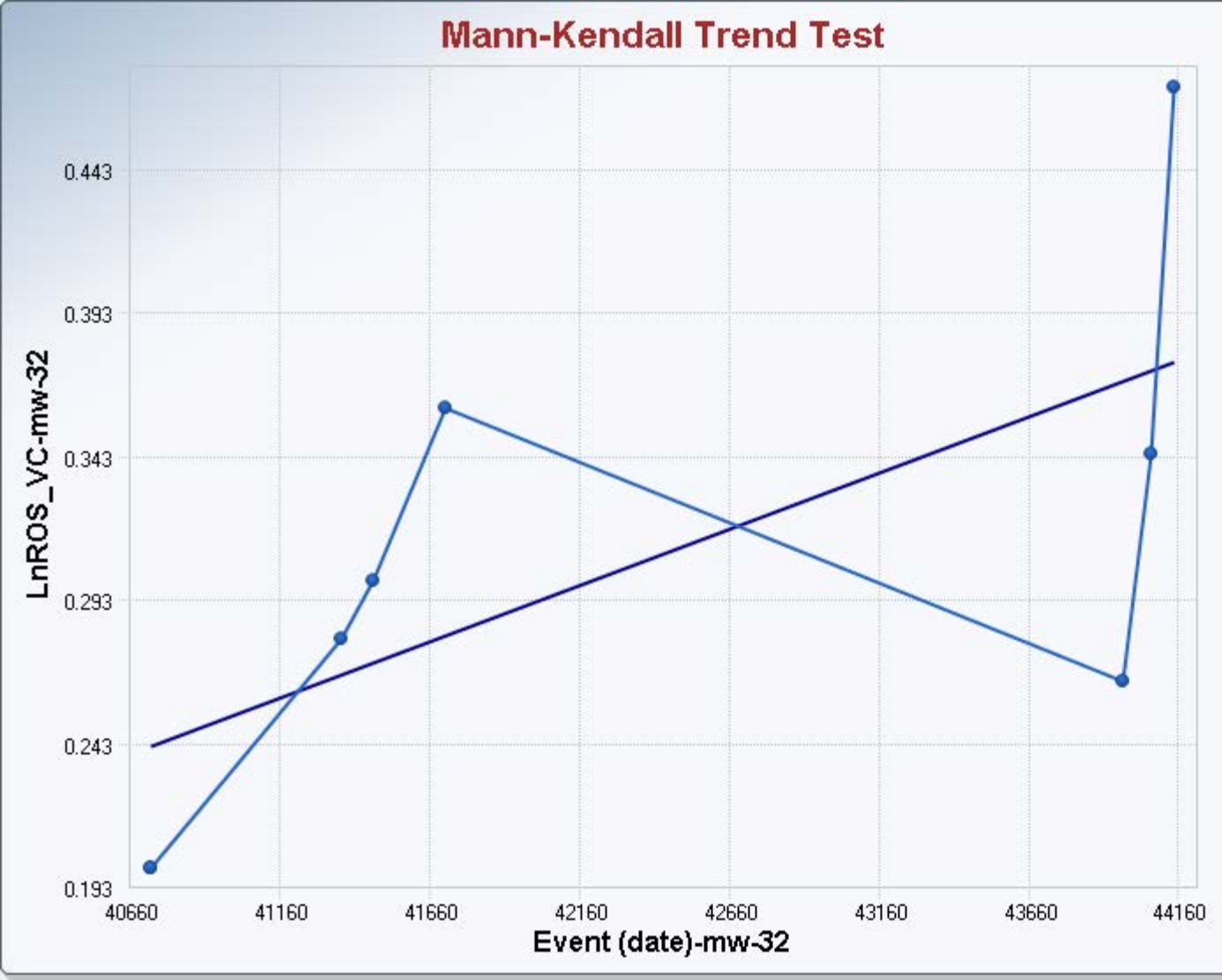
Mann-Kendall Trend Analysis

n	7
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	6.6583
Standardized Value of S	-1.8023
M-K Test Value (S)	-13
Tabulated p-value	0.0350
Approximate p-value	0.0358

OLS Regression Line (Blue)

OLS Regression Slope	-0.0021
OLS Regression Intercept	91.4228

Statistically significant evidence of a decreasing trend at the specified level of significance.



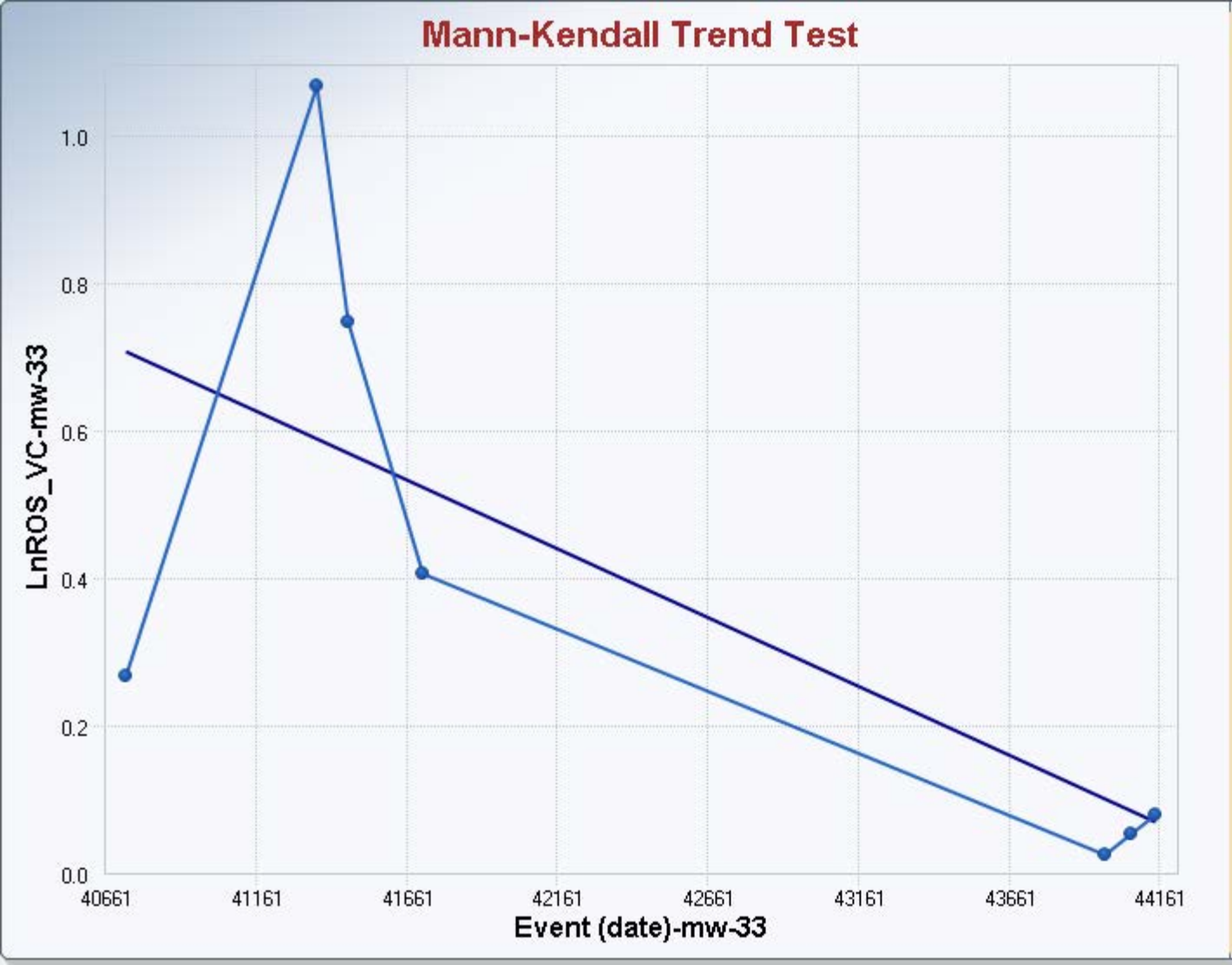
Mann-Kendall Trend Analysis

n	8
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	8.0208
Standardized Value of S	2.2442
M-K Test Value (S)	19
Tabulated p-value	0.0160
Approximate p-value	0.0124

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.3559

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	7
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	6.6583
Standardized Value of S	-1.2015
M-K Test Value (S)	-9
Tabulated p-value	0.1190
Approximate p-value	0.1148

OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	8.3531

Insufficient statistical evidence of a significant trend at the specified level of significance.

D3

Groundwater Monitoring Well Data and Field Forms

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady - T. Perry
Well ID: MW-8
Location (Site/Facility Name): South Park
Date of Collection: 5/28/20
Project Number: 553-1550-067

Purge Data

Purge Device: Bladder Pump
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 8.41
Well Casing Type/Diameter: PVC / 2"
Pump Intake Depth:
Screened Interval (feet below MP):
Begin Purge Time: 806
End Purge Time: 9:19
Total Volume Purged: 4.8 gal
Purge Water Disposal Method: Drum

Time	Dept 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
809	8.41	7/10	245	0.1	15.8	4.72	1222	6.95	152.4	17.28	
814	8.41	"	"	0.2	12.7	2.44	1715	6.75	153.4	17.22	
819	8.41	"	"	0.7	12.6	1.65	1359	6.72	117.0	72.30	
824	8.44	"	"	~~0.7~~ 1.1	12.5	2.36	1319	6.74	75.5	25.21	
829	8.44	"	"	1.25	12.5	2.18	1302	6.74	62.1	18.05	
834	8.42	"	"	1.50	12.6	1.57	1296	6.73	37.4	15.91	
839	8.42	"	"	1.00	12.5	1.55	1312	6.73	13.5	11.77	
844	8.44	"	"	2.33	12.5	1.53	1301	6.73	-4.8	10.87	
849	8.44	"	"	2.66	12.6	1.52	1286	6.73	-17.0	9.95	
854	8.44	"	"	2.95	12.6	1.52	1286	6.73	-27.3	9.83	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW8-0520
Time Collected: 925
Weather: Sunny 2nd clear sky.
Sample Description (Color, Turbidity, Odor, Other): Clear
Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

859	8.44	"	"	3.10	12.6	1.52	1290	6.73	-36.3	9.30	
904	8.42	"	"	3.35	12.7	1.51	1285	6.73	-44.0	9.45	
909	8.42	"	"	3.6	12.7	1.50	1282	6.74	-51.1	8.78	
914	8.48	"	"	4.0	12.7	1.50	1281	6.72	-57.2	9.66	
919	8.48	"	"	4.5	12.8	~~1.88~~ 1.50	1284	6.73	-60.3	6.75	Changed purge bucket.
~~924~~											
~~929~~											

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX **Field Personnel:** M. Brady + T. Perry

Well ID: MW-10 **Location (Site/Facility Name):** South Park.

Date of Collection: 5/27/20 **Project Number:** 553-1550-067

Purge Data

Purge Device: Peristaltic pump using dedicated intake

Measurement Point (MP):

Initial Depth of Water (Feet From Top of Well Casing): 13.11 Well Casing Type/Diameter: PVC/2"

Pump Intake Depth: 13.52 Screened Interval (feet below MP):

Begin Purge Time: 13:52

End Purge Time: 14:36

Total Volume Purged: 2.2 gal

Purge Water Disposal Method: Onsite

Time	Dept 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
13:56	13.11	15%	215 ml/min	0.20	14.4	7.17	1227	6.63	143.8	70.3	
14:01	13.10	"	"	0.40	14.4	2.31	1432	6.68	27.8	59.80	
14:06	13.10	"	"	0.70	14.4	1.73	1468	6.73	-42.7	23.02	
14:11	13.11	"	"	1.00	14.3	1.52	1482	6.75	-82.1	18.88	
14:16	13.11	"	"	1.20	14.2	1.49	1487	6.77	-96.3	24.12	
14:21	13.11	"	"	1.50	14.4	1.45	1493	6.78	-105.6	17.70	
14:26	13.11	"	"	1.80	14.3	1.43	1499	6.78	-110.3	16.58	
14:31	13.11	"	"	1.95	14.4	1.43	1499	6.79	-114.4	13.70	
14:36	13.12	"	"	2.10	14.4	1.41	1504	6.79	-117.6	12.19	
14:41	-	-	-	-	-	-	-	-	-	-	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW10-0520 Time Collected: 1440 Weather: Sunny w/ clear skies.

Sample Description (Color, Turbidity, Odor, Other):

Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

To purge water, use a peristaltic pump attached to dedicated line. Turn pump on and start to draw the dedicated line until water begins to flow. Then return the dedicated line back into well casing.

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX | Field Personnel: Mike / Trey

Well ID: MW-12 | Location (Site/Facility Name): South Park

Date of Collection: 5/26/20 | Project Number: 553-1550-067

Purge Data

Purge Device: DEDICATED BLADDER

Measurement Point (MP): TOC

Initial Depth of Water (Feet From Top of Well Casing): 5.90 | Well Casing Type/Diameter: PVC/2

Pump Intake Depth: 12.24 | Screened Interval (feet below MP): 11.52-16.52

Begin Purge Time: 13:31

End Purge Time: 1406

Total Volume Purged: 1.50

Purge Water Disposal Method: Drum.

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged (gal)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
13:31	5.94	6/6	160 mL/min	0.06	13.7	8.00	426.7	6.82	259.9	40.01	
13:36	5.92	"	"	0.10	13.0	3.95	431.0	6.59	264.0	30.23	
13:41	5.92	"	135 mL/min	0.30	13.0	2.37	438.9	6.50	269.5	21.05	
13:46	5.93	"	500 mL/min	0.70	12.1	2.06	440.6	6.48	274.1	12.24	Duplicate spike in prepare
13:51	5.92	5/7	110 mL/min	0.90	12.4	1.90	436.6	6.48	275.7	13.88	
13:56	5.92	"	"	1.15	13.4	1.91	440.7	6.51	275.8	10.77	
14:01	5.92	"	"	1.75	12.9	1.85	440.3	6.51	276.0	10.52	
14:06	5.92	"	"	1.50	13.2	1.82	441.3	6.50	275.7	9.72	
14:11	—	—	—	—	—	—	—	—	—	—	
14:16	—	—	—	—	—	—	—	—	—	—	
	Discharge/Fill Time		Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW12-0520 | Time Collected: 14:06 | Weather: Overcast.

Sample Description (Color, Turbidity, Odor, Other): Clear with no odor.

Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No | If yes, ID(s):

Additional Information/Comments

End of Sample time: 14:27

Total purge with sampling: 2.2 gallons.

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady + T. Ring
Well ID: MW-14
Location (Site/Facility Name): South Park
Date of Collection: 5/26/20
Project Number: 553-1550-067

Purge Data

Purge Device: Peristaltic Waterra
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 2.54
Well Casing Type/Diameter: PVC/2
Pump Intake Depth: 16.63
Screened Interval (feet below MP): 12.3-22.3
Begin Purge Time: 15:07
End Purge Time: 16:26
Total Volume Purged: 2.66 gal. 3.0 gal after collecting samples
Purge Water Disposal Method: Drum

Time	Dept 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
1511	2.70	6/6	145 ml/min	0.1	15.2	3.00	611	6.82	81.0	16.54	
1516	2.90	"	110 ml/min	0.3	14.0	1.94	567	6.85	59.2	8.88	• H_2S odor
1521	2.67	"	110 ml/min	0.5	14.8	1.84	544	6.83	41.1	13.52	
1526	2.70	"	"	0.8	14.9	1.59	530	6.81	26.9	14.63	
1531	2.81	"	"	1.0	14.3	1.49	523	6.79	15.6	20.66	
1536	2.79	"	"	1.25	14.2	1.46	522	6.78	7.1	28.92	
1541	2.68	"	"	1.50	14.7	1.44	521	6.79	-1.2	38.96	
1546	2.60	"	"	1.64	14.9	1.44	520	6.79	-7.7	36.10	
1551	2.58	"	"	1.70	15.4	1.44	521	6.79	-14.4	46.41	
1556	2.59	"	"	1.80	15.6	1.44	523	6.79	-18.9	50.62	
See below			Stabilization Criteria		3%	10%	3%	±0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW14-0520
Time Collected: 1626
Weather: Overcast
Sample Description (Color, Turbidity, Odor, Other): Clear
Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

1601	2.59	"	"	1.85	15.8	1.44	523	6.80	-23.1	55.74	
1606	2.70	"	"	1.90	16.1	1.44	524	6.79	-27.0	48.41	• Battery died at 1606.
1611	2.70	"	"	1.95	15.2	1.50	526	6.79	-29.4	13.34	Purging was resumed at
1616	2.81	"	"	2.10	14.1	1.48	522	6.77	-32.6	19.80	1609. This caused a
1621	2.91	"	240	2.33	14.6	1.44	520	6.79	-37.3	26.73	bump in flow and change
1626	2.75	"	"		14.4	1.41	524	6.79	-40.8	27.88	in parameters.

End of Sample time: 16:44

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady & T. Parry
Well ID: MW-18
Location (Site/Facility Name): South Park
Date of Collection: 5/27/20
Project Number: 553-1550-067

Purge Data

Purge Device: Bladder Pump
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 15.39
Well Casing Type/Diameter: PVC/2"
Pump Intake Depth: 15.39
Screened Interval (feet below MP):
Begin Purge Time: 1018
End Purge Time: 1108
Total Volume Purged:
Purge Water Disposal Method: Drum

Time	Dept 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
1023	15.39	7/7	25 ml/min	0.05	18.4	9.55	537	7.97	118.9	19.17	
1028	15.39	8/8	350 ml/min	0.20	19.4	8.58	581	7.61	141.1	17.58	
1033	15.39	5/7	190 ml/min	0.30	15.4	3.21	1274	6.50	106.0	21.53	
1038	15.41	"	"	0.75	15.3	1.60	1367	6.59	6.5	11.00	
1043	15.50	"	"	1.10	15.1	1.49	1303	6.61	-21.2	8.80	
1048	15.41	"	"	1.40	15.0	1.47	1263	6.63	-37.5	5.37	
1053	15.39	"	"	1.60	15.2	1.44	1251	6.63	-48.3	5.34	
1058	15.39	"	"	1.80	15.1	1.44	1242	6.64	-54.5	4.80	Henry here, fell down well.
1103	15.39	"	"	2.20	15.1	1.43	1240	6.63	-59.6	5.28	
1108	15.39	"	"	2.60	15.0	1.43	1233	6.64	-63.4	5.26	
	Discharge/fill rate	Stabilization Criteria			3%	10%	3%	±0.1	±10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW18-0520
Time Collected: 11:10
Weather: Sunny with clear skies.
Sample Description (Color, Turbidity, Odor, Other): Clear
Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

There is a sheen on the surface of the water.

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady & T. Parry
Well ID: MW-24
Location (Site/Facility Name): South Park
Date of Collection: 5/26/20
Project Number: 553-1550-067

Purge Data

Purge Device: Bladder Pump
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 8.80
Well Casing Type/Diameter: PVC / 2"
Pump Intake Depth:
Screened Interval (feet below MP):
Begin Purge Time: 11:06
End Purge Time: 11:55
Total Volume Purged: 2.10 gal.
Purge Water Disposal Method: Drum

Time	Dept 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
11:15	8.83	5/7	200ml/min	0.2	13.7	2.32	1020	6.65	-22.2	26.11	
11:20	8.85	"	"	0.4	13.7	2.02	1021	6.74	-42.5	23.85	
11:25	8.85	"	"	0.8	13.7	1.83	1017	6.75	-58.1	15.89	
11:30	8.84	"	"	1.0	13.8	1.72	1015	6.74	-61.7	17.28	
11:35	8.84	"	"	1.2	13.7	1.64	1009	6.74	-72.7	12.35	
11:40	8.84	"	"	1.4	13.6	1.62	1010	6.74	-77.1	12.80	
11:45	8.84	"	"	1.5	13.7	1.58	1006	6.74	-80.8	7.96	
11:50	8.84	"	"	1.75	13.5	1.54	1005	6.73	-84.1	7.30	
11:55	8.83	"	"	1.90	13.4	1.51	1002	6.73	-86.6	7.32	
12:00											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW24-0520
Time Collected: 12:05
Weather: Sunny with clear sky
Sample Description (Color, Turbidity, Odor, Other): Clear.
Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady + T. Ray
Well ID: MW-25
Location (Site/Facility Name): South Park
Date of Collection: 5/27/20
Project Number: 553-1550-067

Purge Data

Purge Device: Bladder Pump.
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 13.74.
Well Casing Type/Diameter: PVC / 2"
Pump Intake Depth:
Screened Interval (feet below MP):
Begin Purge Time: 1147
End Purge Time: 1305
Total Volume Purged: 3.8 gal
Purge Water Disposal Method: Drum

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
1148	13.74	5/5	15 ml/min	0.0	15.0	7.29	364.8	7.35	135.0	4.34	
1153	13.74	Variable	Variable	0.1 gal	17.8	7.10	360.3	6.81	158.2	3.84	Pump failed.
1225 ~~1158~~	13.72	7/10	210 ml/min	0.5 gal	16.4	2.81	842	6.49	115.4	61.03	
1230 ~~1203~~	13.76	"	"	0.9 gal	14.8	1.89	888	653	54.9	13.50	
1235 ~~1208~~	13.74	"	"	1.1 gal	14.8	1.71	900	6.57	13.4	9.68	
1240 ~~1213~~	13.75	"	"	1.3 gal	14.3	1.57	918	6.58	-15.5	9.87	
1245 ~~1218~~	13.75	"	"	2.0 gal	14.1	1.47	941	6.60	-31.9	8.42	
1250 ~~1223~~	13.75	"	"	2.5 gal	14.1	1.45	955	6.63	-47.2	10.73	
1255 ~~1228~~	13.75	5/7	"	3.4 gal	14.1	1.43	963	6.63	-55.8	11.96	
1300 ~~1233~~	13.75	"	"	3.6 gal	14.4	1.41	966	6.63	-61.6	11.68	
	Discharge/Fill		Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW25-0520
Time Collected: 1310
Weather: Sunny with clear skies.
Sample Description (Color, Turbidity, Odor, Other): light orange color
Sample Container Analyses:

Duplicate Sample Collected: ☒ Yes ☐ No
If yes, ID(s): SPL-GW-MW60-0520

Additional Information/Comments

1305	"	"	3.7 gal	14.3	1.43	965	6.62	-65.3	12.25
~~1310~~									
~~1315~~									
~~1320~~									
~~1325~~									

not needed

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: Parametrix
Field Personnel: MPB
Well ID: MW-26
Location (Site/Facility Name):
Date of Collection: 5/28/20
Project Number: 553-1550-067

Purge Data

Purge Device: Bladder Pump
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 9.53
Well Casing Type/Diameter: 2-in PVC
Pump Intake Depth: 20
Screened Interval (feet below MP): 17.39-27.39
Begin Purge Time: 9:56
End Purge Time: 10:51 / 1105
Total Volume Purged: 1.50 / 1.80
Purge Water Disposal Method: Drum

Time	Dept 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
1001	9.53	DT/FII	150ml/min	~0.25	13.9	7.40	176.3	6.55	134.5	22.52	80ml/min ~2 Mins
1006	9.53	DT/FII	150ml/min	~0.5	13.5	2.52	189.2	6.33	113.3	9.21	
1011	9.53	"	"	0.65	13.5	1.91	189.7	6.31	80.7	9.68	
1016	9.53	"	"	0.80	13.6	1.79	188.0	6.30	51.1	9.17	
1021	9.52	"	"	0.90	13.5	1.66	187.0	6.30	40.5	8.39	
1026	9.53	"	"	1.00	13.5	1.72	186.3	6.29	30.9	9.10	
1031	9.53	"	"	1.10	13.5	1.61	186.3	6.28	25.1	9.23	
1036	9.53	"	"	1.20	13.4	1.59	185.9	6.27	19.8	8.21	
1041	9.53	"	"	1.30	13.4	1.59	184.4	6.27	16.6	7.93	
1046		"	"	1.40	13.4	1.59	183.7	6.26	14.0	7.64	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW26-0520
Time Collected: 1051
Weather: Sunny
Sample Description (Color, Turbidity, Odor, Other): Clear
Sample Container Analyses: 2 1L HDPE : Diss As, Tot Fe, Mn
6 40ml VOA: VC, 1,2DCE
Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady + T. Perry
Well ID: MW-27
Location (Site/Facility Name): South Park
Date of Collection: 5/28/20
Project Number: 553-1550-067.

Purge Data

Purge Device: Bladder Pump.
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 8.28
Well Casing Type/Diameter: PVC/2"
Pump Intake Depth: 15.0
Screened Interval (feet below MP):
Begin Purge Time: 7:10
End Purge Time: 7:35
Total Volume Purged: 1.20
Purge Water Disposal Method: Drum.

Time	Dept 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
7:15	8.31	5/a	180 ml/min	0.1	12.9	8.61	252.4	6.96	193.6	32.29	
7:20	8.31	"	"	0.2	12.1	3.45	295.6	6.52	205.1	28.81	
7:25	8.31	"	"	0.5	11.9	1.83	298.3	6.46	206.0	22.00	
7:30	8.30	"	"	0.9	11.9	1.73	297.1	6.47	202.7	23.22	
7:35	8.29	"	"	1.05	12.0	1.68	298.9	6.49	196.2	22.78	
7:40	-	-	-	-	-	-	-	-	-	-	
7:45	-	-	-	-	-	-	-	-	-	-	
7:50	-	-	-	-	-	-	-	-	-	-	
7:55	-	-	-	-	-	-	-	-	-	-	
8:00	-	-	-	-	-	-	-	-	-	-	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW27-0520
Time Collected: 7:40
Weather: Sunny with clear sky
Sample Description (Color, Turbidity, Odor, Other): Clear.
Sample Container Analyses:

Duplicate Sample Collected: ☒ Yes ☐ No
If yes, ID(s): SPL-GW-MW61-0520

Additional Information/Comments

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PNX
Field Personnel: M. Brady + T. Parry
Well ID: MW-29
Location (Site/Facility Name): South Park
Date of Collection: 5/27/20
Project Number: 553-1550-067.

Purge Data

Purge Device: Peristaltic Pump.
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 7.40
Well Casing Type/Diameter: PVC / 2"
Pump Intake Depth:
Screened Interval (feet below MP): 20-30'
Begin Purge Time: 8:36
End Purge Time: 9:37
Total Volume Purged:
Purge Water Disposal Method: Drum

Time	Dept to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged (gal)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
842	8.63	43	160 ml/min	0.05	12.4	2.18	1072	6.59	81.1	55.25	
847	8.79	"	"	0.15	12.5	1.77	1068	6.60	28.9	38.20	
852	9.05	"	"	0.40	12.5	1.65	1062	6.59	-7.5	36.51	
857	9.14	"	"	0.70	12.4	1.61	1061	6.59	-31.7	35.55	
902	9.30	"	"	1.00	12.4	1.59	1031	6.59	-46.5	35.42	
907	9.35	"	"	1.25	12.3	1.56	995	6.58	-51.7	33.40	
912	9.43	"	"	1.50	12.4	1.54	1002	6.58	-57.5	34.98	
917	9.40	"	"	1.75	12.4	1.53	1008	6.59	-63.0	35.51	
922	9.40	"	"	2.10	12.4	1.52	1019	6.61	-69.7	36.61	
927	9.45	"	"	2.40	12.4	1.51	1023	6.62	-74.5	42.65	
			Stabilization Criteria		3%	10%	3%	±0.1	±10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW29-0520
Time Collected: 940
Weather: Sunny W/ clear skies
Sample Description (Color, Turbidity, Odor, Other): Clear
Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

The tubing was replaced and targeted the center/middle of the screen.

932	9.45	"	"	2.50	12.4	1.50	1076	6.63	-79.4	49.20
937	9.53			3.00	12.4	1.49	1029	6.64	-84.2	26.84
942	–	–	–	–	–	–	–	–	–	–
947	–	–	–	–	–	–	–	–	–	–

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady + T. Parry
Well ID: MW-30
Location (Site/Facility Name): South Park.
Date of Collection: 5/28/20
Project Number: 553-1550-067

Purge Data

Purge Device: Peristaltic Pump
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 10.33
Well Casing Type/Diameter: PVC / 2"
Pump Intake Depth:
Screened Interval (feet below MP):
Begin Purge Time: 1355
End Purge Time: 1436
Total Volume Purged: 1.50 gal
Purge Water Disposal Method: Onsite.

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
1401	10.41	1/3	145 ml/min	0.1 gal	17.7	5.33	687	6.28	113.0	19.51	
1406	10.46	<1/3	140 ml/min	0.2 gal	15.5	3.28	697	6.29	123.6	55.00	
1411	10.36	"	"	0.3 gal	15.2	2.00	655	6.30	111.9	17.52	
1416	10.36	"	145	0.4 gal	15.6	2.07	630	6.30	106.4	97.52	There is an issue with the DTW so it likely stirred up sediment at 1416.
1421	10.36	"	"	0.5 gal	15.7	2.06	625	6.30	103.0	43.55	
1426	10.36	"	"	0.7 gal	16.3	2.12	617	6.30	102.6	20.40	
1431	10.36	"	"	1.0 gal	15.5	2.16	613	6.31	97.3	21.28	
1436	10.36	"	"	1.5 gal	15.6	2.17	612	6.30	100.1	23.09	
1441	—	—	—	—	—	—	—	—	—	—	
1446	—	—	—	—	—	—	—	—	—	—	
			Stabilization Criteria		3%	10%	3%	±0.1	±10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW30-0620 Time Collected: 1441 Weather: Sunny with clear skies.
Sample Description (Color, Turbidity, Odor, Other):
Sample Container Analyses.

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

There is a lot of backsh in well which caused some DTW reading difficulty.

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX
Field Personnel: M. Brady + T. Perry
Well ID: MW-31
Location (Site/Facility Name): South Park.
Date of Collection: 5/28/20
Project Number: 553-1550-067

Purge Data

Purge Device: Bladder Pump.
Measurement Point (MP): TOC
Initial Depth of Water (Feet From Top of Well Casing): 10.85
Well Casing Type/Diameter: PVC / 2"
Pump Intake Depth:
Screened Interval (feet below MP):
Begin Purge Time: 12:45
End Purge Time.
Total Volume Purged.
Purge Water Disposal Method: Drum.

Time	Dept 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
12:50	10.85	40/11F	200 ml/min	0.5	16.1	1.72	339.4	6.52	145.7	18434	ORANGE
12:55	10.85	"	"	0.5	16.3	1.69	340.2	6.56	99.7	75.54	
13:00	10.85	"	"	0.7	17.5	1.78	346.6	6.56	44.4	44.68	WQ clearing
13:05	10.85	"	160 ml/min	0.85	16.7	1.59	349.9	6.56	22.0	37.40	
13:10	10.85	"	"	1.00	16.8	1.59	351.0	6.54	4.4	34.60	
1315	10.85	"	"	1.20	16.3	1.60	350.8	6.55	-7.3	53.70	
1320	10.85	"	"	1.40	16.5	1.58	351.5	6.56	-15.4	30.96	
1325	10.85	"	"	1.60	16.8	1.57	352.4	6.55	-22.4	33.94	
1330	10.85	"	"	1.90	16.5	1.56	352.0	6.56	-28.5	26.01	
1335	10.85	"	"	2.0	16.8	1.55	352.6	6.55	-32.5	26.95	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID. SPL-GW-MW31-0520 Time Collected. 1345 Weather: Sunny with clear skies
Sample Description (Color, Turbidity, Odor, Other). Clear
Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID(s):

Additional Information/Comments

STARTED PUMP 12:29 STUCK AFTER 1L, PULLED PUMP, DISLODGED & REDEPLOYED START AT 12:45

1340	10.85	"	"	2.2	16.3	1.56	351.9	6.55	-35.8	26.98	
~~1345~~											

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX **Field Personnel:** M. Brady + T. Perry

Well ID: MW-32 **Location (Site/Facility Name):** South Park

Date of Collection: 5/27/20 **Project Number:** 533-1550-067.

