2023 Operations, Maintenance, and Monitoring Annual Report
South Park Landfill

Volume I

Prepared for

Seattle Public Utilities

March 2024

Parametrix

In Association with

HWA GeoSciences Inc.
DBE/MWBE

2023 Operations, Maintenance, and Monitoring Annual Report South Park Landfill

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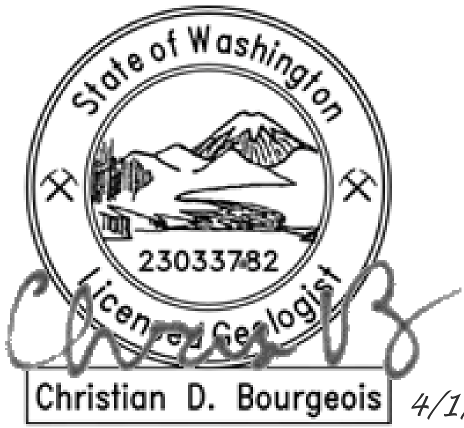
March 2024 | 553-1550-067

Citation

Parametrix and HWA GeoSciences, Inc. 2024. 2023 Operations,
Maintenance, and Monitoring Annual Report South Park Landfill.
Prepared by HWA Geosciences in association with Parametrix,
Seattle, Washington.
March 2024.

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.



4/1/2024

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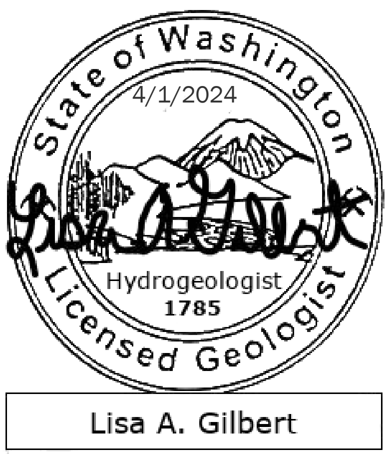

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4/1/2024

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Acronyms and Abbreviations

CAP	Cleanup Action Plan
City	City of Seattle
COC	chemical of concern
CPOC	conditional point of compliance
CPSP	CenterPoint South Park LLC
County	King County
CUL	cleanup level
DCE	dichloroethene (*cis*-1,2-DCE is measured for the compliance monitoring)
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
KIP	Kenyon Industrial Park
LEL	lower explosive limit
LFG	landfill gas
LFGCCS	landfill gas collection and control system
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
ppmv	parts per million by volume
PVC	polyvinyl chloride
redox	oxidation-reduction (potential)
RI/FS	Remedial Investigation/Feasibility Study
ROW	right-of-way
SPPD	South Park Property Development, LLC
SPU	Seattle Public Utilities
SR	State Route
SRDS	South Recycling and Disposal Station
WAC	Washington Administrative Code

1. Introduction

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

The Settlement Area primarily consists of the two largest properties within the Edge of Refuse; South Recycling and Disposal Station (SRDS) and CenterPoint South Park LLC (CPSP), formerly owned by the South Park Property Development, LLC (SPPD). The SRDS property owner is the City of Seattle (City). The SPPD/CPSP property owner was SPPD until September 2022 when it was purchased by CPSP. The Settlement Area also includes certain adjacent City and Washington State rights-of-way (ROWs). The other properties within the Edge of Refuse are the Kenyon Industrial Park (KIP) and the 7901 2nd Avenue South properties.

This report presents the results of the 2023 operations, maintenance, and monitoring (OMM) 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.

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

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

1.1 Regulatory Status

The landfill received solid waste from the 1930s until 1966, when it was closed under the existing landfill closure laws at the time. Investigations of groundwater, surface water, soil, and landfill gas (LFG) began in the late 1980s. In February 2007, the landfill 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 SPPD entered into Agreed Order No. 6706 with Ecology to conduct a RI/FS and to complete a preliminary draft CAP. The Agreed Order was amended in 2013 to include an Interim Action (IA) to be conducted primarily on the portion of the Settlement Area owned by SPPD (Farallon 2013) and was amended again in 2015 to include an IA to be conducted primarily on the SRDS portion, owned by SPU. The IAs included construction of a landfill cap, installing LFG and surface water control systems, establishing groundwater and LFG monitoring, and implementing institutional controls.

The South Park Landfill Final CAP (Ecology 2018a) was included as an attachment to the March 26, 2019, Consent Decree for the SPPD and SRDS properties. The selected cleanup action described in the CAP fulfills the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D of the

Revised Code of Washington, administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

The CAP is currently in the process of being amended (draft Amended CAP; Ecology 2023) to address redevelopment plan modifications for the SRDS property and add additional PLPs. Until 2020, SPU planned to construct support facilities for the adjacent South Transfer Station on the SRDS property in conjunction with implementation of the remedial action requirements. In 2020, SPU chose to reevaluate the best use of the SRDS property and decoupled the redevelopment elements from the remedial project. SPU will proceed with implementation of the required remedial action components defined in the CAP and will manage the SRDS property as a paved transfer station support facility with minor operational improvements for SPU activities.

1.2 Settlement Area Properties and Remedy Components

The Settlement Area includes the SRDS and CPSP (formerly SPPD) 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 Recycling and Disposal Station Property

The SRDS property includes County tax parcel No. 7328400005, encompassing 10.55 acres. A portion of this property was purchased by SPU in 1951. Later in the 1950s, the City sold some portions of the property to private individuals. Between 1965 and 1967, the City reacquired those portions of the property sold in the 1950s. Two additional strips of land defined by County tax parcel No. 3224049110, 60 feet (ft) on the west of the SRDS property and 30 ft on the south, were incorporated into the property in 2003 by City Ordinance 121306. This additional land is in the process of being recorded by the County and brings the area to approximately 11 acres.

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

The SRDS facility includes the main waste disposal building, a small maintenance facility, a scale house, two vehicle-fueling systems, and several additional small buildings used for offices and HHW collection. The offices and HHW collection are the only regularly occupied/active facilities. The majority of the facility is paved, except for some landscaped areas along the eastern edge of the property adjacent to 5th Avenue South, a landscaped strip along the south side of the property, a few landscape planter islands along the western side of the property, and other small areas in the interior of the property as shown in the aerial of Figure 2.

Under Amendment No. 2 of Agreed Order No. DE 6706, an IA was implemented for the SRDS property between 2015 and 2020, as detailed in an Interim Action Work Plan (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.

1.2.2 CenterPoint South Park LLC Property

The CPSP (former 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 purchased by CPSP in 2022. The property was previously purchased by the County in 1957 and leased to SPU from 1958 to 1978 for municipal solid waste disposal. After disposal operations ended in 1966, additional unclassified fill was added, and the property was graded (but not paved) as part of landfill closure. The County later leased portions of the property to a variety of tenants from the mid-1980s through the late 1990s, primarily for truck and equipment storage. In 2008, the property was largely cleared of vegetation and, in some areas, a layer of crushed concrete was added as ballast and the property was regraded.

In 2014 and 2015, the SPPD owner performed an IA for cleanup at the property in accordance with the 2013 Ecology-approved IAWP (Farallon 2013) under Amendment No. 1 of Agreed Order No. DE 6706. 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.

1.3 Hydrogeologic Setting

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

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

The solid waste deposited in the landfill extends into the top of the A-Zone with the depth of waste extending down approximately to sea level (Floyd|Snider et al 2017). The lower portion of solid waste in the landfill is saturated (i.e., occurring below the local water table). Interpreted cross-sections of the landfill and surrounding area are included in Figures 5.2 to 5.7 in Floyd|Snider et al (2017).

1.4 Monitoring Program Overview

In accordance with the CAP, monitoring at the Settlement Area by the Site Coordinator consists of annual cap inspections, quarterly monitoring of LFG perimeter probes, and quarterly sampling and analysis of groundwater monitoring wells upgradient and downgradient of the Settlement Area. SPU assumed responsibility for the quarterly monitoring of LFG perimeter probes in the third quarter of 2022. Additional events may be triggered by LFG monitoring results at the perimeter probes or by unforeseen emergency or extreme weather conditions, as summarized in the following sections. Monitoring by the property owners (SPU and CPSP) consists of continuous methane monitoring in on-site buildings as defined in the OMMP. The status of the 2023 monitoring is documented in the Annual Report Checklist presented in Appendix A.

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

1.4.1 Annual Monitoring

Cap inspections are conducted annually as described in Section 2 of this report. Maintenance forms are completed by the property owners to document repairs conducted and re-inspections are conducted by the Site Coordinator. The 2023 annual cap inspection results are presented in Appendix B.

1.4.2 Quarterly Monitoring

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

1.4.3 Unforeseen Emergency or Extreme Weather Events

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

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

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

2. Landfill Cap System

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

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

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

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

After redevelopment, in accordance with the draft Amended CAP, stormwater drainage will be collected across the SRDS property with flow and quality mitigation using an above-grade stormwater treatment system. The location, treatment media, sizing, and configuration of the stormwater treatment system are currently in the design process.

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

2.1 Landfill Cap Inspection Methodology

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

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

- Asphaltic Concrete (Location numbers AC-):
  - → 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 Geomembrane (Location numbers G-):
  - → Erosion of cover soil
  - → Exposed geotextile
  - → Holes/signs of unauthorized digging
  - → Poor vegetative cover
  - → Invasive/deep-rooted plants
  - → Exposed geomembrane
- Stormwater Management Facilities (Location numbers SW-):
  - → 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 or monitoring will be included on the Cap Inspection Report. Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action and the Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Inspection Form B (a blank sample is located in Appendix B2-A) and the Site Coordinator will provide observations in Part 2 of the form after the verification inspection.

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

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days. These areas are of highest concern due to the potential compromise of the landfill cap and need to be further inspected, repaired, and restored in accordance with the approved 2013 IAWP of the Agreed Order.

2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.
3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

2.2 Landfill Cap Inspection and Maintenance Events

In accordance with the Cap Inspection Work Plan (Parametrix 2020), an annual inspection was conducted on April 6, 2023 and a mid-year landfill cap reinspection was conducted on October 11, 2023. Maintenance and repairs conducted by the property owners were documented and inspections were conducted by the Site Coordinator.

2.2.1 April 2023 Landfill Cap Inspection

The 2023 annual landfill cap inspection was conducted on April 6, 2023. Previously identified concerns that remained in the same general or worse condition were retained in the current list of concerns. The findings of the inspection are presented in the technical memorandum included as Appendix B1-A (Appendix B) and are summarized below.

SRDS Property. The general property condition was good. Pavement cracks, ruttings, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration is not recommended based on conditions at this time, except at locations SRDS AC-13, AC-14, and AC-15, which are worsening.

CPSP Property. The general property condition was good. The paved area was in good condition, though ponding will be monitored to ensure the depressions do not get deeper, which could indicate asphaltic concrete cap damage. Vegetated slopes are uniform and generally in good condition with some erosion noted. The primary concerns were exposed geomembrane at the parking area interface at SPPD G-6, G-7 and G-8, and growth of vegetation through asphalt near the fences. In addition, there are two open pipes, one at the AC-3 location and one at the G-1 location, which were identified in a previous inspection.

Right-of-Way. Four areas in the ROW were identified as locations of concern due to asphalt cracking, rutting, and potholes that have continued to worsen.

2.2.2 October 2023 Mid-Year Landfill Cap Reinspection

A mid-year reinspection was conducted by the Site Coordinator on October 11, 2023. Locations identified in the April 2023 annual inspection were reinspected. The findings are presented in a technical memorandum included as Appendix B1-B (Appendix B) and are summarized below.

SRDS Property. The general property conditions observed were good and similar to previous inspections. Pavement cracks, ruttings, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration were not recommended based on conditions at this time, except at locations SRDS AC-13, AC-14, and AC-20.

CPSP Property. The general property conditions observed were good and similar to previous inspections. The paved area was in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate asphaltic concrete cap damage. Vegetated slopes were uniform and generally in good condition with some erosion. The primary concerns were exposed geomembrane at the parking area interface at SPPD G-6, G-7 and G-8, invasive plant growth, and growth of vegetation through asphalt. In addition, there was an open pipe identified in the April 2023 annual inspection at the G-1 location that was covered in dirt and vegetation.

Right-of-Way. The four areas in the ROW that were identified as locations of concern in the April 2023 annual inspection were reinspected.

2.2.3 Landfill Cap Maintenance Completed

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

2.2.3.1 SRDS Property.

In February 2024, cracks were repaired at locations SRDS AC-13, AC-14, and AC-20 with hot mix asphalt and sealant. The Site Coordinator observed the repairs and determined the repair activities were complete.

2.2.3.2 CPSP Property.

On November 9, 2023, Catchment Solutions, on behalf of CenterPoint completed cap maintenance at Locations SPPD SW-3, SW-4, and AC-23. The drains were inspected, cleared, and sediment was removed from the drain areas at SPPD SW-3 and SW-4, and an invasive bush was removed from SPPD AC-23. The Site Coordinator has observed the repairs and determined the repair activities were complete.

On February 22 and 23, 2024, Veths Landscaping, on behalf of CenterPoint completed cap maintenance at Locations SPPD G-6, G-7, G-8, and G-12. Dead grass was removed, and new sod and re-seed was placed partially restoring areas of exposed geomembrane..

2.2.3.3 Rights-of-Way.

On February 6, 2024 the Site Coordinator observed previously-performed repairs on cracks and pot holes at Locations AC-1 and AC-4. The repairs at AC-4 are considered complete, and the repairs at AC-1 are considered partially complete, with a few large cracks remaining.

2.2.4 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2023 that triggered an inspection to the landfill cap.

2.3 Activities Planned for the Next One-Year Period

The Site Coordinator will conduct an annual cap inspection in the first quarter of 2024 which will include reinspection of previous areas of concern, reviewing maintenance conducted, and looking for any new areas of concern. The previously identified locations of concern will be evaluated during the 2024 inspections (See tables presented in Appendices B1-A and B1-B for further details). A mid-year reinspection will be conducted in the Fall of 2024 to reinspect previous areas of concern.

2.3.1 SRDS Property.

The 2023 Landfill Cap Inspection conducted in April 2023, and 2023 Mid-Year Landfill Cap Reinspection conducted in October 2023, presented in Appendices B1-A and B1-B, identified areas of concern within the Settlement Area. All recommended repairs were completed by SPU. Additional work may be required if new areas of concern are identified during the 2024 cap inspection.

2.3.2 CPSP Property.

The 2023 Landfill Cap Inspection conducted in April 2023 and the 2023 Mid-Year Landfill Cap Reinspection conducted in October 2023, presented in Appendices B1-A and B1-B, identified areas of concern within the Settlement Area. Several areas of concern identified during the cap inspections were repaired during this reporting period. Additional work will be required in 2024 to complete and/or reinspect outstanding recommended repairs.

2.3.3 Rights-of Way.

The 2023 Landfill Cap Inspection conducted in April 2023, and 2023 Mid-Year Landfill Cap Reinspection conducted in October 2023, presented in Appendices B1-A and B1-B, identified areas of concern within the Settlement Area. Several areas of concern identified during the cap inspections were repaired during this reporting period. Additional work will be required in 2024 to complete and/or reinspect outstanding recommended repairs.

3. Landfill Gas System

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

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

3.1 Landfill Gas Monitoring Methodology

The LFG monitoring includes quarterly monitoring of perimeter probes; continuous monitoring of on-site buildings using methane detectors and alarms conducted by individual property owners; and off-site building monitoring, if necessary (see conditions in Figure 4). 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. The Site Coordinator conducted the monitoring through the second quarter of 2022 and SPU assumed responsibility for the monitoring in the third quarter of 2022 and future quarterly monitoring of the perimeter LFG probes. Procedures for perimeter gas probe monitoring are presented in the OMMP – Landfill Gas Monitoring and Contingency Plan.

3.1.1 Gas Probe Monitoring

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

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, and oxygen. The purge time using the Landtec GEM is calculated for each probe based on its construction. The LFG meter is connected to

LFG probes using Teflon tubing and a rubber stopper placed into probes without a valve. Teflon, silicone, and polyethylene tubing are utilized to connect to the LFG meter.

Several of the LFG probes exhibit water levels above their screens year-round, blocking landfill gas from entering the probes. If the probe is observed through field observations to be blocked by water during the purging process (e.g., high differential pressures, water entering Landtec GEM tubing), purging is discontinued and the probe is noted to be blocked and this information is entered directly into the Landtec GEM. All the data are downloaded from the Landtec GEM and submitted to the Site Coordinator.

3.1.2 Landfill Gas Triggers and Contingency Actions

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

3.2 Landfill Gas Monitoring Activities and Results

3.2.1 Perimeter Probe Monitoring

Quarterly perimeter probe monitoring events were conducted in January, April, July, and October 2023. The results are summarized in Table 2 and included on the gas probe monitoring field forms presented in Appendix C1.

Four gas probes (GP-11, GP-13, GP-15, and GP-32) were observed to be blocked (screened zones completely saturated) during one or more sampling events and any data measured from blocked probes during those events were not used.

LFG was measured at GP-09 during a separate event on February 6, 2024 in the first quarter, due to encroachment of a homeless encampment into the probe area presenting potential access and safety issues for field personnel. There were no methane concentrations measured during quarterly monitoring events that exceeded 5 percent by volume, which is the LEL for methane. Methane concentrations were less than the 1.25 percent by volume regulatory action limit, with the following exceptions:

- In the first quarter, methane at gas probe GP-33 was recorded at 4.9% by volume. The flow chart for triggers and contingent actions (Figure 4) was followed and CPSP was notified immediately. Farallon Consulting adjusted the CPSP landfill gas collection and control system (LFGCCS) bringing the methane concentration below 1.25% by volume within 1 week of notification of the elevated gas level.
- In the fourth quarter, methane at gas probe GP-13 was recorded at 4.2% by volume. The Cleanup Action Plan Landfill Gas Monitoring and Contingency Plan (Figure A.2.4) has a contingent action trigger for measurements below 5% and above 1.25%. GP-13 is a shallow probe blocked with water and therefore the recorded measurement is not representative of concentration in the screen zone. A work plan was approved by Ecology in December for installation of supplemental gas probes at probes that are consistently blocked with water.