Purge Data

Purge Device: Peristaltic Pump.

Measurement Point (MP): TOC

Initial Depth of Water (Feet From Top of Well Casing): 10.81 Well Casing Type/Diameter: PVC/2"

Pump Intake Depth: Screened Interval (feet below MP):

Begin Purge Time: 1623

End Purge Time: 17:16

Total Volume Purged: 3.2 gal

Purge Water Disposal Method: Drum

Time	Dept 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
1626	10.82	43 (quarter)	225	0.1	14.8	3.00	871	6.79	133.5	351.12	*Tubing was too low; the cyclones the Turbidity
1631	10.82	"	"	0.3	14.4	1.55	868	6.76	78.5	99.19	
1636	10.84	"	"	0.8	14.3	1.61	886	6.80	35.6	45.10	
1641	10.84	"	"	1.0	14.3	1.45	901	6.80	-6.2	48.30	
1646	10.84	"	"	1.2	14.3	1.47	910	6.81	-35.9	46.72	
1651	10.84	"	"	1.4	14.3	1.41	915	6.82	-55.2	48.16	
1656	10.84	"	"	1.8	14.3	1.40	917	6.82	-69.2	46.00	
1701	10.84	"	"	2.0	14.2	1.39	920	6.82	-78.3	46.12	
1706	10.84	"	"	2.2	14.2	1.38	925	6.82	-84.4	48.83	
1711	10.84	"	"	2.4	14.2	1.38	927	6.82	-89.1	46.32	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW Time Collected: 1720 Weather: Sunny 2/ clear sky.

Sample Description (Color, Turbidity, Odor, Other):

Sample Container Analyses:

Duplicate Sample Collected: ☐ Yes ☐ No If yes, ID(s):

Additional Information/Comments

1716	10.84	"	"	2.8	14.2	1.38	929	6.85	-93.5	42.15

South Park Landfill

GROUNDWATER SAMPLE COLLECTION FORM

Sampling Organization: PMX **Field Personnel:** M. Brady + T. Ramy

Well ID: MW-33 **Location (Site/Facility Name):** South Park

Date of Collection: 5/27/20 **Project Number:** 553-1550-067

Purge Data

Purge Device Peristaltic Pump.

Measurement Point (MP) TOC

Initial Depth of Water (Feet From Top of Well Casing) 10.98 **Well Casing Type/Diameter.** PVC / 2"

Pump Intake Depth 22' BTOC **Screened Interval (feet below MP):**

Begin Purge Time: 15:06

End Purge Time: 15:48

Total Volume Purged:

Purge Water Disposal Method: Drum.

Time	Dept 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
1506	11.00	3/4 (22%)	230 ml/min	0.05	15.6	2.12	1505	6.89	111.4	9.40	
1513	11.00	"	"	0.15	15.4	1.46	1514	6.78	-2.8	36.40	
1518	10.94	"	"	0.40	15.3	1.40	1511	6.79	-52.6	73.97	
1523	10.96	"	"	0.75	15.3	1.38	1507	6.79	-72.8	106.74	
1528	10.98	"	"	1.20	15.3	1.36	1504	6.79	-85.3	134.72	Steady flow through cell Turbo down to 14.63
1533	10.99	"	"	1.40	15.3	1.35	1500	6.79	-94.3	27.07	
1538	10.98	"	"	1.60	15.3	1.33	1491	6.78	-96.6	35.31	
1543	10.97	"	"	1.80	15.4	1.33	1486	6.79	-100	43.45	
1548	10.97	"	"	2.10	15.4	1.32	1484	6.79	-102.7	28.04	
1553	—	—	—	—	—	—	—	—	—	—	
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID. SPL-GW-MW33-0520 **Time Collected:** 1550 **Weather:** Sunny 21 / clear skies

Sample Description (Color, Turbidity, Odor, Other): light orange color.

Sample Container Analyses.

Duplicate Sample Collected: ☐ Yes ☒ No **If yes, ID(s):**

Additional Information/Comments

PARAMETRIX Form 07-EN-215/Rev. 02/07

Water Level Measurement Field Report

DATE 5/26/20		JOB NO. 553-1550-067	
PROJECT: South Park Landfill		CLIENT: Seattle Public Utilities	
LOCATION: Seattle, WA			
WEATHER	TEMP	° at	AM
Overcast with light rain		° at	PM
PRESENT AT SITE M. Brady + T. Parry			

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	9:08	5.90	12.24 (likely pump depth)	TOC	15.3	10-15	1.52
MW-14	9:20	2.54	16.63 " "	TOC	21.8	11.5-21.5	0.8
MW-29	~~9:44~~ 10:32	~~6.61~~ 7.41	29.54	TOC	30	20-30	-0.29
MW-18	10:50	15.41	33.70 " "	TOC	40.4	30-40	1.25
MW-25	11:35	13.75	25.30 " "	TOC	27	22-27	2.79
MW-32	10:59	10.65	23.52	TOC	24	19-24	-0.44
MW-33	11:08	10.98	25.16	TOC	25	20-25	-0.47
MW-26	12:18	9.54	20.09 " "	TOC	25	15-25	2.39
MW-27	12:02	8.24	4.47 " "	TOC	20	10-20	2.04
MW-10	11:27	13.11	38.64 " "	TOC	45	35-45	1.65
MW-24	12:25	8.79	39.80 " "	TOC	45.3	35-45	1.56
MW-08	11:55	8.40	39.32 " "	TOC	45.6	35.5 – 45.5	1.88
MW-30	12:33	10.32	12.90	TOC	13	8-13	-0.53
MW-31	12:38	10.87	18.24 " "	TOC	23	35.5-45.5	-0.46
SG-1S	—	—	NA	SG	NA	NA	NA
SG-2N	—	—	NA	SG	NA	NA	NA

Comments: Tide appears to be low. All flush mounted well depths are accurate. All other wells are assumed to be measured to the top of the bladder.

TOC – top of PVC casing SG – staff gauge

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 08/26/20 Well ID: MW-08

Sampling Organization: Parametrix Samplers: T. Parry + A. York

Purge Data Screened Interval (ft bgs): 5.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.09 Purge Water Disposal Method: ~~Bladder Pump~~ Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 10.5ft

Begin Purge Time: 10:44 End Purge Time: 1202

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
1047	9.09	8/14	360	0.33	14.6	2.23	1.143	6.78	16.4	279.26	Dark orange color
1052	9.09	8/12	255	0.75	13.9	1.36	1.133	6.51	-58.7	161.68	
1057	9.09	"	"	~~1.25~~ 1.2	14.0	0.54	1.080	6.53	-61.1	118.97	
1102	9.11	"	"	1.5	13.8	0.40	1.104	6.54	-64.3	63.51	
1107	9.12	"	"	2.0	13.5	0.26	1.123	6.53	-65.3	63.11	
1112	9.10	"	"	2.3	13.5	0.31	1.121	6.58	-69.0	60.35	
1117	9.11	"	"	2.75	13.5	0.25	1.113	6.54	-69.5	63.12	
1122	9.11	"	"	3.20	13.5	0.28	1.111	6.55	-71.7	66.41	
1127	9.11	"	"	3.60	13.5	0.26	1.110	6.54	-71.8	221.02	Emptied flow
1132	9.11	"	"	4.10	13.5	3.75	1.120	6.52	-69.9	19.64	through cell
1137	9.11	"	"	4.45	13.7	2.18	1.084	6.51	-69.8	16.35	done to turbidity
1142	9.11	"	"	4.85	13.7	1.14	1.091	6.57	-72.1	10.72	Build up.
1147	9.11	"	"	5.20	13.7	0.93	1.095	6.52	-72.0	10.47	
1152	9.11	"	"	5.60	13.8	0.84	1.095	6.53	-72.2	9.41	
1157	9.11	"	"	5.90	13.8	0.79	1.098	6.53	-73.2	9.44	
1202	9.11	"	"	6.30	13.9	0.77	1.094	6.53	-74.3	8.85	
1207	Sampled at	12:15									
1212											
1217											
1222											
1227											
1232											
1237											
1242											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW08-0820 Time Collected: 1215 Weather: Sunny 2/ clear sky.

Sample Description (Color, Turbidity, Odor, Other): Clear

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/27 Well ID: MW-10

Sampling Organization: Parametrix Samplers: T. Parry + A. York

Purge Data Screened Interval (ft bgs): 35.0-44.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.76 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump (broken), sampled with peristaltic pump and dedicated tubing Pump Intake Depth: 30.0 ft

Begin Purge Time: 1052 End Purge Time: 1159

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
1054	10.76	1/3	300	0.05	14.8	1.73	1.245	6.87	24.7	69.10	
1059	"	"	"	0.70	14.7	0.33	1.397	6.47	-76.9	74.92	
1104	"	"	"	0.85	14.7	0.32	1.400	6.48	-80.6	75.10	
1109	"	"	"	1.25	14.7	0.28	1.408	6.49	-89.4	82.87	
1114	"	"	"	1.75	14.7	0.26	1.427	6.51	-95.9	96.81	
1119	"	"	"	2.05	14.7	0.07	1.443	6.53	-100.9	23.15	
1124	"	"	"	2.50	14.6	0.06	1.453	6.57	-104.3	25.72	
1129	"	"	"	2.75	14.6	0.04	1.458	6.56	-105.5	13.82	
1134	10.77	"	"	3.20	14.6	0.03	1.467	6.57	-107.9	25.42	
1139	"	"	"	3.50	14.6	0.02	1.471	6.58	-109.4	20.37	
1144	"	"	"	3.75	14.7	0.02	1.474	6.58	-110.4	19.23	
1149	"	"	"	4.00	14.6	0.03	1.475	6.59	-111.2	10.29	
1154	"	"	"	4.50	14.6	0.03	1.477	6.60	-111.6	9.61	
1159	"	"	"	5.00	14.6	0.03	1.482	6.61	-112.3	9.99	
1204	Sampled at 12:10										
1209											
1214											
1219											
1224											
1229											
1234											
1239											
1244											
1249											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW10-0820 Time Collected: 1210 Weather: Sunny 2/ clear sky

Sample Description (Color, Turbidity, Odor, Other): Clear.

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/25/20 Well ID: MW-12

Sampling Organization: Parametrix Samplers: T. Parry A. York

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 6.28 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 12.5 ft

Begin Purge Time: 8:33 End Purge Time: 9:26

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
831	6.31	5/7	440	1/2 gal.	14.0	4.78	0.475	7.53	75.6	101.1	Orange
836	6.31	4/7	275	1	14.1	2.24	0.476	6.54	63.7	74.92	Clear
841	6.31	"	~~275~~ 265	1.5	14.3	1.34	0.479	6.37	57.9	48.92	
846	6.30	"	255	1.75	14.3	0.90	0.480	6.33	55.3	36.65	
851	6.31	"	275	2.1	14.3	0.68	0.481	6.31	53.6	30.39	
856	6.31	"	"	2.5	14.3	0.50	0.482	6.30	52.7	28.38	
901	6.32	"	"	2.75	14.4	0.40	0.482	6.30	50.8	28.78	
906	6.32	"	"	3.25	14.4	0.39	0.483	6.30	49.4	28.52	
911	6.32	"	"	3.6	14.4	0.32	0.484	6.32	48.0	30.20	
916	6.32	"	"	4.1	14.5	0.28	0.485	6.30	48.2	38.5	
921	6.32	"	"	4.75	14.5	0.27	0.486	6.30	47.0	41.61	
926	6.32	"	"	5.25	14.5	0.26	0.487	6.30	45.1	40.02	
931	Sampled at 0926										
936											
941											
946											
951											
956											
1001											
1006											
1011											
1016											
1021											
1026											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW12-0820 Time Collected: 0926 Weather: Sunny w/ clear sky

Sample Description (Color, Turbidity, Odor, Other): Clear

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/25 Well ID: MW-14

Sampling Organization: Parametrix Samplers: T. Perry + A. York.

Purge Data Screened Interval (ft bgs): 11.5-21.5 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 3.07 Purge Water Disposal Method: Onsm.

Purge Device dedicated bladder pump Pump Intake Depth: 16.5 ft

Begin Purge Time: 1005 End Purge Time: 1128

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
1008	3.17	4/5	550	0.5	15.7	1.10	0.593	6.84	-88.5	44.72	
1013	3.14	3/5	225	0.7	17.0	0.42	0.566	6.68	-114.2	54.29	
1018	3.16	"	235	1.0	17.3	0.24	0.552	6.62	-131.6	96.06	
1023	3.15	"	230	1.25	17.5	0.12	0.550	6.59	-145.8	30.68	
1028	3.15	"	"	1.50	17.5	0.08	0.550	6.59	-151.8	45.68	
1033	3.15	"	"	1.75	17.4	0.06	0.550	6.58	-155.4	57.46	
1038	3.14	"	"	2.0	17.4	0.06	0.551	6.60	-158.0	69.80	
1043	3.13	"	"	2.25	17.4	0.05	0.551	6.58	-157.9	80.50	
1048	3.13	"	"	2.5	17.5	0.05	0.552	6.58	-158.3	89.24	
1053	3.13	"	"	2.75	17.5	0.04	0.551	6.59	-157.4	100.45	
1058	3.13	"	"	3.00	17.6	0.04	0.551	6.59	-156.1	4.95	← Emptied casing for turbidity stabilization
1103	3.15	"	"	3.25	17.4	0.15	0.553	6.56	-132.2	5.50	
1108	3.15	"	"	3.5	17.5	0.08	0.552	6.56	-139.4	18.60	
1113	3.15	"	"	3.75	17.4	0.06	0.551	6.54	-142.0	32.75	
1118	3.13	"	"	4.0	17.5	0.05	0.551	6.55	-143.3	62.13	
1123	3.13	"	"	4.25	17.4	0.05	0.551	6.55	-143.2	62.99	
1128	3.13	"	"	4.50	17.2	0.05	0.550	6.56	-143.1	67.82	
1133	Sampled MW-14										
1138											
1143											
1148											
1153											
1158											
1203											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW14-0820 Time Collected: 11:33 Weather: Sunny with clear sky.

Sample Description (Color, Turbidity, Odor, Other): Clear.

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/25/20 Well ID: MW-18

Sampling Organization: Parametrix Samplers: T. Perry + A. Volk

Purge Data Screened Interval (ft bgs): _____ Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~30.0-40.0~~ 16.00 Purge Water Disposal Method: Onsite

Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 1348 End Purge Time: 1454

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
1354	16.00	5/8	260 ml/min	0.05	16.9	1.66	0.941	6.75	-26.5	119.18	
1359	16.00	"	200	1/2	16.0	1.23	1.212	6.47	-54.1	105.48	
1404	16.00	"	"	0.75	16.6	0.34	1.112	6.52	-63.5	69.93	
1409	16.00	"	"	1.0	16.5	0.21	1.096	6.53	-65.7	53.19	
1414	16.00	"	"	1.25	16.5	0.14	1.092	6.53	-68.3	49.22	
1419	16.00	"	"	1.50	16.3	0.12	1.092	6.54	-70.3	50.38	
1424	16.00	"	"	1.80	16.0	0.09	1.082	6.54	-72.4	53.95	
1429	16.00	"	"	2.30	15.9	0.09	1.072	6.54	-74.2	66.71	
1434	16.00	"	225	2.45	16.2	0.07	1.072	6.55	-75.8	79.81	
1439	16.00	"	"	2.60	16.0	0.07	1.076	6.55	-76.8	~~118.27~~ 113.21	
1444	16.00	"	"	3.00	16.0	0.07	1.076	6.55	-77.3	142.37	
1449	16.00	"	"	3.25	16.0	0.07	1.070	6.56	-77.7	198.21	
1454	1600	"	"	3.50	16.0	0.07	1.070	6.55	-78.2	221.04	
1459	—	—	—	—	—	—	—	—	—	—	
1504	Sampled at 1500										
1509											
1514											
1519											
1524											
1529											
1534											
1539											
1544											
1549											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW18-0820 Time Collected: 1500 Weather: Sunny with clear sky.

Sample Description (Color, Turbidity, Odor, Other): Clear.

Sample Analyses: _____

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID: _____

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Oily sheen present on the surface of the purged water.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/26/20 Well ID: MW-24

Sampling Organization: Parametrix Samplers: T. Thorny + A. York

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~~ 9.53 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 40.0 ft

Begin Purge Time: 1426 End Purge Time: 1547

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
1432	9.56	7/10	195	0.1	15.0	2.87	0.823	6.96	34.4	168.54	
1437	"	"	"	0.4	14.2	2.43	0.951	6.62	-43.5	102.00	
1442	9.54	"	"	0.6	14.1	2.29	0.965	6.53	-53.3	60.03	
1447	"	"	"	0.75	14.0	2.10	0.970	6.52	-56.6	44.39	
1452	"	"	"	1.0	14.0	1.88	0.962	6.51	-58.0	39.40	
1457	"	"	180	1.25	14.0	2.00	0.955	6.50	-57.6	35.20	
1502	"	"	"	1.50	14.1	2.11	0.950	6.49	-57.8	29.70	
1507	"	"	"	1.75	14.0	1.97	0.950	6.49	-56.0	27.00	
1512	"	"	"	2.00	14.1	2.09	0.944	6.49	-57.4	22.51	
1517	"	"	"	2.25	14.1	2.12	0.945	6.48	-57.3	17.25	
1522	"	"	"	2.50	14.1	2.11	0.945	6.48	-57.0	14.22	
1527	"	"	"	2.75	14.1	1.92	0.944	6.48	-57.2	9.91	
1532	"	"	"	3.00	14.1	1.99	0.944	6.47	-56.7	8.41	
1537	"	"	"	3.25	13.8	1.84	0.942	6.47	-56.4	7.70	
1542	"	"	"	3.50	13.9	1.92	0.942	6.47	-56.8	7.25	
1547	"	"	"	3.75	13.9	1.89	0.941	6.47	-56.3	7.16	
1552	Sampled at 1600										
1557											
1602											
1607											
1612											
1617											
1622											
1627											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW24-0820 Time Collected: 1600 Weather: Sunny w/ clear sky

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/17 Well ID: MW-25

Sampling Organization: Parametrix Samplers: T. Perry + A. York

Purge Data Screened Interval (ft bgs): 20.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 14.50 Purge Water Disposal Method: onsite

Purge Device: dedicated bladder pump Pump Intake Depth: 24.5 ft

Begin Purge Time: 1220 End Purge Time: 1350

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
1222	14.51	5/7	100	0.05	15.5	6.69	0.866	7.15	23.1	9.50	
1227	"	"	"	0.10	16.6	1.79	0.916	6.54	-23.2	5.02	
1232	"	"	"	0.25	16.8	1.43	0.925	6.52	-28.8	4.38	
1237	"	"	"	0.35	17.1	1.15	0.939	6.52	-41.0	5.15	
1242	"	"	"	0.45	17.3	0.87	0.945	6.51	-49.2	3.54	
1247	"	"	"	0.5	17.4	0.82	0.948	6.51	-52.2	4.14	
1252	"	"	"	0.55	17.3	0.57	0.953	6.51	-55.8	3.39	
1257	"	"	"	0.65	17.5	0.42	0.960	6.50	-58.7	3.87	
1302	"	"	"	0.75	17.3	0.37	0.965	6.50	-61.6	3.75	
1307	"	"	"	0.85	17.1	0.36	0.967	6.50	-62.8	4.00	
1312	"	"	"	0.95	17.0	0.34	0.969	6.49	-63.6	3.95	
1317	"	"	"	1.05	17.0	0.34	0.970	6.49	-64.3	4.11	
1322				sampled @ 1322							
1327											
1332											
1337											
1342											
1347											
1352											
1357											
1402											
1407											
1412											
1417											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW25-0820 Time Collected: 1322 Weather: Sunny 2/ Clear sky

Sample Description (Color, Turbidity, Odor, Other): Bucket/purge water light brown, sample water clear, no odor

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☒ Yes ☐ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/28/20 Well ID: MW-26

Sampling Organization: Parametrix Samplers: T. Perry - A. York

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.28 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 715 End Purge Time: 816

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
716	10.28	80 ml/min ↔ 5/9		0.05	13.0	5.34	0.199	7.53	29.2	47.65	
721	10.28	175	6/9	0.50	12.9	2.96	0.222	6.21	29.8	42.04	
726	10.28	6/9	175	0.75	13.2	2.17	0.200	6.10	28.5	30.27	
731	10.28	"	"	0.90	13.5	1.34	0.200	6.07	26.5	27.87	
736	10.28	"	"	1.05	13.4	0.95	0.199	6.06	25.3	24.33	
741	10.28	"	"	1.20	13.5	0.71	0.198	6.06	24.4	21.89	
746	10.28	"	"	1.30	13.5	0.54	0.198	6.06	24.0	18.80	
751	10.28	"	"	1.50	13.6	0.49	0.199	6.06	23.6	16.52	
756	10.28	"	"	1.65	13.6	0.40	0.197	6.06	23.3	15.82	
801	10.28	"	"	1.80	13.7	0.37	0.196	6.06	23.0	13.13	
806	10.28	"	"	1.90	13.6	0.33	0.197	6.06	22.7	11.94	
811	10.28	"	"	2.10	13.6	0.32	0.197	6.06	22.6	10.75	
816	10.28	"	"	2.25	13.6	0.30	0.197	6.06	22.4	10.97	
821	Sampled at 8:25										
826											
831											
836											
841											
846											
851											
856											
901											
906											
911											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW26-0820 Time Collected: 8:25 Weather: Sunny w/ clear sky

Sample Description (Color, Turbidity, Odor, Other): Clear

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/26/20 Well ID: MW-27

Sampling Organization: Parametrix Samplers: T. Ramy + A. York

Purge Data Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.04 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 15.0 ft

Begin Purge Time: 1219 End Purge Time: 1345

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
1220	"	5/9	100	0.1	15.0	4.00	0.371	7.42	-8.7	105.74	
1225	9.06	"	100	0.25	16.6	2.03	0.384	6.47	-35.4	49.59	
1230	9.05	"	"	0.3	16.6	1.54	0.398	6.42	-44.1	31.32	
1235	"	"	"	0.45	16.3	0.97	0.409	6.42	-53.8	21.70	
1240	"	"	"	0.5	16.3	0.82	0.411	6.42	-56.6	21.68	
1245	"	"	"	0.6	16.2	0.61	0.414	6.43	-61.5	19.30	
1250	"	"	"	0.7	16.2	0.48	0.416	6.46	-64.5	18.05	
1255	"	"	"	0.8	16.2	0.37	0.418	6.43	-67.2	17.55	
1300	"	"	"	0.9	16.2	0.30	0.419	6.43	-69.4	18.53	
1305	"	"	"	1.0	16.1	0.28	0.420	6.44	-71.4	20.05	
1310	"	"	95	1.2	16.1	0.24	0.421	6.44	-73.3	28.03	
1315	"	"	"	1.35	16.1	0.22	0.421	6.44	-74.3	33.75	
1320	"	"	"	1.45	16.2	0.21	0.422	6.45	-75.2	40.80	Cleared flow-cell
1325	"	"	"	1.5	15.5	1.00	0.425	6.36	-53.9	3.95	
1330	"	"	"	1.6	16.1	0.20	0.424	6.33	-70.1	3.66	
1335	"	"	"	1.65	16.2	0.19	0.426	6.37	-70.2	3.70	
1340	"	"	"	1.75	16.3	0.17	0.428	6.40	-73.6	3.85	
1345	"	"	"	1.85	16.3	0.16	0.428	6.39	-74.0	14.95	
1350			Sampled MW-27								
1355											
1400											
1405											
1410											
1415											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW27-0820 Time Collected: 1350 Weather: Sunny with clear sky.

Sample Description (Color, Turbidity, Odor, Other): Purge water light yellow-brown, no odor, oil sheen on purged water

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☒ Yes ☐ No

Additional Information/Comments

See Sample description.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/25/20 Well ID: MW-29

Sampling Organization: Parametrix Samplers: T. Ahmy + A. York

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.15 Purge Water Disposal Method: Drum

Purge Device peristaltic pump Pump Intake Depth: 25.0 ft

Begin Purge Time: 12:13 End Purge Time: 1310

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	(gal) Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1215	9.00	1/3	230	0.05	19.0	4.01	0.847	7.38	-77.7	21.88	
1220	9.97	"	"	0.4	14.1	0.34	0.875	6.63	-98.0	12.70	
1225	10.04	"	250	0.6	13.9	0.14	0.907	6.60	-105.7	17.00	
1230	10.15	"	260	1.1	13.8	0.07	0.914	6.60	-110.0	28.62	
1235	10.21	"	"	1.8	13.8	0.04	0.912	6.61	-112.1	50.99	Slowed Flow
1240	10.14	1/4	240	1.8	13.9	0.03	0.917	6.61	-113.4	66.00	
1245	10.12	"	"	2.0	14.0	0.02	0.910	6.61	-114.6	77.52	
1250	10.14	"	250	2.25	13.9	0.01	0.902	6.62	-115.2	86.30	
1255	10.16	"	"	2.6	13.9	0.00	0.897	6.63	-115.9	99.71	
1300	"	"	"	2.9	13.9	0.00	0.889	6.64	-117.0	113.6	
1305	10.17	"	"	3.25	13.8	0.00	0.880	6.64	-118.2	116.9	
1310	"	"	"	3.6	13.8	0.00	0.878	6.65	-119.7	119.9	
1315	sampled MW-29										
1320											
1325											
1330											
1335											
1340											
1345											
1350											
1355											
1400											
1405											
1410											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW29-0820 Time Collected: 1315 Weather: Sunny with clear sky.

Sample Description (Color, Turbidity, Odor, Other): Clear, no odor

Sample Analyses:

Duplicate Sample Collected: ☒ Yes ☐ No If yes, ID: MW-60

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Fill containers for MW60

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/26/20 Well ID: MW-30

Sampling Organization: Parametrix Samplers: T. Pamy + A. York.

Purge Data Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.98 Purge Water Disposal Method: Drum

Purge Device peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 8:24 End Purge Time: 856

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
826	11.19	1/3	240	0.05	16.1	4.43	0.619	7.31	-5.3	18.12	
831	11.28	1/3	"	0.50	15.4	0.71	0.616	6.24	-3.1	5.49	
836	11.34	"	"	0.75	15.4	0.41	0.626	6.22	5.6	3.38	
841	11.33	"	"	1.0	15.3	0.34	0.630	6.21	6.4	3.52	
846	11.33	"	"	1.25	15.4	0.28	0.635	6.21	6.8	3.16	
851	11.33	"	"	1.60	15.3	0.27	0.637	6.21	7.1	3.09	
856	11.33	"	"	1.80	15.3	0.27	0.639	6.22	7.2	3.34	
901	Sampled at 9:00										
906											
911											
916											
921											
926											
931											
936											
941											
946											
951											
956											
1001											
1006											
1011											
1016											
1021											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW30-0820 Time Collected: 9:00 Weather: Sunny with clear sky.

Sample Description (Color, Turbidity, Odor, Other): Clear.

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/26/20 Well ID: MW-31

Sampling Organization: Parametrix Samplers: T. Pany - A. York

Purge Data Screened Interval (ft bgs): 18.0-23.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.60 Purge Water Disposal Method: Dam

Purge Device: dedicated bladder pump Pump Intake Depth: 20.5ft

Begin Purge Time: 9:13 End Purge Time: 1005

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
915	11.61	~~4/8~~ 5/8	300	0.05	14.7	3.01	0.372	6.79	-35.9	220.47	Yellowish color
920	11.61	4/8	110	0.50	15.4	1.21	0.362	6.36	-35.8	101.74	
~~925~~	11.61	"	"	0.65	15.8	0.81	0.365	6.33	-41.3	90.91	
930	11.61	"	"	0.75	15.8	0.57	0.371	6.34	-46.7	65.34	
935	11.61	"	"	0.75	15.5	0.48	0.375	6.34	-48.9	57.08	
940	11.61	"	"	0.85	15.5	0.40	0.380	6.33	-51.8	51.8	
945	11.61	"	"	0.95	15.4	0.31	0.386	6.34	-54.8	41.47	
950	11.61	"	"	1.10	15.9	0.28	0.386	6.34	-57.3	40.03	
955	11.61	"	"	1.25	15.9	0.24	0.389	6.37	-60.6	40.30	
1000	11.61	"	"	1.40	15.9	0.23	0.388	6.36	-61.6	40.78	
1005	11.61	"	"	1.55	16.0	0.22	0.388	6.36	-62.6	42.15	
1010	Sampled at 1010										
1015											
1020											
1025											
1030											
1035											
1040											
1045											
1050											
1055											
1100											
1105											
1110											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW31-0820 Time Collected: 1010 Weather: Sunny with clear sky

Sample Description (Color, Turbidity, Odor, Other): Slight yellowish hue

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/27/20 Well ID: MW-32

Sampling Organization: Parametrix Samplers: T. Rainey + A. York.

Purge Data Screened Interval (ft bgs): 19.0-24.00 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~19.0-24.0~~ 11.44 Purge Water Disposal Method: Onsite

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 8:54. End Purge Time: 1006

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
856	11.44	13	275	0.05	15.0	1.84	0.845	6.41	-9.1	11.22	
901	11.44	"	"	0.25	14.4	0.30	0.851	6.48	-52.3	17.84	
906	"	"	"	0.5	14.4	0.21	0.859	6.52	-62.0	37.76	
911	"	"	"	0.85	14.4	0.15	0.872	6.57	-70.6	63.56	
916	"	"	"	1.4	14.5	0.14	0.882	6.59	-76.4	122.96	
921	"	"	"	1.8	14.4	0.16	0.887	6.61	-81.1	179.32	
926	"	"	"	~~2.25~~ 2.0	14.4	0.13	0.893	6.62	-84.8	214.09	
931	11.45	"	"	~~2.75~~ 2.25	14.4	0.13	0.897	6.63	-87.6	276.78	
936	11.45	"	"	~~2.8~~ 2.5	14.4	0.17	0.898	6.64	-89.4	352.39	
941	"	"	"	2.75	14.4	0.04	0.905	6.64	-91.3	5.35	Shook meter ~~to clear~~
946	"	"	"	3.0	14.4	0.03	0.906	6.65	-92.8	8.50	
951	"	"	"	3.3	14.4	0.03	0.908	6.65	-94.0	15.16	
956	"	"	"	3.5	14.4	0.03	0.910	6.69	-95.8	22.95	
1001	"	"	"	3.75	14.4	0.02	0.909	6.66	-95.5	33.52	
1006	"	"	"	4.0	14.4	0.03	0.912	6.66	-96.4	47.08	
1011			Sampled @ 1010								
1016											
1021											
1026											
1031											
1036											
1041											
1046											
1051											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW32-0820 Time Collected: 1010 Weather: Sunny with clear sky.

Sample Description (Color, Turbidity, Odor, Other): Clear, no odor

Sample Analyses:

Duplicate Sample Collected: ☒ Yes ☐ No If yes, ID: MW-61

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Fill containers for MW-61

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/25/20 Well ID: MW-33

Sampling Organization: Parametrix Samplers: T. Parry + A. York

Purge Data Screened Interval (ft bgs): 20.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.58 Purge Water Disposal Method: Drum

Purge Device peristaltic pump Pump Intake Depth: 22.5ft

Begin Purge Time: 15:27 End Purge Time: 1610

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
1530	11.58	1.5	220	0.05	16.8	1.90	1.489	6.79	-92.3	81.62	
1535	11.58	"	"	0.6	16.3	0.21	1.461	6.66	-99.0	550.45	
1540	11.58	"	"	0.6	16.3	0.33	1.460	6.63	-92.6	413.50	Emptied flow through cell in attempt to clear turbidity.
1545	11.58	"	"	0.8	16.1	0.09	1.454	6.64	-98.8	605.5	
1550	"	"	"	1.1	16.2	0.05	1.444	6.65	-102.0	620.1	
1555	"	"	"	1.5	16.1	0.03	1.435	6.66	-104.1	680.20	
1600	"	"	"	1.75	16.1	0.02	1.421	6.66	-105.7	765.33	
1605	"	"	"	2.2	16.1	0.02	1.408	6.66	-107.1	740.15	
1610	"	"	"	2.4	16.0	0.00	1.401	6.66	-107.8	739.60	
1615		Sampled MW-33 at 16:15									
1620											
1625											
1630											
1635											
1640											
1645											
1650											
1655											
1700											
1705											
1710											
1715											
1720											
1725											
				Stabilization Criteria	3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW33-0820 Time Collected: 1615 Weather: Sunny w/ clear sky

Sample Description (Color, Turbidity, Odor, Other): At purged clear, no odor, bucket water brown, water sample slight yellow color

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

PARAMETRIX Form 07-EN-215/Rev. 02/07

Water Level Measurement Field Report

DATE 8/24/20	JOB NO. 553-1550-067	
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities	
LOCATION: Seattle, WA		
WEATHER: Sunny with clear skies	TEMP: 62 ° at 9:00 AM; 72 ° at 14:45 PM	
PRESENT AT SITE: T. Parry + A. York		

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	14:49	6.26	–	TOC	15.3	10-15	1.52
MW-14	14:55	3.04	–	TOC	21.8	11.5-21.5	0.8
MW-29	15:17	9.11	–	TOC	30	20-30	-0.29
MW-18	14:59	15.98	–	TOC	40.4	30-40	1.25
MW-25	14:44	14.44	–	TOC	27	22-27	2.79
MW-32	15:33	11.40	–	TOC	24	19-24	-0.44
MW-33	15:44	11.57	–	TOC	25	20-25	-0.47
MW-26	14:22	10.26	–	TOC	25	15-25	2.39
MW-27	13:56	8.98	–	TOC	20	10-20	2.04
MW-10	14:42	13.70	–	TOC	45	35-45	1.65
MW-24	13:37	9.47	–	TOC	45.3	35-45	1.56
MW-08	13:54	8.99	–	TOC	45.6	35.5 – 45.5	1.88
MW-30	15:09	10.95	–	TOC	13	8-13	-0.53
MW-31	14:09	11.57	–	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: 11/11/20 Well ID: MW-08

Sampling Organization: Parametrix Samplers: T. Perry + A. Volk

Purge Data Screened Interval (ft bgs): 5.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.95 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 10.5ft

Begin Purge Time: 12:27 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
12:30	8.95	10/12	240 ml/min	0.1	12.4	1.30	1037	6.38	33.5	10.9	
12:35	"	"	"	0.5	12.4	0.07	1084	6.44	-13.6	24.3	
1240	"	"	"	0.75	12.3	0.01	1068	6.45	-26.6	23.5	
1245	"	"	"	1.0	12.3	0.01	1056	6.47	-41.5	16.3	
1250	"	"	"	1.50	12.3	0.00	1051	6.48	-49.9	11.0	
1255	"	"	"	1.75	12.2	0.00	1051	6.49	-53.1	8.05	
1300	"	"	"	2.0	12.2	0.00	1050	6.49	-55.5	6.47	
1305	"	"	"	2.25	12.2	0.00	1044	6.50	-57.5	5.16	
1310	"	"	"	2.75	12.3	0.00	1044	6.50	-59.3	4.37	
1315	"	"	"	2.95	12.3	0.00	1044	6.50	-60.2	3.62	
1320	"	"	"	3.25	12.3	0.00	1045	6.50	-60.6	3.52	
1325											
1330											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW_MW08-1120 Time Collected: 1325 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: 11/10/20 Well ID: MW-10

Sampling Organization: Parametrix Samplers: T. Perry + A. York.

Purge Data Screened Interval (ft bgs): 35.0-44.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.55 Purge Water Disposal Method: Drum

Purge Device ~~dedicated bladder pump~~ Peristaltic Pump Pump Intake Depth: 30.0 ft

Begin Purge Time: 1205 End Purge Time: 1243

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
1208	13.50	1/3	0.6	0.1	13.9	0.97	1418	6.49	-64.6	13.3	
1213	13.99	1/4	175 ml/min	0.6	13.7	0.49	1455	6.57	-83.3	16.4	
1218	"	"	210	0.8	13.7	0.35	1460	6.58	-95.8	18.0	
1223	"	"	"	1.10	13.7	0.28	1463	6.60	-100.8	16.3	
1228	"	"	"	1.4	13.7	0.22	1470	6.61	-103.9	17.9	
1233	"	"	"	1.7	13.8	0.19	1472	6.61	-105.9	15.8	
1238	"	"	"	1.95	13.8	0.20	1474	6.58	-105.9	15.7	
1243	"	"	"	2.20	13.8	0.20	1472	6.62	-108.4	15.1	
1245											
~~1247~~ 1248											
1253											
1258											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW10- Time Collected: 1250 Weather: Overcast w/ light rain

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

Purged water has a faint odor.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/9/20 Well ID: MW-12

Sampling Organization: Parametrix Samplers: T. Perry + A. York

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 5.87 Purge Water Disposal Method: Onm

Purge Device dedicated bladder pump Pump Intake Depth: 12.5 ft

Begin Purge Time: 1443 End Purge Time: 14:57

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance uS ~~mg~~/cm	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
~~1447~~ 1347	5.89	5/7	275ml/min	0.1	14.0	4.92	468.1	5.79	235.5	1.12	
~~1452~~ 1352	5.88	5/7	"	0.25	14.3	1.41	458.6	5.97	230.2	0.02	
~~1457~~ 1357	5.88	5/7	"	0.6	14.4	0.70	459.5	6.00	228.9	0.02	
~~1502~~ 1402	"	5/7	"	1.15	14.3	0.32	459.0	6.02	228.3	0.02	
~~1507~~ 1407	"	"	"	1.5	14.4	0.12	458.7	6.03	225.6	0.02	
~~1512~~ 1412	"	"	"	1.80	14.4	0.01	459.2	6.04	200.3	0.02	
~~1517~~ 1417	"	"	"	2.20	14.4	0.00	461.1	6.04	164.5	0.02	
~~1522~~ 1422	"	"	"	2.60	14.4	0.00	462.6	6.02	138.0	0.02	
~~1527~~ 1427	"	"	"	2.85	14.4	0.00	463.5	6.06	125.9	0.02	
~~1532~~ 1432	"	"	"	3.30	14.4	0.00	464.1	6.07	110.6	0.02	
~~1537~~ 1437	"	"	"	3.7	14.4	0.00	464.7	6.07	100.0	0.02	
~~1542~~ 1442	"	"	"	4.15	14.4	0.00	465.7	6.07	92.3	0.02	
1447	"	"	"	4.5	14.4	0.00	465.8	6.08	86.7	0.02	
1452	"	"	"	4.8	14.4	0.00	466.2	6.06	82.6	0.02	
1457	"	"	"	5.2	14.4	0.00	467.8	6.08	79.1	0.02	
1502											
1507											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW12-1120 Time Collected: 14:57 Weather: Overcast 2/ light rain

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/9/2020 Well ID: MW-14

Sampling Organization: Parametrix Samplers: A. York, T. Perry

Purge Data Screened Interval (ft bgs): 11.5-21.5 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 2.84 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 16.5 ft

Begin Purge Time: 1519 End Purge Time: ~~1625~~ 1609

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
1519	2.92	5/7	190 mL/min	0	13.3	2.74	491.7	6.67	11.5	0.02	
1524	2.92	5/7	"	0.20	14.7	1.21	563.8	6.61	-16.8	20.1	
1529	2.90	"	"	0.40	14.8	1.22	577.5	6.62	-38.9	16.6	
1534	2.90	"	"	0.60	14.9	0.27	549.3	6.62	-32.8	12.7	
1539	"	"	"	0.80	14.9	0.11	534.3	6.59	-23.0	11.1	
1544	"	"	"	1.10	14.9	0.00	530.9	6.56	-19.0	5.61	
1549	"	"	"	1.30	14.9	0.00	529.1	6.54	-18.9	4.55	
1554	"	"	"	1.55	15.1	0.00	530.4	6.53	-20.0	2.77	
1559	"	"	"	1.80	15.1	0.00	531.5	6.50	-20.9	1.60	
1604	"	"	"	2.10	15.1	0.00	531.9	6.51	-22.9	1.67	
1609	"	"	"	2.25	15.1	0.00	532.1	6.51	-23.7	1.73	
1614											
1619											
1624											
1629											
1634											
1639											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW14-1120 Time Collected: 1615 Weather: Overcast 41°F

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: MW-60

MS/MSD Collected: ☒ Yes ☐ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/10 Well ID: MW-18

Sampling Organization: Parametrix Samplers: T. Parry + A. York.

Purge Data Screened Interval (ft bgs): _____ Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~30.0-40.0~~ 15.78 Purge Water Disposal Method: Onsite

Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 9:34 End Purge Time: 10:01

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
9:36	15.78	7/10	225 mL/min	0.1 gal	14.2	1.11	1040	6.61	-9.5	7.21	
9:41	15.78	"	"	0.75 gal	14.0	0.35	1200	6.45	-32.1	4.92	
9:46	15.78	"	"	0.75 gal	13.9	0.09	1077	6.47	-43.8	2.23	
9:51	15.78	"	"	1.1 gal	14.1	0.00	1041	6.47	-51.1	1.21	
9:56	15.78	"	"	1.30 gal	14.0	0.00	1031	6.48	-55.5	1.20	
10:01	15.78	"	"	1.60 gal	13.8	0.00	1029	6.48	-58.4	1.19	
10:06											
10:11											
10:16											
10:21											
10:26											
10:31											
10:36											
10:41											
10:46											
10:51											
10:56											
11:01											
11:06											
11:11											
11:16											
11:21											
11:26											
11:31											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW18- Time Collected: 10:15 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

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/11/20 Well ID: MW-24

Sampling Organization: Parametrix Samplers: T. Perry + A. York

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~~ 9.43 Purge Water Disposal Method: Drum

Purge Device dedicated bladder pump Pump Intake Depth: 40.0 ft

Begin Purge Time: 1032 End Purge Time: 11:09

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
1034	9.45	7.9	180 ml/min	0.15	11.6	4.99	811	6.75	10.4	3.80	
1039	"	"	"	0.40	11.9	0.04	942	6.49	-20.0	1.81	
1044	"	"	"	0.70	12.0	0.08	945	6.43	-32.9	3.99.	
1049	"	"	"	0.85	12.0	0.09	955	6.40	-39.2	1.20	
1054	"	"	"	1.20	12.0	0.06	953	6.39	-44.1	1.17	
1059	"	"	"	1.35	12.0	0.05	953	6.39	-46.6	2.01	
1104	"	"	"	1.50	12.0	0.05	951	6.39	-48.8	2.41	
1109	"	"	"	1.65	12.0	0.05	950	6.39	-50.4	1.41	
1114											
1119											
1124											
1129											
1134											
1139											
1144											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW24- 1120 Time Collected: 11:15 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

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/10/20 Well ID: MW-25

Sampling Organization: Parametrix Samplers: T. Remy + A. York

Purge Data Screened Interval (ft bgs): 20.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 14.22 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 24.5 ft

Begin Purge Time: 10:40 End Purge Time: 11:27

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
1042	14.23	6/14	325 ml/m	0.1 gal	13.7	1.80	862	6.51	3.2	29.8	
1047	14.23	"	"	0.65 gal	13.7	0.56	967	6.43	-40.1	18.5	
1052	14.23	"	"	1.0 gal	13.7	0.25	995	6.42	-53.1	14.1	
1057	14.23	"	"	1.35 gal	13.7	0.15	1006	6.43	-60.9	10.4	
1102	14.23	"	"	1.75 gal	13.7	0.08	1014	6.44	-65.2	8.45	
1107	14.23	"	"	2.1 gal	13.7	0.07	1017	6.44	-68.3	6.14	
1112	14.23	"	"	2.4 gal	13.7	0.03	1021	6.45	-70.4	4.78	
1117	14.23	"	"	2.75 gal	13.7	0.00	1025	6.44	-71.6	4.10	
1122	14.23	"	"	3.10 gal	13.7	0.00	1027	6.44	-72.9	3.21	
1127	14.23	"	"	3.45 gal	13.7	0.01	1029	6.44	-74.0	2.84	
1132											
1137											
1142											
1147											
1152											
1157											
1202											
1207											
1212											
1217											
1222											
1227											
1232											
1237											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW25- Time Collected: 11:35 Weather: Overcast

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

Purged water has a orangish/brown color to it. It also has a faint odor.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/11/20 Well ID: MW-26

Sampling Organization: Parametrix Samplers: T. Rumy - A. Work

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.20 Purge Water Disposal Method: Onsite

Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 11:22 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
1124	10.20	6/9.	225 mL/min	0.10	12.1	3.33	211.0	6.71	20.0	15.9	
1129	"	"	225 mL/min	0.50	12.2	0.86	221.6	6.05	40.4	11.4	
1134	"	"	"	0.75	12.2	0.14	226.6	5.93	40.4	8.46	
1139	"	"	"	1.10	12.2	0.00	227.0	5.90	39.7	6.70	
1144	"	"	"	1.30	12.2	0.00	226.7	5.88	39.0	5.42	
1149	"	"	"	1.55	12.2	0.00	227.2	5.88	38.5	3.59	
1154	"	"	"	1.80	12.3	0.00	226.5	5.83	39.9	3.55	
1159	"	"	"	2.10	12.2	0.00	226.7	5.87	37.9	3.35	
1204											
1209											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW26-1120 Time Collected: 12:10 Weather: overcast

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/11/20 Well ID: MW-27

Sampling Organization: Parametrix Samplers: T. Parry + A. York.

Purge Data Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.88 Purge Water Disposal Method: Drum

Purge Device: dedicated bladder pump Pump Intake Depth: 15.0 ft

Begin Purge Time: 1348 End Purge Time: 1415

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	8.88	5/9	260	0.1	13.1	0.99	365.4	6.55	27.1	2.80	
1355	"	"	"	0.25	13.0	0.27	371.1	6.32	12.0	3.62	
1400	8.90	"	"	0.75	13.0	0.00	373.8	6.26	-0.3	2.60	
1405	"	"	"	1.25	13.0	0.00	374.8	6.25	-7.8	2.73	
1410	"	"	"	1.75	13.0	0.00	375.2	6.25	-12.6	3.44	
1415	"	"	"	2.15	13.0	0.00	376.0	6.24	-16.8	3.03	
1420											
1425											
1430											
1435											
1440											
1445											
1450											
				Stabilization Criteria	3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW27-1120 Time Collected: 1420 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

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 9/10/20 Well ID: MW-29

Sampling Organization: Parametrix Samplers: T. Remy - A. York

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.05 Purge Water Disposal Method: Drum

Purge Device peristaltic pump Pump Intake Depth: 25.0 ft

Begin Purge Time: 8:16 End Purge Time: 8:58

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
8:16	8.54	1/3	180 ml/min	0.1 gal	12.6	14.07	635.9	5.21	38.1	2.47	
823	8.58	1/3	"	0.25 gal	12.6	0.43	615.6	6.21	-55.5	0.78	
828	8.60	1/3	"	0.45 gal	12.8	0.21	610.0	6.34	-66.7	1.74	
833	8.66	1/3	190 ml/min	0.75 gal	12.7	0.06	616.4	6.43	-74.9	0.04	
838	8.76	1/3	"	1.00 gal	12.7	0.00	643.4	6.48	-80.9	0.06	
843	8.82	1/3	"	1.25 gal	12.6	0.00	644.6	6.51	-83.7	0.14	
848	8.86	1/3	"	1.50 gal	12.6	0.00	662	6.53	-86.0	0.02	
853	8.90	1/3	"	1.75 gal	12.6	0.00	663	6.54	-87.6	0.02	
858	8.90	1/3	"	2.0 gal	12.6	0.00	663	6.54	-88.7	0.02	
903											
908											
913											
918											
923											
928											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW29-1120 Time Collected: 9:10 Weather: Overcast

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Purged water has a fairly strong and foul odor.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/11/20 Well ID: MW-30

Sampling Organization: Parametrix Samplers: J. Perry + A. York

Purge Data Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.78 Purge Water Disposal Method: Drum

Purge Device: peristaltic pump Pump Intake Depth: ~~10.5 ft~~ 11.5 (targeted)

Begin Purge Time: 933 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
935	11.07	4/3	175 ml/min	0.20	14.0	0.55	569.2	6.16	10.4	24.2	
940	11.06	"	"	0.40	14.0	0.01	572.8	6.18	11.3	13.4	
945	11.06	"	"	0.60	14.1	0.00	579.1	6.19	8.1	3.78	
950	11.06	"	"	0.80	14.1	0.00	581.1	6.19	5.9	2.40	
955	11.06	"	"	1.10	14.2	0.00	582.1	6.19	4.8	1.23	
1000											
1005											
1010											
1015											
1020											
1025											
1030											
1035											
1040											
1045											
				Stabilization Criteria	3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW30-1120 Time Collected: 1010 Weather: overcast.

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses:

Duplicate Sample Collected: ☒ Yes ☐ No If yes, ID: MW-61

MS/MSD Collected: ☒ Yes ☒ No (STET)

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/11/20 Well ID: MW-31

Sampling Organization: Parametrix Samplers: T. Perry + A. York

Purge Data Screened Interval (ft bgs): 18.0-23.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.46 Purge Water Disposal Method: Onm

Purge Device: dedicated bladder pump Pump Intake Depth: 20.5ft

Begin Purge Time: 8:20 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
822	11.47	5/9	265 mL/m	0.10	13.5	16.00	377.3	5.23	114.9	37.7	
827	11.47	"	"	0.50 ~~0.25~~	13.6	0.58	375.6	6.05	6.9	31.9	
832	11.47	"	"	0.75	13.7	0.15	379.0	6.20	-15.8	25.6	
837	11.47	"	"	1.20	13.7	0.14	381.3	6.24	-26.3	22.0	
842	11.47	"	"	1.50	13.8	0.10	381.7	6.26	-32.0	20.0	
847	11.47	"	"	1.80	13.7	0.04	382.4	6.27	-35.8	17.6	
852	11.47	"	"	2.15	13.7	0.03	383.6	6.24	-36.2	15.5	
857	11.47	"	"	2.70	13.8	0.04	382.8	6.28	-40.5	14.2	
902	11.47	"	"	2.90	13.7	0.04	383.0	6.29	-41.7	13.0	
907	11.47	"	"	3.25	13.8	0.04	383.1	6.29	-42.9	11.4	
912	11.47	"	"	3.70	13.8	0.03	382.5	6.29	-43.9	11.2	
917	11.47	"	"	4.0	13.8	0.01	382.3	6.29	-44.6	11.8	
922											
927											
932											
				Stabilization Criteria	3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW31-1120 Time Collected: 9:25 Weather: overcast.

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses:

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID:

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Purged water had a faint odor to it.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/10 Well ID: MW-32

Sampling Organization: Parametrix Samplers: T. Phinney + A. York

Purge Data Screened Interval (ft bgs): _____ Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): ~~10.0-21.0~~ 11.18 Purge Water Disposal Method: Drum.

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 1317 End Purge Time: 1354.

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
1319	11.19	1/3	250 mL/min	0.10	14.0	0.74	789	6.94	-9.2	3.75	
1324	"	"	"	0.50	14.3	0.00	799	6.67	-53.1	3.57	
1329	"	"	"	0.75	14.3	0.00	808	6.64	-68.5	0.48	
1334	"	"	"	1.00	14.3	0.00	836	6.63	-79.0	0.12	
1339	"	"	"	1.25	14.3	0.00	845	6.63	-83.9	0.61	
1344	"	"	"	1.50	14.3	0.00	852	6.64	-86.7	1.03	
1349	"	"	"	1.75	14.2	0.00	855	6.60	-87.1	0.76	
1354	"	"	"	2.0	14.2	0.00	861	6.63	-90.4	1.30	
1359											
1404											
1409											
1414											
1419											
1424											
1429											

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10%

Sampling Data

Sample ID: SPL-GW-MW32-1120 Time Collected: 1400 Weather: Overcast w/ light rain

Sample Description (Color, Turbidity, Odor, Other): _____

Sample Analyses: _____

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID: _____

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

_____

_____

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/10/20 Well ID: MW-33

Sampling Organization: Parametrix Samplers: A. Lynk / T. Parry

Purge Data Screened Interval (ft bgs): 20.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.33 Purge Water Disposal Method: Onsite

Purge Device peristaltic pump Pump Intake Depth: 22.5ft

Begin Purge Time: 1434 End Purge Time: 1511

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
1436	11.35	1/4	275 mL/min	0.	15.2	0.00	1289	6.61	-25.6	5.37	
1441	"	"	"	0.5	15.2	0.00	1415	6.58	-61.8	1.28	
1446	11.36	"	"	0.75	15.2	0.00	1403	6.59	-73.6	3.51	
1451	"	"	"	1.20	15.3	0.00	1399	6.59	-79.7	14.7	
1456	"	"	"	1.6	15.2	0.00	1398	6.59	-84.2	5.25	
1501	"	"	"	1.95	15.2	0.00	1400	6.59	-86.4	1.08	
1506	"	"	"	2.40	15.3	0.00	1391	6.59	-89.6	0.94	
1511	"	"	"	2.75	15.3	0.00	1398	6.59	-91.0	0.99	
1516											
1521											
1526											
1531											
1536											
			Stabilization Criteria		3%	10%	3%	± 0.1	± 10 mv	10%	

Sampling Data

Sample ID: SPL-GW-MW33- 1120 Time Collected: 1515 Weather: Overcast with light rain

Sample Description (Color, Turbidity, Odor, Other): light orange/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

Purged water has a slight odor and orange/brown color.

Parametrix

PARAMETRIX Form 07-EN-215/Rev. 02/07

Water Level Measurement Field Report

DATE 11/9/2020		JOB NO. 553-1550-067			
PROJECT: South Park Landfill		CLIENT: Seattle Public Utilities			
LOCATION: Seattle, WA					
WEATHER	TEMP	42	° at	11:00	AM
Overcast with light rain			° at		PM
PRESENT AT SITE					
Trey Parry and Austin York					

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	12:37	5.86		TOC	15.3	10-15	1.52
MW-14	12:57	2.85		TOC	21.8	11.5-21.5	0.8
MW-29	13:01	8.07		TOC	30	20-30	-0.29
MW-18	13:05	15.86		TOC	40.4	30-40	1.25
MW-25	13:21	14.30		TOC	27	22-27	2.79
MW-32	13:11	11.30		TOC	24	19-24	-0.44
MW-33	13:14	11.46		TOC	25	20-25	-0.47
MW-26	12.18	10.17		TOC	25	15-25	2.39
MW-27	12:10	8.88		TOC	20	10-20	2.04
MW-10	13:25	13.55		TOC	45	35-45	1.65
MW-24	12:16	9.40		TOC	45.3	35-45	1.56
MW-08	12:05	8.90		TOC	45.6	35.5 – 45.5	1.88
MW-30	12:22	10.78		TOC	13	8-13	-0.53
MW-31	12:25	11.50		TOC	23	35.5-45.5	-0.46

Comments:

TOC – top of PVC casing SG – staff gauge

SIGNED: Trey Parry

D4

Laboratory Reports

2nd Quarter 2020

Laboratory Reports

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 June 2020

Min-Soon Yim
Seattle Public Utilities
700-5th Ave, Ste 4900, Box 34018
Seattle, WA 98124-4018

RE: South Park Landfill -Parametrix Water 2020

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20E0287	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20E0287	Turn-around Requested: 2 weeks	Date: 5/26/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2	
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers: 1	Cooler Temps: 12.9°C
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Mike Brady		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**						Notes/Comments
~~SPL-GW-MW18-0520~~			water	8	X		X	X	X						~~**Field-filtered~~
~~SPL-GW-MW29-0520~~			water	7	X		X	X							
SPL-GW-MW14-0520			water	7	X		X	X							Field filtered.
~~SPL-GW-MW27-0520~~			water	8	X		X	X	X						
~~SPL-GW-MW08-0520~~			water	8	X		X	X	X						
~~SPL-GW-MW24-0520~~			water	8	X		X	X	X						
~~SPL-GW-MW26-0520~~			water	8	X		X	X	X						
~~SPL-GW-MW60-0520~~			water	8	X		X	X	X						
~~SPL-GW-MW80-0520~~			water	6	X		X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: [illegible]	Printed Name: Jacobsen	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 5/26/20 17:05	Date & Time: 05/26/2020 1705	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20E0287	Turn-around Requested: 2 weeks	Date: 5/26/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2	
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers: 1	Cooler Temps: 10.9°C
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Mike Brady		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**					Notes/Comments
SPL-GW-MW12-0520			water	8	X		X	X	X					**Field-filtered
SPL-GW-MW32-0520			water	8	X		X	X	X					
SPL-GW-MW33-0520			water	8	X		X	X	X					
SPL-GW-MW10_0520			water	8	X		X	X	X					
SPL-GW-MW25-0520			water	8		X	X	X	X					
SPL-GW-MW30-0520			water	7	X		X	X						
SPL-GW-MW31-0520			water	7	X		X	X						
SPL-GW-MW61-0520			water	8		X	X	X	X					
SPL-GW-MW81-0520			water	6		X	X							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: [illegible]	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: [illegible]	Company: ARI	Company:	Company:
	Date & Time: 5/26/20 17:05	Date & Time: 05/26/2020 1705	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SPL-GW-MW12 -0520	20E0287-01	Water	26-May-2020 14:06	26-May-2020 17:05
SPL-GW-MW12 -0520	20E0287-02	Water	26-May-2020 14:06	26-May-2020 17:05
SPL-GW-MW14 -0520	20E0287-03	Water	26-May-2020 16:26	26-May-2020 17:05
SPL-GW-MW14 -0520	20E0287-04	Water	26-May-2020 16:26	26-May-2020 17:05

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Work Order Case Narrative

Client: Seattle Public Utilities
Project: South Park Landfill -Parametrix Water 2020
Work Order: 20E0287

Revised Report

This report was revised to include missing cooler receipt form. Data has been inadvertantly reported to the Method Detection Limit. This revised report reports to the Method Reporting Limit.

Sample receipt

Samples as listed on the preceding page were received 26-May-2020 17:05 under ARI work order 20E0287. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260C

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Total Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Dissolved Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20E0287-02 in batch BIF0032. The duplicate RPD and matrix spike percent recoveries were within control limits.