3.2.2 Building Monitoring

Building monitoring is required for occupied on-site buildings unless the construction demonstrates effective LFG mitigation. Off-site building monitoring is required only if triggered by conditions in perimeter gas probes.

3.2.2.1 On-Site

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

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

CPSP Property. The CPSP property owner did not report any incidences of methane detections inside on-site buildings or structures during 2023. The methane alarms were inspected quarterly in 2023. Inspection checklists are included in Appendix C2.

3.2.2.2 Off-Site

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

3.2.3 Operational Activities Completed

CPSP Property.

- Conducted quarterly operation and maintenance of the LFGCCS.
- Conducted ongoing remote monitoring of the CPSP property LFGCCS blowers.
- Conducted quarterly maintenance of the methane alarms in the on-site buildings.

3.2.4 Gas Probe Maintenance Completed

The City of Seattle cleared the homeless encampment from the ROW containing gas probe GP-09 and groundwater wells MW-10 and MW-25 in April 2023. The ROW was cleaned of debris and fencing was installed around the perimeter.

3.2.5 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2023 that triggered an inspection of the perimeter gas probes or the LFG system.

3.3 Activities Planned for the Next One-Year Period

3.3.1 Landfill Gas Monitoring

Quarterly perimeter probe monitoring by SPU personnel is planned during the last week of January (completed), April, July, and October.

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

3.3.2 Gas Probe Maintenance

Some additional future maintenance may be necessary at the following locations:

- There is asphalt erosion near gas probe GP-31. The roadway margin near the probe appears to be actively eroding due to heavy truck traffic. The condition of the probe will continue to be monitored to determine when actions are necessary to restore the asphalt near the probe.
- Repair cracked concrete around the casing at GP-28.

3.3.3 Shallow Gas Probe Replacement

Four of the compliance monitoring gas probes at South Park Landfill are consistently blocked with water so that the presence of LFG in the shallow subsurface cannot be monitored. The four gas probes are GP-11, GP-13, GP-15, and GP-32. The locations are on the west (GP-11 and GP-13) and south (GP-15 and GP-32) side of the Landfill. Since these probes are located in the vicinity of adjacent occupied buildings, these probes will be supplemented in 2024 with probes screened at shallower depths. A work plan (Parametrix 2023) was approved by Ecology in December 2023 and the work is scheduled to take place in spring 2024.

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.

In accordance with the CAP, analysis for dissolved arsenic in CPOC wells (MW-08, MW-10, MW-12, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32 and MW-33) was discontinued beginning in the second quarter of 2023 because concentrations remained in compliance with the CUL for 2 years. Additionally, analysis for benzene at well MW-25 was discontinued beginning in the third quarter of 2023 because concentrations remained in compliance for 2 years. 2023 benzene and dissolved arsenic results are presented in this report, but not discussed in detail.

There are 14 groundwater monitoring wells included in the long-term groundwater monitoring program for the Settlement Area at the locations shown on Figure 5. In addition to the CPOC wells, 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 3 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 (MW30/MW-31) and A- and B-Zones (MW-27/MW-8, MW-25/MW-10, and MW-26/MW-24).

4.1 Groundwater Monitoring Methodology

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

4.1.1 Water Level Measurement

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

4.1.2 Sampling and Analysis

Groundwater samples are collected according to procedures outlined in the OMMP, using either a dedicated bladder pump and Teflon tubing or a peristaltic pump with disposable low-density polyethylene and silicon tubing. Details on which type of pump is used at each well are included in Table 3. The monitoring wells are purged using low-flow sampling procedures while field parameters (temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential [redox]) are measured to determine stabilization using a calibrated multiparameter probe with a flow-through cell. Turbidity is also measured in the field using a separate turbidity meter outside of the flow through cell.

Long-term groundwater monitoring includes analyzing samples for vinyl chloride, iron, and manganese (groundwater COCs that have exceeded cleanup levels (CULs) at the CPOC); and cis-1,2-DCE, the precursor for vinyl chloride. Benzene was previously analyzed in samples from well MW-25 to track a localized plume that appears to originate upgradient of the Settlement Area; and arsenic was previously analyzed in samples from wells MW-08, MW-10, MW-12, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32, and MW-33. Analysis of benzene and dissolved arsenic was discontinued prior to the third and second quarters of 2023, respectively.

Groundwater samples are analyzed using the following methods:

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

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

4.1.3.1 Vinyl Chloride

In accordance with the CAP, either or both of 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).

4.1.3.2 Iron and Manganese

In accordance with the CAP, 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. If the concentrations are increasing, the Subject PLPs will meet with Ecology to discuss next actions. Ecology will determine if further active remediation is needed and if this will require reopening the consent decree due to remedy failure.

4.2 Groundwater Monitoring Activities and Results

4.2.1 Long-Term Groundwater Monitoring

Quarterly long-term monitoring events were conducted in February, May, August, and November 2023. The measured groundwater levels, calculated gradients, interpreted flow directions, and groundwater quality results are presented in this section of the report.

4.2.1.1 Gradients and Flow Direction

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

Horizontal Gradients

Groundwater gradient maps were prepared using data from all the A-Zone wells plus MW-18, as the A- and B-Zones are not separate aquifers or even hydraulically separated by any low permeability layers. Figures 6, 7, 8 and 9 show the interpreted gradients. The groundwater flow direction is generally to the east and northeast, toward the Lower Duwamish Waterway, with gradients ranging from 0.0083 to 0.0098 ft/ft in the northern region (calculated between MW-12 and MW-32) and 0.0089 to 0.0094 ft/ft in the southern region (calculated between MW-14 and MW-18). This is consistent with historical observations.

Vertical Gradients

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

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

Flow Velocity

Based on estimates of horizontal hydraulic conductivity and porosity determined in the RI/FS (Floyd|Snider et al. 2017) and the gradients measured in 2023, estimated horizontal groundwater flow velocities in the Duwamish Valley Alluvial Aquifer in the northern and southern regions of the Settlement Area are summarized in Table 6.

The two regions were identified in the RI/FS as having differing groundwater flow directions, soil types, and hydraulic conductivity estimates. The northern region of the Settlement Area (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 Settlement Area CPSP property) is in the vicinity of MW-8/MW-27, with an easterly groundwater flow direction and slightly lower hydraulic conductivities due to siltier soils. These values are similar or higher than measured/estimated values during the RI/FS, due to steeper measured and interpreted gradients.

The following formula was used to calculate groundwater flow velocities:

$V = Ki/ne$, where:

V = groundwater velocity (ft/day)

K = hydraulic conductivity (ft/day)

i = hydraulic gradient (ft/ft)

ne = effective porosity (dimensionless)

Based on the observed gradients of 0.0083 to 0.0098 ft/ft in the northern region of the Settlement Area and 0.0089 to 0.0094 ft/ft in the southern region, the calculated flow velocity ranged from 4.65 to 7.79 ft/day in the northern region and 1.36 to 3.17 ft/day in the southern region of the Settlement Area.

4.2.1.2 Groundwater Quality Results

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

The following is a summary of CUL exceedances in CPOC wells during 2023 monitoring events:

- Vinyl chloride concentrations exceeded the CUL of 0.29 μg/L in A-Zone wells MW-25 (Q1, Q2, and Q3), and MW-32 (Q1 and Q2).
- Total iron concentrations exceeded the CUL of 27 mg/L in A-Zone wells MW-25 (Q1, Q2, Q3, and Q4) and MW-27 (Q3); and the CUL of 31 mg/L in B-Zone well MW-10 (Q1, Q2, Q3, and Q4).
- Total manganese concentrations exceeded the CUL of 2.2 mg/L in A-Zone well MW-25 (Q1, Q2, Q3, and Q4) and B-Zone well MW-10 (Q1, Q2, Q3, and Q4).
- There were no concentrations of cis-1,2-DCE exceeding the CUL of 16 μg/L.
- There were no concentrations of benzene at MW-25 exceeding the CUL of 5.0 μg/L.
- There were no concentrations of dissolved arsenic exceeding the CUL of 5.0 μg/L.

Time-series plots for all COCs, showing data for all historical events and post-Consent Decree sampling events 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 2023, vinyl chloride concentrations exceeded the CUL in CPOC downgradient A-Zone wells MW-25 and MW-32 during at least two quarters, but none of the concentrations exceeded the concentration trigger value.

Time-series plots of all historical data presented in Appendix D1 show apparent overall stable or decreasing trends for vinyl chloride over the history of monitoring. 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

Mann-Kendall trend analyses for the vinyl chloride post-Consent Decree data (second quarter 2020 through fourth quarter 2023) were conducted using the Excel-based program ProUCL (EPA 2015). The Mann-Kendall trend plots, calculations, and a summary of the approach used is provided in Appendix D2, and the results are summarized in Table 8. Note that trends are required to include MW-31 but not MW-30, even though these wells are not CPOC wells.

There were no statistically significant trends in the post-Consent Decree data for vinyl chloride in the two downgradient wells that had 2023 vinyl chloride concentrations above the CUL (MW-25 and MW-32). Statistically significant increasing trends were observed in wells MW-33 (A Zone) and well MW-24 (B-Zone), but at concentrations below the CUL.

Since there were no wells that exceeded either of the contingency trigger conditions for vinyl chloride in 2023 (concentrations above the concentration trigger criteria for two consecutive sampling events and an increasing trend in a well where the concentration of vinyl chloride is greater than the CUL), no additional actions were required.

Iron and Manganese

In 2023, iron and manganese concentrations exceeded the CUL during all four quarters in downgradient wells MW-25 (A-Zone) and MW-10 (B-Zone). The manganese concentration exceeded the CUL during one quarter in downgradient well MW-27 (A-Zone). Time-series plots for iron and manganese are presented in Appendix D1. Historic data coverage prior to 2020 for each well is summarized below.

- 1999-2003; 2011-2014: MW-08, MW-10, MW-12, MW-14, MW-18, MW-24
- 2006; 2011-2014: MW-25, MW-26, MW-27
- 2013-2014: MW-29, MW-30, MW-31, MW-32, MW-33

The time-series plots show generally stable or decreasing trends over the history of monitoring since 1999. One exception was the apparent increases in iron in well MW-25. Apparent decreases included iron in upgradient well MW-12 (A-Zone) and downgradient wells MW-32 (A-Zone) and MW-

08 and MW-18 (B-Zone); and manganese in upgradient well MW-12 (A-Zone), and downgradient wells MW-26, MW-29, and MW-32 (A-Zone) and MW-08 (B-Zone).

Mann-Kendall trend analyses for the iron and manganese post-Consent Decree data (second quarter 2020 through fourth quarter 2023) were conducted using the Excel-based program ProUCL (EPA 2015). The Mann-Kendall trend plots, calculations, and a summary of the approach used is provided in Appendix D2, and the results are summarized in Tables 9 and 10.

The trend analyses indicated statistically significant increasing trends in the post-Consent Decree data for iron in downgradient wells MW-25, MW-26, MW-31, MW-32, and MW-33 (A-Zone) and MW-24 (B-Zone); and for manganese in upgradient well MW-14 (A-Zone) and downgradient wells MW-25, MW-31, and MW-33 (A-Zone). Therefore, in accordance with the CAP, it is recommended that analyses for iron and manganese be continued during 2024. This recommendation will be discussed with Ecology.

4.2.2 Monitoring Well Maintenance Completed

The Site Coordinator installed new silicone tubing at wells with dedicated bladder pumps to replace deteriorated low density polyethylene discharge tubing at the wellheads, and the bolts for the well MW-29 monument were replaced in July 2023.

The City of Seattle cleared the homeless encampment from the ROW containing gas probe GP-09 and groundwater wells MW-10 and MW-25 in April 2023. The ROW was cleaned of debris and fencing was installed around the perimeter.

4.2.3 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2023 that triggered an inspection to the groundwater monitoring wells.

4.3 Activities Planned for the Next One-Year Period

4.3.1 Groundwater Monitoring

During the next 1-year period, quarterly groundwater monitoring is planned during the months of February, May, August, and November.

4.3.2 Monitoring Well Maintenance

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

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

The old partially buried purge water drums that King County installed will be removed.

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

5. Conclusions and Recommendations

No unforeseen emergency or extreme weather events occurred during 2023 at the Settlement Area that triggered additional monitoring requirements.

5.1 Landfill Cap

The 2023 Landfill Cap Inspection was conducted on April 6, 2023 and identified some areas requiring additional monitoring, maintenance, and repairs. A Mid-Year Landfill Cap Reinspection was conducted on October 11, 2023. SRDS and CPSP conducted some of the recommended repairs during 2023-2024, and these repairs were observed by the Site Coordinator. Additional work is required based on the findings of the inspections. The Site Coordinator will conduct an annual inspection in the Spring of 2024.

5.2 Landfill Gas

LFG monitoring throughout 2023 indicated that LFG remains present at the Settlement Area and that the LFG is being effectively controlled without offsite migration above regulatory thresholds.

Supplemental shallow gas probe installation is scheduled for the spring of 2024 for probes with screened intervals that are typically blocked by groundwater (GP-11, GP-13, GP-15, and GP-32) since these probes are located in the vicinity of adjacent occupied buildings. A work plan to install the supplemental gas probes (Parametrix 2023) has been approved by Ecology.

5.3 Groundwater

The groundwater flow direction indicated by 2023 groundwater monitoring was toward the northeast and generally consistent with historical measurements. Based on the observed gradients, the calculated flow velocity ranged from 4.65 to 7.79 ft/day in the northern region and 1.36 to 3.17 ft/day in the southern region of the Settlement Area.

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

The following CPOC wells had at least one COC concentration that exceeded the CUL during 2023:

- Vinyl chloride: downgradient wells MW-25 and MW-32 (A-Zone)
- Iron: downgradient wells MW-25 and MW-27 (A-Zone) and MW-10 (B-Zone)
- Manganese: downgradient wells MW-25 (A-Zone) and MW-10 (B-Zone)

The 2023 vinyl chloride data were evaluated and there were no conditions that triggered contingent actions. None of the vinyl chloride groundwater monitoring results exceeded the concentration trigger (concentration greater than 1.45 µg/L for two consecutive sampling events), and there were no statistically significant increasing trends in the post-Consent Decree data in the two downgradient wells that had vinyl chloride concentrations above the CUL (MW-25 and MW-32). Since there were no wells that exceeded either of these contingency trigger conditions for vinyl chloride in 2023, no additional actions were required. Trends in vinyl chloride will be updated quarterly during 2024 in wells where measured concentrations exceed the CUL.

Since statistically significant upward trends during the Post-Consent Decree period were observed for iron and manganese in some wells (iron in wells MW-24, MW-25, MW-26, MW-31, MW-32, and MW-33, and manganese in wells MW-14, MW-25, MW-31, and MW-33), monitoring for iron and manganese will continue in 2024 in accordance with the CAP. Trends in iron and manganese will be reevaluated after fourth quarter 2024 to assess whether potential future reductions in monitoring frequency can be recommended.

Arsenic analysis was terminated after the first quarter of 2023, in accordance with the CAP, based on concentrations in CPOC wells remaining in compliance with the CUL for 2 years.

Benzene analysis in well MW-25 was terminated after the second quarter of 2023, in accordance with the CAP, because the concentrations remained in compliance for 2 years.