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Parametrix / SPL Project Name: South Park Landfill

COC No(s): _____ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 20E0287 Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1705 12.9°C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 5006

Cooler Accepted by: JB Date: 05/26/2020 Time: 1705

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used?	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: (1)		
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: [signature] Date: 5/27/2020 Time: 0934 Labels checked by: SLF

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

(1) ~~All Sample Times on COC~~, NO Sample date/time on COC

(1) ~~SPL-GW-MW12-05~~ Times from Sample bottles

SPL-GW-MW12 0520 5/26/2020 1406

SPL-GW-MW14 0520 5/26/2020 1626

By: _____ Date: _____

(1) SLF 5/27/2020

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

ARI Work Order: 20E0287

Cooler#:	Temperature(°C): 12.9 °C	
Sample ID	**Bottle Count**	**Bottle Type**
Samples received above 6 °C		

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Completed by: JSm Date: 05/26/2020 Time: 1705

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW12 -0520

20E0287-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/26/2020 14:06

Instrument: NT7 Analyst: PKC — Analyzed: 05/28/2020 22:20

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0287-01 D

Preparation Batch: BIE0525 — Sample Size: 10 mL

Prepared: 05/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW12 -0520

20E0287-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/26/2020 14:06

Instrument: NT16 Analyst: PB — Analyzed: 05/28/2020 16:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 20E0287-01 B

Preparation Batch: BIE0426 — Sample Size: 10 mL

Prepared: 05/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*102*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW12 -0520

20E0287-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/26/2020 14:06

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/01/2020 20:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0287-01 G 01

Preparation Batch: BIE0498 — Sample Size: 25 mL

Prepared: 05/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	864	ug/L	
Manganese	7439-96-5	1	0.500	24.3	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW12 -0520

20E0287-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/26/2020 14:06

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/02/2020 23:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0287-02 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.423	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW14 -0520

20E0287-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/26/2020 16:26

Instrument: NT7 Analyst: PKC — Analyzed: 05/28/2020 16:37

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0287-03 D

Preparation Batch: BIE0525 — Sample Size: 10 mL

Prepared: 05/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*103*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW14 -0520

20E0287-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/26/2020 16:26

Instrument: NT16 Analyst: PB — Analyzed: 05/28/2020 17:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 20E0287-03 A

Preparation Batch: BIE0426 — Sample Size: 10 mL

Prepared: 05/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

SPL-GW-MW14 -0520

20E0287-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/26/2020 16:26
Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/01/2020 20:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0287-03 G 01
Preparation Batch: BIE0498 — Sample Size: 25 mL
Prepared: 05/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	5090	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/02/2020 22:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0287-03 G 01
Preparation Batch: BIE0498 — Sample Size: 25 mL
Prepared: 05/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	628	ug/L	D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Volatile Organic Compounds - Quality Control

Batch BIE0525 - EPA 5030C (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIE0525-BLK1)				Prepared: 28-May-2020 Analyzed: 28-May-2020 15:10						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.07		ug/L	*5.00*		*101*	*80-129*			
LCS (BIE0525-BS1)				Prepared: 28-May-2020 Analyzed: 28-May-2020 13:42						
cis-1,2-Dichloroethene	9.76	0.20	ug/L	10.0		97.6	80-121			
Surrogate: 1,2-Dichloroethane-d4	4.63		ug/L	*5.00*		*92.6*	*80-129*			
LCS Dup (BIE0525-BSD1)				Prepared: 28-May-2020 Analyzed: 28-May-2020 14:11						
cis-1,2-Dichloroethene	9.24	0.20	ug/L	10.0		92.4	80-121	5.50	30	
Surrogate: 1,2-Dichloroethane-d4	4.70		ug/L	*5.00*		*94.0*	*80-129*			

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Volatile Organic Compounds - SIM - Quality Control

Batch BIE0426 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIE0426-BLK1)				Prepared: 28-May-2020 Analyzed: 28-May-2020 11:11						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	4930		ng/L	*5000*		*98.6*	*80-129*			
LCS (BIE0426-BS1)				Prepared: 28-May-2020 Analyzed: 28-May-2020 10:10						
Vinyl chloride	1690	20.0	ng/L	2000		84.7	76-120			
Surrogate: 1,2-Dichloroethane-d4	4830		ng/L	*5000*		*96.7*	*80-129*			
LCS Dup (BIE0426-BSD1)				Prepared: 28-May-2020 Analyzed: 28-May-2020 10:51						
Vinyl chloride	1780	20.0	ng/L	2000		89.0	76-120	4.93	30	
Surrogate: 1,2-Dichloroethane-d4	4950		ng/L	*5000*		*99.1*	*80-129*			

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Metals and Metallic Compounds - Quality Control

Batch BIE0498 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIE0498-BLK3)			Prepared: 28-May-2020 Analyzed: 01-Jun-2020 16:19								
Iron	54	ND	20.0	ug/L							U
Iron	57	ND	20.0	ug/L							U
LCS (BIE0498-BS3)			Prepared: 28-May-2020 Analyzed: 01-Jun-2020 16:20								
Iron	54	5010	20.0	ug/L	5000		100	80-120			
Iron	57	5040	20.0	ug/L	5000		101	80-120			

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIE0498-BLK1)			Prepared: 28-May-2020 Analyzed: 28-May-2020 14:23								
Manganese	55	ND	0.500	ug/L							U
LCS (BIE0498-BS1)			Prepared: 28-May-2020 Analyzed: 28-May-2020 14:28								
Manganese	55	24.7	0.500	ug/L	25.0		98.8	80-120			

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BIF0032 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIF0032-BLK1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 16:45							
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BIF0032-BS1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 16:50							
Arsenic, Dissolved	75a	24.8	0.200	ug/L	25.0		99.2	80-120			
Duplicate (BIF0032-DUP1)		**Source: 20E0287-02**		Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 23:10							
Arsenic, Dissolved	75a	0.322	0.200	ug/L		0.423			27.10	20	L
Matrix Spike (BIF0032-MS1)		**Source: 20E0287-02**		Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 23:16							
Arsenic, Dissolved	75a	25.5	0.200	ug/L	25.0	0.423	100	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Iron-54	WADOE,DoD-ELAP
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Arsenic-75a	WADOE,DoD-ELAP,ADEC
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
Acrolein	DoD-ELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,WADOE
Bromoethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE

trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
n-Hexane	WADOE
2-Pentanone	WADOE
2-Pentanone	WADOE

EPA 8260C-SIM in Water

Acrylonitrile	CALAP,WADOE
Acrylonitrile	NELAP,WADOE
Vinyl chloride	CALAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	CALAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	CALAP,WADOE
Trichloroethene	CALAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	CALAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
1,2-Dichloroethane	CALAP,WADOE
Benzene	CALAP,WADOE
Benzene	NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
WADOE	WA Dept of Ecology	C558	06/30/2020
WA-DW	Ecology - Drinking Water	C558	06/30/2020

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:07

Notes and Definitions

D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 June 2020

Min-Soon Yim
Seattle Public Utilities
700-5th Ave, Ste 4900, Box 34018
Seattle, WA 98124-4018

RE: South Park Landfill -Parametrix Water 2020

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20E0321	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20E0321	Turn-around Requested: 2 weeks	Date: 5/28/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 3	
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers: 3	Cooler Temps: 3.6, 3.3, 1.8 9
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Mike Brady		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**					Notes/Comments
~~SPL-GW-MW42-0520~~			~~water~~	~~8~~	~~X~~		~~X~~	~~X~~	~~X~~					**Field-filtered
SPL-GW-MW32-0520	5/27/20	1720	water	8	X		X	X	X					
SPL-GW-MW33-0520	5/27/20	15:50	water	8	X		X	X	X					
SPL-GW-MW10--0520	5/27/20	14:40	water	8	X		X	X	X					
SPL-GW-MW25-0520	5/27/20	13:10	water	8		X	X	X	X					
SPL-GW-MW30-0520	5/28/20	14:41	water	7	X		X	X						
SPL-GW-MW31-0520	5/28/20	13:45	water	7	X		X	X						
SPL-GW-MW61-0520	5/28/20	16:00	water	8		X	X	X	X					
SPL-GW-MW81-0520	5/28/20	TRIP	water	~~6~~ 2		X	X							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Mike Brady	Printed Name: Kenny Dang	Printed Name:	Printed Name:
	Company: Parametrix	Company: ART	Company:	Company:
	Date & Time: 5/28/20 1545	Date & Time: 5/28/2020 1545	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: 20E0321 | Turn-around Requested: 2 weeks | Date: 5/28/20

ARI Client Company: Jeff Neuner, Seattle Public Utility | Phone: 206 684-7693 | Page: 2 of 3

Client Contact: Lisa Gilbert, Parametrix | Phone: 206 394-3667 | No. of Coolers: 3 | Cooler Temps: 3.8, 3.3, 1.8

Client Project Name: South Park Landfill

Client Project #: 553-1550-067 | Samplers: Mike Brady

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**						Notes/Comments
SPL-GW-MW18-0520	5/27/20	11:10	water	8	X		X	X	X						**Field-filtered
SPL-GW-MW29-0520	5/27/20	9:40	water	7	X		X	X							
~~SPL-GW-MW14-0520~~			water	~~7~~	~~X~~		~~X~~	~~X~~							Not included.
SPL-GW-MW27-0520	05/28/20	7:40	water	8	X		X	X	X						
SPL-GW-MW08-0520	05/28/20	9:25	water	8	X		X	X	X						
SPL-GW-MW24-0520	5/28/20	12:05	water	8	X		X	X	X						
SPL-GW-MW26-0520	5/28/20	10:51	water	8	X		X	X	X						
SPL-GW-MW60-0520	5/27/20	13:30	water	8	X		X	X	X						
SPL-GW-MW80-0520	5/28/20	TRIP	water	~~6~~ 2	X		X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Mike Brady	Printed Name: Kenny Dang	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 5/28/20. 1545	Date & Time: 5/28/20 1545	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SPL-GW-MW32-0520	20E0321-01	Water	27-May-2020 17:20	28-May-2020 15:45
SPL-GW-MW33-0520	20E0321-02	Water	27-May-2020 15:50	28-May-2020 15:45
SPL-GW-MW10--0520	20E0321-03	Water	27-May-2020 14:40	28-May-2020 15:45
SPL-GW-MW25-0520	20E0321-04	Water	27-May-2020 13:10	28-May-2020 15:45
SPL-GW-MW30-0520	20E0321-05	Water	28-May-2020 14:41	28-May-2020 15:45
SPL-GW-MW31-0520	20E0321-06	Water	28-May-2020 13:45	28-May-2020 15:45
SPL-GW-MW61-0520	20E0321-07	Water	28-May-2020 08:00	28-May-2020 15:45
SPL-GW-MW81-0520	20E0321-08	Water	28-May-2020 14:41	28-May-2020 15:45
SPL-GW-MW18-0520	20E0321-09	Water	27-May-2020 11:10	28-May-2020 15:45
SPL-GW-MW29-0520	20E0321-10	Water	27-May-2020 09:40	28-May-2020 15:45
SPL-GW-MW27-0520	20E0321-11	Water	28-May-2020 07:40	28-May-2020 15:45
SPL-GW-MW08-0520	20E0321-13	Water	28-May-2020 09:25	28-May-2020 15:45
SPL-GW-MW24-0520	20E0321-14	Water	28-May-2020 12:05	28-May-2020 15:45
SPL-GW-MW26-0520	20E0321-15	Water	28-May-2020 10:51	28-May-2020 15:45
SPL-GW-MW60-0520	20E0321-16	Water	27-May-2020 13:30	28-May-2020 15:45
SPL-GW-MW80-0520	20E0321-17	Water	28-May-2020 12:05	28-May-2020 15:45
Trip Blanks	20E0321-19	Water	28-May-2020 14:41	28-May-2020 15:45
SPL-GW-MW32-0520	20E0321-20	Water	27-May-2020 17:20	28-May-2020 15:45
SPL-GW-MW33-0520	20E0321-21	Water	27-May-2020 15:50	28-May-2020 15:45
SPL-GW-MW10--0520	20E0321-22	Water	27-May-2020 14:40	28-May-2020 15:45
SPL-GW-MW25-0520	20E0321-23	Water	27-May-2020 13:10	28-May-2020 15:45
SPL-GW-MW61-0520	20E0321-24	Water	28-May-2020 08:00	28-May-2020 15:45
SPL-GW-MW18-0520	20E0321-25	Water	27-May-2020 11:10	28-May-2020 15:45
SPL-GW-MW27-0520	20E0321-26	Water	28-May-2020 07:40	28-May-2020 15:45
SPL-GW-MW08-0520	20E0321-27	Water	28-May-2020 09:25	28-May-2020 15:45
SPL-GW-MW24-0520	20E0321-28	Water	28-May-2020 12:05	28-May-2020 15:45
SPL-GW-MW26-0520	20E0321-29	Water	28-May-2020 10:51	28-May-2020 15:45
SPL-GW-MW60-0520	20E0321-30	Water	27-May-2020 13:30	28-May-2020 15:45

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Work Order Case Narrative

Client: Seattle Public Utilities
Project: South Park Landfill -Parametrix Water 2020
Work Order: 20E0321

Revised Report

This report was revised to remove reference in the case narrative for a sample which was not to be included in this report. Data has been inadvertantly reported to the Method Detection Limit. This revised report reports to the Method Reporting Limit.

Sample receipt

Samples as listed on the preceding page were received 28-May-2020 15:45 under ARI work order 20E0321. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260C

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

The matrix spike/matrix spike duplicate recoveries and RPD were within limits.

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

The LCS percent recoveries were within control limits.

The matrix spike/matrix spike duplicate recoveries and RPD were within limits.

Total Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits except Manganese. The sample concentrations are greater than 10 times the reporting limit. The method blank concentration is negligible. All samples which contain analyte have been flagged with a "B" qualifier.

The LCS percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20E0321-05 in batch BIF0110. The duplicate RPD were within control limits. The matrix spike percent recoveries were within control limits except Manganese which is flagged within the QC section of this report.

Dissolved Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SPU Project Name: South Park Landfill

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 20E0321 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1545 3.3 3.8 18.8 ____ ____ ____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D00 520C

Cooler Accepted by: KD Date: 5/28/2020 Time: 1545

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	YES	(NO)
How were bottles sealed in plastic bags?	Individually	Grouped	(Not)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		YES	(NO)
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	5/27/20	

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 5/28/20 Time: 1648 Labels checked by: KD

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
SPL-GW-MW24-0520	SPL-DRUM-0520		

Additional Notes, Discrepancies, & Resolutions:

- SPL-GW-MW24-0520 mislabeled. Name suppose to be SPL-DRUM-0520, used process of elimination to figure out. Time matched as well.
- 3 Trip Blanks were not listed on COC.

By: KD Date: 5/28/2020

Sample 20E0321-18 (SPL-DRUM-0520) metals bottles stated preserved w/ H_2SO_4 not HNO_3. Will note in narrative SLF 5/29/2020

WORK ORDER

20E0321

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

Preservation Confirmation

Container ID	Container Type	pH
20E0321-01 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-01 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-01 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-01 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-01 E	VOA Vial, Clear, 40 mL	
20E0321-01 F	VOA Vial, Clear, 40 mL	
20E0321-01 G	VOA Vial, Clear, 40 mL	
20E0321-02 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-02 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-02 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-02 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-02 E	VOA Vial, Clear, 40 mL	
20E0321-02 F	VOA Vial, Clear, 40 mL	
20E0321-02 G	VOA Vial, Clear, 40 mL	
20E0321-03 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-03 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-03 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-03 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-03 E	VOA Vial, Clear, 40 mL	
20E0321-03 F	VOA Vial, Clear, 40 mL	
20E0321-03 G	VOA Vial, Clear, 40 mL	
20E0321-04 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-04 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-04 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-04 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-04 E	VOA Vial, Clear, 40 mL	
20E0321-04 F	VOA Vial, Clear, 40 mL	
20E0321-04 G	VOA Vial, Clear, 40 mL	
20E0321-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-05 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-05 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-05 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-05 E	VOA Vial, Clear, 40 mL	
20E0321-05 F	VOA Vial, Clear, 40 mL	
20E0321-05 G	VOA Vial, Clear, 40 mL	

Reviewed By

Date

WORK ORDER

20E0321

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

20E0321-06 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-06 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-06 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-06 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-06 E	VOA Vial, Clear, 40 mL	
20E0321-06 F	VOA Vial, Clear, 40 mL	
20E0321-06 G	VOA Vial, Clear, 40 mL	
20E0321-07 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-07 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-07 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-07 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-07 E	VOA Vial, Clear, 40 mL	
20E0321-07 F	VOA Vial, Clear, 40 mL	
20E0321-07 G	VOA Vial, Clear, 40 mL	
20E0321-08 A	VOA Vial, Clear, 40 mL, HCL	
20E0321-08 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-09 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-09 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-09 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-09 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-09 E	VOA Vial, Clear, 40 mL	
20E0321-09 F	VOA Vial, Clear, 40 mL	
20E0321-09 G	VOA Vial, Clear, 40 mL	
20E0321-10 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-10 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-10 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-10 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-10 E	VOA Vial, Clear, 40 mL	
20E0321-10 F	VOA Vial, Clear, 40 mL	
20E0321-10 G	VOA Vial, Clear, 40 mL	
20E0321-11 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-11 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-11 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-11 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-11 E	VOA Vial, Clear, 40 mL	
20E0321-11 F	VOA Vial, Clear, 40 mL	
20E0321-11 G	VOA Vial, Clear, 40 mL	

Reviewed By

Date

WORK ORDER

20E0321

Client: Seattle Public Utilities	**Project Manager: Shelly Fishel**
Project: South Park Landfill -Parametrix Water 2020	**Project Number: 553-155-067**

20E0321-12 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-12 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-12 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-12 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-12 E	VOA Vial, Clear, 40 mL	
20E0321-12 F	VOA Vial, Clear, 40 mL	
20E0321-12 G	VOA Vial, Clear, 40 mL	
20E0321-13 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-13 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-13 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-13 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-13 E	VOA Vial, Clear, 40 mL	
20E0321-13 F	VOA Vial, Clear, 40 mL	
20E0321-13 G	VOA Vial, Clear, 40 mL	
20E0321-14 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-14 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-14 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-14 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-14 E	VOA Vial, Clear, 40 mL	
20E0321-14 F	VOA Vial, Clear, 40 mL	
20E0321-14 G	VOA Vial, Clear, 40 mL	
20E0321-15 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-15 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-15 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-15 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-15 E	VOA Vial, Clear, 40 mL	
20E0321-15 F	VOA Vial, Clear, 40 mL	
20E0321-15 G	VOA Vial, Clear, 40 mL	
20E0321-16 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20E0321-16 B	VOA Vial, Clear, 40 mL, HCL	
20E0321-16 C	VOA Vial, Clear, 40 mL, HCL	
20E0321-16 D	VOA Vial, Clear, 40 mL, HCL	
20E0321-16 E	VOA Vial, Clear, 40 mL	
20E0321-16 F	VOA Vial, Clear, 40 mL	
20E0321-16 G	VOA Vial, Clear, 40 mL	
20E0321-17 A	VOA Vial, Clear, 40 mL, HCL	
20E0321-17 B	VOA Vial, Clear, 40 mL, HCL	

Reviewed By

Date

WORK ORDER

20E0321

Client: Seattle Public Utilities	**Project Manager: Shelly Fishel**
Project: South Park Landfill -Parametrix Water 2020	**Project Number: 553-155-067**

20E0321-18 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass *
20E0321-18 B	BOD Bottle		
20E0321-18 C	VOA Vial, Clear, 40 mL, HCL		
20E0321-18 D	VOA Vial, Clear, 40 mL, HCL		
20E0321-18 E	VOA Vial, Clear, 40 mL, HCL		
20E0321-19 A	VOA Vial, Clear, 40 mL, HCL		
20E0321-19 B	VOA Vial, Clear, 40 mL, HCL		
20E0321-19 C	VOA Vial, Clear, 40 mL, HCL		
20E0321-20 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-21 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-22 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-23 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-24 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-25 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-26 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-27 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-28 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-29 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20E0321-30 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass

KD
Preservation Confirmed By

5/28/2020
Date

* bottle label states preserved w/ H_2SO_4 not HNO_3. will note in narrative. SLF 5/29/2020

Reviewed By

Date

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW32-0520

20E0321-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 17:20

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 14:55

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-01 E

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.97	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*103*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW32-0520

20E0321-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 17:20

Instrument: NT16 Analyst: PB — Analyzed: 06/02/2020 20:14

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-01 D

Preparation Batch: BIF0059 — Sample Size: 10 mL

Prepared: 06/02/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	265	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.0*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW32-0520

20E0321-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 17:20

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 14:30

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-01 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	13700	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW32-0520

20E0321-01RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 17:20

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-01RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1500	ug/L	B, D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW33-0520

20E0321-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 15:50

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 15:21

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-02 F

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*105*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW33-0520

20E0321-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 15:50

Instrument: NT16 Analyst: PB — Analyzed: 06/02/2020 20:34

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-02 C

Preparation Batch: BIF0059 — Sample Size: 10 mL

Prepared: 06/02/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	58.2	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*97.7*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW33-0520

20E0321-02 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 15:50

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 14:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-02 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	13500	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW33-0520

20E0321-02RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 15:50

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-02RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1610	ug/L	B, D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW10--0520

20E0321-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 14:40

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 15:47

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-03 E

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	1.07	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*104*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW10--0520

20E0321-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 14:40
Instrument: NT16 Analyst: PB — Analyzed: 06/02/2020 20:54

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-03 B
Preparation Batch: BIF0059 — Sample Size: 10 mL
Prepared: 06/02/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	77.8	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*97.5*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW10--0520

20E0321-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 14:40
Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-03 A 01
Preparation Batch: BIF0110 — Sample Size: 25 mL
Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	35100	ug/L	D
Manganese	7439-96-5	10	5.00	2280	ug/L	B, D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW25-0520

20E0321-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 13:10

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 16:12

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-04 G

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	0.24	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*104*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.9*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW25-0520

20E0321-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 13:10

Instrument: NT16 Analyst: PB — Analyzed: 06/02/2020 21:14

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-04 B

Preparation Batch: BIF0059 — Sample Size: 10 mL

Prepared: 06/02/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	349	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*96.9*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW25-0520

20E0321-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 13:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 15:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-04 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	21100	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW25-0520

20E0321-04RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 13:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-04RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	2210	ug/L	B, D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW30-0520

20E0321-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 14:41

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 16:38

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-05 E

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.31	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW30-0520

20E0321-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 14:41

Instrument: NT16 Analyst: PB — Analyzed: 06/02/2020 21:34

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-05 B

Preparation Batch: BIF0059 — Sample Size: 10 mL

Prepared: 06/02/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	127	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*97.5*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW30-0520

20E0321-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 14:41

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 14:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-05 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	1430	ug/L	
Manganese	7439-96-5	1	0.500	91.9	ug/L	B

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW31-0520

20E0321-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 13:45

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 17:03

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-06 G

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW31-0520

20E0321-06 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 13:45

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 13:05

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-06 C

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	201	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*88.9*	*%*	

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Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW31-0520

20E0321-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 13:45

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 15:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-06 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	10600	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW31-0520

20E0321-06RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 13:45

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 18:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-06RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	573	ug/L	B, D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW61-0520

20E0321-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 08:00

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 17:55

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-07 F

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.26	ug/L	
Benzene	71-43-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*106*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.2*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW61-0520

20E0321-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 08:00
Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 14:25

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-07 C
Preparation Batch: BIF0093 — Sample Size: 10 mL
Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	81.9	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*97.6*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW61-0520

20E0321-07 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 08:00
Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 15:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-07 A 01
Preparation Batch: BIF0110 — Sample Size: 25 mL
Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	5970	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW61-0520

20E0321-07RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 08:00

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 18:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-07RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	321	ug/L	B, D

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW81-0520

20E0321-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 14:41

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 14:51

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-08 A

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*105*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.4*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW81-0520

20E0321-08 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 14:41

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 14:46

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-08 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.1*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW18-0520

20E0321-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 11:10

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 18:20

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-09 E

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*104*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW18-0520

20E0321-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 11:10

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 15:06

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-09 D

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	35.7	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.0*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW18-0520

20E0321-09 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 11:10
Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 15:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-09 A 01
Preparation Batch: BIF0110 — Sample Size: 25 mL
Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	20100	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW18-0520

20E0321-09RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 11:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-09RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1590	ug/L	B, D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW29-0520

20E0321-10 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 09:40

Instrument: NT3 Analyst: PKC — Analyzed: 05/29/2020 18:46

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-10 E

Preparation Batch: BIE0538 — Sample Size: 10 mL

Prepared: 05/29/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW29-0520

20E0321-10 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 09:40

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 15:26

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-10 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	103	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.3*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW29-0520

20E0321-10 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 09:40

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-10 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	37100	ug/L	D
Manganese	7439-96-5	10	5.00	810	ug/L	B, D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW27-0520

20E0321-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 07:40

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 15:17

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-11 F

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.22	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*104*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW27-0520

20E0321-11 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 07:40

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 15:46

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-11 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	78.2	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.8*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW27-0520

20E0321-11 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 07:40

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 16:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-11 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	5000	ug/L	
Manganese	7439-96-5	1	0.500	252	ug/L	B

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW08-0520

20E0321-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 09:25

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 15:43

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-13 E

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*106*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW08-0520

20E0321-13 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 09:25

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 16:06

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-13 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	59.2	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.0*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW08-0520

20E0321-13 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 09:25

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 16:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-13 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	12700	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW08-0520

20E0321-13RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 09:25

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-13RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1190	ug/L	B, D

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Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW24-0520

20E0321-14 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 12:05

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 16:09

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-14 E

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.6*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW24-0520

20E0321-14 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 12:05

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 16:26

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-14 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.5*	*%*	

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Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW24-0520

20E0321-14 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 12:05

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 16:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-14 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	20000	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW24-0520

20E0321-14RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 12:05

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-14RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1680	ug/L	B, D

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Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW26-0520

20E0321-15 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 10:51

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 16:35

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-15 E

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	1.11	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*108*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW26-0520

20E0321-15 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 10:51

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 16:46

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-15 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	21.6	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.1*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW26-0520

20E0321-15 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/28/2020 10:51

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 16:34

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-15 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	7190	ug/L	
Manganese	7439-96-5	1	0.500	108	ug/L	B

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW60-0520

20E0321-16 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/27/2020 13:30

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 17:00

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-16 E

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	0.28	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*103*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW60-0520

20E0321-16 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/27/2020 13:30

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 17:06

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-16 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	347	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*96.5*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW60-0520

20E0321-16 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 13:30
Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 17:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-16 A 01
Preparation Batch: BIF0110 — Sample Size: 25 mL
Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	21700	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW60-0520

20E0321-16RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 05/27/2020 13:30

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/08/2020 18:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-16RE1 A 01

Preparation Batch: BIF0110 — Sample Size: 25 mL

Prepared: 06/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	2280	ug/L	B, D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW80-0520

20E0321-17 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 12:05

Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 12:09

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-17 A

Preparation Batch: BIF0003 — Sample Size: 10 mL

Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW80-0520

20E0321-17 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 12:05

Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 17:27

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-17 B

Preparation Batch: BIF0093 — Sample Size: 10 mL

Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*97.8*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Trip Blanks

20E0321-19 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 05/28/2020 14:41
Instrument: NT3 Analyst: PKC — Analyzed: 06/01/2020 12:34

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-19 A
Preparation Batch: BIF0003 — Sample Size: 10 mL
Prepared: 06/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*97.9*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.3*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Trip Blanks

20E0321-19 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 05/28/2020 14:41
Instrument: NT16 Analyst: PB — Analyzed: 06/03/2020 13:25

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20E0321-19 B
Preparation Batch: BIF0093 — Sample Size: 10 mL
Prepared: 06/03/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*95.4*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW32-0520

20E0321-20 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/27/2020 17:20

Instrument: ICPMS1 Analyst: MCB — Analyzed: 06/03/2020 13:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-20 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.34	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW33-0520

20E0321-21 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/27/2020 15:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/02/2020 23:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-21 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.08	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW10--0520

20E0321-22 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/27/2020 14:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/02/2020 23:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-22 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW25-0520

20E0321-23 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/27/2020 13:10

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-23 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.353	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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SPL-GW-MW61-0520

20E0321-24 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/28/2020 08:00

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-24 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	5.23	ug/L	

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Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW18-0520

20E0321-25 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/27/2020 11:10

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-25 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW27-0520

20E0321-26 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/28/2020 07:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:27

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-26 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	4.89	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW08-0520

20E0321-27 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/28/2020 09:25

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-27 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW24-0520

20E0321-28 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/28/2020 12:05

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-28 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW26-0520

20E0321-29 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/28/2020 10:51

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-29 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.793	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

SPL-GW-MW60-0520

20E0321-30 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 05/27/2020 13:30

Instrument: ICPMS2 Analyst: MCB — Analyzed: 06/03/2020 00:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20E0321-30 A 01

Preparation Batch: BIF0032 — Sample Size: 25 mL

Prepared: 06/02/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.337	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Volatile Organic Compounds - Quality Control

Batch BIE0538 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIE0538-BLK1)				Prepared: 29-May-2020 Analyzed: 29-May-2020 11:00						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.11		ug/L	*5.00*		*102*	*80-129*			
Surrogate: Toluene-d8	5.17		ug/L	*5.00*		*103*	*80-120*			
LCS (BIE0538-BS1)				Prepared: 29-May-2020 Analyzed: 29-May-2020 09:16						
cis-1,2-Dichloroethene	10.6	0.20	ug/L	10.0		106	80-121			
Benzene	11.1	0.20	ug/L	10.0		111	80-120			
Surrogate: 1,2-Dichloroethane-d4	5.09		ug/L	*5.00*		*102*	*80-129*			
Surrogate: Toluene-d8	5.17		ug/L	*5.00*		*103*	*80-120*			
LCS Dup (BIE0538-BSD1)				Prepared: 29-May-2020 Analyzed: 29-May-2020 09:42						
cis-1,2-Dichloroethene	9.12	0.20	ug/L	10.0		91.2	80-121	14.80	30	
Benzene	9.47	0.20	ug/L	10.0		94.7	80-120	16.10	30	
Surrogate: 1,2-Dichloroethane-d4	5.07		ug/L	*5.00*		*101*	*80-129*			
Surrogate: Toluene-d8	5.02		ug/L	*5.00*		*100*	*80-120*			

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Volatile Organic Compounds - Quality Control

Batch BIF0003 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIF0003-BLK1)				Prepared: 01-Jun-2020 Analyzed: 01-Jun-2020 11:43						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.10		ug/L	*5.00*		*102*	*80-129*			
Surrogate: Toluene-d8	5.11		ug/L	*5.00*		*102*	*80-120*			
LCS (BIF0003-BS1)				Prepared: 01-Jun-2020 Analyzed: 01-Jun-2020 09:33						
cis-1,2-Dichloroethene	9.62	0.20	ug/L	10.0		96.2	80-121			
Benzene	9.50	0.20	ug/L	10.0		95.0	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.77		ug/L	*5.00*		*95.4*	*80-129*			
Surrogate: Toluene-d8	5.08		ug/L	*5.00*		*102*	*80-120*			
LCS Dup (BIF0003-BSD1)				Prepared: 01-Jun-2020 Analyzed: 01-Jun-2020 09:59						
cis-1,2-Dichloroethene	8.78	0.20	ug/L	10.0		87.8	80-121	9.12	30	
Benzene	8.82	0.20	ug/L	10.0		88.2	80-120	7.48	30	
Surrogate: 1,2-Dichloroethane-d4	4.70		ug/L	*5.00*		*94.0*	*80-129*			
Surrogate: Toluene-d8	5.01		ug/L	*5.00*		*100*	*80-120*			

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Volatile Organic Compounds - SIM - Quality Control

Batch BIF0059 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIF0059-BLK1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 12:49						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	4970		ng/L	*5000*		*99.5*	*80-129*			
LCS (BIF0059-BS1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 11:16						
Vinyl chloride	1720	20.0	ng/L	2000		85.9	76-120			
Surrogate: 1,2-Dichloroethane-d4	4870		ng/L	*5000*		*97.4*	*80-129*			
LCS Dup (BIF0059-BSD1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 12:29						
Vinyl chloride	1760	20.0	ng/L	2000		88.2	76-120	2.58	30	
Surrogate: 1,2-Dichloroethane-d4	4870		ng/L	*5000*		*97.4*	*80-129*			

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Volatile Organic Compounds - SIM - Quality Control

Batch BIF0093 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIF0093-BLK1)				Prepared: 03-Jun-2020 Analyzed: 03-Jun-2020 11:12						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	4770		ng/L	*5000*		*95.4*	*80-129*			
LCS (BIF0093-BS1)				Prepared: 03-Jun-2020 Analyzed: 03-Jun-2020 10:00						
Vinyl chloride	1730	20.0	ng/L	2000		86.7	76-120			
Surrogate: 1,2-Dichloroethane-d4	4610		ng/L	*5000*		*92.2*	*80-129*			
LCS Dup (BIF0093-BSD1)				Prepared: 03-Jun-2020 Analyzed: 03-Jun-2020 10:52						
Vinyl chloride	1640	20.0	ng/L	2000		82.0	76-120	5.58	30	
Surrogate: 1,2-Dichloroethane-d4	4560		ng/L	*5000*		*91.2*	*80-129*			

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Metals and Metallic Compounds - Quality Control

Batch BIF0110 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIF0110-BLK1)				Prepared: 04-Jun-2020 Analyzed: 08-Jun-2020 14:16							
Iron	54	ND	20.0	ug/L							U
Iron	57	ND	20.0	ug/L							U
Manganese	55	0.617	0.500	ug/L							
LCS (BIF0110-BS1)				Prepared: 04-Jun-2020 Analyzed: 08-Jun-2020 14:21							
Iron	54	4830	20.0	ug/L	5000		96.7	80-120			
Iron	57	4730	20.0	ug/L	5000		94.6	80-120			
Manganese	55	24.5	0.500	ug/L	25.0		97.9	80-120			B
Duplicate (BIF0110-DUP1)		**Source: 20E0321-05**		Prepared: 04-Jun-2020 Analyzed: 08-Jun-2020 14:59							
Iron	54	1360	20.0	ug/L		1430			4.83	20	
Manganese	55	87.5	0.500	ug/L		91.9			4.97	20	B
Matrix Spike (BIF0110-MS1)		**Source: 20E0321-05**		Prepared: 04-Jun-2020 Analyzed: 08-Jun-2020 15:07							
Iron	54	5450	20.0	ug/L	5000	1430	80.3	75-125			
Manganese	55	110	0.500	ug/L	25.0	91.9	72.2	75-125			*, B

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BIF0032 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIF0032-BLK1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 16:45							
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BIF0032-BS1)				Prepared: 02-Jun-2020 Analyzed: 02-Jun-2020 16:50							
Arsenic, Dissolved	75a	24.8	0.200	ug/L	25.0		99.2	80-120			

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Iron-54	WADOE,DoD-ELAP
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Arsenic-75a	WADOE,DoD-ELAP,ADEC
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
Acrolein	DoD-ELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,WADOE
Bromoethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,CALAP,WADOE

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Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
n-Hexane	WADOE
2-Pentanone	WADOE
2-Pentanone	WADOE

EPA 8260C-SIM in Water

Acrylonitrile	CALAP,WADOE
Acrylonitrile	NELAP,WADOE
Vinyl chloride	CALAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	CALAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	CALAP,WADOE
Trichloroethene	CALAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	CALAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
1,2-Dichloroethane	CALAP,WADOE
Benzene	CALAP,WADOE
Benzene	NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
WADOE	WA Dept of Ecology	C558	06/30/2020
WA-DW	Ecology - Drinking Water	C558	06/30/2020

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Min-Soon Yim	15-Jun-2020 11:19

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

3rd Quarter 2020

Laboratory Reports

Analytical Resources, Incorporated
Analytical Chemists and Consultants

11 September 2020

Jeff Neuner
Seattle Public Utilities
700-5th Ave, Ste 4900, Box 34018
Seattle, WA 98124-4018

RE: South Park Landfill -Parametrix Water 2020

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20H0287	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2010287	Turn-around Requested: 2 weeks	Date: 8/26/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2	
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: 1	Cooler Temps: 3.6°C
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Trey Parry		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**						Notes/Comments
SPL-GW-MW12-0820	8/25	9:26	water	8	X		X	X	X						**Field-filtered
SPL-GW-MW14-0820	8/25	11:33	water	7	X		X	X							
SPL-GW-MW29-0820	8/25	13:15	water	7	X		X	X							
SPL-GW-MW18-0820	8/25	15:00	water	8	X		X	X	X						
~~SPL-GW-MW25-0820~~			water	14		X	X	X	X						MS/MSD
~~SPL-GW-MW10-0820~~			water	8	X		X	X	X						
SPL-GW-MW33-0820	8/25	16:15	water	8	X		X	X	X						
SPL-GW-MW60-0820	8/25	1331	water	~~8~~ 7	X		X	X	[illegible]						No Dissolved As Analysis
SPL-GW-MW80-0820	8/19	N/A	water	~~8~~ 2	X		X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Jamshalter	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 8/26/20 1628	Date & Time: 08/26/2020 1628	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 204027	Turn-around Requested: 2 weeks	Date: 8/26/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2	
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers: 1	Cooler Temps: 3.6 C
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Trey Parry		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**	Notes/Comments
~~SPL-GW-MW32-0820~~			water	8	X		X	X	X	**Field-filtered
SPL-GW-MW27-0820	8/26	1350	water	14	X		X	X	X	MS/MSD
SPL-GW-MW08-0820	8/26	1215	water	8	X		X	X	X	
~~SPL-GW-MW26-0820~~			water	8	X		X	X	X	
SPL-GW-MW24-0820	8/26	1600	water	8	X		X	X	X	
SPL-GW-MW31-0820	8/26	10:10	water	7	X		X	X		
SPL-GW-MW30-0820	8/26	9:00	water	7	X		X	X		
~~SPL-GW-MW61-0820~~			water	8	X		X	X	X	
~~SPL-GW-MW81-0820~~	8/19		water	~~8~~ 2		X	X			

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Jacob Leathe	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 8/26/20 16:26	Date & Time: 08/26/2020 1638	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SPL-GW-MW12-0820	20H0287-01	Water	25-Aug-2020 09:26	26-Aug-2020 16:28
SPL-GW-MW12-0820	20H0287-02	Water	25-Aug-2020 09:26	26-Aug-2020 16:28
SPL-GW-MW14-0820	20H0287-03	Water	25-Aug-2020 11:33	26-Aug-2020 16:28
SPL-GW-MW29-0820	20H0287-04	Water	25-Aug-2020 13:15	26-Aug-2020 16:28
SPL-GW-MW18-0820	20H0287-05	Water	25-Aug-2020 15:00	26-Aug-2020 16:28
SPL-GW-MW18-0820	20H0287-06	Water	25-Aug-2020 15:00	26-Aug-2020 16:28
SPL-GW-MW33-0820	20H0287-07	Water	25-Aug-2020 16:15	26-Aug-2020 16:28
SPL-GW-MW33-0820	20H0287-08	Water	25-Aug-2020 16:15	26-Aug-2020 16:28
SPL-GW-MW60-0820	20H0287-09	Water	25-Aug-2020 13:31	26-Aug-2020 16:28
SPL-GW-MW80-0820	20H0287-10	Water	25-Aug-2020 00:00	26-Aug-2020 16:28
SPL-GW-MW27-0820	20H0287-11	Water	26-Aug-2020 13:50	26-Aug-2020 16:28
SPL-GW-MW27-0820	20H0287-12	Water	26-Aug-2020 13:50	26-Aug-2020 16:28
SPL-GW-MW08-0820	20H0287-13	Water	26-Aug-2020 12:15	26-Aug-2020 16:28
SPL-GW-MW08-0820	20H0287-14	Water	26-Aug-2020 12:15	26-Aug-2020 16:28
SPL-GW-MW24-0820	20H0287-15	Water	26-Aug-2020 16:00	26-Aug-2020 16:28
SPL-GW-MW24-0820	20H0287-16	Water	26-Aug-2020 16:00	26-Aug-2020 16:28
SPL-GW-MW31-0820	20H0287-17	Water	26-Aug-2020 10:10	26-Aug-2020 16:28
SPL-GW-MW30-0820	20H0287-18	Water	26-Aug-2020 09:00	26-Aug-2020 16:28

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Work Order Case Narrative

Client: Seattle Public Utilities
Project: South Park Landfill -Parametrix Water 2020
Work Order: 20H0287

Sample receipt

Samples as listed on the preceding page were received 26-Aug-2020 16:28 under ARI work order 20H0287. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within limits.

Sample specific QC was performed in association with sample 20H0287-11 in batch BII0015. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries were out of control low and have been flagged within the QC section of this report. The MS/MSD relative percent difference (RPD) were within limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within limits.

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Sample specific QC was performed in association with sample 20H0287-11 in batch BIH0605. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within limits.

Total Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20H0287-11 in batch BII0113The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within limits.

Dissolved Arsenic - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20H0287-12 in batch BII0056. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within limits.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SPU/Parametrix Project Name: South Park Landfill

COC No(s): ____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ____

Assigned ARI Job No: 20140287 Tracking No: ____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1628 3.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D00(5)06

Cooler Accepted by: JSm Date: 08/26/2020 Time: 1628

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?			YES (NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies (Foam Block) Paper Other: ____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
How were bottles sealed in plastic bags?	Individually	Grouped	(Not)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		____

Were the sample(s) split by ARI? (NA) YES Date/Time: ____ Equipment: ____ Split by: ____

Samples Logged by: [signature] Date: 8/27/2020 Time: 1049 Labels checked by: SLF

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

WORK ORDER

20H0287

Client: Seattle Public Utilities **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 **Project Number:** 553-155-067

Preservation Confirmation

Container ID	Container Type	pH
20H0287-01 A	VOA Vial, Amber, 40 mL, HCL	
20H0287-01 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-01 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-01 D	VOA Vial, Clear, 40 mL	
20H0287-01 E	VOA Vial, Clear, 40 mL	
20H0287-01 F	VOA Vial, Clear, 40 mL	
20H0287-01 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0287-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0287-03 A	VOA Vial, Amber, 40 mL, HCL	
20H0287-03 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-03 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-03 D	VOA Vial, Clear, 40 mL	
20H0287-03 E	VOA Vial, Clear, 40 mL	
20H0287-03 F	VOA Vial, Clear, 40 mL	
20H0287-03 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0287-04 A	VOA Vial, Amber, 40 mL, HCL	
20H0287-04 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-04 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-04 D	VOA Vial, Clear, 40 mL	
20H0287-04 E	VOA Vial, Clear, 40 mL	
20H0287-04 F	VOA Vial, Clear, 40 mL	
20H0287-04 G	HDPE NM, 500 mL, 1:1 HNO3	
20H0287-05 A	VOA Vial, Amber, 40 mL, HCL	<2 pass
20H0287-05 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-05 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-05 D	VOA Vial, Clear, 40 mL	
20H0287-05 E	VOA Vial, Clear, 40 mL	
20H0287-05 F	VOA Vial, Clear, 40 mL	
20H0287-05 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0287-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0287-07 A	VOA Vial, Amber, 40 mL, HCL	
20H0287-07 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-07 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-07 D	VOA Vial, Clear, 40 mL	
20H0287-07 E	VOA Vial, Clear, 40 mL	

Reviewed By

Date

WORK ORDER

20H0287

Client: Seattle Public Utilities **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 **Project Number:** 553-155-067

20H0287-07 F	VOA Vial, Clear, 40 mL
20H0287-07 G	HDPE NM, 500 mL, 1:1 HNO3
20H0287-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)
20H0287-09 A	VOA Vial, Amber, 40 mL, HCL
20H0287-09 B	VOA Vial, Amber, 40 mL, HCL
20H0287-09 C	VOA Vial, Amber, 40 mL, HCL
20H0287-09 D	VOA Vial, Clear, 40 mL
20H0287-09 E	VOA Vial, Clear, 40 mL
20H0287-09 F	VOA Vial, Clear, 40 mL
20H0287-09 G	HDPE NM, 500 mL, 1:1 HNO3
20H0287-10 A	VOA Vial, Amber, 40 mL, HCL
20H0287-10 B	VOA Vial, Clear, 40 mL
20H0287-11 A	VOA Vial, Amber, 40 mL, HCL
20H0287-11 B	VOA Vial, Amber, 40 mL, HCL
20H0287-11 C	VOA Vial, Amber, 40 mL, HCL
20H0287-11 D	VOA Vial, Clear, 40 mL
20H0287-11 E	VOA Vial, Clear, 40 mL
20H0287-11 F	VOA Vial, Clear, 40 mL
20H0287-11 G	HDPE NM, 500 mL, 1:1 HNO3
20H0287-11 H	VOA Vial, Amber, 40 mL, HCL
20H0287-11 I	VOA Vial, Amber, 40 mL, HCL
20H0287-11 J	VOA Vial, Amber, 40 mL, HCL
20H0287-11 K	VOA Vial, Clear, 40 mL
20H0287-11 L	VOA Vial, Clear, 40 mL
20H0287-11 M	VOA Vial, Clear, 40 mL
20H0287-12 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)
20H0287-13 A	VOA Vial, Amber, 40 mL, HCL
20H0287-13 B	VOA Vial, Amber, 40 mL, HCL
20H0287-13 C	VOA Vial, Amber, 40 mL, HCL
20H0287-13 D	VOA Vial, Clear, 40 mL
20H0287-13 E	VOA Vial, Clear, 40 mL
20H0287-13 F	VOA Vial, Clear, 40 mL
20H0287-13 G	HDPE NM, 500 mL, 1:1 HNO3
20H0287-14 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)
20H0287-15 A	VOA Vial, Amber, 40 mL, HCL
20H0287-15 B	VOA Vial, Amber, 40 mL, HCL
20H0287-15 C	VOA Vial, Amber, 40 mL, HCL

Reviewed By

Date

WORK ORDER

20H0287

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

20H0287-15 D	VOA Vial, Clear, 40 mL	
20H0287-15 E	VOA Vial, Clear, 40 mL	
20H0287-15 F	VOA Vial, Clear, 40 mL	
20H0287-15 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0287-16 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0287-17 A	VOA Vial, Amber, 40 mL, HCL	
20H0287-17 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-17 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-17 D	VOA Vial, Clear, 40 mL	
20H0287-17 E	VOA Vial, Clear, 40 mL	
20H0287-17 F	VOA Vial, Clear, 40 mL	
20H0287-17 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0287-18 A	VOA Vial, Amber, 40 mL, HCL	
20H0287-18 B	VOA Vial, Amber, 40 mL, HCL	
20H0287-18 C	VOA Vial, Amber, 40 mL, HCL	
20H0287-18 D	VOA Vial, Clear, 40 mL	
20H0287-18 E	VOA Vial, Clear, 40 mL	
20H0287-18 F	VOA Vial, Clear, 40 mL	
20H0287-18 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass

Preservation Confirmed By

8/27/2020
Date

Reviewed By

Date

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW12-0820

20H0287-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 09:26

Instrument: NT2 Analyst: PKC — Analyzed: 08/31/2020 20:25

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-01 B

Preparation Batch: BIH0671 — Sample Size: 10 mL

Prepared: 08/31/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.21	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW12-0820

20H0287-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 09:26

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 12:49

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-01 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*96.2*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW12-0820

20H0287-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/25/2020 09:26

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-01 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	1610	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:11

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-01 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	1	0.500	158	ug/L	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW12-0820

20H0287-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/25/2020 09:26

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 17:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-02 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.497	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW14-0820

20H0287-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 11:33

Instrument: NT2 Analyst: PKC — Analyzed: 08/31/2020 20:46

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-03 A

Preparation Batch: BIH0671 — Sample Size: 10 mL

Prepared: 08/31/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*115*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW14-0820

20H0287-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 11:33

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 13:09

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-03 E

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*95.3*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW14-0820

20H0287-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/25/2020 11:33
Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:25

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-03 G 01
Preparation Batch: BII0113 — Sample Size: 25 mL
Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	4040	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-03 G 01
Preparation Batch: BII0113 — Sample Size: 25 mL
Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	623	ug/L	D

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW29-0820

20H0287-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 13:15

Instrument: NT2 Analyst: PKC — Analyzed: 08/31/2020 21:06

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-04 A

Preparation Batch: BIH0671 — Sample Size: 10 mL

Prepared: 08/31/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW29-0820

20H0287-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 13:15

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 13:30

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-04 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	124	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.8*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW29-0820

20H0287-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/25/2020 13:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-04 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	32400	ug/L	D
Manganese	7439-96-5	10	5.00	650	ug/L	D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW18-0820

20H0287-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 15:00

Instrument: NT2 Analyst: PKC — Analyzed: 08/31/2020 21:27

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-05 A

Preparation Batch: BIH0671 — Sample Size: 10 mL

Prepared: 08/31/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*119*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW18-0820

20H0287-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 15:00

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 13:50

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-05 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	35.7	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.0*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW18-0820

20H0287-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/25/2020 15:00

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:34

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-05 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	18000	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-05 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1500	ug/L	D

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW18-0820

20H0287-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/25/2020 15:00

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 17:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-06 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW33-0820

20H0287-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 16:15

Instrument: NT2 Analyst: PKC — Analyzed: 08/31/2020 21:47

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-07 B

Preparation Batch: BIH0671 — Sample Size: 10 mL

Prepared: 08/31/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*117*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW33-0820

20H0287-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 16:15

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 14:10

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-07 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	86.2	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.7*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW33-0820

20H0287-07 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/25/2020 16:15

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-07 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	14100	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-07 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1710	ug/L	D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW33-0820

20H0287-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/25/2020 16:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 17:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-08 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.04	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW60-0820

20H0287-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 13:31

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 14:59

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-09 A

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*121*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW60-0820

20H0287-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 13:31

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 14:30

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-09 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	132	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.6*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW60-0820

20H0287-09 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/25/2020 13:31

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-09 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	34000	ug/L	D
Manganese	7439-96-5	10	5.00	687	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW80-0820

20H0287-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/25/2020 00:00

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 14:19

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-10 A

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW80-0820

20H0287-10 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/25/2020 00:00

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 12:29

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-10 B

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*90.5*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW27-0820

20H0287-11 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/26/2020 13:50

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 15:20

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-11 B

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW27-0820

20H0287-11 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/26/2020 13:50

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 14:50

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-11 F

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	76.9	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW27-0820

20H0287-11 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/26/2020 13:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 17:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-11 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	31300	ug/L	D
Manganese	7439-96-5	10	5.00	822	ug/L	D

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW27-0820

20H0287-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/26/2020 13:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 18:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-12 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	13.3	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW08-0820

20H0287-13 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/26/2020 12:15

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 15:40

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-13 B

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	

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SPL-GW-MW08-0820

20H0287-13 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/26/2020 12:15

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 15:11

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-13 F

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	71.2	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	

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20H0287-13 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/26/2020 12:15

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-13 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	15300	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:27

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-13 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1230	ug/L	D

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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SPL-GW-MW08-0820

20H0287-14 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/26/2020 12:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 18:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-14 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.254	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW24-0820

20H0287-15 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/26/2020 16:00

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 16:00

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-15 B

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*123*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW24-0820

20H0287-15 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/26/2020 16:00

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 15:31

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-15 F

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	30.8	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.9*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW24-0820

20H0287-15 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/26/2020 16:00

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-15 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	17900	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:30

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-15 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1400	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW24-0820

20H0287-16 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/26/2020 16:00

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 18:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-16 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW31-0820

20H0287-17 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/26/2020 10:10

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 16:21

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-17 C

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*124*	*%*	

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW31-0820

20H0287-17 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/26/2020 10:10

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 15:51

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-17 E

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	475	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.3*	*%*	

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW31-0820

20H0287-17 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/26/2020 10:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 17:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-17 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	12300	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-17 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	558	ug/L	D

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SPL-GW-MW30-0820

20H0287-18 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/26/2020 09:00

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 16:41

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-18 B

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*120*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW30-0820

20H0287-18 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/26/2020 09:00

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 16:11

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0287-18 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	161	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.2*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

SPL-GW-MW30-0820

20H0287-18 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/26/2020 09:00

Instrument: ICPMS1 Analyst: MCB — Analyzed: 09/04/2020 18:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-18 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	2880	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 16:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0287-18 G 01

Preparation Batch: BII0113 — Sample Size: 25 mL

Prepared: 09/04/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	1	0.500	155	ug/L	

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Volatile Organic Compounds - Quality Control

Batch BIH0671 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIH0671-BLK1)				Prepared: 31-Aug-2020 Analyzed: 31-Aug-2020 14:16						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.08		ug/L	*5.00*		*102*	*80-129*			
LCS (BIH0671-BS1)				Prepared: 31-Aug-2020 Analyzed: 31-Aug-2020 10:52						
cis-1,2-Dichloroethene	9.16	0.20	ug/L	10.0		91.6	80-121			
Surrogate: 1,2-Dichloroethane-d4	4.79		ug/L	*5.00*		*95.7*	*80-129*			
LCS Dup (BIH0671-BSD1)				Prepared: 31-Aug-2020 Analyzed: 31-Aug-2020 11:15						
cis-1,2-Dichloroethene	8.97	0.20	ug/L	10.0		89.7	80-121	2.01	30	
Surrogate: 1,2-Dichloroethane-d4	4.70		ug/L	*5.00*		*94.1*	*80-129*			

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Volatile Organic Compounds - Quality Control

Batch BII0015 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BII0015-BLK1)				Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 13:58						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.38		ug/L	*5.00*		*108*	*80-129*			
LCS (BII0015-BS1)				Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 11:56						
cis-1,2-Dichloroethene	9.01	0.20	ug/L	10.0		90.1	80-121			
Surrogate: 1,2-Dichloroethane-d4	5.16		ug/L	*5.00*		*103*	*80-129*			
LCS Dup (BII0015-BSD1)				Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 12:17						
cis-1,2-Dichloroethene	9.39	0.20	ug/L	10.0		93.9	80-121	4.17	30	
Surrogate: 1,2-Dichloroethane-d4	4.95		ug/L	*5.00*		*99.1*	*80-129*			
Matrix Spike (BII0015-MS1)	**Source: 20H0287-11**			Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 21:00						
cis-1,2-Dichloroethene	7.75	0.20	ug/L	10.0	ND	76.2	80-121			*
Surrogate: 1,2-Dichloroethane-d4	5.66		ug/L	*5.00*	*5.47*	*113*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BII0015-MSD1)	**Source: 20H0287-11**			Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 21:21						
cis-1,2-Dichloroethene	7.90	0.20	ug/L	10.0	ND	77.7	80-121	1.88	30	*
Surrogate: 1,2-Dichloroethane-d4	5.69		ug/L	*5.00*	*5.47*	*114*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Volatile Organic Compounds - SIM - Quality Control

Batch BIH0605 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIH0605-BLK1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 10:37						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	4700		ng/L	*5000*		*94.1*	*80-129*			
LCS (BIH0605-BS1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 09:40						
Vinyl chloride	2410	20.0	ng/L	2000		120	76-120			
Surrogate: 1,2-Dichloroethane-d4	4840		ng/L	*5000*		*96.9*	*80-129*			
LCS Dup (BIH0605-BSD1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 10:17						
Vinyl chloride	1950	20.0	ng/L	2000		97.6	76-120	20.90	30	
Surrogate: 1,2-Dichloroethane-d4	4700		ng/L	*5000*		*93.9*	*80-129*			
Matrix Spike (BIH0605-MS1)	**Source: 20H0287-11**			Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 18:32						
Vinyl chloride	2040	20.0	ng/L	2000	76.9	98.1	76-120			
Surrogate: 1,2-Dichloroethane-d4	4990		ng/L	*5000*	*5030*	*99.9*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIH0605-MSD1)	**Source: 20H0287-11**			Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 18:52						
Vinyl chloride	2030	20.0	ng/L	2000	76.9	97.6	76-120	0.48	30	
Surrogate: 1,2-Dichloroethane-d4	5100		ng/L	*5000*	*5030*	*102*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Metals and Metallic Compounds - Quality Control

Batch BII0113 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BII0113-BLK1)				Prepared: 04-Sep-2020 Analyzed: 04-Sep-2020 13:07							
Iron	54	ND	20.0	ug/L							U
Iron	57	ND	20.0	ug/L							U
Manganese	55	ND	0.500	ug/L							U
LCS (BII0113-BS1)				Prepared: 04-Sep-2020 Analyzed: 04-Sep-2020 13:11							
Iron	54	4970	20.0	ug/L	5000		99.5	80-120			
Iron	57	5070	20.0	ug/L	5000		101	80-120			
Manganese	55	28.9	0.500	ug/L	25.0		116	80-120			

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BII0113-DUP2)		**Source: 20H0287-11**		Prepared: 04-Sep-2020 Analyzed: 08-Sep-2020 17:07							
Iron	54	30600	200	ug/L		31300			2.43	20	D
Manganese	55	794	5.00	ug/L		822			3.37	20	D
Matrix Spike (BII0113-MS2)		**Source: 20H0287-11**		Prepared: 04-Sep-2020 Analyzed: 08-Sep-2020 17:11							
Iron	54	37500	200	ug/L	5000	31300	123	75-125			D
Manganese	55	855	5.00	ug/L	25.0	822	132	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BII0113-MSD2)		**Source: 20H0287-11**		Prepared: 04-Sep-2020 Analyzed: 08-Sep-2020 17:15							
Iron	54	35600	200	ug/L	5000	31300	85.1	75-125	5.19	20	D
Manganese	55	812	5.00	ug/L	25.0	822	-38.0	75-125	5.11	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BII0156 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BII0156-BLK1)					Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 15:02						
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BII0156-BS1)					Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 15:05						
Arsenic, Dissolved	75a	25.7	0.200	ug/L	25.0		103	80-120			
Duplicate (BII0156-DUP1)		**Source: 20H0287-12**			Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 18:21						
Arsenic, Dissolved	75a	13.1	0.200	ug/L		13.3			1.64	20	
Matrix Spike (BII0156-MS1)		**Source: 20H0287-12**			Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 18:25						
Arsenic, Dissolved	75a	38.7	0.200	ug/L	25.0	13.3	102	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BII0156-MSD1)		**Source: 20H0287-12**			Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 18:31						
Arsenic, Dissolved	75a	37.0	0.200	ug/L	25.0	13.3	94.8	75-125	4.48	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,DoD-ELAP
Iron-54	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,DoD-ELAP
Iron-57	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,DoD-ELAP
Manganese-55	WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE

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Trichlorofluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
Acrolein	DoD-ELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Acrylonitrile	DoD-ELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE

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trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Butanone	DoD-ELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
2,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

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Carbon tetrachloride	DoD-ELAP,ADEC,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromodichloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Toluene	DoD-ELAP,ADEC,NELAP,CALAP
Toluene	DoD-ELAP,ADEC,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dibromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
m,p-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
o-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Bromobenzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
4-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP
4-Isopropyl Toluene	DoD-ELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP
n-Butylbenzene	DoD-ELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dichlorodifluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP
n-Hexane	WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

n-Hexane	
n-Hexane	WADOE
n-Hexane	WADOE
2-Pentanone	WADOE
2-Pentanone	
2-Pentanone	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,CALAP
Acrylonitrile	NELAP,WADOE
Acrylonitrile	NELAP,CALAP,WADOE
Acrylonitrile	CALAP,WADOE
Vinyl chloride	CALAP,WADOE
Vinyl chloride	NELAP,CALAP
Vinyl chloride	NELAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
1,1-Dichloroethene	CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	CALAP,WADOE
Trichloroethene	NELAP,CALAP
Trichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,WADOE
Tetrachloroethene	CALAP,WADOE
Tetrachloroethene	NELAP,CALAP
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP
1,1,2,2-Tetrachloroethane	CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP
1,2-Dichloroethane	CALAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP
Benzene	CALAP,WADOE
Benzene	NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 09:55

Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	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
J	Estimated concentration value detected below the reporting limit.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

11 September 2020

Jeff Neuner
Seattle Public Utilities
700-5th Ave, Ste 4900, Box 34018
Seattle, WA 98124-4018

RE: South Park Landfill -Parametrix Water 2020

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20H0297	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20H0297	Turn-around Requested: 2 weeks	Date: 8/27/20
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers: 1 Cooler Temps: 4.1
Client Project Name: South Park Landfill		
Client Project #: 553-1550-067	Samplers: Trey Parry	

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**						Notes/Comments
SPL-GW-MW32-0820	8/27	10:10	water	8	X		X	X	X						**Field-filtered
~~SPL-GW-MW27-0820~~			water	14	X		X	X	X						MS/MSD
~~SPL-GW-MW08-0820~~			water	8	X		X	X	X						
SPL-GW-MW26-0820	8/27	8:25	water	8	X		X	X	X						
~~SPL-GW-MW24-0820~~			water	8	X		X	X	X						
~~SPL-GW-MW31-0820~~			water	7	X		X	X							
~~SPL-GW-MW30-0820~~			water	7	X		X	X							
SPL-GW-MW61-0820	8/27	10:25	water	8	X		X	X	X						
SPL-GW-MW81-0820	8/19	N/A.	water	~~8~~ 2		X	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Kenny Dang	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 8/27/20 1456	Date & Time: 8/27/20 1456	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2040297	Turn-around Requested: 2 weeks	Date: 8/27/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2	
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: 1	Cooler Temps: 4.1
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Trey Parry		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**					Notes/Comments
~~SPL-GW-MW12-0820~~			water	8	X		X	X	X					**Field-filtered
~~SPL-GW-MW14-0820~~			water	7	X		X	X						
~~SPL-GW-MW29-0820~~			water	7	X		X	X						
~~SPL-GW-MW18-0820~~			water	8	X		X	X	X					
SPL-GW-MW25-0820	8/27	13:22	water	14		X	X	X	X					MS/MSD
SPL-GW-MW10-0820	8/27	12:10	water	8	X		X	X	X					
~~SPL-GW-MW33-0820~~			water	8	X		X	X	X					
~~SPL-GW-MW60-0820~~			water	8	X		X	X	X					
~~SPL-GW-MW80-0820~~			water	6	X		X							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Kenny Dang	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 8/27/20	Date & Time: 8/27/20 1456	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SPL-GW-MW32-0820	20H0297-01	Water	27-Aug-2020 10:10	27-Aug-2020 14:56
SPL-GW-MW32-0820	20H0297-02	Water	27-Aug-2020 10:10	27-Aug-2020 14:56
SPL-GW-MW26-0820	20H0297-03	Water	27-Aug-2020 08:25	27-Aug-2020 14:56
SPL-GW-MW26-0820	20H0297-04	Water	27-Aug-2020 08:25	27-Aug-2020 14:56
SPL-GW-MW61-0820	20H0297-05	Water	27-Aug-2020 10:25	27-Aug-2020 14:56
SPL-GW-MW61-0820	20H0297-06	Water	27-Aug-2020 10:25	27-Aug-2020 14:56
SPL-GW-MW81-0820	20H0297-07	Water	27-Aug-2020 00:00	27-Aug-2020 14:56
SPL-GW-MW25-0820	20H0297-08	Water	27-Aug-2020 13:22	27-Aug-2020 14:56
SPL-GW-MW25-0820	20H0297-09	Water	27-Aug-2020 13:22	27-Aug-2020 14:56
SPL-GW-MW10-0820	20H0297-10	Water	27-Aug-2020 12:10	27-Aug-2020 14:56
SPL-GW-MW10-0820	20H0297-11	Water	27-Aug-2020 12:10	27-Aug-2020 14:56

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Work Order Case Narrative

Client: Seattle Public Utilities
Project: South Park Landfill -Parametrix Water 2020
Work Order: 20H0297

Sample receipt

Samples as listed on the preceding page were received 27-Aug-2020 14:56 under ARI work order 20H0297. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within limits.

Sample specific QC was performed in association with sample 20H0297-08 in batch BII0015. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries were out of control low and have been flagged within the QC section of this report. The MS/MSD relative percent difference (RPD) were within limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within limits.

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Sample specific QC was performed in association with sample 20H0297-08 in batch BIH0605. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within limits.

Total Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20H0297-08 in batch BIH0586. The duplicate (DUP) relative percent difference (RPD) were within limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and RPD were within control limits.

Dissolved Arsenic - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20H0297-09 in batch BII0156. The duplicate (DUP) relative percent difference (RPD) were within limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and RPD were within control limits.