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Figures

Tables

Table 1. Project Contact Information, South Park Landfill

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Primary contacts in **bold**

Table 2. Methane in Perimeter Gas Probes, 2023, 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	Pressure (in W.C.)	CH_4 (% Volume)	CO_2 (% Volume)	O_2 (% Volume)
GP-03	0.063	6.73 to 8.63	725	1.32	1/31/2023	9:47	-0.04	0.0	4.1	13.9
					4/25/2023	10:01	0.07	0.0	4.4	13.5
					7/25/2023	11:05	0.01	0.0	5.8	14.0
					10/31/2023	9:00	0.02	0.0	5.1	17.4
GP-07	0.063	5.75 to 6.25	519	0.94	1/31/2023	12:17	-0.08	0.0	1.3	18.1
					4/25/2023	12:12	0.08	0.0	1.9	18.7
					7/25/2023	9:51	-0.02	0.0	3.2	17.8
					10/31/2023	10:27	0.07	0.0	3.5	17.5
GP-09	0.063	6.62 to 10.62	899	1.63	2/6/2023	8:58	0.06	0.0	5.2	14.7
					4/25/2023	9:27	0.09	0.0	7.5	12.6
					7/25/2023	10:30	0.03	0.0	5.4	16.7
					10/31/2023	10:16	0.22	0.0	6.7	15.4
GP-11	0.167	6.23 to 6.73	4,632	8.42	1/31/2023	9:33	- -	- -	- -	- -
					4/25/2023	9:49	- -	- -	- -	- -
					7/25/2023	10:51	- -	- -	- -	- -
					10/31/2023	8:46	0.09	0.0	1.3	21.1
GP-13	0.167	4.91 to 5.41	4,014	7.29	1/31/2023	9:40	- -	- -	- -	- -
					4/25/2023	9:54	- -	- -	- -	- -
					7/25/2023	10:58	- -	- -	- -	- -
					10/31/2023	8:51	- -	- -	- -	- -
GP-15	0.167	6.62 to 8.62	5,558	10.11	1/31/2023	10:07	- -	- -	- -	- -
					4/25/2023	10:15	1.33	0.0	1.2	20.8
					7/25/2023	11:35	-7.64	0.0	0.5	20.7
					10/31/2023	11:23	-1.90	0.0	4.5	18.8
GP-16	0.167	6.60 to 9	5,867	10.67	1/31/2023	10:47	-0.10	0.0	1.1	19.4
					4/25/2023	10:38	0.04	0.0	0.4	21.2
					7/25/2023	10:23	0.03	0.0	0.7	20.3
					10/31/2023	9:17	-0.04	0.0	11.8	6.8
GP-23	0.167	6.05 to 7.05	4,940	8.98	1/31/2023	12:33	-0.04	0.0	0.1	20.2
					4/25/2023	12:07	0.04	0.0	2.2	18.8
					7/25/2023	10:05	-0.01	0.0	7.6	13.7
					10/31/2023	10:41	-0.01	0.0	7.8	14.3
GP-26	0.063	4.62 to 9.62	868	1.57	1/31/2023	8:46	-0.05	0.0	1.8	19.2
					4/25/2023	8:49	0.14	0.0	1.7	19.5
					7/25/2023	8:42	-0.05	0.0	2.2	19.1
					10/31/2023	10:52	0.00	0.0	3.2	17.8
GP-27	0.063	8.57 to 13.57	1,216	2.21	1/31/2023	12:04	-0.07	0.4	9.7	0.0
					4/25/2023	11:02	0.08	0.1	8.5	0.0
					7/25/2023	9:22	0.03	0.0	12.2	0.0
					10/31/2023	9:41	0.03	0.1	14.0	0.0
GP-28	0.063	6.59 to 11.59	1,042	1.89	1/31/2023	11:09	-0.07	0.0	3.8	7.7
					4/25/2023	10:54	0.07	0.0	0.0	21.5
					7/25/2023	9:14	-0.07	0.0	0.0	20.8
					10/31/2023	9:31	0.10	0.0	0.1	22.1
GP-29	0.063	4.62 to 9.62	868	1.57	1/31/2023	10:57	-0.08	0.9	8.1	0.0
					4/25/2023	10:43	0.05	0.1	12.7	0.1
					7/25/2023	9:08	0.01	0.0	16.8	0.0
					10/31/2023	9:22	0.02	0.3	15.4	0.0
GP-31	0.063	4.64 to 9.64	868	1.57	1/31/2023	10:28	-0.06	0.0	5.8	7.2
					4/25/2023	10:23	0.16	0.0	1.9	17.4
					7/25/2023	11:40	0.01	0.0	10.8	7.9
					10/31/2023	11:01	0.01	0.0	9.9	7.6
GP-32	0.063	4.72 to 9.72	868	1.57	1/31/2023	9:55	- -	- -	- -	- -
					4/25/2023	12:23	- -	- -	- -	- -
					7/25/2023	11:14	-1.26	0.0	2.7	14.6
					10/31/2023	11:08	- -	- -	- -	- -
GP-33	0.063	8.2 to 13.2	1,165	2.12	1/31/2023	11:24	-0.03	4.9	7.1	0.0
					4/25/2023	9:35	-0.05	0.0	1.1	20.1
					7/25/2023	8:58	-0.04	0.0	2.4	17.7
					10/31/2023	8:30	-0.03	0.0	2.7	17.5
GP-37	0.063	2.8 to 7.8	868	1.57	1/31/2023	9:03	-0.06	0.0	7.4	4.4
					4/25/2023	9:17	0.04	0.0	7.7	6.4
					7/25/2023	9:30	0.05	0.0	9.9	10.9
					10/31/2023	10:00	0.02	0.0	10.4	5.6
GP-38	0.063	3.8 to 8.8	882	1.6	1/31/2023	9:16	-0.08	0.0	11.8	4.2
					4/25/2023	9:07	0.05	0.0	11.9	4.5
					7/25/2023	9:40	0.01	0.0	18.4	2.1
					10/31/2023	10:09	0.02	0.0	15.7	2.5

Table 2. Methane in Perimeter Gas Probes, 2023, South Park Landfill

Notes:

[1]	Purge volume assumes no water present within the probe screen
- -	No measurement, screen blocked by water

Abbreviations:

ft	feet
cc	cubic centimeter
W.C.	Water Column
CH_4	Methane
CO_2	Carbon Dioxide
O_2	Oxygen

Table 3. Groundwater Monitoring Well Information, South Park Landfill

Well ID	Latitude (NAD 83) [1]	Longitude (NAD 83) [1]	Well Information from RI [2] WASPN North (ft NAD 83)	WASPN East (ft NAD 83)	Ground Elevation (ft NAVD 88)	Casing Elevation (ft NAVD 88)	Stickup (ft)	Total Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)	Screen Top Elevation (ft NAVD 88)	Screen Bottom Elevation (ft NAVD 88)	Aquifer	Pump Information Pump Type	Target Intake or Top of Pump [3] (ft bgs)
MW-08	47.529801	-122.3273	196834.57	1271362.27	12.88	14.76	1.88	45.6	35.6	45.6	-22.72	-32.72	B-Zone	Bladder	40
MW-10	47.531977	-122.3306	197659.19	1270559.83	17.7	19.35	1.65	45	35	45	-17.3	-27.3	B-Zone	Peristaltic	40
MW-12	47.530062	-122.3337	196964.43	1269792.64	19.11	20.63	1.52	15.3	10	15	9.11	4.11	A-Zone	Bladder	12.5
MW-14	47.528523	-122.3329	196399.9	1269963.70	19.05	19.85	0.8	21.8	11.5	21.5	7.55	-2.45	A-Zone	Bladder	16.5
MW-18	47.528449	-122.3284	196350.26	1271077.67	20.78	22.03	1.25	40.4	30	40	-9.22	-19.22	B-Zone	Bladder	35
MW-24	47.530515	-122.3281	197110.02	1271165.6	13.57	15.13	1.56	45.3	35	45	-21.43	-31.43	B-Zone	Bladder	40
MW-25	47.532033	-122.3305	197657.49	1270566.75	17.3	20.09	2.79	27	22	27	-4.7	-9.7	A-Zone	Bladder	24.5
MW-26	47.53057	-122.3281	197121.60	1271164.4	13.55	15.94	2.39	25	15	25	-1.45	-11.45	A-Zone	Bladder	20
MW-27	47.529792	-122.3273	196835.06	1271357.64	12.72	14.76	2.04	20	10	20	2.72	-7.28	A-Zone	Bladder	15
MW-29	47.527537	-122.3316	196034.29	1270270.91	19.45	19.16	-0.29	30	20	30	-0.55	-10.55	A-Zone	Peristaltic	25
MW-30	47.532014	-122.3295	197655.77	1270826.64	17.6	17.07	-0.53	13	8	13	9.6	4.6	Perched	Peristaltic	10.5
MW-31	47.532027	-122.3295	197660.37	1270825.71	17.58	17.12	-0.46	23	18	23	-0.42	-5.42	A-Zone	Bladder	20.5
MW-32	47.531347	-122.3303	197416.52	1270622.16	17.51	17.07	-0.44	24	19	24	-1.49	-6.49	A-Zone	Peristaltic	21.5
MW-33	47.53092	-122.3298	197257.91	1270751.02	17.81	17.34	-0.47	25	20	25	-2.19	-7.19	A-Zone	Peristaltic	22.5

Notes:

[1] Converted from Washington State plane data.

[2] Well information sourced from the RI Table 5.4 (Floyd Snider, 2017).

[3] Pump intake placed at the midpoint of the screen interval.

Abbreviations:

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

Table 4. Groundwater Elevation Summary, 2023, South Park Landfill

Well ID	TOC (ft NAVD 88)	Depth to Water (ft)				Groundwater Elevation (ft NAVD 88)			
		2/6/23	5/1/23	7/31/23	11/6/23	2/6/23	5/1/23	7/31/23	11/6/23
Perched Zone									
MW-30	17.07	9.20	9.59	10.71	10.06	7.87	7.48	6.36	7.01
Shallow / A-Zone wells									
MW-12	20.63	5.60	5.69	6.49	4.58	15.03	14.94	14.14	16.05
MW-14	19.85	2.40	2.52	3.45	2.33	17.45	17.33	16.40	17.52
MW-25	20.09	13.13	13.25	14.19	13.41	6.96	6.84	5.90	6.68
MW-26	15.94	8.84	9.03	10.09	9.30	7.10	6.91	5.85	6.64
MW-27	14.76	7.52	7.72	8.83	8.11	7.24	7.04	5.93	6.65
MW-29	19.16	6.80	6.34	8.86	7.03	12.36	12.82	10.30	12.13
MW-31	17.12	10.24	10.40	11.32	10.50	6.88	6.72	5.80	6.62
MW-32	17.07	10.03	10.16	11.20	10.41	7.04	6.91	5.87	6.66
MW-33	17.34	10.17	10.29	11.36	10.59	7.17	7.05	5.98	6.75
Deep / B-Zone wells									
MW-08	14.76	7.56	7.72	8.83	8.15	7.20	7.04	5.93	6.61
MW-10	19.35	12.40	12.60	13.45	12.63	6.95	6.75	5.90	6.72
MW-18	22.03	14.60	14.70	15.85	15.09	7.43	7.33	6.18	6.94
MW-24	15.13	8.08	8.25	9.30	8.55	7.05	6.88	5.83	6.58

Abbreviations:

TOC = Top of casing
ft = feet
NAVD 88 = North American Vertical Datum of 1988

Table 5. Groundwater Vertical Gradients, 2023, South Park Landfill

Well Pairs	Zone	Groundwater Elevation (ft NAVD 88) 2/6/23	5/1/23	7/31/23	11/6/23	Mid-screen Elevation (ft NAVD 88)	Mid-screen Elevation Difference (ft)	Vertical gradient (ft/ft) 2/6/23	5/1/23	7/31/23	11/6/23
MW-26	Shallow	7.10	6.91	5.85	6.64	-6.45	19.98	0.0025	0.0015	0.0010	0.0030
MW-24	Deep	7.05	6.88	5.83	6.58	-26.43					
MW-27	Shallow	7.24	7.04	5.93	6.65	-2.28	25.44	0.0016	0.0000	0.0000	0.0016
MW-08	Deep	7.20	7.04	5.93	6.61	-27.72					
MW-25	Shallow	6.96	6.84	5.90	6.68	-7.2	15.1	0.0007	0.0060	0.0000	-0.0026
MW-10	Deep	6.95	6.75	5.90	6.72	-22.3					
MW-30	Perched	7.87	7.48	6.36	7.01	7.1	10.02	0.0988	0.0758	0.0559	0.0389
MW-31	Shallow	6.88	6.72	5.80	6.62	-2.92					

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

Abbreviations:

ft = feet
NAVD 88 = North American Vertical Datum of 1988

Table 6. Groundwater Flow Velocity, South Park Landfill

Region	Horizontal Hydraulic Conductivity [1] (ft/day)	2023 Horizontal Hydraulic Gradient (ft/ft)	Effective Porosity [1]	Horizontal Groundwater Velocity (ft/day)
Northern Region [2]	145 to 167	0.0083 to 0.0098	0.21 to 0.26	4.65 to 7.79
Southern Region [3]	40 to 71	0.0089 to 0.0094	0.21 to 0.26	1.36 to 3.17

Notes:

[1] Hydraulic Conductivity and Effective Porosity as determined from the RI-FS (Floyd Snider, 2017).

[2] Horizontal gradients for the northern region are calculated between A-Zone wells MW-12 and MW-32.

[3] Horizontal gradients for the southern region are calculated between A-Zone well MW-14 and B-Zone well MW-18.

Table 7. Groundwater Quality Data Summary, 2023, South Park Landfill

			Upgradient Wells												Downgradient Wells			
			A-Zone												Perched Zone			
			MW-12	MW-12	MW-12	MW-12	MW-14	MW-14	MW-14	MW-14	MW-29	MW-29	MW-29	MW-29	MW-30 [1]	MW-30 [1]	MW-30 [1]	MW-30 [1]
Parameter	Units	Cleanup Level	2/8/23	5/3/23	8/1/23	11/8/23	2/8/23	5/3/23	8/1/23	11/8/23	2/6/23	5/3/23	8/1/23	11/8/23	2/7/23	5/2/23	7/31/23	11/7/23
Field Parameters																		
Temperature	C		9.7	11.5	15.2	14.6	12.9	13.4	16.5	15.7	11.9	12.3	13.4	12.7	11.1	11.3	14.9	15.0
Dissolved Oxygen	mg/L		1.47	0.7	0.22	0.81	0.26	0.1	0.28	0.16	0.11	0.1	0.16	0.25	0.55	0.4	0.28	0.89
Specific Conductivity	µS/cm		368.4	440.7	500.4	0.278	468.4	478.5	533.0	0.448	526.4	820	765	0.452	740	995	1066	0.425
pH	units		6.52	6.32	6.54	6.33	6.87	6.61	6.94	6.71	6.94	6.69	7.03	6.81	6.37	6.27	6.38	6.30
Redox	mv		184.6	40.1	43.0	48.9	-42.2	-49.1	-51.8	-51.4	-108.5	-108.7	-105.6	-107.9	39.9	49.4	-41.3	-6.6
Turbidity	NTU		0.82	2.02	4.08	1.06	4.61	8.14	4.03	3.35	0.92	1.72	3.59	0.78	1.37	2.47	0.24	1.49
Metals																		
Arsenic, Dissolved	µg/L	5.0	0.287	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Iron, Total	mg/L	27 A-Zone	0.0720 U	2.36	1.41	1.41	3.97	3.90	4.39	3.94	17.6	11.6	23.4	17.3	3.31	1.20	9.27	3.52
		31 B-Zone	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Manganese, Total	mg/L	2.2	0.0200	0.189	0.0993	0.132	0.851	0.740	0.797	0.865	0.434	0.291	0.562	0.441	0.138	0.0520	0.291	0.112
Volatile Organic Compounds																		
Vinyl Chloride	µg/L	0.29	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0312	0.0816	0.0667	0.427 [1]	0.0710
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.21	0.20 U	0.24	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.35	0.33	0.74	0.29
Benzene	µg/L	5.0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Table 7. Groundwater Quality Data Summary, 2023, South Park Landfill

			Downgradient Wells (cont.)													
			A-Zone													
			MW-25	MW-25	MW-25	MW-25	MW-26	MW-26	MW-61 (MW-26 Dup)	MW-26	MW-26	MW-27 [2]	MW-27	MW-27	MW-27	MW-61 (MW-27 Dup)
Parameter	**Units**	**Cleanup Level**	**2/6/23**	**5/1/23**	**8/2/23**	**11/6/23**	**2/7/23**	**5/2/23**	**5/2/23**	**7/31/23**	**11/7/23**	**2/7/23**	**5/2/23**	**8/1/23**	**11/7/23**	**11/7/23**
Field Parameters																
Temperature	C		13.3	13.6	14.8	14.0	12.0	11.9	- -	12.6	12.0	11.0	11.6	13.8	13.3	- -
Dissolved Oxygen	mg/L		0.24	0.2	0.16	0.21	0.15	0.4	- -	0.92	0.28	0.15	0.2	0.15	0.32	- -
Specific Conductivity	µS/cm		1089	1218	1200	0.96	227.8	287.1	- -	338.5	0.314	384.5	435.5	521.3	0.316	- -
pH	units		6.77	6.53	6.85	6.61	6.22	5.97	- -	6.32	6.02	6.71	6.49	6.85	6.47	- -
Redox	mv		-103.0	-101.8	-98.1	-110.8	35.2	23.4	- -	14.3	15.5	-12.9	-64.0	-90.9	-111	- -
Turbidity	NTU		0.56	0.82	3.68	1.88	6.28	5.41	- -	3.76	2.90	18.7	12.3	15.9	10.0	- -
Metals																
Arsenic, Dissolved	µg/L	5.0	0.308	- -	- -	- -	0.647	- -	- -	- -	- -	3.70	- -	- -	- -	- -
Iron, Total	mg/L	27 A-Zone	**36.6**	**31.3**	**35.9**	**34.9**	7.98	9.40	9.30	12.1	12.3	9.77	12.8	**28.8**	10.4	10.5
		31 B-Zone	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Manganese, Total	mg/L	2.2	**2.90**	**2.47**	**2.88**	**2.78**	0.0982	0.117	0.109	0.137	0.145	0.369	0.370	0.683	0.393	0.397
Volatile Organic Compounds																
Vinyl Chloride	µg/L	0.29	**0.593**	**0.562**	**0.311**	0.285	0.173	0.0219	0.0224	0.0200 U	0.0240	0.0778	0.155	0.0955	0.0200 U	0.0200 U
Cis-1,2-Dichloroethene	µg/L	16	0.22	0.20 U	0.21	0.23	0.33	0.34	0.33	0.24	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	3.99	2.49	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Table 7. Groundwater Quality Data Summary, 2023, South Park Landfill

			Downgradient Wells (cont.)													
			A-Zone (cont.)													
			MW-31 [1]	MW-31 [1]	MW-31 [1]	MW-31 [1]	MW-32 [3]	MW-32 [3]	MW-60 (MW-32 Dup)	MW-32 [3]	MW-32 [3]	MW-33 [3]	MW-33 [3]	MW-33 [3]	MW-60 (MW-33 Dup)	MW-33 [3]
Parameter	**Units**	**Cleanup Level**	**2/7/23**	**5/2/23**	**7/31/23**	**11/7/23**	**2/6/23**	**5/1/23**	**5/1/23**	**8/2/23**	**11/6/23**	**2/6/23**	**5/1/23**	**8/2/23**	**8/2/23**	**11/6/23**
Field Parameters																
Temperature	C		12.7	13.2	14.2	14.3	13.4	13.4	- -	15.3	13.8	14.6	15.0	15.8	- -	15.1
Dissolved Oxygen	mg/L		0.32	0.1	0.14	0.22	0.14	0.2	- -	0.36	0.31	0.20	0.2	0.20	- -	0.30
Specific Conductivity	µS/cm		439.4	495.8	493.6	0.422	754	844	- -	850	0.62	1306	1450	1321	- -	1.07
pH	units		6.63	6.35	6.67	6.44	6.99	6.73	- -	7.06	6.80	6.89	6.69	7.01	- -	6.74
Redox	mv		-53.8	-64.6	-96.0	-76.1	-115.2	-112.8	- -	-109.6	-121.9	-114.4	-120.0	-114.7	- -	-116.9
Turbidity	NTU		2.87	3.59	4.32	5.81	1.43	0.87	- -	4.30	1.16	3.49	3.84	2.51	- -	1.23
Metals																
Arsenic, Dissolved	µg/L	5.0	- -	- -	- -	- -	0.992	- -	- -	- -	- -	1.07	- -	- -	- -	- -
Iron, Total	mg/L	27 A-Zone	18.2	17.2	21.4	21.3	16.2	14.0	13.9	18.6	14.7	19.6	18.8	20.8	19.5	15.2
		31 B-Zone	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Manganese, Total	mg/L	2.2	0.765	0.711	0.830	0.890	1.61	1.39	1.38	1.45	1.32	2.05	1.89	1.98	1.92	1.74
Volatile Organic Compounds																
Vinyl Chloride	µg/L	0.29	0.219	0.576 [1]	0.765 [1]	0.435 [1]	**0.317**	**0.339**	**0.348**	0.279	0.275	0.0967	0.133	0.168	0.164	0.104
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.92	0.48 J	0.49	0.44	0.53	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	- -	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -	- -	- -