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Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SPU
Project Name: South Park Landfill
COC No(s): NA
Delivered by: Fed-Ex UPS Courier Hand Delivered Other:
Assigned ARI Job No: 20H0297
Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1456 4.1

If cooler temperature is out of compliance fill out form 00070F
Temp Gun ID#: D00 5206

Cooler Accepted by: KD Date: 8/27/20 Time: 1456

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? … Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) …	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: Equipment: Split by:

Samples Logged by: Date: 8/27/2020 Time: 1454 Labels checked by: SLF

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

WORK ORDER

20H0297

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

20H0297-08 J	VOA Vial, Amber, 40 mL, HCL	
20H0297-08 K	VOA Vial, Clear, 40 mL	
20H0297-08 L	VOA Vial, Clear, 40 mL	
20H0297-08 M	VOA Vial, Clear, 40 mL	
20H0297-09 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0297-10 A	VOA Vial, Amber, 40 mL, HCL	
20H0297-10 B	VOA Vial, Amber, 40 mL, HCL	
20H0297-10 C	VOA Vial, Amber, 40 mL, HCL	
20H0297-10 D	VOA Vial, Clear, 40 mL	
20H0297-10 E	VOA Vial, Clear, 40 mL	
20H0297-10 F	VOA Vial, Clear, 40 mL	
20H0297-10 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0297-11 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass

Preservation Confirmed By

8/27/2020
Date

Reviewed By

Date

WORK ORDER

20H0297

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

Preservation Confirmation

Container ID	Container Type	pH
20H0297-01 A	VOA Vial, Amber, 40 mL, HCL	
20H0297-01 B	VOA Vial, Amber, 40 mL, HCL	
20H0297-01 C	VOA Vial, Amber, 40 mL, HCL	
20H0297-01 D	VOA Vial, Clear, 40 mL	
20H0297-01 E	VOA Vial, Clear, 40 mL	
20H0297-01 F	VOA Vial, Clear, 40 mL	
20H0297-01 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0297-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0297-03 A	VOA Vial, Amber, 40 mL, HCL	
20H0297-03 B	VOA Vial, Amber, 40 mL, HCL	
20H0297-03 C	VOA Vial, Amber, 40 mL, HCL	
20H0297-03 D	VOA Vial, Clear, 40 mL	
20H0297-03 E	VOA Vial, Clear, 40 mL	
20H0297-03 F	VOA Vial, Clear, 40 mL	
20H0297-03 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0297-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0297-05 A	VOA Vial, Amber, 40 mL, HCL	
20H0297-05 B	VOA Vial, Amber, 40 mL, HCL	
20H0297-05 C	VOA Vial, Amber, 40 mL, HCL	
20H0297-05 D	VOA Vial, Clear, 40 mL	
20H0297-05 E	VOA Vial, Clear, 40 mL	
20H0297-05 F	VOA Vial, Clear, 40 mL	
20H0297-05 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0297-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 pass
20H0297-07 A	VOA Vial, Amber, 40 mL, HCL	
20H0297-07 B	VOA Vial, Clear, 40 mL	
20H0297-08 A	VOA Vial, Amber, 40 mL, HCL	
20H0297-08 B	VOA Vial, Amber, 40 mL, HCL	
20H0297-08 C	VOA Vial, Amber, 40 mL, HCL	
20H0297-08 D	VOA Vial, Clear, 40 mL	
20H0297-08 E	VOA Vial, Clear, 40 mL	
20H0297-08 F	VOA Vial, Clear, 40 mL	
20H0297-08 G	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
20H0297-08 H	VOA Vial, Amber, 40 mL, HCL	
20H0297-08 I	VOA Vial, Amber, 40 mL, HCL	

Reviewed By _____ Date _____

WORK ORDER

20H0297

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

Analysis	Due	TAT	Expires	Comments
20H0297-10 SPL-GW-MW10-0820 [Water] Sampled 27-Aug-2020 12:10				2 Versions
8260D VOA	09/10/2020	10	9/10/2020	
8260D-SIM VOC	09/10/2020	10	9/3/2020	
Met 6020A - Fe	09/10/2020	10	2/23/2021	
Met 6020A - Mn	09/10/2020	10	2/23/2021	
Metals Prep ICPMS	09/10/2020	10	8/27/2021	
20H0297-11 SPL-GW-MW10-0820 [Water] Sampled 27-Aug-2020 12:10				
Met Diss 6020A - As UCT	09/10/2020	10	2/23/2021	
Metals Prep Diss ICPMS	09/10/2020	10	8/27/2021	

Reviewed By

Date

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW32-0820

20H0297-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/27/2020 10:10

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 17:02

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-01 B

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.50	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*122*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW32-0820

20H0297-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/27/2020 10:10

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 16:31

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-01 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	344	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*100*	*%*	

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Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW32-0820

20H0297-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 10:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 16:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-01 G 01

Preparation Batch: BIH0586 — Sample Size: 25 mL

Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	13200	ug/L	

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Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW32-0820

20H0297-01RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 10:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 17:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-01RE1 G 01

Preparation Batch: BIH0586 — Sample Size: 25 mL

Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1540	ug/L	D

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Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW32-0820

20H0297-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/27/2020 10:10

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 18:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-02 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.52	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW26-0820

20H0297-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/27/2020 08:25

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 17:22

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-03 A

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.41	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*123*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW26-0820

20H0297-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/27/2020 08:25

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 16:52

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-03 F

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	28.0	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.7*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW26-0820

20H0297-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 08:25
Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 16:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-03 G 01
Preparation Batch: BIH0586 — Sample Size: 25 mL
Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	8120	ug/L	
Manganese	7439-96-5	1	0.500	125	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW26-0820

20H0297-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/27/2020 08:25
Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 18:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-04 A 01
Preparation Batch: BII0156 — Sample Size: 25 mL
Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.816	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW61-0820

20H0297-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/27/2020 10:25

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 17:43

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-05 B

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.54	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*125*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW61-0820

20H0297-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/27/2020 10:25

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 17:12

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-05 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	347	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW61-0820

20H0297-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 10:25

Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 16:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-05 G 01

Preparation Batch: BIH0586 — Sample Size: 25 mL

Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	13400	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW61-0820

20H0297-05RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 10:25

Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 17:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-05RE1 G 01

Preparation Batch: BIH0586 — Sample Size: 25 mL

Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1520	ug/L	D

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Analytical Report

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW61-0820

20H0297-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/27/2020 10:25

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 19:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-06 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.50	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW81-0820

20H0297-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/27/2020 00:00

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 14:39

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-07 A

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW81-0820

20H0297-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/27/2020 00:00

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 17:32

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-07 B

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.6*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW25-0820

20H0297-08 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/27/2020 13:22

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 18:03

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-08 H

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	0.26	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*125*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW25-0820

20H0297-08 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/27/2020 13:22

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 17:52

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-08 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	345	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.9*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW25-0820

20H0297-08 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 13:22
Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 15:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-08 G 01
Preparation Batch: BIH0586 — Sample Size: 25 mL
Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	18300	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW25-0820

20H0297-08RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 13:22

Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 17:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-08RE1 G 01

Preparation Batch: BIH0586 — Sample Size: 25 mL

Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1910	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW25-0820

20H0297-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/27/2020 13:22

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 19:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-09 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.396	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW10-0820

20H0297-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 08/27/2020 12:10

Instrument: NT2 Analyst: PKC — Analyzed: 09/01/2020 18:25

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-10 A

Preparation Batch: BII0015 — Sample Size: 10 mL

Prepared: 09/01/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.73	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*127*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW10-0820

20H0297-10 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 08/27/2020 12:10

Instrument: NT16 Analyst: PB — Analyzed: 08/28/2020 18:12

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20H0297-10 D

Preparation Batch: BIH0605 — Sample Size: 10 mL

Prepared: 08/28/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	95.2	ng/L	M
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*99.8*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW10-0820

20H0297-10 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 08/27/2020 12:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 08/28/2020 17:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-10 G 01

Preparation Batch: BIH0586 — Sample Size: 25 mL

Prepared: 08/28/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	20	400	40200	ug/L	D
Manganese	7439-96-5	20	10.0	2670	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

SPL-GW-MW10-0820

20H0297-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 08/27/2020 12:10

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/08/2020 19:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20H0297-11 A 01

Preparation Batch: BII0156 — Sample Size: 25 mL

Prepared: 09/07/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Volatile Organic Compounds - Quality Control

Batch BII0015 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BII0015-BLK1)				Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 13:58						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.38		ug/L	*5.00*		*108*	*80-129*			
LCS (BII0015-BS1)				Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 11:56						
cis-1,2-Dichloroethene	9.01	0.20	ug/L	10.0		90.1	80-121			
Benzene	9.41	0.20	ug/L	10.0		94.1	80-120			
Surrogate: 1,2-Dichloroethane-d4	5.16		ug/L	*5.00*		*103*	*80-129*			
LCS Dup (BII0015-BSD1)				Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 12:17						
cis-1,2-Dichloroethene	9.39	0.20	ug/L	10.0		93.9	80-121	4.17	30	
Benzene	9.69	0.20	ug/L	10.0		96.9	80-120	2.97	30	
Surrogate: 1,2-Dichloroethane-d4	4.95		ug/L	*5.00*		*99.1*	*80-129*			
Matrix Spike (BII0015-MS2)	**Source: 20H0297-08**			Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 21:43						
cis-1,2-Dichloroethene	6.46	0.20	ug/L	10.0	ND	63.7	80-121			*
Benzene	7.24	0.20	ug/L	10.0	0.26	69.8	80-120			*
Surrogate: 1,2-Dichloroethane-d4	5.80		ug/L	*5.00*	*6.24*	*116*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BII0015-MSD2)	**Source: 20H0297-08**			Prepared: 01-Sep-2020 Analyzed: 01-Sep-2020 22:04						
cis-1,2-Dichloroethene	6.27	0.20	ug/L	10.0	ND	61.7	80-121	3.12	30	*
Benzene	7.06	0.20	ug/L	10.0	0.26	68.0	80-120	2.51	30	*
Surrogate: 1,2-Dichloroethane-d4	5.81		ug/L	*5.00*	*6.24*	*116*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Volatile Organic Compounds - SIM - Quality Control

Batch BIH0605 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIH0605-BLK1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 10:37						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	4700		ng/L	*5000*		*94.1*	*80-129*			
LCS (BIH0605-BS1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 09:40						
Vinyl chloride	2410	20.0	ng/L	2000		120	76-120			
Surrogate: 1,2-Dichloroethane-d4	4840		ng/L	*5000*		*96.9*	*80-129*			
LCS Dup (BIH0605-BSD1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 10:17						
Vinyl chloride	1950	20.0	ng/L	2000		97.6	76-120	20.90	30	
Surrogate: 1,2-Dichloroethane-d4	4700		ng/L	*5000*		*93.9*	*80-129*			
Matrix Spike (BIH0605-MS2)	**Source: 20H0297-08**			Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 19:13						
Vinyl chloride	2610	20.0	ng/L	2000	345	113	76-120			
Surrogate: 1,2-Dichloroethane-d4	5440		ng/L	*5000*	*4990*	*109*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIH0605-MSD2)	**Source: 20H0297-08**			Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 19:34						
Vinyl chloride	2690	20.0	ng/L	2000	345	117	76-120	3.12	30	
Surrogate: 1,2-Dichloroethane-d4	5930		ng/L	*5000*	*4990*	*119*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Metals and Metallic Compounds - Quality Control

Batch BIH0586 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIH0586-BLK1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 14:15							
Iron	54	ND	20.0	ug/L							U
Iron	57	ND	20.0	ug/L							U
Manganese	55	ND	0.500	ug/L							U
LCS (BIH0586-BS1)				Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 14:19							
Iron	54	5070	20.0	ug/L	5000		101	80-120			
Iron	57	5120	20.0	ug/L	5000		102	80-120			
Manganese	55	25.9	0.500	ug/L	25.0		104	80-120			
Duplicate (BIH0586-DUP1)			**Source: 20H0297-08**	Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 15:57							
Iron	54	18200	20.0	ug/L		18300			0.66	20	
Duplicate (BIH0586-DUP2)			**Source: 20H0297-08RE1**	Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 17:09							
Manganese	55	1940	5.00	ug/L		1910			1.75	20	D
Matrix Spike (BIH0586-MS1)			**Source: 20H0297-08**	Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 16:02							
Iron	54	22300	20.0	ug/L	5000	18300	79.1	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BIH0586-MS2)			**Source: 20H0297-08RE1**	Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 17:13							
Manganese	55	1970	5.00	ug/L	250	1910	24.8	75-125			HC, D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BIH0586-MSD1)			**Source: 20H0297-08**	Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 16:09							
Iron	54	22500	20.0	ug/L	5000	18300	83.3	75-125	0.93	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BIH0586-MSD2)			**Source: 20H0297-08RE1**	Prepared: 28-Aug-2020 Analyzed: 28-Aug-2020 17:17							
Manganese	55	1920	5.00	ug/L	250	1910	6.04	75-125	2.42	20	HC, D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BII0156 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BII0156-BLK1)					Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 15:02						
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BII0156-BS1)					Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 15:05						
Arsenic, Dissolved	75a	25.7	0.200	ug/L	25.0		103	80-120			
Duplicate (BII0156-DUP2)		**Source: 20H0297-09**			Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 19:21						
Arsenic, Dissolved	75a	0.381	0.200	ug/L		0.396			3.86	20	
Matrix Spike (BII0156-MS2)		**Source: 20H0297-09**			Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 19:26						
Arsenic, Dissolved	75a	25.6	0.200	ug/L	25.0	0.396	101	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BII0156-MSD2)		**Source: 20H0297-09**			Prepared: 07-Sep-2020 Analyzed: 08-Sep-2020 19:31						
Arsenic, Dissolved	75a	25.7	0.200	ug/L	25.0	0.396	101	75-125	0.25	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,DoD-ELAP
Iron-54	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,DoD-ELAP
Iron-57	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,DoD-ELAP
Manganese-55	WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Trichlorofluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
Acrolein	DoD-ELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Acrylonitrile	DoD-ELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Butanone	DoD-ELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
2,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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Carbon tetrachloride	DoD-ELAP,ADEC,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromodichloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

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Toluene	DoD-ELAP,ADEC,NELAP,CALAP
Toluene	DoD-ELAP,ADEC,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dibromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP

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1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
m,p-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
o-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Bromobenzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
4-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP
4-Isopropyl Toluene	DoD-ELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE

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1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP
n-Butylbenzene	DoD-ELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dichlorodifluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP
n-Hexane	WADOE

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n-Hexane	
n-Hexane	WADOE
n-Hexane	WADOE
2-Pentanone	WADOE
2-Pentanone	
2-Pentanone	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,CALAP
Acrylonitrile	NELAP,WADOE
Acrylonitrile	NELAP,CALAP,WADOE
Acrylonitrile	CALAP,WADOE
Vinyl chloride	CALAP,WADOE
Vinyl chloride	NELAP,CALAP
Vinyl chloride	NELAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
1,1-Dichloroethene	CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	CALAP,WADOE
Trichloroethene	NELAP,CALAP
Trichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,WADOE
Tetrachloroethene	CALAP,WADOE
Tetrachloroethene	NELAP,CALAP
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP
1,1,2,2-Tetrachloroethane	CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP
1,2-Dichloroethane	CALAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP
Benzene	CALAP,WADOE
Benzene	NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	11-Sep-2020 10:28

Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	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
J	Estimated concentration value detected below the reporting limit.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

4th Quarter 2020

Laboratory Reports

Analytical Resources, Incorporated
Analytical Chemists and Consultants

25 November 2020

Jeff Neuner
Seattle Public Utilities
700-5th Ave, Ste 4900, Box 34018
Seattle, WA 98124-4018

RE: South Park Landfill -Parametrix Water 2020

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20K0179	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20K0179	Turn-around Requested: 2 weeks	Date: 11/10/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2	
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers:	Cooler Temps:
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Trey Parry		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**						Notes/Comments
SPL-GW-MW12-1120	11/9	14:57	water	8	X		X	X	X						**Field-filtered
SPL-GW-MW14-1120	11/9	16:15	water	13 14	X		X	X							MS/MSD
SPL-GW-MW29-1120	11/10	9:10	water	7	X		X	X							
SPL-GW-MW18-1120	11/10	10:15	water	8	X		X	X	X						
SPL-GW-MW32-1120	11/10	14:00	water	8	X		X	X	X						
SPL-GW-MW33-1120	11/10	15:15	water	8	X		X	X	X						
SPL-GW-MW10-1120	11/10	1250	water	8	X		X	X	X						
SPL-GW-MW60-1120	11/9	16:15	water	7	X		X	X							
SPL-GW-MW80-1120	11/9	13:30	water	2		X	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Samantha Colon	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 11/10 1543	Date & Time: 11/10/2020 1543	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20K0179	Turn-around Requested: 2 weeks	Date: 11/10/20	
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2	
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers:	Cooler Temps:
Client Project Name: South Park Landfill			
Client Project #: 553-1550-067	Samplers: Trey Parry		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**	Notes/Comments
SPL-GW-MW25-1120	11/10	11:35	water	8		X	X	X	X	**Field-filtered
~~SPL-GW-MW30-1120~~			water	14	X		X	X		MS/MSD
~~SPL-GW-MW31-1120~~			water	7	X		X	X		
~~SPL-GW-MW24-1120~~			water	8	X		X	X	X	
~~SPL-GW-MW26-1120~~			water	8	X		X	X	X	
~~SPL-GW-MW08-1120~~			water	8	X		X	X	X	
~~SPL-GW-MW27-1120~~			water	8	X		X	X	X	
~~SPL-GW-MW61-1120~~			water	7	X		X	X		
~~SPL-GW-MW81-1120~~	11/11	10:00	water	2		X	X			

Comments/Special Instructions

	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name:	Trey Parry	Samantha Colon		
Company:	Parametrix	ARI		
Date & Time:	11/10 1543	11/10/2020 1543		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SPL-GW-MW12-1120	20K0179-01	Water	09-Nov-2020 14:57	10-Nov-2020 15:43
SPL-GW-MW14-1120	20K0179-02	Water	09-Nov-2020 16:15	10-Nov-2020 15:43
SPL-GW-MW29-1120	20K0179-03	Water	10-Nov-2020 09:10	10-Nov-2020 15:43
SPL-GW-MW18-1120	20K0179-04	Water	10-Nov-2020 10:15	10-Nov-2020 15:43
SPL-GW-MW32-1120	20K0179-05	Water	10-Nov-2020 14:00	10-Nov-2020 15:43
SPL-GW-MW33-1120	20K0179-06	Water	10-Nov-2020 15:15	10-Nov-2020 15:43
SPL-GW-MW10-1120	20K0179-07	Water	10-Nov-2020 12:50	10-Nov-2020 15:43
SPL-GW-MW60-1120	20K0179-08	Water	09-Nov-2020 16:15	10-Nov-2020 15:43
SPL-GW-MW80-1120	20K0179-09	Water	09-Nov-2020 13:30	10-Nov-2020 15:43
SPL-GW-MW25-1120	20K0179-10	Water	10-Nov-2020 11:35	10-Nov-2020 15:43
SPL-GW-MW12-1120	20K0179-11	Water	09-Nov-2020 14:57	10-Nov-2020 15:43
SPL-GW-MW18-1120	20K0179-12	Water	10-Nov-2020 10:15	10-Nov-2020 15:43
SPL-GW-MW32-1120	20K0179-13	Water	10-Nov-2020 14:00	10-Nov-2020 15:43
SPL-GW-MW33-1120	20K0179-14	Water	10-Nov-2020 15:15	10-Nov-2020 15:43
SPL-GW-MW10-1120	20K0179-15	Water	10-Nov-2020 12:15	10-Nov-2020 15:43
SPL-GW-MW25-1120	20K0179-16	Water	10-Nov-2020 11:35	10-Nov-2020 15:43

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Work Order Case Narrative

Client: Seattle Public Utilities
Project: South Park Landfill -Parametrix Water 2020
Work Order: 20K0179

Sample receipt

Samples as listed on the preceding page were received 10-Nov-2020 15:43 under ARI work order 20K0179. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

Sample specific QC was performed in association with sample 20K0179-02 in batch BIK0327. The matrix spike (MS) percent recoveries were within control limits. The matrix spike duplicate (MSD) percent recoveries were out of control high and have been flagged. The MS/MSD relative percent difference (RPD) were within advisory control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 20K0179-02 in batch BIK0388. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries were out of control high and have been flagged. The MS/MSD relative percent

difference (RPD) were within advisory control limits.

Total Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 20K0179-02 in batch BIK0694. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and RPD were within advisory control limits.

Dissolved Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

WORK ORDER

20K0179

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

Preservation Confirmation

Container ID	Container Type	pH
20K0179-01 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-01 B	VOA Vial, Clear, 40 mL	
20K0179-01 C	VOA Vial, Clear, 40 mL	
20K0179-01 D	VOA Vial, Clear, 40 mL	
20K0179-01 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-01 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-01 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-02 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-02 B	VOA Vial, Clear, 40 mL	
20K0179-02 C	VOA Vial, Clear, 40 mL	
20K0179-02 D	VOA Vial, Clear, 40 mL	
20K0179-02 E	VOA Vial, Clear, 40 mL	
20K0179-02 F	VOA Vial, Clear, 40 mL	
20K0179-02 G	VOA Vial, Clear, 40 mL	
20K0179-02 H	VOA Vial, Clear, 40 mL, HCL	
20K0179-02 I	VOA Vial, Clear, 40 mL, HCL	
20K0179-02 J	VOA Vial, Clear, 40 mL, HCL	
20K0179-02 K	VOA Vial, Clear, 40 mL, HCL	
20K0179-02 L	VOA Vial, Clear, 40 mL, HCL	
20K0179-02 M	VOA Vial, Clear, 40 mL, HCL	
20K0179-03 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-03 B	VOA Vial, Clear, 40 mL	
20K0179-03 C	VOA Vial, Clear, 40 mL	
20K0179-03 D	VOA Vial, Clear, 40 mL	
20K0179-03 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-03 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-03 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-04 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-04 B	VOA Vial, Clear, 40 mL	
20K0179-04 C	VOA Vial, Clear, 40 mL	
20K0179-04 D	VOA Vial, Clear, 40 mL	
20K0179-04 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-04 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-04 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass

Reviewed By _____ Date _____

WORK ORDER

20K0179

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

20K0179-05 B	VOA Vial, Clear, 40 mL	
20K0179-05 C	VOA Vial, Clear, 40 mL	
20K0179-05 D	VOA Vial, Clear, 40 mL	
20K0179-05 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-05 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-05 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-06 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-06 B	VOA Vial, Clear, 40 mL	
20K0179-06 C	VOA Vial, Clear, 40 mL	
20K0179-06 D	VOA Vial, Clear, 40 mL	
20K0179-06 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-06 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-06 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-07 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-07 B	VOA Vial, Clear, 40 mL	
20K0179-07 C	VOA Vial, Clear, 40 mL	
20K0179-07 D	VOA Vial, Clear, 40 mL	
20K0179-07 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-07 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-07 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-08 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-08 B	VOA Vial, Clear, 40 mL	
20K0179-08 C	VOA Vial, Clear, 40 mL	
20K0179-08 D	VOA Vial, Clear, 40 mL	
20K0179-08 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-08 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-08 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-09 A	VOA Vial, Clear, 40 mL, HCL	
20K0179-09 B	VOA Vial, Clear, 40 mL, HCL	
20K0179-10 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
20K0179-10 B	VOA Vial, Clear, 40 mL	
20K0179-10 C	VOA Vial, Clear, 40 mL	
20K0179-10 D	VOA Vial, Clear, 40 mL	
20K0179-10 E	VOA Vial, Clear, 40 mL, HCL	
20K0179-10 F	VOA Vial, Clear, 40 mL, HCL	
20K0179-10 G	VOA Vial, Clear, 40 mL, HCL	
20K0179-11 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 Pass

Reviewed By

Date

WORK ORDER

20K0179

Client: Seattle Public Utilities	**Project Manager: Shelly Fishel**
Project: South Park Landfill -Parametrix Water 2020	**Project Number: 553-155-067**

20K0179-12 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 Pass
20K0179-13 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 Pass
20K0179-14 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 Pass
20K0179-15 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 Pass
20K0179-16 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 Pass

KD
Preservation Confirmed By

11/11/2020
Date

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SPU
Project Name: South Park Landfill
COC No(s): _____ NA
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Assigned ARI Job No: 20K0179
Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1543 — 7.9

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: DOO 5206

Cooler Accepted by: SC Date: 11/10/2020 Time: 1543

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used?	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA	_____	

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 11/11/20 Time: 1138 Labels checked by: KD

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

ARI Work Order: 20K0179

Cooler#: _____ **Temperature(°C):** 7.9

Sample ID	Bottle Count	Bottle Type
Samples received above 6°C.		

Cooler#: _____ **Temperature(°C):** _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ **Temperature(°C):** _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ **Temperature(°C):** _____

Sample ID	Bottle Count	Bottle Type

Completed by: SC Date: 11/10/2020 Time: 1543

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW12-1120

20K0179-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/09/2020 14:57

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 15:11

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-01 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.39	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*106*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW12-1120

20K0179-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/09/2020 14:57

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 15:12

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-01 D

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*103*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW12-1120

20K0179-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/09/2020 14:57

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 22:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-01 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	942	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 18:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-01 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	1	0.500	109	ug/L	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW14-1120

20K0179-02 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/09/2020 16:15

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 15:37

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-02 H

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW14-1120

20K0179-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/09/2020 16:15

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 16:13

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-02 C

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*117*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW14-1120

20K0179-02 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/09/2020 16:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 18:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-02 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	5	100	3560	ug/L	D
Manganese	7439-96-5	5	2.50	603	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW29-1120

20K0179-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/10/2020 09:10

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 16:03

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-03 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*105*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW29-1120

20K0179-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/10/2020 09:10

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 16:34

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-03 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	95.9	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW29-1120

20K0179-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/10/2020 09:10
Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 22:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-03 A 01
Preparation Batch: BIK0694 — Sample Size: 25 mL
Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	14400	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 18:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-03 A 01
Preparation Batch: BIK0694 — Sample Size: 25 mL
Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	480	ug/L	D

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW18-1120

20K0179-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/10/2020 10:15

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 16:29

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-04 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW18-1120

20K0179-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/10/2020 10:15

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 16:55

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-04 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	36.3	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW18-1120

20K0179-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/10/2020 10:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-04 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	21000	ug/L	D
Manganese	7439-96-5	10	5.00	1360	ug/L	D

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW32-1120

20K0179-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/10/2020 14:00

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 15:15

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-05 F

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.75	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	

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SPL-GW-MW32-1120

20K0179-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/10/2020 14:00

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 17:15

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-05 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	472	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*124*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW32-1120

20K0179-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/10/2020 14:00

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 22:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-05 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	11000	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 19:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-05 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	1430	ug/L	D

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW33-1120

20K0179-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/10/2020 15:15

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 16:55

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-06 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW33-1120

20K0179-06 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/10/2020 15:15

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 17:36

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-06 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	112	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW33-1120

20K0179-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/10/2020 15:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 20:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-06 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	15800	ug/L	D
Manganese	7439-96-5	10	5.00	1680	ug/L	D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW10-1120

20K0179-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/10/2020 12:50

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 17:21

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-07 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	1.28	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW10-1120

20K0179-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/10/2020 12:50

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 17:57

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-07 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	114	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*121*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW10-1120

20K0179-07 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/10/2020 12:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 20:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-07 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	20	400	39100	ug/L	D
Manganese	7439-96-5	20	10.0	2550	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW60-1120

20K0179-08 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/09/2020 16:15

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 17:47

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-08 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW60-1120

20K0179-08 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/09/2020 16:15

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 18:18

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-08 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*118*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW60-1120

20K0179-08 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/09/2020 16:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 18:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-08 A 01

Preparation Batch: BIK0694 — Sample Size: 25 mL

Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	5	100	3590	ug/L	D
Manganese	7439-96-5	5	2.50	598	ug/L	D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW80-1120

20K0179-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/09/2020 13:30
Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 18:13

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-09 A
Preparation Batch: BIK0327 — Sample Size: 10 mL
Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.6*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW80-1120

20K0179-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/09/2020 13:30

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 15:53

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-09 B

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW25-1120

20K0179-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/10/2020 11:35

Instrument: NT3 Analyst: PC — Analyzed: 11/11/2020 18:39

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-10 E

Preparation Batch: BIK0327 — Sample Size: 10 mL

Prepared: 11/11/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	0.49	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.4*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW25-1120

20K0179-10 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/10/2020 11:35

Instrument: NT16 Analyst: PB — Analyzed: 11/13/2020 13:04

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0179-10 B

Preparation Batch: BIK0414 — Sample Size: 10 mL

Prepared: 11/13/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	505	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW25-1120

20K0179-10 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/10/2020 11:35
Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 23:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-10 A 01
Preparation Batch: BIK0694 — Sample Size: 25 mL
Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	18200	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 20:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-10 A 01
Preparation Batch: BIK0694 — Sample Size: 25 mL
Prepared: 11/23/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	5.00	2110	ug/L	D

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW12-1120

20K0179-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/09/2020 14:57

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/20/2020 21:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-11 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.395	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW18-1120

20K0179-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/10/2020 10:15

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/20/2020 21:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-12 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW32-1120

20K0179-13 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/10/2020 14:00

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/20/2020 21:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-13 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.51	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW33-1120

20K0179-14 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/10/2020 15:15

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/20/2020 21:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-14 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	1.01	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW10-1120

20K0179-15 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/10/2020 12:15

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/20/2020 21:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-15 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

SPL-GW-MW25-1120

20K0179-16 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/10/2020 11:35

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/20/2020 21:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0179-16 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.300	ug/L	

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Volatile Organic Compounds - Quality Control

Batch BIK0327 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0327-BLK1)				Prepared: 11-Nov-2020 Analyzed: 11-Nov-2020 11:14						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.29		ug/L	*5.00*		*106*	*80-129*			
Surrogate: Toluene-d8	5.08		ug/L	*5.00*		*102*	*80-120*			
LCS (BIK0327-BS1)				Prepared: 11-Nov-2020 Analyzed: 11-Nov-2020 09:43						
cis-1,2-Dichloroethene	10.8	0.20	ug/L	10.0		108	80-121			
Benzene	10.6	0.20	ug/L	10.0		106	80-120			
Surrogate: 1,2-Dichloroethane-d4	5.34		ug/L	*5.00*		*107*	*80-129*			
Surrogate: Toluene-d8	5.11		ug/L	*5.00*		*102*	*80-120*			
LCS Dup (BIK0327-BSD1)				Prepared: 11-Nov-2020 Analyzed: 11-Nov-2020 10:09						
cis-1,2-Dichloroethene	10.5	0.20	ug/L	10.0		105	80-121	2.69	30	
Benzene	10.2	0.20	ug/L	10.0		102	80-120	3.42	30	
Surrogate: 1,2-Dichloroethane-d4	5.52		ug/L	*5.00*		*110*	*80-129*			
Surrogate: Toluene-d8	5.03		ug/L	*5.00*		*101*	*80-120*			
Matrix Spike (BIK0327-MS1)	**Source: 20K0179-02**			Prepared: 11-Nov-2020 Analyzed: 11-Nov-2020 19:56						
cis-1,2-Dichloroethene	10.7	0.20	ug/L	10.0	ND	107	80-121			
Benzene	10.1	0.20	ug/L	10.0	ND	101	80-120			
Surrogate: 1,2-Dichloroethane-d4	5.63		ug/L	*5.00*	*5.44*	*113*	*80-129*			
Surrogate: Toluene-d8	5.09		ug/L	*5.00*		*102*	*80-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0327-MSD1)	**Source: 20K0179-02**			Prepared: 11-Nov-2020 Analyzed: 11-Nov-2020 20:22						
cis-1,2-Dichloroethene	13.1	0.20	ug/L	10.0	ND	131	80-121	20.50	30	*
Benzene	12.6	0.20	ug/L	10.0	ND	126	80-120	22.70	30	*
Surrogate: 1,2-Dichloroethane-d4	5.34		ug/L	*5.00*	*5.44*	*107*	*80-129*			
Surrogate: Toluene-d8	5.05		ug/L	*5.00*		*101*	*80-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Volatile Organic Compounds - Quality Control