Table 7. Groundwater Quality Data Summary, 2023, South Park Landfill

			Downgradient Wells (cont.)														
			B-Zone														
Parameter	Units	Cleanup Level	MW-08 2/7/23	MW-08 5/1/23	MW-08 8/1/23	MW-61 (MW-08 Dup) 8/1/23	MW-08 11/7/23	MW-10 2/6/23	MW-10 5/1/23	MW-10 8/2/23	MW-10 11/6/23	MW-60 (MW-10 Dup) 11/6/23	MW-18 [3] 2/6/23	MW-60 (MW-18 Dup) 2/6/23	MW-18 [3] 5/3/23	MW-18 [3] 8/1/23	MW-18 [3] 11/8/23
Field Parameters																	
Temperature	C		11.5	13.0	14.1	- -	12.9	13.4	13.7	14.8	14.1	- -	13.5	- -	14.7	16.6	14.7
Dissolved Oxygen	mg/L		0.11	0.1	0.28	- -	0.21	0.27	0.3	0.27	0.31	- -	0.16	- -	0.2	0.87	0.30
Specific Conductivity	µS/cm		555.1	1139	1113	- -	0.67	1299	1506	1428	1.15	- -	785	- -	831	738	0.50
pH	units		7.08	6.70	6.97	- -	6.76	6.93	6.06	6.96	6.76	- -	6.79	- -	6.58	6.89	6.78
Redox	mv		-20.3	-106.9	-102.5	- -	-109.6	-120.1	-102.7	-123.0	-135.3	- -	-69.5	- -	-68.2	-77.4	-80.9
Turbidity	NTU		3.46	4.75	4.23	- -	2.56	3.41	0.88	3.73	1.51	- -	0.55	- -	1.57	3.75	1.40
Metals																	
Arsenic, Dissolved	µg/L	5.0	0.200 U	- -	- -	- -	- -	0.200 U	- -	- -	- -	- -	0.200 U	0.200 U	- -	- -	- -
Iron, Total	mg/L	27 A-Zone	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
		31 B-Zone	2.70	17.6	17.1	16.1	14.3	**37.9**	**36.6**	**45.8**	**43.9**	**44.5**	14.1 J-	15.9	13.7	16.1	12.1
Manganese, Total	mg/L	2.2	0.825	0.914	0.979	0.934	0.802	**2.37**	**2.26**	**2.51**	**2.51**	**2.63**	1.27	1.20	1.07	1.17	0.943
Volatile Organic Compounds																	
Vinyl Chloride	µg/L	0.29	0.0200 U	0.0850	0.0721	0.0704	0.0520	0.142	0.151	0.121	0.0877	0.0850	0.0264	0.0253	0.0268	0.0223	0.0222
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.83	0.54	0.69	0.76	0.75	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzene	µg/L	5.0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Table 7. Groundwater Quality Data Summary, 2023, South Park Landfill

			Downgradient Wells (cont.) B-Zone (cont.)					Trip Blanks		Trip Blanks		Trip Blanks		Trip Blanks	
			MW-24	MW-61 (MW-24 Dup)	MW-24	MW-24	MW-24	MW-80	MW-81	MW-80	MW-81	MW-80	MW-81	MW-80	MW-81
Parameter	Units	Cleanup Level	2/7/23	2/7/23	5/2/23	7/31/23	11/7/23	2/6/23	2/8/23	5/1/23	5/3/23	8/2/23	7/31/23	11/6/23	11/8/23
Field Parameters															
Temperature	C		11.6	- -	12.1	12.5	12.1	- -	- -	- -	- -	- -	- -	- -	- -
Dissolved Oxygen	mg/L		0.16	- -	0.1	0.29	0.28	- -	- -	- -	- -	- -	- -	- -	- -
Specific Conductivity	µS/cm		911	- -	889	1001	0.75	- -	- -	- -	- -	- -	- -	- -	- -
pH	units		6.80	- -	6.63	6.82	6.54	- -	- -	- -	- -	- -	- -	- -	- -
Redox	mv		-80.0	- -	-71.4	-89.5	-78.1	- -	- -	- -	- -	- -	- -	- -	- -
Turbidity	NTU		2.27	- -	5.85	2.41	1.18	- -	- -	- -	- -	- -	- -	- -	- -
Metals															
Arsenic, Dissolved	µg/L	5.0	0.200 U	0.200 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Iron, Total	mg/L	27 A-Zone	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
		31 B-Zone	22.2	26.8	13.3	27.8	28.6	- -	- -	- -	- -	- -	- -	- -	- -
Manganese, Total	mg/L	2.2	1.76	1.77	1.29	1.65	1.78	- -	- -	- -	- -	- -	- -	- -	- -
Volatile Organic Compounds															
Vinyl Chloride	µg/L	0.29	0.0484	0.0482	0.0425	0.0489	0.0559	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	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.

[3] MW-18 is completed in refuse along the downgradient edge of the Landfill; MW-32 and MW-33 are completed beneath refuse along the downgradient edge.

(shaded) = Exceeds cleanup level for CPOC wells

- - = Not analyzed

U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J = The result is an estimated quantity.

J - = The result is an estimated quantity, but the result may be biased low.

Abbreviations:

µg/L Micrograms per liter

mg/L Milligrams per liter

µS/cm Microsiemens per centimeter

NTU Nephelometric Turbidity unit

CPOC Conditional point of compliance

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

Well ID	# Samples	# ND's	% ND's	MK S Value[1]	Significance Level[2]	Trend[2]
Upgradient Wells						
A-Zone						
MW-12	15	15	100	NA	NA	NA
MW-14	15	15	100	NA	NA	NA
MW-29	15	11	73.33	29	0.0840	no trend
Downgradient Wells						
A-Zone						
MW-25	**13**	**0**	**0**	**2**	**0.4760**	**no trend**
MW-26	15	4	26.67	1	0.5000	no trend
MW-27	15	3	20.00	33	0.0570	no trend
MW-31	15	0	0	29	0.0840	no trend
MW-32	**15**	**0**	**0**	**-11**	**0.3130**	**no trend**
MW-33	15	0	0	36	0.0370	increasing
B-Zone						
MW-08	15	2	13.33	-7	0.3850	no trend
MW-10	13	0	0	22	0.1020	no trend
MW-18	15	1	6.67	-8	0.3490	no trend
MW-24	15	1	6.67	37	0.0370	increasing

Notes:

Trend analyses include all post-Consent Decree data (Second Quarter 2020 through Fourth Quarter 2023)

ND = Non-detected value
All ND's were replaced with estimated values using the ROS (Regression on Order Statistics) method.

NA = Not applicable

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

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

[2] Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated. Value provided is the tabulated p-value reported by ProUCL.

Table 9. Summary of Total Iron Trend Analyses, South Park Landfill

Well ID	# Samples	# ND's	% ND's	MK S Value[1]	Significance Level[2]	Trend[2]
Upgradient Wells						
A-Zone						
MW-12	15	2	13.33	24	0.1200	no trend
MW-14	15	0	0	-7	0.3850	no trend
MW-29	15	0	0	-24	0.1200	no trend
Downgradient Wells						
Perched Zone						
MW-30	15	0	0	17	0.2180	no trend
A-Zone						
MW-25	13	0	0	42	0.0050	increasing
MW-26	15	0	0	53	0.0040	increasing
MW-27	15	0	0	23	0.1410	no trend
MW-31	15	0	0	73	0.0000	increasing
MW-32	15	0	0	60	0.0010	increasing
MW-33	15	0	0	52	0.0040	increasing
B-Zone						
MW-08	15	0	0	-5	0.4230	no trend
MW-10	13	0	0	24	0.0820	no trend
MW-18	15	0	0	-41	0.0230	decreasing
MW-24	15	0	0	35	0.0460	increasing

Notes:

Trend analyses include all post-Consent Decree data (Second Quarter 2020 through Fourth Quarter 2023)

ND = Non-detected value

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

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

[2] Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated. Value provided is the tabulated p-value reported by ProUCL.

Table 10. Summary of Total Manganese Trend Analyses, South Park Landfill

Well ID	# Samples	# ND's	% ND's	MK S Value[1]	Significance Level[2]	Trend[2]
Upgradient Wells						
A-Zone						
MW-12	15	0	0	15	0.2480	no trend
MW-14	15	0	0	70	0.0000	increasing
MW-29	15	0	0	-49	0.0080	decreasing
Downgradient Wells						
Perched Zone						
MW-30	15	0	0	4	0.4230	no trend
A-Zone						
MW-25	13	0	0	38	0.0110	increasing
MW-26	15	0	0	18	0.1900	no trend
MW-27	15	0	0	5	0.4230	no trend
MW-31	15	0	0	81	0.0000	increasing
MW-32	15	0	0	-27	0.1010	no trend
MW-33	15	0	0	45	0.0140	increasing
B-Zone						
MW-08	15	0	0	-55	0.0030	decreasing
MW-10	13	0	0	-5	0.4290	no trend
MW-18	15	0	0	-45	0.0140	decreasing
MW-24	15	0	0	29	0.0840	no trend

Notes:

Trend analyses include all post-Consent Decree data (Second Quarter 2020 through Fourth Quarter 2023)

ND = Non-detected value

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

[2] Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated. Value provided is the tabulated p-value reported by ProUCL.

Appendix A

Annual Report Checklist

SOUTH PARK LANDFILL
ANNUAL REPORT CHECKLIST

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

1. Landfill Cap Inspections and Maintenance

	Type of Activity	Date Completed	Form Completed	Comments
☒	Annual	April 6, 2023	☒	Annual inspection
☒	Maintenance	December 2, 2023	☒	CenterPoint. Storm drain inspections and cleaning at locations SPPD SW-3 and 4 and AC-23.
		February 13, 2024	☒	ROW. Repairs to asphalt at in the ROW at locations ROW AC-1 and 4.
		February 22, 2024	☒	SRDS. Repairs to asphalt at locations SRDS AC-13, 14, and 20.
		February 28, 2024	☒	CenterPoint. Repairs to geomembrane at locations SPPD G-6, 7, 8, and 12.
☒	Inspection	October 11, 2023	☒	Mid-Year Re-inspection

2. Quarterly LFG Perimeter Probe Monitoring

		Date Completed	Field Forms	Comments
☒	Q1	January 31 and February 6, 2023	☒	
☒	Q2	April 25, 2023	☒	
☒	Q3	July 25, 2023	☒	
☒	Q4	October 31, 2023	☒	

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

		Date Completed	
		SPPD	SRDS
☒	Q1	March 14, 2023	Not required until redevelopment
☒	Q2	June 12 and 13, 2023	
☒	Q3	September 12, 2023	
☒	Q4	December 12, 2023	

Off-site building monitoring conducted? ☐ Yes ☒ No

4. Quarterly Groundwater Monitoring

		Date Completed	Field Forms	Uploaded into EIM
☒	Q1	February 6 through 8, 2023	☒	☐
☒	Q2	May 1 through 3, 2023	☒	☐
☒	Q3	July 31 through August 2, 2023	☒	☐
☒	Q4	November 6 through 8, 2023	☒	☐

Laura Boyce Lee

Site Coordinator Signature

March 29, 2024

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

Appendix B1

Cap Inspections

Appendix B1-A

April 2023 Annual Inspection

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
719 2ND AVENUE, SUITE 200 | SEATTLE, WA 98104 | P 206.394.3700

TECHNICAL MEMORANDUM

DATE:	August 1, 2023
TO:	Mark Jusayan, Seattle Public Utilities Ashley Piatek, CenterPoint Properties
FROM:	Laura Lee and Tiffany Neier, PE
SUBJECT:	South Park Landfill 2023 Annual Landfill Cap Inspection
CC:	Julia Schwarz, Washington State Department of Ecology Ryan Gardiner, Washington State Department of Ecology
PROJECT NUMBER:	553-1550-067
PROJECT NAME:	South Park Landfill Site Coordination

INTRODUCTION

The purpose of this Technical Memorandum is to summarize the findings of the 2023 annual landfill cap inspection at South Park Landfill.

The inspection satisfies the requirements of the Cleanup Action Plan which fulfills a requirement of the Consent Decree that was signed on March 26, 2019. The primary objective of this inspection was to reinspect issues identified during the December 2022 mid-year inspection, document current status, and complete another inspection of the landfill cap to identify any additional areas of concern.

The 2023 inspection was performed on April 6, 2023, by Parametrix staff members from approximately 10 a.m. to 2 p.m. The weather was rainy, and the high temperature was around 50°F with heavy rainfall accumulation of approximately 0.53 inches of rain recorded at the King County Hamm Creek Rain Station (HAU2), the majority of which fell after the inspection. Figure 1 shows the approximate bounds of the landfill cap for the two Consent Decree Settlement Area properties and the right-of-way (ROW) as defined in the Cleanup Action Plan. Figure 1 also shows the approximate landfill refuse extent which goes below two additional properties that are not currently included in the Settlement Area. The landfill cover material is shown on Figure 2. Cap Inspection Form A, provided in Appendix A, was completed for the SRDS property, the CenterPoint (former SPPD) property, and the ROW. Photographs were taken using a Trimble DA2 GNSS Receiver which used GPS to tag the photographs. The photographs are included in Tables 1 through 3 with numbered locations mapped on Figures 1 through 5.

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

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days.
2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.
3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action. The Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Maintenance Form B and the Site Coordinator will provide observations in Part 2 of the form.

The next cap inspection shall occur in the third quarter of 2023.

SRDS PARCEL

The general property conditions observed were good and similar to previous inspections. Locations on the SRDS property identified in December 2022 mid-year inspection were reinspected during this site visit. Two new locations were identified during the 2023 annual inspection. Pavement cracks, ruttings, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration is not recommended based on conditions at this time, except at locations SRDS AC-13, SRDS AC-14, and SRDS AC-15, which are worsening.

Table 1 describes the issue or concern at each location on the SRDS property, status of repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs, maintenance, and/or reinspection. Each location of concern is identified by number in Figures 1, 2, and 3, and corresponding photographs are included in Table 1.

Figures 1 and 3 show the SRDS Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Checklist Form A was completed for the SRDS property and is included in Attachment A-1.

CENTERPOINT PARCEL

The general property conditions observed were good and similar to previous inspections. Locations on the CenterPoint property identified in the December 2022 mid-year cap inspection were reinspected during this site visit. A few new inspection points were identified in April 2023 and are included in Table 2. The paved area is in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate asphaltic concrete cap damage. Vegetated slopes are uniform and generally in good condition with some erosion noted in Table 2. The primary concerns are exposed geomembrane at the parking area interface at SPPD G-6, G-7, and G-8 and the growth of vegetation through asphalt near the fences. In addition, there is an open pipe at the G-1 location that had been identified in a previous inspection.

Table 2 describes the issue or concern at each location on the CenterPoint property, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs, maintenance, and/or reinspection. Previous concerns identified primarily remain in the same general condition with improvements at several locations. Each location of concern is identified by number in Figures 1, 2, 4 and 5, and corresponding photographs are included in Table 2.

Figures 1, 4 and 5 show the CenterPoint Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Form A was completed for the CenterPoint property and is included in Attachment A-2.

RIGHT-OF-WAY

There are three areas in the ROW that were identified as locations of concern in the December 2022 mid-year inspection. These three areas were reinspected along with a new location identified in April 2023. Table 3 describes the issue or concern at each location in the ROW, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs, maintenance, and/or reinspection. Each location of concern is identified by number in Figures 1 and 2, with corresponding photographs included in Table 3.

Figures 1, 3, 4 and 5 show the ROW Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Form A was completed for the ROW and is included in Attachment A-3.

Under the Cleanup Action Plan, routine street maintenance does not require Ecology notification or maintenance reports.

TABLES

FIGURES

ATTACHMENTS

No Maintenance has been reported since December 2022 Inspection

Tables

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, April 06, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
				Asphalt Concrete				
AC-1	Minor pavement cracking and ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-3	Minor pavement cracking and ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-4	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, April 06, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-6	Minor pavement cracking and ponding	Additional areas of cracking. Continue to monitor for further deterioration during follow-up reinspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-7	Minor cracking and ponding in repatched area	Visible ponding near vehicle wash area appears related to wash pad. Low spot in pavement is not centered on the nearest storm drain. Ponding depth is less than a few inches. No concerns at this time. Follow-up reinspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-9	Ponding and minor cracking	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, April 06, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-10	Minor pavement cracking with grass growing in the cracks	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-11	Minor cracking with asphalt degrading and ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Ponding in the area. Follow-up reinspection	6 months	Site Coordinator	
AC-13	Minor pavement cracking and deep rutting	Observed much deeper rutting. to where soil may be exposed. The open crack should be patched.	No action taken	Worse	The hole is bigger with water accumulation inside the rut. The open hole should be patched.	No later than end of calendar year	SRDS	

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, April 06, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-14	Minor pavement cracks with exposed moss	The spalling has continued to degrade the cap to the point where soil may be exposed. This area should be patched.	No action taken	No significant changes observed	Previous recommendation remains.	No later than end of calendar year	SRDS	
AC-15	Minor pavement cracking with moss growing in the cracks	Follow-up inspection	No actions taken or required	Worse	Observed more grass growing in the entire cracked areas. This area should be patched.	No later than end of calendar year	SRDS	
AC-16	Minor pavement cracking and ponding	Follow-up inspection	No actions taken or required	Worse	Follow-up reinspection	6 months	Site Coordinator	

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, April 06, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-17	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-18	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-19	Minor cracks in asphalt with ponding			New location	Follow up reinspection	6 months	Site Coordinator	

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, April 06, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-20	Open pipe in the ground			New location	Determine what the pipe is and cap it.	No later than end of calendar year	SRDS	
Stormwater Management Facilities								
SW-4	Potential run-on from SPPD	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	

Notes: Locations with recommended repairs or action items are in **BOLD** text.
NA = Not applicable

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection: Conditions Observed and Recommended Action	December 2022 Inspection: Action Taken	April 2023 Inspection: Condition Status	April 2023 Inspection: Conditions Observed and Recommended Action	April 2023 Inspection: Timeline for Repair and/or Reinspection	April 2023 Inspection: Recommended Action Assignment	April 2023 Inspection: Photographs
Asphalt Concrete								
AC-1	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-3	New buildings, potential cap penetrations.	There is one hole from where the previous building was that needs to have the seal fixed. An uncapped pipe protruding from the asphalt needs to be capped or filled and sealed. Property owner should request Occupancy Permit from tenant which would include drawings for the new buildings.	Holes have been sealed. Pipe is still not capped. No maintenance form was submitted.	Some improvement	Previous recommended action regarding open pipe remains.	60 days	CenterPoint	 

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-4	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed.	A larger extent of ponding observed due to rainfall accumulation. Follow-up reinspection	6 months	Site Coordinator	
AC-5	Ponding, modification of asphalt	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-6	Gaps and holes in electric fence post holes and ponding	Seal the remaining gaps in the interface between the posts of the new electric fence and the asphalt There are still some electric fence posts that have not been completely sealed, especially around the back of the pipe where it would be hard to reach. There are also some holes that were drilled next to the installed post. All posts and holes need to have complete seals.	Action Not Yet Completed	No visible improvement	Previous recommended repairs remain.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-7	Several areas of ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Ponding in larger extent observed due to rainfall accumulation. Follow-up reinspection	6 months	Site Coordinator	
AC-8	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection: Conditions Observed and Recommended Action	December 2022 Inspection: Action Taken	April 2023 Inspection: Condition Status	April 2023 Inspection: Conditions Observed and Recommended Action	April 2023 Inspection: Timeline for Repair and/or Reinspection	April 2023 Inspection: Recommended Action Assignment	April 2023 Inspection: Photographs
AC-9	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Ponding in larger extent observed due to rainfall accumulation. Follow-up reinspection	6 months	Site Coordinator	 
AC-10	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-11	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	
AC-12	Ponding	Follow-up inspection	No actions taken or required	No significant changes observed	Follow-up reinspection	6 months	Site Coordinator	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-13	Blackberry shrubs growth and stagnated water behind the concrete blocks			New Location	Remove blackberry shrubs and clear pathways to allow proper water flow into the storm drains	No later than end of calendar year	CenterPoint	  

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-14	Ponding			New Location	Follow-up reinspection	6 months	Site Coordinator	 

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection: Conditions Observed and Recommended Action	December 2022 Inspection: Action Taken	April 2023 Inspection: Condition Status	April 2023 Inspection: Conditions Observed and Recommended Action	April 2023 Inspection: Timeline for Repair and/or Reinspection	April 2023 Inspection: Recommended Action Assignment	April 2023 Inspection: Photographs
AC-15	Minor Cracking			New Location	Follow-up reinspection	6 months	Site Coordinator	
AC-17	Ponding			New location	Large area of ponding observed. Follow-up reinspection	6 months	Site Coordinator	
AC-18	Ponding			New location	Large area of ponding observed. Follow-up reinspection	6 months	Site Coordinator	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection: Conditions Observed and Recommended Action	December 2022 Inspection: Action Taken	April 2023 Inspection: Condition Status	April 2023 Inspection: Conditions Observed and Recommended Action	April 2023 Inspection: Timeline for Repair and/or Reinspection	April 2023 Inspection: Recommended Action Assignment	April 2023 Inspection: Photographs
AC-19	Holes near fence allowing growth of grasses			New location	Remove plants and seal cap penetrations.	No later than end of calendar year	CenterPoint	
AC-20	Minor cracks and failed patch			New location	Follow-up reinspection	6 months	Site Coordinator	
AC-21	Holes near fence allowing growth of invasive plants & ponding presence			New location	Remove plants and seal cap penetrations.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
Center Point (SPPD) Location	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-22	Holes near concrete post allowing invasive plant growth			New location	Remove plants and seal cap penetrations.	No later than end of calendar year	CenterPoint	
Low-Permeability Geomembrane								
G-1	An open pipe present	Pipes remain present. The origin and use of the pipes protruding from the ground needs to be investigated. Once the information about the pipe is known appropriate actions should be taken to ensure the integrity of the cap.	Action Not Yet Completed	No change	Need investigation of this open pipe and action should be taken to cap it, if it does not have any purpose.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-3	Loss of vegetation and minimal erosion of soil	Minimal erosion of soil, netting from vegetation correction is visible. Geomembrane is not exposed. Reinspect every 6 months. If loss of vegetation or erosion exposes the geomembrane, the actions recommended in the 2021 annual inspection should be taken.	No actions taken or required	Improved	Improved vegetation. Follow-up reinspection	6 months	Site Coordinator	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-4	Loss of grass cover along with blackberry shrubs growth in the area	April 2022 recommendations remain. Blackberry shrubs have been introduced to the area since the April 2022 inspection. Remove blackberries before the roots spread and become invasive, may need to re-seed the grass.	Action Not Yet Completed	Worse	Loss of grass around the concrete post exposing the soil and growth of blackberry shrubs around the region. Remove the blackberry shrubs before the roots spread and re-seed the grass.	No later than end of calendar year	CenterPoint	 

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection: Conditions Observed and Recommended Action	December 2022 Inspection: Action Taken	April 2023 Inspection: Condition Status	April 2023 Inspection: Conditions Observed and Recommended Action	April 2023 Inspection: Timeline for Repair and/or Reinspection	April 2023 Inspection: Recommended Action Assignment	April 2023 Inspection: Photographs
G-5	New grass cover over previously exposed geomembrane	See Location G-4 2022 recommendations.	Action Not Yet Completed	Improved	Follow-up reinspection	6 months	Site Coordinator	
G-6	Geomembrane exposed in one area	See Location G-4 2022 recommendations.	Action Not Yet Completed	Some Improvement	Improved vegetation. Exposed geomembrane remains in one area. Add soil to exposed geomembrane and re-seed grasses	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-7	Exposed and damaged geomembrane at the parking area interface	The geomembrane remains exposed at G 7 and G-10. These locations are of the highest concern due to the potential compromise of the landfill cap. The configuration of the geomembrane and cover at the interface of the parking area does not appear to be in accordance with Figure 5 of the Interim Action Work Plan (IAWP). The geomembrane appears to be directly below the asphalt with no drainage layer or surfacing layer in between. Along with Site Coordinator, prepare a plan to reestablish cover over the geomembrane. Most likely, the area should be exposed, and the geomembrane tested for damage before repairs are be made. The crest of slope should then be provided cover to the maximum extent possible considering the existing asphalt and curb configuration	Action Not Yet Completed	Some improvement	Improved growth of grasses over the geomembrane. Exposed geomembrane remains. Add soil to exposed geomembrane and re-seed grasses. Previous recommendations remain.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	
G-8	Exposed geomembrane around utility access hole	Work with Site Coordinator to prepare a plan to re-establish cover over the geomembrane. The geomembrane should be carefully exposed so as to not damage the geomembrane and inspected to determine if it is excess material or part of the cover. Make repairs as necessary and install adequate cover soil in accordance with the IAWP.	No documentation of actions taken	Improved	Improved vegetation. Previous recommendations remain	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	 

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-10	Exposed and damaged geomembrane at the parking area interface.	See Location G-4 2022 recommendations.	No documentation of actions taken	Improved	No exposed or damaged geomembrane visible during inspection. Poor growth of vegetation in this area. Follow-up reinspection	6 months	Site Coordinator	
G-11	Bare Patch			New location	Re-establish vegetated cover	No later than end of calendar year	CenterPoint	
G-12	Poor vegetative cover			New location	Areas of exposed soil. Grass should be re-seeded.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-13	Grass growing unevenly. The upper portion of the slope has started to slough off.			New location	If this condition worsens take appropriate steps for prevention of sloughing. Follow-up reinspection	6 months	CenterPoint/Site Coordinator	
Stormwater Management Facilities								
SW-1	Standing water	The swale does not meet City of Seattle Stormwater Manual requirement for a biofiltration swale to have a minimum slope of 1.5%. Bottom channel should be regraded to the intended 1.5% slope. Along with Site Coordinator, prepare a plan to address this situation.	Action Not Yet Completed.	No Significant Change Observed	Previous recommended actions remain.	No later than end of calendar year	CenterPoint will work in coordination with Site Coordinator to establish a solution	 

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, April 6, 2023 Inspection

Center Point (SPPD) Location	Description	December 2022 Inspection		April 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
SW-2	Invasive/Deep Rooted Plants	The willow (salix sp.) and black cottonwood (populus balsamifera) growing along the edge of the west bioswale are native but deep-rooted species that should be removed so that it does not damage the geomembrane on that side. This recommendation remains from April 2022.	Action Not Yet Completed	No Significant Change Observed	Previous recommendations remain	No later than end of calendar year	CenterPoint	

Notes: Locations with recommended repairs or action items are in **BOLD** text.
NA = Not applicable

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, April 6, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
ROW Location	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
Asphalt Concrete								
AC-1	Cracks and pavement repair	Roadway is in poor condition, there are large open cracks and ruts in the asphalt pavement. SDOT previously repaired a portion of this location but did not cover the entire area. Recommend coordination with SDOT.	No action taken	Worse	Cracks got worse with ponding. Repair/repatching should be coordinated with SDOT	60 days	SPU to coordinate with SDOT	 

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, April 6, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
ROW Location	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-2	Asphalt open cracking	Follow-up inspection	No action taken or required	Worse	Cracks got bigger with ponding. Repatching should be coordinated with SDOT	No later than end of calendar year	SPU to coordinate with SDOT	 
AC-3	Asphalt cracking and potholes alongside of street	Pothole appears to be getting worse and should be patched to prevent further erosion.	No action taken	No Significant Change Observed	Previous recommendations remain.	No later than end of calendar year	SPU to coordinate with SDOT	

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, April 6, 2023 Inspection

		December 2022 Inspection		April 2023 Inspection				
ROW Location	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-4	Potholes in the middle of roadway			New location	Repatch work should be arranged with SDOT	No later than end of calendar year	SPU to coordinate with SDOT	

Notes: Locations with recommended repairs or action items are in **BOLD** text.

Figures

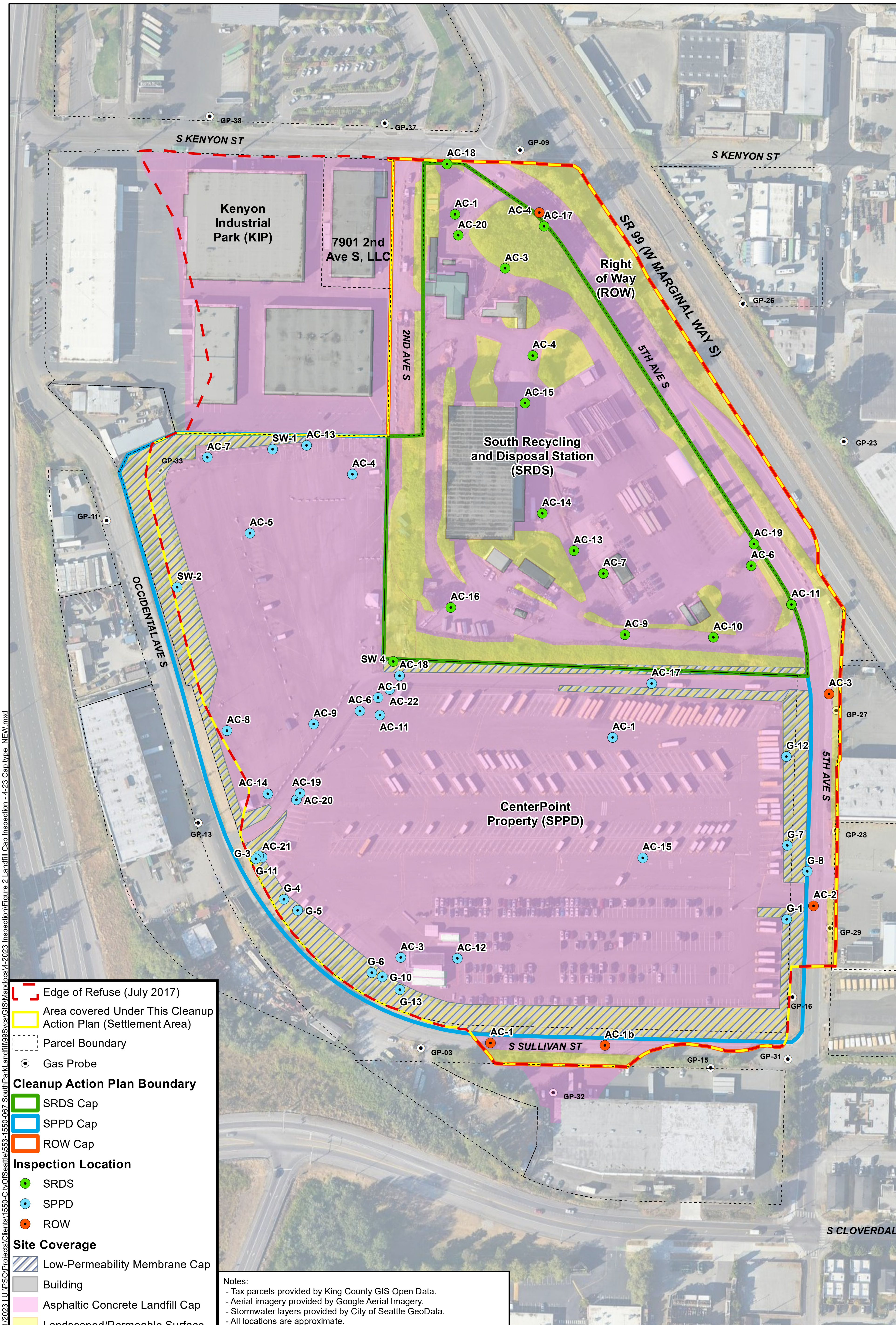
7/11/2023 | U:\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\GIS\Mapdocs\4-2023 Inspection\Figure 1 Landfill Cap Inspection 4-23 - Site Plan with field data V2.mxd

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

Parametrix

Figure 1
April 6, 2023 Landfill Cap Inspection
Site Plan
South Park Landfill
Seattle, WA

0 100 200 400
Feet



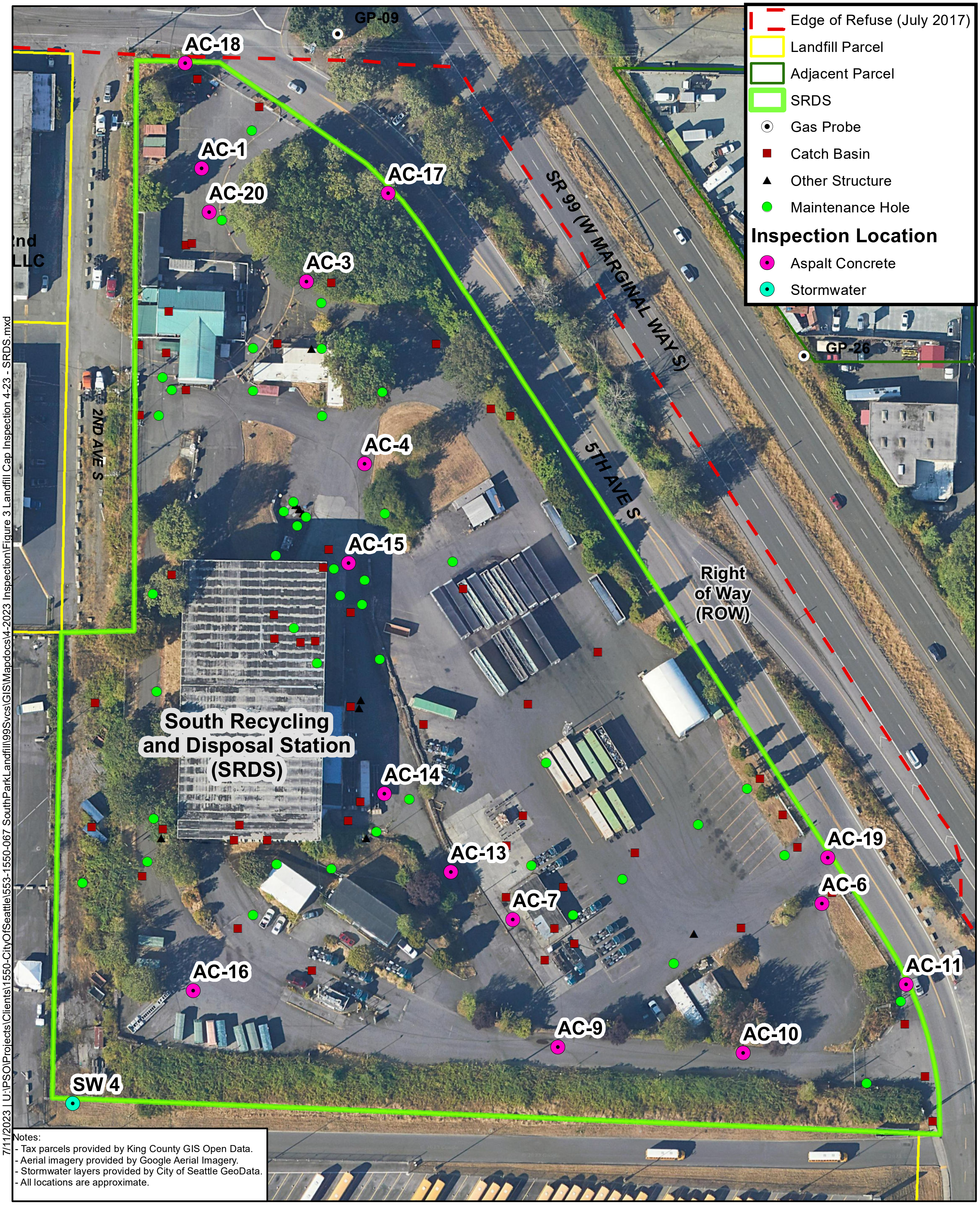
7/11/2023 | U:\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\GIS\Mapdocs\4-2023 Inspection\Figure 2 Landfill Cap Inspection - 4-23 Cap type_NEW.mxd