Batch BIK0380 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0380-BLK2)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 11:48						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	4.89		ug/L	*5.00*		*97.8*	*80-129*			
LCS (BIK0380-BS2)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 10:38						
cis-1,2-Dichloroethene	10.4	0.20	ug/L	10.0		104	80-121			
Surrogate: 1,2-Dichloroethane-d4	4.51		ug/L	*5.00*		*90.2*	*80-129*			
LCS Dup (BIK0380-BSD2)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 10:58						
cis-1,2-Dichloroethene	10.1	0.20	ug/L	10.0		101	80-121	2.53	30	
Surrogate: 1,2-Dichloroethane-d4	4.58		ug/L	*5.00*		*91.7*	*80-129*			

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Volatile Organic Compounds - SIM - Quality Control

Batch BIK0388 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0388-BLK1)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 14:15						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5300		ng/L	*5000*		*106*	*80-129*			
LCS (BIK0388-BS1)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 13:06						
Vinyl chloride	2310	20.0	ng/L	2000		115	76-120			
Surrogate: 1,2-Dichloroethane-d4	5330		ng/L	*5000*		*107*	*80-129*			
LCS Dup (BIK0388-BSD1)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 13:42						
Vinyl chloride	2380	20.0	ng/L	2000		119	76-120	2.96	30	
Surrogate: 1,2-Dichloroethane-d4	5310		ng/L	*5000*		*106*	*80-129*			
Matrix Spike (BIK0388-MS1)	**Source: 20K0179-02**			Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 22:07						
Vinyl chloride	2550	20.0	ng/L	2000	ND	127	76-120			*
Surrogate: 1,2-Dichloroethane-d4	6500		ng/L	*5000*	*5860*	*130*	*80-129*			*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0388-MSD1)	**Source: 20K0179-02**			Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 22:27						
Vinyl chloride	2590	20.0	ng/L	2000	ND	129	76-120	1.61	30	*
Surrogate: 1,2-Dichloroethane-d4	6770		ng/L	*5000*	*5860*	*135*	*80-129*			*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Volatile Organic Compounds - SIM - Quality Control

Batch BIK0414 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0414-BLK1)				Prepared: 13-Nov-2020 Analyzed: 13-Nov-2020 11:46						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5510		ng/L	*5000*		*110*	*80-129*			
LCS (BIK0414-BS1)				Prepared: 13-Nov-2020 Analyzed: 13-Nov-2020 11:06						
Vinyl chloride	2340	20.0	ng/L	2000		117	76-120			
Surrogate: 1,2-Dichloroethane-d4	5550		ng/L	*5000*		*111*	*80-129*			
LCS Dup (BIK0414-BSD1)				Prepared: 13-Nov-2020 Analyzed: 13-Nov-2020 12:07						
Vinyl chloride	2360	20.0	ng/L	2000		118	76-120	0.73	30	
Surrogate: 1,2-Dichloroethane-d4	5840		ng/L	*5000*		*117*	*80-129*			

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Metals and Metallic Compounds - Quality Control

Batch BIK0694 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0694-BLK1)				Prepared: 23-Nov-2020 Analyzed: 23-Nov-2020 17:41							
Iron	54	ND	20.0	ug/L							U
Iron	57	ND	20.0	ug/L							U
Manganese	55	ND	0.500	ug/L							U
LCS (BIK0694-BS1)				Prepared: 23-Nov-2020 Analyzed: 23-Nov-2020 17:45							
Iron	54	4870	20.0	ug/L	5000		97.5	80-120			
Iron	57	4860	20.0	ug/L	5000		97.3	80-120			
Manganese	55	26.5	0.500	ug/L	25.0		106	80-120			

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BIK0694-DUP2)		**Source: 20K0179-02**		Prepared: 23-Nov-2020 Analyzed: 24-Nov-2020 18:57							
Iron	54	3550	100	ug/L		3560			0.07	20	D
Manganese	55	589	2.50	ug/L		603			2.38	20	D
Matrix Spike (BIK0694-MS2)		**Source: 20K0179-02**		Prepared: 23-Nov-2020 Analyzed: 24-Nov-2020 19:03							
Iron	54	8850	100	ug/L	5000	3560	106	75-125			D
Manganese	55	644	2.50	ug/L	25.0	603	166	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0694-MSD2)		**Source: 20K0179-02**		Prepared: 23-Nov-2020 Analyzed: 24-Nov-2020 19:10							
Iron	54	8680	100	ug/L	5000	3560	103	75-125	1.86	20	D
Manganese	55	613	2.50	ug/L	25.0	603	39.9	75-125	5.02	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BIK0643 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0643-BLK1)				Prepared: 20-Nov-2020 Analyzed: 20-Nov-2020 16:53							
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BIK0643-BS1)				Prepared: 20-Nov-2020 Analyzed: 20-Nov-2020 16:57							
Arsenic, Dissolved	75a	26.1	0.200	ug/L	25.0		104	80-120			

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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,DoD-ELAP
Iron-54	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,DoD-ELAP
Iron-57	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,DoD-ELAP
Manganese-55	WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE

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Trichlorofluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
Acrolein	DoD-ELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Acrylonitrile	DoD-ELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Butanone	DoD-ELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
2,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Carbon tetrachloride	DoD-ELAP,ADEC,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromodichloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

Toluene	DoD-ELAP,ADEC,NELAP,CALAP
Toluene	DoD-ELAP,ADEC,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dibromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
m,p-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
o-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Bromobenzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
4-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP
4-Isopropyl Toluene	DoD-ELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP
n-Butylbenzene	DoD-ELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dichlorodifluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP
n-Hexane	WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

n-Hexane	
n-Hexane	WADOE
n-Hexane	WADOE
2-Pentanone	WADOE
2-Pentanone	
2-Pentanone	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,CALAP
Acrylonitrile	NELAP,WADOE
Acrylonitrile	NELAP,CALAP,WADOE
Acrylonitrile	CALAP,WADOE
Vinyl chloride	CALAP,WADOE
Vinyl chloride	NELAP,CALAP
Vinyl chloride	NELAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
1,1-Dichloroethene	CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	CALAP,WADOE
Trichloroethene	NELAP,CALAP
Trichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,WADOE
Tetrachloroethene	CALAP,WADOE
Tetrachloroethene	NELAP,CALAP
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP
1,1,2,2-Tetrachloroethane	CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP
1,2-Dichloroethane	CALAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP
Benzene	CALAP,WADOE
Benzene	NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:28

Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
HC	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
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

25 November 2020

Jeff Neuner
Seattle Public Utilities
700-5th Ave, Ste 4900, Box 34018
Seattle, WA 98124-4018

RE: South Park Landfill -Parametrix Water 2020

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
20K0193	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20K0193	Turn-around Requested: 2 weeks	Date: 11/11/20
ARI Client Company: Jeff Neuner, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 1
Client Contact: Lisa Gilbert, Parametrix	Phone: 206 394-3667	No. of Coolers: 1 Cooler Temps: 3.5
Client Project Name: South Park Landfill		
Client Project #: 553-1550-067	Samplers: Trey Parry	

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	Number of Containers	Analysis Requested: cis-1,2-DCE	cis-1,2-DCE, benzene	Vinyl Chloride	Total Fe, Mn	Dissolved As**					Notes/Comments
~~SPL-GW-MW25-1120~~			~~water~~	~~8~~		~~X~~	~~X~~	~~X~~	~~X~~					
SPL-GW-MW30-1120	11/11	10:10	water	13 ~~14~~	X		X	X						MS/MSD
SPL-GW-MW31-1120	11/11	9:25	water	7	X		X	X						
SPL-GW-MW24-1120	11/11	11:15	water	8	X		X	X	X					
SPL-GW-MW26-1120	11/11	12:10	water	8	X		X	X	X					
SPL-GW-MW08-1120	11/11	13:25	water	8	X		X	X	X					
SPL-GW-MW27-1120	11/11	14:20	water	8	X		X	X	X					
SPL-GW-MW61-1120	11/11	10:10	water	7	X		X	X						
SPL-GW-MW81-1120	11/11	10:00	water	2		X	X							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Samantha Colon	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 11/11 15:00	Date & Time: 11/11/2020 1500	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SPL-GW-MW30-1120	20K0193-01	Water	11-Nov-2020 10:10	11-Nov-2020 15:00
SPL-GW-MW31-1120	20K0193-02	Water	11-Nov-2020 09:25	11-Nov-2020 15:00
SPL-GW-MW24-1120	20K0193-03	Water	11-Nov-2020 11:15	11-Nov-2020 15:00
SPL-GW-MW24-1120	20K0193-04	Water	11-Nov-2020 11:15	11-Nov-2020 15:00
SPL-GW-MW26-1120	20K0193-05	Water	11-Nov-2020 12:10	11-Nov-2020 15:00
SPL-GW-MW26-1120	20K0193-06	Water	11-Nov-2020 12:10	11-Nov-2020 15:00
SPL-GW-MW08-1120	20K0193-07	Water	11-Nov-2020 13:25	11-Nov-2020 15:00
SPL-GW-MW08-1120	20K0193-08	Water	11-Nov-2020 13:25	11-Nov-2020 15:00
SPL-GW-MW27-1120	20K0193-09	Water	11-Nov-2020 14:20	11-Nov-2020 15:00
SPL-GW-MW27-1120	20K0193-10	Water	11-Nov-2020 14:20	11-Nov-2020 15:00
SPL-GW-MW61-1120	20K0193-11	Water	11-Nov-2020 10:10	11-Nov-2020 15:00
SPL-GW-MW81-1120	20K0193-12	Water	11-Nov-2020 10:00	11-Nov-2020 15:00

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

Work Order Case Narrative

Client: Seattle Public Utilities
Project: South Park Landfill -Parametrix Water 2020
Work Order: 20K0193

Sample receipt

Samples as listed on the preceding page were received 11-Nov-2020 15:00 under ARI work order 20K0193. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 20K0193-01 in batch BIK0380. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except 1,2-Dichloroethane-d4 in the matrix spike which has been flagged within the QC section of this report.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

Sample specific QC was performed in association with sample 20K0193-01. The matrix spike (MS) percent recoveries outside advisory control limits high for both Vinyl Chloride and surrogate 1,2-Dichloroethane-d4 which have been flagged within the QC section of this report. The matrix spike duplicate (MSD) percent recoveries and MS/MSD relative percent difference (RPD) were within advisory control limits.

Total Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and RPD were within advisory control limits.

Dissolved Metals - EPA Method 6020A

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

WORK ORDER

20K0193

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

Preservation Confirmation

Container ID	Container Type	pH	
20K0193-01 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-01 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-01 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-01 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-01 E	VOA Vial, Clear, 40 mL, HCL		
20K0193-01 F	VOA Vial, Clear, 40 mL, HCL		
20K0193-01 G	VOA Vial, Clear, 40 mL, HCL		
20K0193-01 H	VOA Vial, Clear, 40 mL		
20K0193-01 I	VOA Vial, Clear, 40 mL		
20K0193-01 J	VOA Vial, Clear, 40 mL		
20K0193-01 K	VOA Vial, Clear, 40 mL		
20K0193-01 L	VOA Vial, Clear, 40 mL		
20K0193-01 M	VOA Vial, Clear, 40 mL		
20K0193-02 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-02 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-02 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-02 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-02 E	VOA Vial, Clear, 40 mL		
20K0193-02 F	VOA Vial, Clear, 40 mL		
20K0193-02 G	VOA Vial, Clear, 40 mL		
20K0193-03 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-03 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-03 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-03 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-03 E	VOA Vial, Clear, 40 mL		
20K0193-03 F	VOA Vial, Clear, 40 mL		
20K0193-03 G	VOA Vial, Clear, 40 mL		
20K0193-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20K0193-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-05 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-05 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-05 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-05 E	VOA Vial, Clear, 40 mL		
20K0193-05 F	VOA Vial, Clear, 40 mL		
20K0193-05 G	VOA Vial, Clear, 40 mL		

Reviewed By _____ Date _____

WORK ORDER

20K0193

Client: Seattle Public Utilities | **Project Manager:** Shelly Fishel

Project: South Park Landfill -Parametrix Water 2020 | **Project Number:** 553-155-067

20K0193-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20K0193-07 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-07 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-07 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-07 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-07 E	VOA Vial, Clear, 40 mL		
20K0193-07 F	VOA Vial, Clear, 40 mL		
20K0193-07 G	VOA Vial, Clear, 40 mL		
20K0193-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20K0193-09 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-09 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-09 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-09 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-09 E	VOA Vial, Clear, 40 mL		
20K0193-09 F	VOA Vial, Clear, 40 mL		
20K0193-09 G	VOA Vial, Clear, 40 mL		
20K0193-10 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20K0193-11 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20K0193-11 B	VOA Vial, Clear, 40 mL, HCL		
20K0193-11 C	VOA Vial, Clear, 40 mL, HCL		
20K0193-11 D	VOA Vial, Clear, 40 mL, HCL		
20K0193-11 E	VOA Vial, Clear, 40 mL		
20K0193-11 F	VOA Vial, Clear, 40 mL		
20K0193-11 G	VOA Vial, Clear, 40 mL		
20K0193-12 A	VOA Vial, Clear, 40 mL, HCL	Bubble	
20K0193-12 B	VOA Vial, Clear, 40 mL, HCL		

JA
Preservation Confirmed By

11/11/2020
Date

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SPU
Project Name: South Park Landfill
COC No(s): _____ (NA)
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Assigned ARI Job No: 20K0193
Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1500 — 3.5

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: D00 5206

Cooler Accepted by: SC Date: 11/11/2020 Time: 1500

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies (Foam Block) Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	(NO) SC
How were bottles sealed in plastic bags?	Individually	Grouped	(Not)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	YES	(NO)
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JS Date: 11/11/2020 Time: 1533 Labels checked by: JS

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

vials w/air bubbles marked on preservation sheet, lab to determine sizes.

By: JS Date: 11/11/2020

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW30-1120

20K0193-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 10:10

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 15:35

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-01 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.30	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW30-1120

20K0193-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 10:10

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 18:59

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-01 H

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	251	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*121*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW30-1120

20K0193-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 10:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 18:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-01 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	4700	ug/L	
Manganese	7439-96-5	1	0.500	138	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW31-1120

20K0193-02 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 09:25

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 15:56

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-02 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW31-1120

20K0193-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 09:25

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 19:20

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-02 E

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	443	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*115*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW31-1120

20K0193-02 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 09:25

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 19:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-02 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	5	100	13400	ug/L	D
Manganese	7439-96-5	5	2.50	517	ug/L	D

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW24-1120

20K0193-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 11:15

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 16:17

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-03 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW24-1120

20K0193-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 11:15

Instrument: NT16 Analyst: PB — Analyzed: 11/13/2020 13:24

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-03 F

Preparation Batch: BIK0414 — Sample Size: 10 mL

Prepared: 11/13/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	43.8	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*120*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW24-1120

20K0193-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 11:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 19:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-03 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	27000	ug/L	D
Manganese	7439-96-5	10	5.00	1560	ug/L	D

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW24-1120

20K0193-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/11/2020 11:15

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 18:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-04 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW26-1120

20K0193-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 12:10

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 16:37

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-05 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.31	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW26-1120

20K0193-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 12:10

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 20:01

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-05 E

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	37.0	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*127*	*%*	

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW26-1120

20K0193-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 12:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 19:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-05 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	8130	ug/L	
Manganese	7439-96-5	1	0.500	110	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW26-1120

20K0193-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/11/2020 12:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 19:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-06 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.865	ug/L	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW08-1120

20K0193-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 13:25

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 16:57

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-07 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*115*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW08-1120

20K0193-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 13:25
Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 20:22

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-07 E
Preparation Batch: BIK0388 — Sample Size: 10 mL
Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	83.6	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*120*	*%*	

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW08-1120

20K0193-07 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 13:25

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 19:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-07 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	200	17400	ug/L	D
Manganese	7439-96-5	10	5.00	1170	ug/L	D

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW08-1120

20K0193-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/11/2020 13:25

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 19:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-08 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	ND	ug/L	U

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW27-1120

20K0193-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 14:20

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 17:18

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-09 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW27-1120

20K0193-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 14:20

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 20:43

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-09 E

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	26.7	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*119*	*%*	

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW27-1120

20K0193-09 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 14:20

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 19:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-09 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	15000	ug/L	

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 19:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-09 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	2.50	572	ug/L	D

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW27-1120

20K0193-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED — Sampled: 11/11/2020 14:20

Instrument: ICPMS2 Analyst: MCB — Analyzed: 11/24/2020 18:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-10 A 01

Preparation Batch: BIK0643 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	8.34	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW61-1120

20K0193-11 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 10:10

Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 17:39

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-11 B

Preparation Batch: BIK0380 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.31	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW61-1120

20K0193-11 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 10:10

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 21:03

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-11 E

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	252	ng/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*120*	*%*	

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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW61-1120

20K0193-11 (Water)

Metals and Metallic Compounds

Method: EPA 6020A — Sampled: 11/11/2020 10:10

Instrument: ICPMS1 Analyst: MCB — Analyzed: 11/23/2020 19:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 20K0193-11 A 01

Preparation Batch: BIK0644 — Sample Size: 25 mL

Prepared: 11/20/2020 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	20.0	4430	ug/L	
Manganese	7439-96-5	1	0.500	132	ug/L	

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700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW81-1120

20K0193-12 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 11/11/2020 10:00
Instrument: NT2 Analyst: PKC — Analyzed: 11/12/2020 18:00

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-12 B
Preparation Batch: BIK0380 — Sample Size: 10 mL
Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*94.3*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

SPL-GW-MW81-1120

20K0193-12 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM — Sampled: 11/11/2020 10:00

Instrument: NT16 Analyst: PB — Analyzed: 11/12/2020 15:32

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 20K0193-12 A

Preparation Batch: BIK0388 — Sample Size: 10 mL

Prepared: 11/12/2020 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	

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Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

Volatile Organic Compounds - Quality Control

Batch BIK0380 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0380-BLK2)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 11:48						
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	4.89		ug/L	*5.00*		*97.8*	*80-129*			
Surrogate: Toluene-d8	4.75		ug/L	*5.00*		*95.0*	*80-120*			
LCS (BIK0380-BS2)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 10:38						
cis-1,2-Dichloroethene	10.4	0.20	ug/L	10.0		104	80-121			
Benzene	10.7	0.20	ug/L	10.0		107	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.51		ug/L	*5.00*		*90.2*	*80-129*			
Surrogate: Toluene-d8	5.01		ug/L	*5.00*		*100*	*80-120*			
LCS Dup (BIK0380-BSD2)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 10:58						
cis-1,2-Dichloroethene	10.1	0.20	ug/L	10.0		101	80-121	2.53	30	
Benzene	10.4	0.20	ug/L	10.0		104	80-120	2.76	30	
Surrogate: 1,2-Dichloroethane-d4	4.58		ug/L	*5.00*		*91.7*	*80-129*			
Surrogate: Toluene-d8	5.03		ug/L	*5.00*		*101*	*80-120*			
Matrix Spike (BIK0380-MS1)	**Source: 20K0193-01**			Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 19:02						
cis-1,2-Dichloroethene	8.57	0.20	ug/L	10.0	0.30	82.6	80-121			
Benzene	8.91	0.20	ug/L	10.0	ND	89.1	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.94		ug/L	*5.00*	*5.60*	*98.7*	*80-129*			
Surrogate: Toluene-d8	5.05		ug/L	*5.00*		*101*	*80-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0380-MSD1)	**Source: 20K0193-01**			Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 19:23						
cis-1,2-Dichloroethene	9.05	0.20	ug/L	10.0	0.30	87.5	80-121	5.46	30	
Benzene	9.26	0.20	ug/L	10.0	ND	92.6	80-120	3.82	30	
Surrogate: 1,2-Dichloroethane-d4	4.80		ug/L	*5.00*	*5.60*	*95.9*	*80-129*			
Surrogate: Toluene-d8	5.02		ug/L	*5.00*		*100*	*80-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

Volatile Organic Compounds - SIM - Quality Control

Batch BIK0388 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0388-BLK1)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 14:15						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5300		ng/L	*5000*		*106*	*80-129*			
LCS (BIK0388-BS1)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 13:06						
Vinyl chloride	2310	20.0	ng/L	2000		115	76-120			
Surrogate: 1,2-Dichloroethane-d4	5330		ng/L	*5000*		*107*	*80-129*			
LCS Dup (BIK0388-BSD1)				Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 13:42						
Vinyl chloride	2380	20.0	ng/L	2000		119	76-120	2.96	30	
Surrogate: 1,2-Dichloroethane-d4	5310		ng/L	*5000*		*106*	*80-129*			
Matrix Spike (BIK0388-MS2)	**Source: 20K0193-01**			Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 22:48						
Vinyl chloride	3120	20.0	ng/L	2000	251	143	76-120			*
Surrogate: 1,2-Dichloroethane-d4	6880		ng/L	*5000*	*6030*	*138*	*80-129*			*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0388-MSD2)	**Source: 20K0193-01**			Prepared: 12-Nov-2020 Analyzed: 12-Nov-2020 23:09						
Vinyl chloride	2550	20.0	ng/L	2000	251	115	76-120	20.20	30	
Surrogate: 1,2-Dichloroethane-d4	5920		ng/L	*5000*	*6030*	*118*	*80-129*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Volatile Organic Compounds - SIM - Quality Control

Batch BIK0414 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0414-BLK1)				Prepared: 13-Nov-2020 Analyzed: 13-Nov-2020 11:46						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5510		ng/L	*5000*		*110*	*80-129*			
LCS (BIK0414-BS1)				Prepared: 13-Nov-2020 Analyzed: 13-Nov-2020 11:06						
Vinyl chloride	2340	20.0	ng/L	2000		117	76-120			
Surrogate: 1,2-Dichloroethane-d4	5550		ng/L	*5000*		*111*	*80-129*			
LCS Dup (BIK0414-BSD1)				Prepared: 13-Nov-2020 Analyzed: 13-Nov-2020 12:07						
Vinyl chloride	2360	20.0	ng/L	2000		118	76-120	0.73	30	
Surrogate: 1,2-Dichloroethane-d4	5840		ng/L	*5000*		*117*	*80-129*			

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Metals and Metallic Compounds - Quality Control

Batch BIK0644 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0644-BLK2)					Prepared: 20-Nov-2020 Analyzed: 23-Nov-2020 16:34						
Iron	54	ND	20.0	ug/L							U
Iron	57	ND	20.0	ug/L							U
Manganese	55	ND	0.500	ug/L							U
LCS (BIK0644-BS2)					Prepared: 20-Nov-2020 Analyzed: 23-Nov-2020 16:39						
Iron	54	4790	20.0	ug/L	5000		95.9	80-120			
Iron	57	4830	20.0	ug/L	5000		96.6	80-120			
Manganese	55	25.8	0.500	ug/L	25.0		103	80-120			
Duplicate (BIK0644-DUP2)		**Source: 20K0193-01**			Prepared: 20-Nov-2020 Analyzed: 23-Nov-2020 18:09						
Iron	54	4770	20.0	ug/L		4700			1.34	20	
Manganese	55	139	0.500	ug/L		138			0.73	20	
Matrix Spike (BIK0644-MS2)		**Source: 20K0193-01**			Prepared: 20-Nov-2020 Analyzed: 23-Nov-2020 18:14						
Iron	54	8500	20.0	ug/L	5000	4700	75.9	75-125			
Manganese	55	153	0.500	ug/L	25.0	138	58.8	75-125			HC

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0644-MSD2)		**Source: 20K0193-01**			Prepared: 20-Nov-2020 Analyzed: 23-Nov-2020 18:21						
Iron	54	8560	20.0	ug/L	5000	4700	77.1	75-125	0.73	20	
Manganese	55	155	0.500	ug/L	25.0	138	68.7	75-125	1.61	20	HC

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BIK0643 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0643-BLK1)				Prepared: 20-Nov-2020 Analyzed: 20-Nov-2020 16:53							
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BIK0643-BS1)				Prepared: 20-Nov-2020 Analyzed: 20-Nov-2020 16:57							
Arsenic, Dissolved	75a	26.1	0.200	ug/L	25.0		104	80-120			

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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-54	NELAP,DoD-ELAP
Iron-54	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,DoD-ELAP
Iron-57	WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,DoD-ELAP
Manganese-55	WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Arsenic-75a	NELAP,DoD-ELAP,ADEC
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE

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Trichlorofluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
Acrolein	DoD-ELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP
Acrylonitrile	DoD-ELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,NELAP,CALAP
Carbon Disulfide	DoD-ELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE

trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Butanone	DoD-ELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
2,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
1,1-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

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Carbon tetrachloride	DoD-ELAP,ADEC,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Bromodichloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

Toluene	DoD-ELAP,ADEC,NELAP,CALAP
Toluene	DoD-ELAP,ADEC,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2-Trichloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dibromochloromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP

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1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
m,p-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP
o-Xylene	DoD-ELAP,ADEC,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichloropropane	DoD-ELAP,ADEC,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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Bromobenzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP
4-Chlorotoluene	DoD-ELAP,ADEC,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP
4-Isopropyl Toluene	DoD-ELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP
n-Butylbenzene	DoD-ELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP
Dichlorodifluoromethane	DoD-ELAP,ADEC,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP
n-Hexane	WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
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n-Hexane	
n-Hexane	WADOE
n-Hexane	WADOE
2-Pentanone	WADOE
2-Pentanone	
2-Pentanone	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,CALAP
Acrylonitrile	NELAP,WADOE
Acrylonitrile	NELAP,CALAP,WADOE
Acrylonitrile	CALAP,WADOE
Vinyl chloride	CALAP,WADOE
Vinyl chloride	NELAP,CALAP
Vinyl chloride	NELAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
1,1-Dichloroethene	CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP
trans-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	CALAP,WADOE
Trichloroethene	NELAP,CALAP
Trichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,WADOE
Tetrachloroethene	CALAP,WADOE
Tetrachloroethene	NELAP,CALAP
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP
1,1,2,2-Tetrachloroethane	CALAP,WADOE

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
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1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP
1,2-Dichloroethane	CALAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP
Benzene	CALAP,WADOE
Benzene	NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021

Seattle Public Utilities	Project: South Park Landfill -Parametrix Water 2020	
700-5th Ave, Ste 4900, Box 34018	Project Number: 553-155-067	**Reported:**
Seattle WA, 98124-4018	Project Manager: Jeff Neuner	25-Nov-2020 15:41

Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
HC	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
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

D5

Data Validation Memoranda

May 2020 Groundwater Sampling Event
South Park Landfill
Data Validation Report

Prepared for

Seattle Public Utilities

March 2021

Prepared by

Parametrix

May 2020 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

March 2021 | 553-1550-067 (03.00)

CITATION

Parametrix. 2021. May 2020 Groundwater Sampling Event South Park Landfill Data Validation Report. Prepared by Parametrix, Seattle, Washington. March 2021.

TABLE OF CONTENTS

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 May 2020 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260C	8260C-SIM	6010A Total Fe, Mn	6010A Dissolved As
SPL-GW-MW12-0520	20E0287-01	MW-12	X	X	X	
SPL-GW-MW12-0520	20E0287-02	MW-12				X
SPL-GW-MW14-0520	20E0287-03	MW-14	X	X	X	
SPL-GW-MW14-0520	20E0287-04	MW-14				X
SPL-GW-MW32-0520	20E0321-01	MW-32	X	X	X	
SPL-GW-MW33-0520	20E0321-02	MW-33	X	X	X	
SPL_GW-MW10-0520	20E0321-03	MW-10	X	X	X	
SPL-GW-MW25-0520	20E0321-04	MW-25	X	X	X	
SPL-GW-MW30-0520	20E0321-05	MW-30	X	X	X	
SPL-GW-MW31-0520	20E0321-06	MW-31	X	X	X	
SPL-GW-MW61-0520	20E0321-07	MW-27	X	X	X	
SPL-GW-MW81-0520	20E0321-08	TRIP BLANK	X	X		
SPL-GW-MW18-0520	20E0321-09	MW-18	X	X	X	
SPL-GW-MW29-0520	20E0321-10	MW-29	X	X	X	
SPL-GW-MW27-0520	20E0321-11	MW-27	X	X	X	
SPL-GW-MW08-0520	20E0321-13	MW-08	X	X	X	
SPL-GW-MW24-0520	20E0321-14	MW-24	X	X	X	
SPL-GW-MW26-0520	20E0321-15	MW-26	X	X	X	
SPL-GW-MW60-0520	20E0321-16	MW-25	X	X	X	
SPL-GW-MW80-0520	20E0321-17	TRIP BLANK	X	X		
Trip Blanks	20E0321-19	TRIP BLANK	X	X		
SPL-GW-MW32-0520	20E0321-20	MW-32				X
SPL-GW-MW33-0520	20E0321-21	MW-33				X
SPL-GW-MW10-0520	20E0321-22	MW-10				X
SPL-GW-MW25-0520	20E0321-23	MW-25				X
SPL-GW-MW61-0520	20E0321-24	MW-27				X
SPL-GW-MW18-0520	20E0321-25	MW-18				X
SPL-GW-MW08-0520	20E0321-27	MW-08				X
SPL-GW-MW24-0520	20E0321-28	MW-24				X
SPL-GW-MW26-0520	20E0321-29	MW-26				X
SPL-GW-MW60-0520	20E0321-30	MW-25				X

Groundwater samples were collected between May 26 and May 28, 2020 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 20E0287 and 20E0321. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260C
- Vinyl chloride—EPA Method 8260C-SIM
- Select metals (Iron, manganese, and arsenic) - EPA Method 6010A

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-0520 is a duplicate of SPL-GW-MW25-0520. Sample SPL-GW-MW61-0520 is a duplicate of SPL-GW-MW27-0520.

Two trip blanks were analyzed (SPL-GW-MW80-0520 and SPL-GW-MW81-0520). An additional trip blank labeled "Trip blank" was also analyzed.

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.

2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260C

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[1]	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[3]	

Notes:

1 Quality control results are discussed below, but no data were qualified.

2 Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below

3 Lab indicated that QC requirements were met but project specific samples were not used in the analysis

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 Cooler Temperature and Preservation

For ARI Work Order 20E0287, the laboratory noted that the sample cooler temperature (12.9 degrees C) was outside of the laboratory standard of ≤ 6°C. For ARI Work Order 20E0321, the laboratory noted that the sample cooler temperatures (3.3, 3.8, and 18.8 degrees C) were outside of the laboratory standard of ≤ 6°C. Samples were delivered to the laboratory the same day they were collected from the field. Only approximately 60 minutes elapsed between when the final sample was collected and the coolers were delivered to the laboratory, leaving insufficient time for the cooler temperature to drop within the standard range. It is with professional judgment that no sample results be qualified based on cooler temperature, as the samples were delivered with minimal holding time.

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 relative percent difference (RPD).

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260C-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[1]	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination	Reporting limits and reported results
LCS and LCSD	Field duplicates
MS/MSD[3]	

Notes:
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below
[3] Lab indicated that QC requirements were met but project specific samples were not used in the analysis

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.