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

Parametrix

0 100 200 400 Feet

Figure 2
April 6, 2023 Landfill Cap Inspection
Landfill Cover Material
South Park Landfill
Seattle, WA



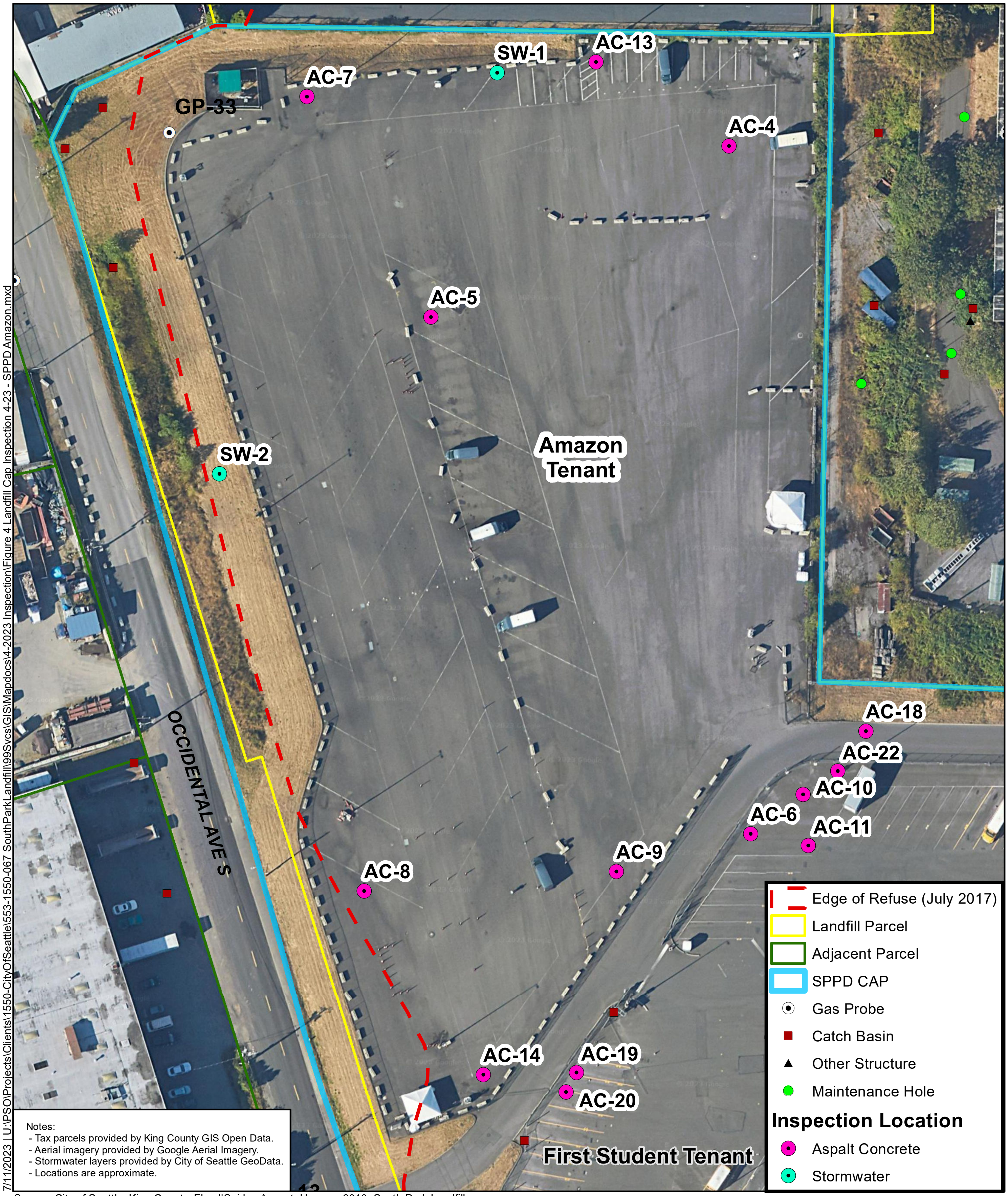
7/11/2023 | U:\PSO\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svcs\GIS\Mapdocs\4-2023 Inspection\Figure 3 Landfill Cap Inspection 4-23 - SRDS.mxd

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

Parametrix

0 50 100 200 Feet

Figure 3
April 6, 2023 Landfill Cap Inspection
SRDS Property
South Park Landfill
Seattle, WA

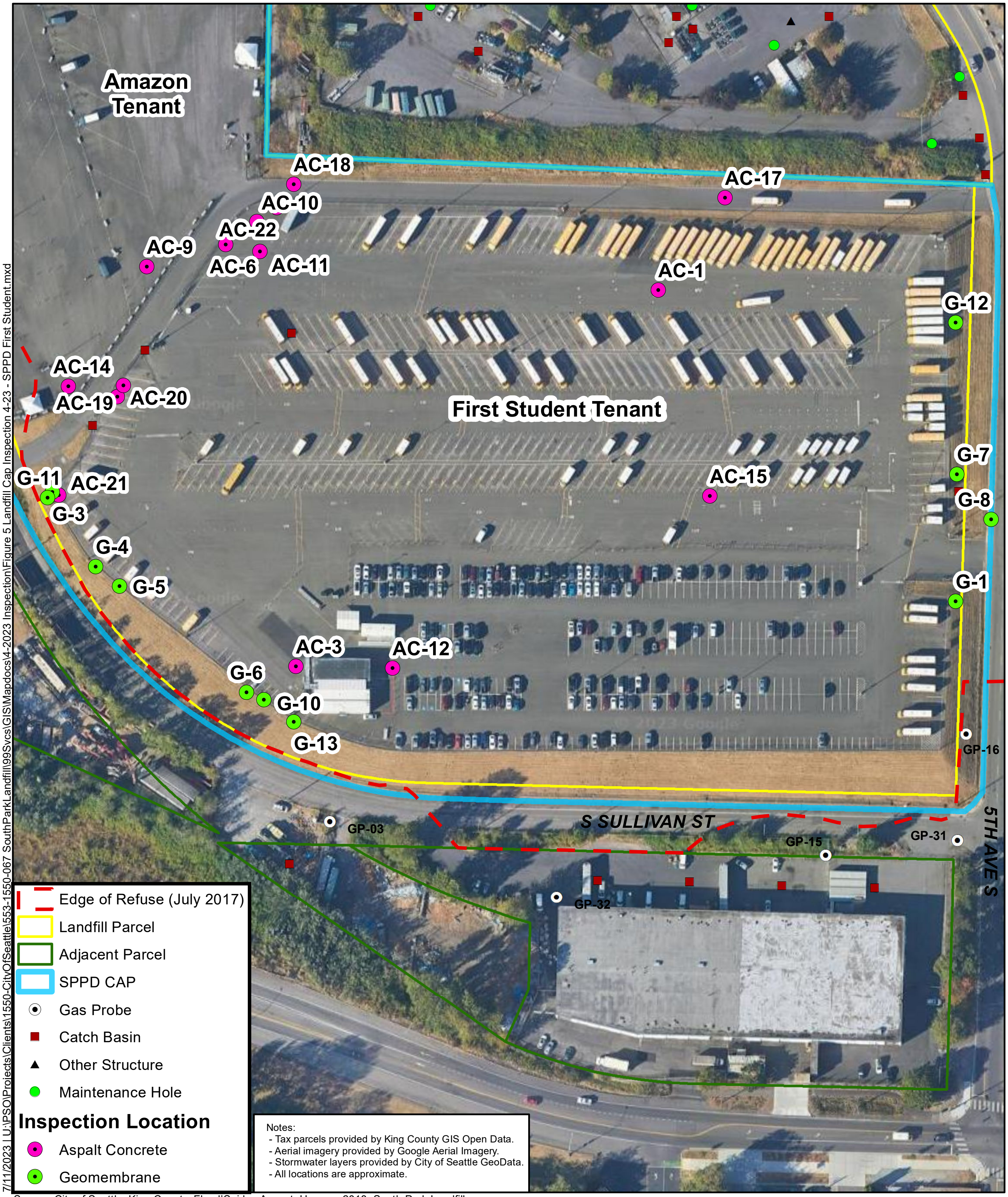


Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

Parametrix

0 50 100 200 Feet

Figure 4
April 6, 2023 Landfill Cap Inspection
CenterPoint Property - Amazon Tenant
South Park Landfill
Seattle, WA



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

Parametrix

0 50 100 200 Feet

Figure 5
April 6, 2023 Landfill Cap Inspection
CenterPoint Property - First Student Tenant
South Park Landfill
Seattle, WA

Attachment A

April 2023 Cap Inspection Checklists

A-1

SRDS Cap Inspection Checklist

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date:	April 6, 2023	**Parcel Owner:**	☒ SRDS ☐ CenterPoint (former SPPD) ☐ Right-of-Way
Inspector(s):	Tiffany Neier, Amanda Weiss		

Type of Inspection: ☒ Annual ☐ Reinspection ☐ Non-Routine Reason:

Last Rain Event before Inspection:

Daily precipitation observations from King County Hamm Creek Rain Station (HAU2).
Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation

	03/31/23	04/01/23	04/02/23	04/03/23	04/04/23	04/05/23	04/06/23
Precipitation (in)	0.4	0.01	0.31	0.19	0.01	0.0	0.53

VISUAL INSPECTION CHECKLIST

Asphalt Concrete	Yes	No	Needs Repair	If yes, describe:
Minor cracking	☒	☐	☒	Locations SRDS AC-1, AC-3, AC-6, AC-7, AC-9, AC-10, AC-11 AC-13, AC-14, AC-15, AC-16, AC-19 See Table 1 for details
Open cracks/ruts	☒	☐	☒	Locations SRDS AC-13, AC-16, AC-20 See Table 1 for details
Differential settlement	☐	☒	☐	
Potholes	☐	☒	☐	
Pooling or ponding	☒	☐	☐	Locations SRDS AC-1, AC-3, AC-4, AC-6, AC-7, AC-9, AC-11, AC-13, AC-16, AC-17, AC-18, AC-19 See Table 1 for details
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:
See Table 1 for recommended actions.

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	☐	☒	☐	
Exposed geotextile	☐	☒	☐	
Holes/signs of unauthorized digging	☐	☒	☐	
Poor vegetative cover	☐	☒	☐	
Exposed geomembrane	☐	☒	☐	
Recommended Maintenance or Repair Type/Location:				

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	☐	☒	☐	
Incorrect drainage path or not draining	☒	☐	☐	Location SRDS SW-4
Recommended Maintenance or Repair Type/Location: See Table 1 for recommended actions.				

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

See Table 1, figures and inspection photos included in the cap inspection report.

A-2

CenterPoint Cap Inspection Checklist

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date:	April 6, 2023	**Parcel Owner:**	☐ SRDS
Inspector(s):	Tiffany Neier, Amanda Weiss		☒ CenterPoint (former SPPD)
			☐ Right-of-Way

Type of Inspection: ☒ Annual ☐ Reinspection
☐ Non-Routine Reason:

Last Rain Event before Inspection:

Daily precipitation observations from King County Hamm Creek Rain Station (HAU2).
Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation

	03/31/23	04/01/23	04/02/23	04/03/23	04/04/23	04/05/23	04/06/23
Precipitation (in)	0.4	0.01	0.31	0.19	0.01	0.0	0.53

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	**No**	**Needs Repair**	**If yes, describe:**
Minor cracking	☒	☐	☐	Location SPPD-AC-15, AC-20
Open cracks/ruts	☒	☐	☒	Locations SPPD AC-6, AC-19,AC-21,AC-22 See Table 2 for details
Differential settlement	☐	☒	☐	
Potholes	☐	☒	☐	
Pooling or ponding	☒	☐	☒	Locations SPPD AC-1, AC-4, AC-5, AC-6, AC-7, AC-8, AC-9, AC-10, AC-11, AC-12, AC-13, AC-14, AC-17, and AC-18 See Table 2 for details
Separation of pavement from curbs, gutters, or catch basins	☐	☒	☐	
Sloughing or crumbling of edge materials	☐	☒	☐	
Erosion	☐	☒	☐	
Invasive plant growth	☒	☐	☒	Locations SPPD AC-13, AC-19, AC-21 and AC-22 See Table 2 for details
Other signs of cap damage, failure, or disturbance	☒	☐	☒	Location SPPD AC-3 See Table 2 for details

Recommended Maintenance or Repair Type/Location:
See Table 2 for recommended actions.

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	☒	☐	☐	Location SPPD G-3 See Table 2 for details
Exposed geotextile	☐	☒	☐	
Holes/signs of unauthorized digging	☐	☒	☐	
Poor vegetative cover	☒	☐	☒	Locations SPPD G-4, G-5, G-10, G-11, G-12 See Table 2 for details
Exposed geomembrane	☒	☐	☒	Locations SPPD G-6, G-7, G-8 See Table 2 for details
Soil Sloughing	☒	☐	☐	Location SPPD G-13 See Table 2 for details
Recommended Maintenance or Repair Type/Location: See Table 2 for recommended actions.				

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	☒	☐	☒	Location SPPD SW-2 See Table 2 for details
Poor vegetative cover	☐	☒	☐	
Incorrect drainage path or not draining	☒	☐	☒	Location SPPD SW-1 See Table 2 for details
Recommended Maintenance or Repair Type/Location: See Table 2 for recommended actions.				

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

See Table 2, figures and inspection photos included in the cap inspection report.

A-3

ROW Cap Inspection Checklist

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date:	April 6, 2023	**Parcel Owner:**	☐ SRDS ☐ CenterPoint (former SPPD) ☒ Right-of-Way
Inspector(s):	Tiffany Neier, Amanda Weiss		

Type of Inspection: ☒ Annual ☒ Reinspection
☐ Non-Routine Reason:

Last Rain Event before Inspection:

Daily precipitation observations from King County Hamm Creek Rain Station (HAU2).
Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation

	03/31/23	04/01/23	04/02/23	04/03/23	04/04/23	04/05/23	04/06/23
Precipitation (in)	0.4	0.01	0.31	0.19	0.01	0.0	0.53

VISUAL INSPECTION CHECKLIST

Asphalt Concrete	Yes	No	Needs Repair	If yes, describe:
Minor cracking	☒	☐	☐	Locations ROW AC-1 See Table 3 for details
Open cracks/ruts	☒	☐	☒	Locations ROW AC-1, AC-2, See Table 3 for details
Differential settlement	☐	☒	☐	
Potholes	☒	☐	☒	Locations ROW AC-1, AC-3, AC-4 See Table 3 for details
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:

See Table 3 for recommended actions.

VISUAL INSPECTION CHECKLIST (continued)

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

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	☐	☐	☐	Not applicable to ROW.
Erosion of soil	☐	☐	☐	Not applicable to ROW.
Exposed geotextile membrane	☐	☐	☐	Not applicable to ROW.
Holes/signs of unauthorized digging	☐	☐	☐	Not applicable to ROW.
Invasive/deep-rooted plants	☐	☐	☐	Not applicable to ROW.
Poor vegetative cover	☐	☐	☐	Not applicable to ROW.
Incorrect drainage path or not draining	☐	☐	☐	Not applicable to ROW.
Recommended Maintenance or Repair Type/Location:				

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

See Table 3, figures and inspection photos included in the cap inspection report.

Attachment B

Maintenance Forms

No Maintenance Reported

Appendix B1-B

October 2023 Mid-Year Inspection

Parametrix
let's create tomorrow, together

Technical Memorandum

DATE:	December 6, 2023
TO:	Mark Jusayan, Seattle Public Utilities Ashley Piatek, CenterPoint Properties
FROM:	Laura Lee and Tiffany Neier, PE
SUBJECT:	South Park Landfill 2023 Mid-year Landfill Cap Inspection
CC:	Ryan Gardiner, Washington State Department of Ecology
PROJECT NUMBER:	553-1550-067
PROJECT NAME:	South Park Landfill Site Coordinator

Introduction

The purpose of this Technical Memorandum is to summarize the findings of the October 2023 mid-year landfill cap inspection at South Park Landfill.

The inspection satisfies the requirements of the Cleanup Action Plan which fulfills a requirement of the Consent Decree that was signed on March 26, 2019. The primary objective of this inspection was to reinspect issues identified during the April 2023 annual inspection and document recommended maintenance or repairs.

The 2023 mid-year inspection was performed on October 11, 2023, by Parametrix staff members from approximately 7:30 a.m. to 12 p.m. PST. The weather was rainy, and the high temperature was around 61°F with a rainfall accumulation of approximately 0.36 inches of rain recorded at the King County Hamm Creek Rain Station (HAU2). Figure 1 shows the approximate bounds of the landfill cap for the two Consent Decree Settlement Area properties and the right-of-way (ROW) as defined in the Cleanup Action Plan. Figure 1 also shows the approximate landfill refuse extent which goes below two additional properties that are not currently included in the Settlement Area. Cap Inspection Form A, provided in Appendix A, was completed for the SRDS property, the CenterPoint property, and the ROW. Photographs were taken using a Trimble DA2 GNSS Receiver which used GPS to tag the photographs. The photographs are included in Tables 1 through 3 with numbered locations mapped on Figure 1.

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

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days.
2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.
3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action. The Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Maintenance Form B and the Site Coordinator will provide observations in Part 2 of the form.

The next cap inspection shall occur in the first quarter of 2024.

SRDS Parcel

The general property conditions observed were good and similar to previous inspections. Locations on the SRDS property that were identified in the April 2023 cap inspection were reinspected during this site visit. Pavement cracks, rutting, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration is not recommended based on conditions at this time, except at locations SRDS AC-13, SRDS AC-14, and SRDS AC-20 (see recommended actions in Table 1).

Table 1 describes the issue or concern at each identified location of concern on the SRDS property, status of repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Each location of concern is identified by number in Figure 1 and corresponding photographs are included in Table 1.

The Cap Inspection Checklist Form A was completed for the SRDS property and is included in Attachment A-1.

CenterPoint Parcel

The general property conditions observed were good and similar to previous inspections. Locations on the CenterPoint property that were identified in the April 2023 cap inspection were reinspected during this site visit. The paved area is in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate settlement or asphaltic concrete cap damage. Areas where maintenance was performed were inspected and documented in a Maintenance form (Attachment B-1). Vegetated slopes are uniform and generally in good condition with some erosion noted in Table 2. The primary concerns are exposed geomembrane, invasive plant growth, and the growth of vegetation through asphalt. In addition, there is an open pipe that was identified in the April reinspection that is now covered in dirt and vegetation at the G-1 location. G-12 appears to have had recent maintenance to it including tilling of the soil; if the soil was disturbed as part of maintenance a maintenance report should be submitted. Two new stormwater locations were identified for catch basin clogging at SW-3 and SW-4 which need to be cleared.

Table 2 describes the issue or concern at each location on the CenterPoint property, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Previous concerns identified primarily remain in the same general condition with improvements at several locations. Each location of concern is identified by number in Figure 1 and corresponding photographs are included in Table 2.

Figure 1 shows the CenterPoint Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Checklist Form A was completed for the CenterPoint property and is included in Attachment A-2.

Right-of-Way

There are four areas in the ROW that were identified as locations of concern in the April 2023 annual inspection. These four areas were reinspected in October 2023. Table 3 describes the issue or concern at each location in the ROW, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Each location of concern is identified by number in Figure 1 with corresponding photographs included in Table 3.

Figure 1 shows the ROW Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Checklist Form A was completed for the ROW and is included in Attachment A-3.

Under the Cleanup Action Plan, routine street maintenance does not require Ecology notification or maintenance reports.

Figures

Tables

Attachments

Figures

Notes:
- Tax parcels provided by King County GIS Open Data.
- Aerial imagery provided by Google Maps.
- Stormwater layers provided by City of Seattle GeoData.
- All locations shown are approximate

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

Parametrix

Figure 1
October 11, 2023 Landfill Cap Inspection
Site Plan With Locations of Concern
South Park Landfill
Seattle, WA

Tables

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, October 11, 2023 Inspection

		April 2023 Inspection		October 2023 Inspection				
SRDS	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
				Asphalt Concrete				
AC-13	Minor pavement cracking and deep rutting with water accumulation	Observed much deeper rutting. to where soil may be exposed. The open crack should be patched.	No action taken	No significant changes observed	The open hole should be patched.	No later than end of calendar year	SRDS	
AC-14	Minor pavement cracks with exposed moss	The spalling has continued to degrade the cap to the point where soil may be exposed. This area should be patched.	No action taken	No significant changes observed	Vegetation growing between asphalt cracks. This area should be patched.	No later than end of calendar year	SRDS	
AC-20	Open rut with grass growth	Open hole with stagnated water	No actions taken	Worse	Sediment and grass in the previously seen hole. This hole needs to be patched	No later than end of calendar year	SRDS	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

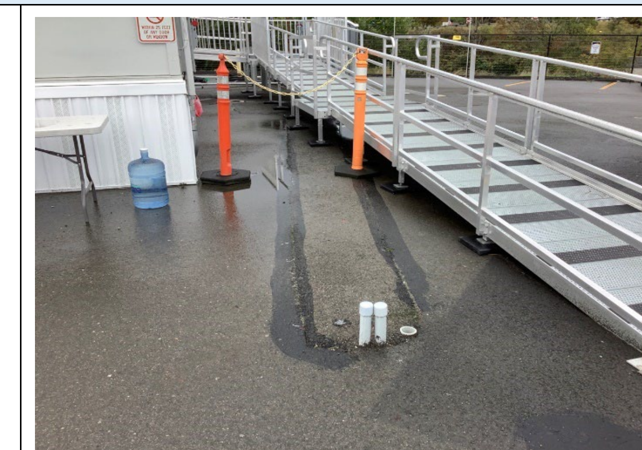
Center Point (SPPD) Location	Description	April 2023 Inspection		October 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
Asphalt Concrete								
AC-3	Uncapped pipe	An uncapped pipe protruding from the asphalt needs to be capped or filled and sealed.	Pipe is still not capped.	No significant changes observed	Previous recommended action regarding open pipe remains.	60 days	CenterPoint	
AC-6	Gaps and holes in electric fence post holes and ponding	Seal the remaining gaps in the interface between the posts of the new electric fence and the asphalt There are still some electric fence posts that have not been completely sealed, especially around the back of the pipe where it would be hard to reach. There are also some holes that were drilled next to the installed post. All posts and holes need to have complete seals.	Action Not Yet Completed	No visible improvement	Ponding. Previous recommended repairs remain.	No later than end of calendar year	CenterPoint	
AC-13	Blackberry shrubs growth and stagnated water behind the concrete blocks	Remove blackberry shrubs and clear pathways to allow proper water flow into the storm drains. Follow up inspection	No Actions Taken	Worse	Blackberries continue to grow. Sediment blocking flow from the swale causing up to 4" of ponding water. Previous recommended repairs remain.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

Center Point (SPPD) Location	Description	April 2023 Inspection		October 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-19	Pavement cracks near to fences	Remove plants and seal cap penetrations	No actions taken or required	No significant changes observed	Plants look dead but the crack is not sealed. Previous recommended repairs remain.	No later than end of calendar year	CenterPoint	
AC-21	Holes near fence allowing growth of invasive plants & ponding presence	Remove plants and seal cap penetrations.	No actions taken or required	Worse	Invasive plants continue to grow in hole near fence with ponding Previous recommendations remain	No later than end of calendar year	CenterPoint	
AC-22	Unsealed pavement after plant removal	Remove plants and seal cap penetrations.	Actions Taken	Improved	Part of the plant has been removed but the pavement has not been sealed	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

Center Point (SPPD) Location	Description	April 2023 Inspection		October 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-23	Invasive plant growth			New location	6ft tall plant next to the storm drain. Remove the plants and seal the cap penetration.	No later than end of calendar year	CenterPoint	
Low-Permeability Geomembrane								
G-1	An open pipe present	Need investigation of this open pipe and action should be taken to cap it, if it does not have any purpose.	Action Not Yet Completed	No significant changes observed	Previous recommendations remain	No later than end of calendar year	CenterPoint	
G-4	Blackberry shrubs growth in the area	Loss of grass around the concrete post exposing the soil and growth of blackberry shrubs around the region. Remove the blackberry shrubs before the roots spread and re-seed the grass.	Action Not Yet Completed	Worse	Improved growth of grass and growth of blackberry shrubs around the region. Previous recommendations remain	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

Center Point (SPPD) Location	Description	April 2023 Inspection: Conditions Observed and Recommended Action	April 2023 Inspection: Action Taken	October 2023 Inspection: Condition Status	October 2023 Inspection: Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-6	Geomembrane exposed in this area	Improved vegetation. Exposed geomembrane remains in one area. Locations with exposed geomembrane are of the highest concern due to the potential compromise of the landfill cap. The configuration of the geomembrane and cover at the interface of the parking area does not appear to be in accordance with Figure 5 of the Interim Action Work Plan (IAWP). The geomembrane appears to be directly below the asphalt with no drainage layer or surfacing layer in between. Along with Site Coordinator, prepare a plan to reestablish cover over the geomembrane. Most likely, the area should be exposed, and the geomembrane tested for damage before repairs are be made. The crest of slope should then be provided cover to the maximum extent possible considering the existing asphalt and curb configuration	Action Not Yet Completed	No significant changes observed	Geomembrane still exposed. Previous recommendations from 2023 remain.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	
G-7	Exposed and damaged geomembrane at the parking area interface	The geomembrane remains exposed at G7. Locations with exposed geomembrane are of the highest concern due to the potential compromise of the landfill cap. The configuration of the geomembrane and cover at the interface of the parking area does not appear to be in accordance with Figure 5 of the Interim Action Work Plan (IAWP). The geomembrane appears to be directly below the asphalt with no drainage layer or surfacing layer in between. Along with Site Coordinator, prepare a plan to reestablish cover over the geomembrane. Most likely, the area should be exposed, and the geomembrane tested for damage before repairs are be made. The crest of slope should then be provided cover to the maximum extent possible considering the existing asphalt and curb configuration	Action Not Yet Completed	Worse	Geomembrane still exposed. Previous recommendations from 2023 remain.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

Center Point (SPPD) Location	Description	April 2023 Inspection		October 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-8	Exposed geomembrane around utility access hole	Work with Site Coordinator to prepare a plan to re-establish cover over the geomembrane. The geomembrane should be carefully exposed so as to not damage the geomembrane and inspected to determine if it is excess material or part of the cover. Make repairs as necessary and install adequate cover soil in accordance with the IAWP.	No documentation of actions taken	No significant changes observed	Previous recommendations from 2023 remain	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	
G-12	Poor vegetative cover	Areas of exposed soil. Grass should be re seeded. Follow-up inspection	No documentation of actions taken.	Changed	Dirt appears to be tilled and the area may have been seeded. No maintenance report received. Submit maintenance report if the tilling was intentional otherwise repair vegetation.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

Center Point (SPPD) Location	Description	April 2023 Inspection		October 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
G-14	Invasive Plants			New location	Invasive large plant growth. Remove the large plant due to risk of roots compromising the cover system.	No later than end of calendar year	CenterPoint	
Stormwater Management Facilities								
SW-1	Standing water	The swale does not meet City of Seattle Stormwater Manual requirement for a biofiltration swale to have a minimum slope of 1.5%. Bottom channel should be regraded to the intended 1.5% slope. Along with Site Coordinator, prepare a plan to address this situation.	Action Not Yet Completed.	No Significant Change Observed	Improved plan growth but there are still patches of bare soil. Water presence in the swale due to improper sloping. Previous recommended actions from 2023 remain.	No later than end of calendar year	CenterPoint will work in coordination with Site Coordinator to establish a solution	 

Table 2. Status of Identified Locations of Concern on the South Park Landfill CenterPoint (Former SPPD) Property, October 11, 2023 Inspection

Center Point (SPPD) Location	Description	April 2023 Inspection		October 2023 Inspection				
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
SW-2	Invasive/Deep Rooted Plants	The willow (salix sp.) and black cottonwood (populus balsamifera) growing along the edge of the west bioswale are native but deep-rooted species that should be removed so that it does not damage the geomembrane on that side. This recommendation remains from April 2022.	Action Not Yet Completed	Worse	Trees have grown larger. Remove the tree coordinating with CenterPoint Previous recommendations from 2023 remain	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	
SW-3	Catch basin clogged			New location	Catch basin inlet obstructed. Remove the obstruction.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	
SW-4	Catch basin clogged			New location	Catch basin inlet obstructed with sediment buildup and plant growth. Remove the obstruction and vegetation.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, October 11, 2023 Inspection

		April 2023 Inspection		October 2023 Inspection				
ROW Location	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
Asphalt Concrete								
AC-1	Cracks and pavement repair	Cracks got worse with ponding. Repair/repatching should be coordinated with SDOT	No action taken	No significant changes	Previous recommendations from 2022 and 2023 remain.	60 days	SPU to coordinate with SDOT	 
AC-2	Asphalt open cracking	Cracks got bigger with ponding. Repatching should be coordinated with SDOT	No action taken	Worse	Cracks got extended. Previous recommendation remains	60 days	SPU to coordinate with SDOT	

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, October 11, 2023 Inspection

		April 2023 Inspection		October 2023 Inspection				
ROW Location	Description	Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	Photographs
AC-3	Asphalt cracking and potholes alongside of street	Pothole appears to be getting worse and should be patched to prevent further erosion.	No action taken	No Significant Change Observed	Previous recommendations remain.	No later than end of calendar year	SPU to coordinate with SDOT	
AC-4	Potholes in the middle of roadway	Repatch work should be arranged with SDOT	No action taken	Worse	The pothole got bigger and ponding inside. Repatching should be done coordinating with SDOT	60 days	SPU to coordinate with SDOT	

Attachment A

October 2023 Cap Inspection Checklists

A-1	SRDS Cap Inspection Checklist
A-2	CenterPoint Cap Inspection Checklist
A-3	ROW Cap Inspection Checklist

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date:	October 11, 2023	**Parcel Owner:**	☒ SRDS ☐ CenterPoint (former SPPD) ☐ Right-of-Way
Inspector(s:	Tiffany Neier, Lauryn Guerrissi		

Type of Inspection: ☐ Annual ☒ Reinspection
☐ Non-Routine Reason:

Last Rain Event before Inspection:

Daily precipitation observations from King County Hamm Creek Rain Station (HAU2).
Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation

	10/05/23	10/06/23	10/07/23	10/08/23	10/09/23	10/10/23	10/11/23
Precipitation (in)	0	0	0	0	0.02	0.41	0.36

VISUAL INSPECTION CHECKLIST

Asphalt Concrete	Yes	No	Needs Repair	If yes, describe:
Minor cracking	☒	☐	☒	Locations SRDS AC-13, AC-14 need repair. See Table 1 for details. There were multiple locations with minor conductions observed that do not currently need repair.
Open cracks/ruts	☒	☐	☒	Locations SRDS AC-13, AC-20 need repair. See Table 1 for details.
Differential settlement	☐	☒	☐	
Potholes	☐	☒	☐	
Pooling or ponding	☒	☐	☒	Location SRDS AC-13 needs repair. See Table 1 for details. There were multiple locations with minor conductions observed that do not currently need repair.
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:
See Table 1 for recommended actions.

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	☐	☒	☐	
Exposed geotextile	☐	☒	☐	
Holes/signs of unauthorized digging	☐	☒	☐	
Poor vegetative cover	☐	☒	☐	
Exposed geomembrane	☐	☒	☐	
Recommended Maintenance or Repair Type/Location:				

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	☐	☒	☐	
Incorrect drainage path or not draining	☒	☐	☐	There were multiple locations with minor conductions observed that do not currently need repair.
Recommended Maintenance or Repair Type/Location:				

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

See Figure 1 and Table 1

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date:	October 11, 2023	**Parcel Owner:**	☐ SRDS ☒ CenterPoint (former SPPD) ☐ Right-of-Way
Inspector(s):	Tiffany Neier, Lauryn Guerrissi		

Type of Inspection: ☐ Annual ☒ Reinspection ☐ Non-Routine Reason:

Last Rain Event before Inspection:

Daily precipitation observations from King County Hamm Creek Rain Station (HAU2).
Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation

	10/05/23	10/06/23	10/07/23	10/08/23	10/09/23	10/10/23	10/11/23
Precipitation (in)	0	0	0	0	0.02	0.41	0.36

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	**No**	**Needs Repair**	**If yes, describe:**
Minor cracking	☒	☐	☐	
Open cracks/ruts	☒	☐	☒	Locations SPPD AC-6, AC-19, AC-21, AC-22 need repair
Differential settlement	☐	☒	☐	
Potholes	☐	☒	☐	
Pooling or ponding	☒	☐	☒	Locations SPPD AC-6, AC-13, AC-21 need repair
Separation of pavement from curbs, gutters, or catch basins	☐	☒	☐	
Sloughing or crumbling of edge materials	☐	☒	☐	
Erosion	☒	☐	☐	
Invasive plant growth	☒	☐	☒	Locations SPPD AC-13, AC-19, AC-21, and AC-23 need repair
Other signs of cap damage, failure, or disturbance	☒	☐	☒	Location SPPD AC-3 needs repair

Recommended Maintenance or Repair Type/Location:

See Table 2 for details and recommended actions.

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	☐	☒	☐	
Exposed geotextile	☐	☒	☐	
Holes/signs of unauthorized digging	☐	☒	☐	
Poor vegetative cover	☒	☐	☒	Location SPPD G-12 needs repair
Exposed geomembrane	☒	☐	☒	Locations SPPD G-6, G-7, G-8 need repair
Soil Sloughing	☐	☒	☐	
Invasive plant growth	☒	☐	☒	Locations G-4, G-14 need repair

Recommended Maintenance or Repair Type/Location:
See Table 2 for details and recommended actions.

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	☒	☐	☒	Location SPPD SW-2 needs repair
Poor vegetative cover	☐	☒	☐	
Incorrect drainage path or not draining	☒	☐	☒	Locations SPPD SW-1, SW-3, SW-4 need repair

Recommended Maintenance or Repair Type/Location:
See Table 2 for details and recommended actions.

Attach necessary documentation such as photographs, sketches, and additional notes.
See Figure 1 and Table 2

SOUTH PARK LANDFILL
CAP INSPECTION FORM A

Date:	October 11, 2023	**Parcel Owner:**	☐ SRDS ☐ CenterPoint (former SPPD) ☒ Right-of-Way
Inspector(s):	Tiffany Neier, Lauryn Guerrissi		

Type of Inspection: ☐ Annual ☒ Reinspection
☐ Non-Routine Reason:

Last Rain Event before Inspection:

Daily precipitation observations from King County Hamm Creek Rain Station (HAU2).
Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation

	10/05/23	10/06/23	10/07/23	10/08/23	10/09/23	10/10/23	10/11/23
Precipitation (in)	0	0	0	0	0.02	0.41	0.36

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	**No**	**Needs Repair**	**If yes, describe:**
Minor cracking	☒	☐	☐	Locations ROW AC-1 See Table 3 for details
Open cracks/ruts	☒	☐	☒	Locations ROW AC-1, AC-2, AC-3 See Table 3 for details
Differential settlement	☐	☒	☐	
Potholes	☒	☐	☒	Locations ROW AC-1, AC-3, AC-4 See Table 3 for details
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:

See Table 3 for recommended actions.