3.2.1 Cooler Temperature and Preservation

For ARI Work Order 20E0287, the laboratory noted that the sample cooler temperature (12.9 degrees C) was outside of the laboratory standard of ≤ 6°C. For ARI Work Order 20E0321, the laboratory noted that the sample cooler temperatures (3.3, 3.8, and 18.8 degrees C) were outside of the laboratory standard of ≤ 6°C. Samples were delivered to the laboratory the same day they were collected from the field. Only approximately 60 minutes elapsed between when the final samples were collected and the coolers were delivered to the laboratory, leaving insufficient time for the cooler temperature to drop within the standard range. It is with professional judgment that no sample results be qualified based on cooler temperature, as the samples were delivered with minimal holding time

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 6010B

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[1]	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate[3]
Blank contamination[2]	Target analyte list
Matrix Spike (MS)[3]	Reporting limits and reported results
	Field duplicates[2]

Notes:
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below
[3] Lab indicated that QC requirements were met but project specific samples were not used in the analysis for all analytes

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

For ARI Work Order 20E0287, the laboratory noted that the sample cooler temperature (12.9 degrees C) was outside of the laboratory standard of of ≤ 6°C. For ARI Work Order 20E0321, the laboratory noted that the sample cooler temperatures (3.3, 3.8, and 18.8 degrees C) were outside of the laboratory standard of ≤ 6°C. Samples were delivered to the laboratory the same day they were collected from the field. Only approximately 60 minutes elapsed between when the final samples were collected and the coolers were was delivered to the laboratory, leaving insufficient time for the cooler temperatures to drop within the standard range. It is with professional judgment that no sample results be qualified based on cooler temperature, as the samples were delivered with minimal holding time.

4.2.2 Blank Contamination

The method blank(s) were clean at the reporting limits except Manganese. Manganese was measured in the method blank at a concentration of 0.617 ug/L. The sample concentrations are all greater than 10 times the reporting limit. In accordance with the criteria shown in Appendix A the “B” qualifiers were

removed from manganese results because all results were greater than 10 times the amount measured in the blank.

4.2.3 Matrix Spike

Sample specific QC was performed in association with sample 20E0321-05 (MW-30) in batch BIF 0110. The matrix spike percent recovery for Manganese (72.2 percent) was outside control limits (75 to 125 percent) low which is flagged within the QC section of the report. The manganese result for all samples in the batch with results less than four times the spike level (25 mg/L) were qualified "J-" as estimated low.

4.2.4 Laboratory Control Sample and Laboratory Duplicate

For the analysis of total iron and manganese in ARI Work Order 20E0287, and for dissolved arsenic in ARI Work Order 20E0321, no sample-specific matrix spike or laboratory duplicates were run. It is with professional judgment that no results be qualified based on missing duplicate analysis, as results for other samples in the batch and for other batches for this event demonstrated adequate precision for this laboratory for this method.

4.2.5 Field Duplicates

The RPD between sample SPL-GW-MW27-0520 and its field duplicate SPL-GW-MW61-0520 was greater than the target precision of +/- 20 percent. Therefore, the manganese result for SPL-GW-MW27-0520 was qualified "J" as estimated in accordance with the criteria presented in Appendix A.

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 2017a,b)

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 2017b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 6°C HCl to pH < 2	If >6 deg. C but </= 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: R if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: If sample result <CRQL, qualify U report at CRQL If sample result >/= CRQL, use professional judgement
		If blank >/= CRQL: If sample result <CRQL, qualify U and report at CRQL If sample result >/= but <blank result, qualify U or R and report at sample result If sample result >/= CRQL and >/= blank results, use professional judgement
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: J if %R <20%, or 20%</=%R<Lower limit, or %R or RPD >Upper limit; For non-detects: R if %R<20%, UJ if 20%<%R<Lower limit
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD >Upper limit
LCS	One per lab batch Control limit +/-20%	Qualify sample results J/UJ
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ
Surrogates	Added to all samples Within method control limits	Qualify sample results J/UJ
Field Duplicates	QAPP limits RPD <50% OR absolute diff. < 1X RL (for results < 5X RL)	J/UJ in original sample only)

Notes:

Validation Guidelines for Metals Analysis by ICP-MS (Based on EPA 2017a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 6°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	Detects: J; Non-detects: R if holding time exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: If sample result non-detect, qualify UJ If sample result </= CRQL, use professional judgement or qualify as estimated low J- If sample result <10x CRQL, quality results >/=CRQL as estimated low J- If sample result >/= 10xCRQL, no qualification
		If blank >CRQL: If sample result non-detect, no qualification If sample result </= CRQL, qualify U and report at CRQL If sample result >CRQL but <10x blank, report at blank results and use professional judgement to qualify as estimated high J+ or R If sample result >/= 10x blank, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	For detects: If %R < 40% or 40-69%, J-; If %R 70-130%, no qualification; if %R>130%, J+; If %R >150%, R For non-detects: If %R<40%, R; If %R 40-69%, UJ, if %R>70%, no qualification
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level	For detects: J+ if %R>125% J-if %R <75% For Non-detects: R if %R<30%, UJ if %R <75% Qualify all samples in batch
Laboratory Duplicate	One per matrix per batch RPD <20% for samples >/= 5x CRQL OR CQRL if sample results <5x CRQL	If results >/= 5x CRQL and RPD>20% OR if results <5x CRQL and absolute difference >CRQL, J if detect, UJ if nondetect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5 x RL: Diff < RL	J/UJ in original sample only

Table 3
Data Quality Assurance Criteria

Parameter	Matrix	Reporting Limit/PQL	Precision	Accuracy	Completeness	Reference
Volatile Organic Compounds						
Benzene	Groundwater	0.2 µg/L	± 50%	± 50%	95%	SW-846 8260C
cis -1,2-DCE		0.2 µg/L				
Vinyl chloride		0.02 µg/L				
Monitored Natural Attenuation Parameters						
Arsenic	Groundwater	1 µg/L	± 20%	± 20%	95%	USEPA 6020
Iron		1 µg/L	± 20%	± 20%	95%	USEPA 6020
Manganese		1 µg/L	± 20%	± 20%	95%	USEPA 6020

Abbreviations:

DCE Dichloroethene
µg/L Microgram per liter
PQL Practical quantitation limit

Appendix B

Field Duplicate Analysis

Data Validation			South Park Landfill						
QA/QC completed by: Lisa Gilbert					6/11/2020				
ARI Work Order		20E0321							
Sample numbers:		SPL-MW-25-520; SPL-MW-61-0520							
Sample Date:				27-May-20					
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
units = ug/L		**MW-25**	**MW-60**						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ng/L	349	347	348	2.00	1	y	20.0	
Benzene	ug/L	0.24	0.28	0.26	-0.04	15	y	0.2	
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	ug/L	21100	21700	21400	-600.00	3	y	20.0	
Manganese	ug/L	2210	2280	2245	-70.00	3	y	5.0	
Arsenic'	ug/L	0.353	0.337	0.345	0.02	5	y	0.2	
Comments:	**No Data Qualified**								

Data Validation			South Park Landfill						
QA/QC completed by: Lisa Gilbert					6/11/2020				
ARI Work Order		20E0321							
Sample numbers:		SPL-MW-27-520; SPL-MW-60-0520							
Sample Date:				28-May-20					
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
units = ug/L		**MW-27**	**MW-61**						
cis-1,2-DCE	ug/L	0.22	0.26	0.24	-0.04	17		0.2	y
Vinyl chloride	ng/L	78.1	81.9	80	-3.80	5	y	20.0	y
Benzene	ug/L	0.24	NT	0.24	#VALUE!	#VALUE!		0.2	
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	ug/L	5000	5970	5485	-970.00	18	y	20.0	y
Manganese	**ug/L**	**252**	**321**	**286.5**	**-69.00**	**24**	**n**	**5.0**	**n**
Arsenic'	ug/L	4.89	5.23	5.06	-0.34	7	y	0.2	y
Comments:	**Mn data for MW-27 qualified "J" as estimated**								

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table May 2020 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW32-0520	20E0321-01	EPA 6010A	Total Manganese	1500	µg/L	B		
SPL-GW-MW33-0520	20E0321-02	EPA 6010A	Total Manganese	1610	µg/L	B		
SPL_GW-MW10-0520	20E0321-03	EPA 6010A	Total Manganese	2280	µg/L	B		
SPL-GW-MW25-0520	20E0321-04	EPA 6010A	Total Manganese	2210	µg/L	B		
SPL-GW-MW30-0520	20E0321-05	EPA 6010A	Total Manganese	91.9	µg/L	B	J-	J-
SPL-GW-MW31-0520	20E0321-06	EPA 6010A	Total Manganese	573	µg/L	B		
SPL-GW-MW61-0520	20E0321-07	EPA 6010A	Total Manganese	321	µg/L	B		
SPL-GW-MW18-0520	20E0321-09	EPA 6010A	Total Manganese	1590	µg/L	B		
SPL-GW-MW29-0520	20E0321-10	EPA 6010A	Total Manganese	810	µg/L	B		
SPL-GW-MW27-0520	20E0321-11	EPA 6010A	Total Manganese	252	µg/L	B	J	J
SPL-GW-MW08-0520	20E0321-13	EPA 6010A	Total Manganese	1190	µg/L	B		
SPL-GW-MW24-0520	20E0321-14	EPA 6010A	Total Manganese	1680	µg/L	B		
SPL-GW-MW26-0520	20E0321-15	EPA 6010A	Total Manganese	108	µg/L	B		
SPL-GW-MW60-0520	20E0321-16	EPA 6010A	Total Manganese	2280	µg/L	B		

Qualifiers:

B The analyte was detected in the method blank

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.

August 2020 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

Seattle Public Utilities

March 2021

Prepared by

Parametrix

August 2020 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

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CITATION

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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 August 2020 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260C	8260C-SIM	6010A Total Fe, Mn	6010A Dissolved As
SPL-GW-MW12-0820	20H0287-01	MW-12	X	X	X	
SPL-GW-MW12-0820	20H0287-02	MW-12				X
SPL-GW-MW14-0820	20H0287-03	MW-14	X	X	X	
SPL-GW-MW29-0820	20H0287-04	MW-29	X	X	X	
SPL-GW-MW18-0820	20H0287-05	MW-18	X	X	X	
SPL-GW-MW18-0820	20H0287-06	MW-18				X
SPL_GW-MW33-0820	20H0287-07	MW-33	X	X	X	
SPL-GW-MW33-0820	20H0287-08	MW-33				X
SPL-GW-MW60-0820	20H0287-09	MW-29 Dup	X	X	X	
SPL-GW-MW80-0820	20H0287-10	TRIP BLANK	X	X		
SPL-GW-MW27-0820	20H0287-11	MW-27	X	X	X	
SPL-GW-MW27-0820	20H0287-12	MW-27				X
SPL-GW-MW08-0820	20H0287-13	MW-08	X	X	X	
SPL-GW-MW08-0820	20H0287-14	MW-08				X
SPL-GW-MW24-0820	20H0287-15	MW-24	X	X	X	
SPL-GW-MW24-0820	20H0287-16	MW-24				X
SPL-GW-MW31-0820	20H0287-17	MW-31	X	X	X	
SPL-GW-MW30-0820	20H0287-18	MW-30	X	X	X	
SPL-GW-MW32-0820	20H0297-01	MW-32	X	X	X	
SPL-GW-MW32-0820	20H0297-02	MW-32				X
SPL-GW-MW26-0820	20H0297-03	MW-26	X	X	X	
SPL-GW-MW26-0820	20H0297-04	MW-26				X
SPL-GW-MW61-0820	20H0297-05	MW-32 Dup	X	X	X	
SPL-GW-MW61-0820	20H0297-06	MW-32 Dup				X
SPL-GW-MW81-0820	20H0297-07	TRIP BLANK	X	X		
SPL-GW-MW25-0820	20H0297-08	MW-25	X	X	X	
SPL-GW-MW25-0820	20H0297-09	MW-25				X
SPL-GW-MW10-0820	20H0297-10	MW-10	X	X	X	
SPL-GW-MW10-0820	20H0297-11	MW-10				X

Groundwater samples were collected between August 25 and 27, 2020 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 20H0287 and 20H0297. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260C
- Vinyl chloride—EPA Method 8260C-SIM
- Select metals (Total iron and manganese, and dissolved arsenic) - EPA Method 6010A

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-MW60-0820 is a duplicate of SPL-GW-MW29-0820. Sample SPL-GW-MW61-0820 is a duplicate of SPL-GW-MW32-0820.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples. RPDs = difference / average = ((X1-X2) / (X1+X2)/2) x 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-MW80-0820 and SPL-GW-MW81-0820).

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 3.6 and 4.1 degrees C, indicating adequate temperature control for sample preservation (i.e., below the recommended 6 degrees C).

2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260C

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[1]	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[3]	

Notes:

1 Quality control results are discussed below, but no data were qualified.

2 Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below

3 Lab indicated that QC requirements were met but project specific samples were not used in the analysis

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 20H0287-11 (SPL-GW-MW27-0820) in batch BII0015. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries for cis-1,2-dichloroethene were out of control low (76.2 and 77.7 percent compared to the acceptable range of 80 to 121 percent) and have been flagged for the original sample only. The MS/MSD relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 20H0297-08 (SPL-GW-MW25-0820) in batch BII0015. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries for cis-1,2-dichloroethene and benzene were out of control low (61.7 and 63.7 percent for cis-1,2-dichloroethene compared to the acceptable range of 80 to 121 percent; 68.0 and 69.8 percent for benzene compared to the acceptable range of 80 to 120 percent) and have been flagged for the original sample only.

Qualifiers were added to the data as follows: J for detected values, and UJ for non-detected values. Because all the detected concentrations were well below cleanup levels, qualification of the data as estimated should not affect their use in evaluating project objectives.

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 relative percent difference (RPD).

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260C-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[1]	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination	Reporting limits and reported results
LCS and LCSD	Field duplicates
MS/MSD[3]	

Notes:
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below
[3] Lab indicated that QC requirements were met but project specific samples were not used in the analysis

Six of 16 vinyl chloride results 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 28 to 86.2 ng/L, and were all less than the cleanup level by a factor of at least three, therefore the final data were not 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.

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 6010B

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[1]	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate[3]
Blank contamination[2]	Target analyte list
Matrix Spike (MS)[3]	Reporting limits and reported results
	Field duplicates[2]

Notes:
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were changed or issued as discussed below
[3] Lab indicated that QC requirements were met but project specific samples were not used in the analysis for all analytes

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 20H0287-11 (MW-27) in batch BII0113 and 20H0297-08RE1 (MW-25) in batch BIH0586. The matrix spike percent recoveries for Manganese were outside control limits (75 to 125 percent) and were flagged within the QC section of the report (qualified HC). 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.

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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.

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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 2017a,b)

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 2017b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 6°C HCl to pH < 2	If >6 deg. C but </= 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: R if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: If sample result <CRQL, qualify U report at CRQL If sample result >/= CRQL, use professional judgement
		If blank >/= CRQL: If sample result <CRQL, qualify U and report at CRQL If sample result >/= but <blank result, qualify U or R and report at sample result If sample result >/= CRQL and >/= blank results, use professional judgement
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: J if %R <20%, or 20%<%R<Lower limit, or %R or RPD >Upper limit; For non-detects: R if %R<20%, UJ if 20%<%R<Lower limit
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD >Upper limit
LCS	One per lab batch Control limit +/-20%	Qualify sample results J/UJ
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ
Surrogates	Added to all samples Within method control limits	Qualify sample results J/UJ
Field Duplicates	QAPP limits RPD <50% OR absolute diff. < 1X RL (for results < 5X RL)	J/UJ in original sample only)

Notes:

Validation Guidelines for Metals Analysis by ICP-MS (Based on EPA 2017a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 6°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	Detects: J; Non-detects: R if holding time exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: If sample result non-detect, qualify UJ If sample result </= CRQL, use professional judgement or qualify as estimated low J- If sample result <10x CRQL, quality results >/=CRQL as estimated low J- If sample result >/= 10xCRQL, no qualification
		If blank >CRQL: If sample result non-detect, no qualification If sample result </= CRQL, qualify U and report at CRQL If sample result >CRQL but <10x blank, report at blank results and use professional judgement to qualify as estimated high J+ or R If sample result >/= 10x blank, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	For detects: If %R < 40% or 40-69%, J-; If %R 70-130%, no qualification; if %R>130%, J+; If %R >150%, R For non-detects: If %R<40%, R; If %R 40-69%, UJ, if %R>70%, no qualification
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level	For detects: J+ if %R>125% J-if %R <75% For Non-detects: R if %R<30%, UJ if %R <75% Qualify all samples in batch
Laboratory Duplicate	One per matrix per batch RPD <20% for samples >/= 5x CRQL OR CQRL if sample results <5x CRQL	If results >/= 5x CRQL and RPD>20% OR if results <5x CRQL and absolute difference >CRQL, J if detect, UJ if nondetect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5 x RL: Diff < RL	J/UJ in original sample only

Table 3
Data Quality Assurance Criteria

Parameter	Matrix	Reporting Limit/PQL	Precision	Accuracy	Completeness	Reference
Volatile Organic Compounds						
Benzene	Groundwater	0.2 µg/L	± 50%	± 50%	95%	SW-846 8260C
cis -1,2-DCE		0.2 µg/L				
Vinyl chloride		0.02 µg/L				
Monitored Natural Attenuation Parameters						
Arsenic	Groundwater	1 µg/L	± 20%	± 20%	95%	USEPA 6020
Iron		1 µg/L	± 20%	± 20%	95%	USEPA 6020
Manganese		1 µg/L	± 20%	± 20%	95%	USEPA 6020

Abbreviations:

DCE Dichloroethene
µg/L Microgram per liter
PQL Practical quantitation limit

Appendix B

Field Duplicate Analysis

QA/QC Completed by: Lisa Gilbert

Date Completed: 3/24/2021
South Park Landfill
553-1550-167

Data Validation			South Park Landfill						
QA/QC completed by: Mary Alice Benson					9/7/2020				
ARI Work Order		20H0287							
Sample numbers:		SPL-MW-29-0820; SPL-MW-60-0820							
Sample Date:		8/25 and 8/26/2020							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
units = ug/L		**MW-29**	**MW-60**						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ng/L	124	132	128	-8.00	6	y	20.0	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	ug/L	32400	34000	33200	-1600.00	5	y	20.0	
Manganese	ug/L	650	687	668.5	-37.00	6	y	5.0	
Arsenic	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
Comments:	**No data qualified**								

QA/QC Completed by: Lisa Gilbert

Date Completed: 3/24/2021
South Park Landfill
553-1550-167

Data Validation			South Park Landfill						
QA/QC completed by: Mary Alice Benson					9/17/2020				
ARI Work Order		20H0297							
Sample numbers:		SPL-MW-32-520; SPL-MW-61-0520							
Sample Date:				27-Aug-20					
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
units = ug/L		**MW-32**	**MW-61**						
cis-1,2-DCE	ug/L	0.5	0.54	0.52	-0.04	8	Y	0.2	
Vinyl chloride	ng/L	344	347	345.5	-3.00	1	y	20.0	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	ug/L	13200	13400	13300	-200.00	2	y	20.0	
Manganese	ug/L	1540	1520	1530	20.00	1	y	5.0	
Arsenic	ug/L	1.52	1.5	1.51	0.02	1	y	0.2	
Comments:	**No Data Qualified**								

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table August 2020 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW27-0820	20H0287-11	EPA 8260D	Cis-1,2-DCE	<0.20	µg/L	U	UJ	UJ
SPL-GW-MW25-0820	20H0297-08	EPA8260D	Cis-1,2-DCE	<0.2	µg/L	U	UJ	UJ
SPL-GW-MW25-0820	20H0297-08	EPA 8260D	benzene	0.26	µg/L		J	J

Qualifiers:

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.

UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

November 2020 Groundwater Sampling Event
South Park Landfill
Data Validation Report

Prepared for

Seattle Public Utilities

March 2021

Prepared by

Parametrix

November 2020 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

March 2021 | 553-1550-067 (03.00)

CITATION

Parametrix. 2021. November 2020 Groundwater Sampling Event South Park Landfill Data Validation Report. Prepared by Parametrix, Seattle, Washington. March 2021.

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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 August 2020 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260C	8260C-SIM	6010A Total Fe, Mn	6010A Dissolved As
SPL-GW-MW12-1120	20K0179-01	MW-12	X	X	X	
SPL-GW-MW12-1120	20K0179-11	MW-12				X
SPL-GW-MW14-1120	20K0179-02	MW-14	X	X	X	
SPL-GW-MW29-1120	20K0179-03	MW-29	X	X	X	
SPL-GW-MW18-1120	20K0179-04	MW-18	X	X	X	
SPL-GW-MW18-1120	20K0179-12	MW-18				X
SPL_GW-MW33-1120	20K0179-06	MW-33	X	X	X	
SPL-GW-MW33-1120	20K0179-14	MW-33				X
SPL-GW-MW60-1120	20K0179-08	MW-14 Dup	X	X	X	
SPL-GW-MW80-1120	20K0179-09	TRIP BLANK	X	X		
SPL-GW-MW27-1120	20K0193-09	MW-27	X	X	X	
SPL-GW-MW27-1120	20K0193-10	MW-27				X
SPL-GW-MW08-1120	20K0193-07	MW-08	X	X	X	
SPL-GW-MW08-1120	20K0193-08	MW-08				X
SPL-GW-MW24-1120	20K0193-03	MW-24	X	X	X	
SPL-GW-MW24-1120	20K0193-04	MW-24				X
SPL-GW-MW31-1120	20K0193-02	MW-31	X	X	X	
SPL-GW-MW30-1120	20K0193-01	MW-30	X	X	X	
SPL-GW-MW32-1120	20K0179-05	MW-32	X	X	X	
SPL-GW-MW32-1120	20K0179-13	MW-32				X
SPL-GW-MW26-1120	20K0193-05	MW-26	X	X	X	
SPL-GW-MW26-1120	20K0193-06	MW-26				X
SPL-GW-MW61-1120	20K0193-11	MW-30 Dup	X	X	X	
SPL-GW-MW81-1120	20K0193-12	TRIP BLANK	X	X		
SPL-GW-MW25-1120	20K0179-10	MW-25	X	X	X	
SPL-GW-MW25-1120	20K0179-16	MW-25				X
SPL-GW-MW10-1120	20K0179-07	MW-10	X	X	X	
SPL-GW-MW10-1120	20K0179-15	MW-10				X

Groundwater samples were collected between November 9 and 11, 2020 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 20K0179 and 20K0193. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method 8260C
- Vinyl chloride—EPA Method 8260C-SIM
- Select metals (Total iron and manganese, and dissolved arsenic) - EPA Method 6010A

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-MW60-1120 is a duplicate of SPL-GW-MW14-1120. Sample SPL-GW-MW61-1120 is a duplicate of SPL-GW-MW30-1120.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples. RPDs = difference / average = ((X1-X2) / (X1+X2)/2) x 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-MW80-1120 and SPL-GW-MW81-1120).

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 3.5 and 7.9 degrees C, indicating adequate temperature control for sample preservation for batch 20K0193, and slightly elevated temperature for batch 20K0179, 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 the VOA vial for sample 20K0193-12A (SPL-GW-MW81-1120) had a bubble in it, due possibly to sample collection methods. In some cases (particularly at landfills), dissolved methane present in groundwater forms bubbles in the VOA vials after collection. No data were qualified based on this sample.

2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD 8260C

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[2]	

Notes:

QC requirement findings further discussed in following sections (if required):

[1] Quality control results are discussed below, but no data were qualified.

[2] 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 20K0179-02 (SPL-GW-MW14-1120) in batch BIK0327. The matrix spike (MS) percent recoveries were within control limits. The matrix spike duplicate (MSD) percent recoveries for benzene and cis-1,2-dichloroethene were out of control high (126 % for benzene compared to the acceptable upper limit of 120, and 131% for cis-1,2-dichloroethene compared to the acceptable upper limit of 121) and have been flagged for the original sample only. The MS/MSD RPD was within control limits.

Sample specific QC was performed in association with sample 20K0193-01 (SPL-GW-MW30-1120) in batch BIK0380. The MS/MSD spike recoveries and RPD were within control limits.

Qualifiers were added to the data as follows: J for detected values, and UJ for non-detected values in the original sample only. Because all the detected concentrations were well below cleanup levels, qualification of the data as estimated should not affect their use in evaluating project objectives.

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 8260C-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[2]	

Notes:

QC requirement findings further discussed in following sections (if required):

1 Quality control results are discussed below, but no data were qualified.

2 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 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 20K0179-02 (SPL-GW-MW14-1120) in batch BIK0388. The MS and MSD percent recoveries were out of control high (127 % for vinyl chloride in the MS compared to the acceptable upper limit of 120, and 129% for the MSD, compared to the acceptable upper limit of 120) and have been flagged for the original sample only. The MS/MSD RPD was within control limits.

Sample specific QC was performed in association with sample 20K0193-01 (SPL-GW-MW30-1120) in batch BIK0388. The MS percent recoveries were outside control limits high for both Vinyl Chloride and surrogate 1,2-Dichloroethane-d4 (143 % for vinyl chloride in the MS compared to the acceptable upper limit of 120, and 138% for the surrogate, compared to the acceptable upper limit of 129) which were flagged for the original sample only. The MSD percent recoveries and MS/MSD RPD were within control limits.

Qualifiers were added to the data as follows: J for detected values, and UJ for non-detected values. Because all the detected concentrations were well below cleanup levels, 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 6010B

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)[1]	Reporting limits and reported results
	Field duplicates

QC requirement findings further discussed in following sections (if required):
[1] Quality control results are discussed below, but no data were qualified.
[2] 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 20K0179-02 (MW-14) in batch BIK0694.The duplicate, and MS/MSD RPDs were within control limits. The lab noted that the natural concentration of the spiked analyte (Manganese) was 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 was performed in association with sample 20K0193-01 (MW-30) in batch BIK0644. 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 2017a,b)

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 2017b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 6°C HCl to pH < 2	If >6 deg. C but </= 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: R if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: If sample result <CRQL, qualify U report at CRQL If sample result >/= CRQL, use professional judgement
		If blank >/= CRQL: If sample result <CRQL, qualify U and report at CRQL If sample result >/= but <blank result, qualify U or R and report at sample result If sample result >/= CRQL and >/= blank results, use professional judgement
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: J if %R <20%, or 20%<%R<Lower limit, or %R or RPD >Upper limit; For non-detects: R if %R<20%, UJ if 20%<%R<Lower limit
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD >Upper limit
LCS	One per lab batch Control limit +/-20%	Qualify sample results J/UJ
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ
Surrogates	Added to all samples Within method control limits	Qualify sample results J/UJ
Field Duplicates	QAPP limits RPD <50% OR absolute diff. < 1X RL (for results < 5X RL)	J/UJ in original only)

Notes:

Validation Guidelines for Metals Analysis by ICP-MS (Based on EPA 2017a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 6°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	Detects: J; Non-detects: R if holding time exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: If sample result non-detect, qualify UJ If sample result </= CRQL, use professional judgement or qualify as estimated low J- If sample result <10x CRQL, quality results >/=CRQL as estimated low J- If sample result >/= 10xCRQL, no qualification
		If blank >CRQL: If sample result non-detect, no qualification If sample result </= CRQL, qualify U and report at CRQL If sample result >CRQL but <10x blank, report at blank results and use professional judgement to qualify as estimated high J+ or R If sample result >/= 10x blank, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	For detects: If %R < 40% or 40-69%, J-; If %R 70-130%, no qualification; if %R>130%, J+; If %R >150%, R For non-detects: If %R<40%, R; If %R 40-69%, UJ, if %R>70%, no qualification
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level	For detects: J+ if %R>125% J-if %R <75% For Non-detects: R if %R<30%, UJ if %R <75% Qualify all samples in batch
Laboratory Duplicate	One per matrix per batch RPD <20% for samples >/= 5x CRQL OR CQRL if sample results <5x CRQL	If results >/= 5x CRQL and RPD>20% OR if results <5x CRQL and absolute difference >CRQL, J if detect, UJ if nondetect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5 x RL: Diff < RL	J/UJ in original sample only

Table 3
Data Quality Assurance Criteria

Parameter	Matrix	Reporting Limit/PQL	Precision	Accuracy	Completeness	Reference
Volatile Organic Compounds						
Benzene	Groundwater	0.2 µg/L	± 50%	± 50%	95%	SW-846 8260C
cis -1,2-DCE		0.2 µg/L				
Vinyl chloride		0.02 µg/L				
Monitored Natural Attenuation Parameters						
Arsenic	Groundwater	1 µg/L	± 20%	± 20%	95%	USEPA 6020
Iron		1 µg/L	± 20%	± 20%	95%	USEPA 6020
Manganese		1 µg/L	± 20%	± 20%	95%	USEPA 6020

Abbreviations:

DCE Dichloroethene
µg/L Microgram per liter
PQL Practical quantitation limit

Appendix B

Field Duplicate Analysis

Data Validation			South Park Landfill						
QA/QC completed by: Mary Alice Benson			1/15/2021						
ARI Work Order	20K0179								
Sample numbers:	20K0179-02, 20K0179-08								
Sample Date:	11/9/2020								
Groundwater	**Units**	**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
		MW-14	**MW-60**						
cis-1,2-DCE	ug/L	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
Vinyl chloride	ng/L	<20	<20	#DIV/0!	#VALUE!	#VALUE!		20.0	y
Iron	ug/L	3560	3590	3575	-30.00	0.84	y	20.0	
Manganese	ug/L	603	598	600.5	5.00	0.83	y	5.0	
ARI Work Order	20K0193								
Sample numbers:	20K0193-01, 20K0193-11								
Sample Date:	11/11/2020								
Groundwater	**Units**	**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
		MW-30	**MW-61**						
cis-1,2-DCE	ug/L	0.3	0.31	0.305	-0.01	3.28	y	0.2	
Vinyl chloride	ng/L	251	252	251.5	-1.00	0.40	y	20.0	
Iron	ug/L	4700	4430	4565	270.00	5.91	y	20.0	
Manganese	ug/L	138	132	135	6.00	4.44	y	5.0	
Comments:	**No data qualified**								
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Data Validation			South Park Landfill						
QA/QC completed by: Lisa Gilbert					9/17/2020				
ARI Work Order		20H0297							
Sample numbers:		SPL-MW-32-520; SPL-MW-61-0520							
Sample Date:				27-Aug-20					
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<50%**	**RL**	**w/in RL?**
units = ug/L		**MW-32**	**MW-61**						
cis-1,2-DCE	ug/L	0.5	0.54	0.52	-0.04	8	Y	0.2	
Vinyl chloride	ng/L	344	347	345.5	-3.00	1	y	20.0	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!		0.2	
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	ug/L	13200	13400	13300	-200.00	2	y	20.0	
Manganese	ug/L	1540	1520	1530	20.00	1	y	5.0	
Arsenic	ug/L	1.52	1.5	1.51	0.02	1	y	0.2	
Comments:	**No Data Qualified**								

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table November 2020 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW14-1120	20K0179-02	EPA 8260D	Cis-1,2-Dichloroethene	0.2	µg/L	U	UJ	UJ
SPL-GW-MW14-1120	20K0179-02	EPA8260DSIM	Vinyl Chloride	20	ng/L	U	UJ	UJ
SPL-GW-MW30-1120	20K0193-01	EPA 8260DSIM	Vinyl Chloride	251	ng/L		J	J

Qualifiers:

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.

UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.