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	☐	☐	☐	Not applicable to ROW
Exposed geotextile	☐	☐	☐	Not applicable to ROW
Holes/signs of unauthorized digging	☐	☐	☐	Not applicable to ROW
Poor vegetative cover	☐	☐	☐	Not applicable to ROW
Exposed geomembrane	☐	☐	☐	Not applicable to ROW
Recommended Maintenance or Repair Type/Location:				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	☐	☐	☐	Not applicable to ROW
Erosion of soil	☐	☐	☐	Not applicable to ROW
Exposed geotextile membrane	☐	☐	☐	Not applicable to ROW
Holes/signs of unauthorized digging	☐	☐	☐	Not applicable to ROW
Invasive/deep-rooted plants	☐	☐	☐	Not applicable to ROW
Poor vegetative cover	☐	☐	☐	Not applicable to ROW
Incorrect drainage path or not draining	☐	☐	☐	Not applicable to ROW
Recommended Maintenance or Repair Type/Location:				

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

See Figure 1 and Table 3

Attachment B

Maintenance Forms

South Park Landfill

Cap Maintenance Form B

Date: 7/21/2023 Location: 8249 5th Ave S, Seattle Owner: CenterPoint Properties

Maintenance Contractor: AC Moate

Reason for Maintenance: Alleviate ponding issues around parking lot.

Describe maintenance location (attach sketch, photographs).

Asphalt area around First Student trailers.

Describe maintenance or repair performed (attach photos and additional documentation as necessary).

Repair areas where ponding is occuring by grinding down and removing asphalt and replacing it with new Class B hot ashpalt. All edges and cracks were sealed.

Is the maintenance activity complete? ☒ Yes ☐ No

If 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.

Legend
8249 5th Ave S
Feature 1
Hazmat disposal
Cookingwoods.com
Demolition Man
Valence Surface Technologies
Standard Steel Fabricating
North Star Ice Equipment Corporation
Lion Trucking
Left Coast Services
Demitri's Gourmet Mixes
BUS BARN
8249 - 5TH WAY S.
SEATTLE, WA.
CENTERPOINT - ANDREA
#6 is in stall #69/70
#7 is in stall #83
1= 70x27
2= 45x20
3= 36x26
4= 38x30
5= 32x15
6= 17x17
7= 26x20
8= 45x17
(8)
(5)
(6)
(7)
(1)
First Student Bus Yard
(4)
(2)
(3)
8249 5th Ave S
400 ft
N
Google Earth

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

Date of Observation/Review: October 11, 2022	**Inspector(s):** Tiffany Neier, Lauryn Guerrissi

Observation Notes (attach photos):

Pavement patches were inspected from the maintenance form CenterPoint Submitted. Patches have lo points causing ponding, especially at (1) and (8) as seen in the pictures below. We were not able to locate (7). No further modifications recommended at this time but we will continue to monitor the area for increased ponding. An additional patch was noted that was not included in the submitted maintenance report (last picture).

Location (1)

Location (2)

Location (3)

Location (4)

Location (5)


STOP
FIRST STUDENT
28

Location (6)

Location (8)

Additional Patch noted:

October 19, 2023

Site Coordinator/Inspector Signature | Date

Appendix B2

Cap Maintenance Documentation

Appendix B2-A

Example Form

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☐ SRDS ☐ CenterPoint (former SPPD) ☐ ROW

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):	
Site Coordinator/Inspector Signature	Date

Appendix B2-B

Completed Forms

Appendix B2-B.1

SRDS

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☒ SRDS
☐ CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

Part 1: Maintenance
(Completed by Property Owner)

Date of Repair/ Maintenance: 2/22/2024

Repaired by: Hot Mix

Reason for Maintenance:
Crack Open

Describe Maintenance Location (attach sketch and photos):
AC-13

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

Before

After

Is the maintenance activity complete? ☒ Yes ☐ No

If no, explain:

Minsoon Gim

Property Owner Signature

2/22/2024

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: 3/05/2024	**Inspector(s):** Tiffany Neier, Amber Bailey
Observation Notes (attach photos): Hole is patched with asphalt and sealant	

Tiffany Neier

Site Coordinator/Inspector Signature

3/07/2024

Date

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☒ SRDS
☐ CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

Part 1: Maintenance (Completed by Property Owner)	
Date of Repair/ Maintenance:	**Repaired by:** Hot Mix
Reason for Maintenance: Crack open	
Describe Maintenance Location (attach sketch and photos): AC-14	
Describe Maintenance or Repair Performed (attach photos and documentation as necessary):	

Before

After

Is the maintenance activity complete? ☒ Yes ☐ No

If no, explain:

Minsoon Yim

Property Owner Signature

2/22/2024

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.

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<table>
<tr><th colspan="4">Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)</th></tr>
<tr><td>Date of Observation/Review:</td><td>3/05/2024</td><td>Inspector(s):</td><td>Tiffany Neier, Amber Bailey</td></tr>
<tr><td colspan="4">Observation Notes (attach photos):
Hole is patched with asphalt and sealant</td></tr>
<tr><td colspan="2">Tiffany Neier
Site Coordinator/Inspector Signature</td><td colspan="2">3/07/2024
Date</td></tr>
</table>

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☒ SRDS
☐ CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

Part 1: Maintenance
(Completed by Property Owner)

Date of Repair/ Maintenance: 2/22/2024 **Repaired by:** Hot Mix

Reason for Maintenance:
Crack open

Describe Maintenance Location (attach sketch and photos):
AC-20

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


Before


After

Is the maintenance activity complete? ☒ Yes ☐ No

If no, explain:

Minsoon Yim

Property Owner Signature

2/23/2024

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.

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Part 2: Observation/Review of Maintenance (Completed by Site Coordinator)	
Date of Observation/Review: 3/05/2024	**Inspector(s):** Tiffany Neier, Amber Bailey
Observation Notes (attach photos): Hole is patched with asphalt and sealant	

[signature] 3/07/2024

Site Coordinator/Inspector Signature | Date

Appendix B2-B.2

CenterPoint (former SPPD)

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☐ SRDS ☒ CenterPoint (former SPPD) **Owner Contact:** Andrea Hacker

Part 1: Maintenance (Completed by Property Owner)	
Date of Repair/ Maintenance: 11/9	**Repaired by:** Catchment Solutions
Reason for Maintenance: Storm drain inspections and cleaning	
Describe Maintenance Location (attach sketch and photos): SW-3 & SW-4; AC-23	
Describe Maintenance or Repair Performed (attach photos and documentation as necessary): Drains inspected and cleared, sediment removed from around drain. Butterfly bush removed from AC-23	
Is the maintenance activity complete? ☒ Yes ☐ No **If no, explain:**	
Property Owner Signature	Date 1/10/2024
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:	3/05/2024	**Inspector(s):**	Tiffany Neier, Amber Bailey
Observation Notes (attach photos):	AC-23: Plant was removed now pavement needs to be repaired SW-3: Catch basin needs to be cleaned again SW-4: Problem resolved		

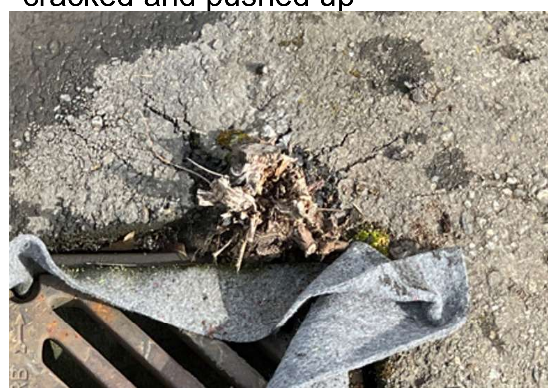
Tif Neier

3/07/2024

Site Coordinator/Inspector Signature

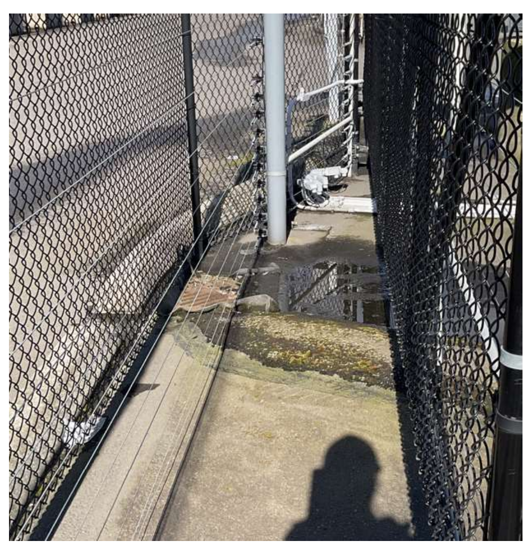
Date

AC-23 - Plant cut but asphalt is cracked and pushed up



SW-3 - Catch basin still has obstructions though less than during previous inspection

SW-4 - Catch basin has been cleaned of obstructions



SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☐ SRDS ☒ CenterPoint (former SPPD)

Owner Contact: Andrea Hacker

Part 1: Maintenance (Completed by Property Owner)	
Date of Repair/ Maintenance: 2/22 & 2/23	**Repaired by:** Veths Landscaping
Reason for Maintenance: Restoration of exposed geomembrane areas	
Describe Maintenance Location (attach sketch and photos): G-6, G-7, G-8, G-12	
Describe Maintenance or Repair Performed (attach photos and documentation as necessary): Hand removal of dead grass, install new sod and re-seed	
Is the maintenance activity complete? ☒ Yes ☐ No **If no, explain:**	
Property Owner Signature	Date 2/28/2024
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	

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

Date of Observation/Review:	**Inspector(s):**
Observation Notes (attach photos):	

Site Coordinator/Inspector Signature

Date

Appendix B2-B.3

ROW

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☐ SRDS
☐ CenterPoint (former SPPD)
☒ ROW

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: 3/5/24	**Inspector(s):** Tiffany Neier, Amber Bailey

Observation Notes (attach photos):

Road patches

ROW AC-1. Partially complete. A large portion of this area of concern was patched; several of the potholes were filled, but there is an area that still needs repair.

3/12/24

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL
CAP MAINTENANCE FORM B

Parcel Owner: ☐ SRDS
☐ CenterPoint (former SPPD)
☒ ROW

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.	

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

Date of Observation/Review: 3/15/24	**Inspector(s):** Chris Bourgeois

Observation Notes (attach photos):

Road patches

ROW AC-4. Complete. Large and smaller potholes patched with asphalt.

Chris B

3/28/24

Site Coordinator/Inspector Signature

Date

Appendix C

Landfill Gas Monitoring

Appendix C1

Perimeter Probe Monitoring Field Forms

Final Probe Report for South Park Landfill

Probe	Date	Technician	CH4 PPM	O2 %	CO2 %	SP In/Wc	Blocked	BPS	Comment
GP03	1/31/2023	TS, WY	0	13.9	4.1	0.0	N	30.21	
GP07	1/31/2023	TS, WY	0	18.1	1.3	-0.1	N	30.19	
GP-09	2/06/2023	WY	0	14.7	5.2	0.06	N	30.30	Probe inaccessible 1/31/24
GP11	1/31/2023	TS, WY	0	21.1	1.3	0.1	Y	30.21	
GP13	1/31/2023	TS, WY	0	15.5	1.9	-15.4	Y	30.21	
GP15	1/31/2023	TS, WY	0	13.6	3.9	1.1	Y	30.23	
GP16	1/31/2023	TS, WY	0	19.4	1.1	-0.1	N	30.19	
GP23	1/31/2023	TS, WY	0	20.2	0.1	0.0	N	30.17	
GP26	1/31/2023	TS, WY	0	19.2	1.8	-0.1	N	30.23	
GP27	1/31/2023	TS, WY	4000	0.0	9.7	-0.1	N	30.15	
GP28	1/31/2023	TS, WY	0	7.7	3.8	-0.1	N	30.21	
GP29	1/31/2023	TS, WY	9000	0.0	8.1	-0.1	N	30.19	
GP31	1/31/2023	TS, WY	0	7.2	5.8	-0.1	N	30.19	
GP32	1/31/2023	TS, WY	0	20.2	0.3	0.5	Y	30.21	
GP33	1/31/2023	TS, WY	49000	0.0	7.1	0.0	N	30.20	
GP37	1/31/2023	TS, WY	0	4.4	7.4	-0.1	N	30.22	
GP38	1/31/2023	TS, WY	0	4.2	11.8	-0.1	N	30.24	

Final Probe Report for South Park Landfill

Probe	Date	Technician	CH4 PPM	O2 %	CO2 %	SP In/Wc	Blocked	BPS	Comment
GP03	4/25/2023	TS, WY	0	13.5	4.4	0.1	N	30.34	
GP07	4/25/2023	TS, WY	0	18.7	1.9	0.1	N	30.34	
GP09	4/25/2023	TS, WY	0	12.6	7.5	0.1	N	30.34	
GP11	4/25/2023	TS, WY	0	21.0	0.8	0.0	Y	30.34	
GP13	4/25/2023	TS, WY	0	17.7	2.9	-14.6	Y	30.34	
GP15	4/25/2023	TS, WY	0	20.8	1.2	1.3	N	30.34	
GP16	4/25/2023	TS, WY	0	21.2	0.4	0.0	N	30.34	
GP23	4/25/2023	TS, WY	0	18.8	2.2	0.0	N	30.34	
GP26	4/25/2023	TS, WY	0	19.5	1.7	0.1	N	30.34	
GP27	4/25/2023	TS, WY	1000	0.0	8.5	0.1	N	30.34	
GP28	4/25/2023	TS, WY	0	21.5	0.0	0.1	N	30.34	
GP29	4/25/2023	TS, WY	1000	0.1	12.7	0.1	N	30.34	
GP31	4/25/2023	TS, WY	0	17.4	1.9	0.2	N	30.34	
GP32	4/25/2023	TS, WY	0	13.5	1.1	0.5	Y	30.34	
GP33	4/25/2023	TS, WY	0	20.1	1.1	-0.1	N	30.34	
GP37	4/25/2023	TS, WY	0	6.4	7.7	0.0	N	30.34	
GP38	4/25/2023	TS, WY	0	4.5	11.9	0.1	N	30.34	

Final Probe Report for South Park Landfill

Probe	Date	Technician	CH4 PPM	O2 %	CO2 %	SP In/Wc	Blocked	BPS	Comment
GP03	7/25/2023	DF/WY/T	0	14.0	5.8	0.0	N	30.16	
GP07	7/25/2023	DF/WY/T	0	17.8	3.2	0.0	N	30.17	
GP09	7/25/2023	DF/WY/T	0	16.7	5.4	0.0	N	30.16	
GP11	7/25/2023	DF/WY/T	0	20.7	0.6	0.3	Y	30.16	
GP13	7/25/2023	DF/WY/T	0	12.0	4.3	-16.1	Y	30.15	
GP15	7/25/2023	DF/WY/T	0	20.7	0.5	-7.6	N	30.17	
GP16	7/25/2023	DF/WY/T	0	20.3	0.7	0.0	N	30.18	
GP23	7/25/2023	DF/WY/T	0	13.7	7.6	0.0	N	30.17	
GP26	7/25/2023	DF/WY/T	0	19.1	2.2	-0.1	N	30.15	
GP27	7/25/2023	DF/WY/T	0	0.0	12.2	0.0	N	30.18	
GP28	7/25/2023	DF/WY/T	0	20.8	0.0	-0.1	N	30.16	
GP29	7/25/2023	DF/WY/T	0	0.0	16.8	0.0	N	30.16	
GP31	7/25/2023	DF/WY/T	0	7.9	10.8	0.0	N	29.99	
GP32	7/25/2023	DF/WY/T	0	14.6	2.7	-1.3	N	30.18	
GP33	7/25/2023	DF/WY/T	0	17.7	2.4	0.0	N	30.17	
GP37	7/25/2023	DF/WY/T	0	10.9	9.9	0.1	N	30.16	
GP38	7/25/2023	DF/WY/T	0	2.1	18.4	0.0	N	30.17	

Final Probe Report for South Park Landfill

Probe	Date	Technician	CH4 PPM	O2 %	CO2 %	SP In/Wc	Blocked	BPS	Comment
GP03	10/31/2023	TS	0	17.4	5.1	0.0	N	30.23	
GP07	10/31/2023	TS	0	17.5	3.5	0.1	N	30.23	
GP09	10/31/2023	TS	0	15.4	6.7	0.2	N	30.23	
GP11	10/31/2023	TS	0	21.1	1.3	0.1	N	30.23	
GP13	10/31/2023	TS	42000	0.2	3.4	-28.7	Y	30.23	
GP15	10/31/2023	TS	0	18.8	4.5	-1.9	N	30.23	
GP16	10/31/2023	TS	0	6.8	11.8	0.0	N	30.23	
GP23	10/31/2023	TS	0	14.3	7.8	0.0	N	30.23	
GP26	10/31/2023	TS	0	17.8	3.2	0.0	N	30.23	
GP27	10/31/2023	TS	1000	0.0	14.0	0.0	N	30.23	
GP28	10/31/2023	TS	0	22.1	0.1	0.1	N	30.23	
GP29	10/31/2023	TS	3000	0.0	15.4	0.0	N	30.23	
GP31	10/31/2023	TS	0	7.6	9.9	0.0	N	30.23	
GP32	10/31/2023	TS	0	13.4	3.6	-4.4	Y	30.23	
GP33	10/31/2023	TS	0	17.5	2.7	0.0	N	30.23	
GP37	10/31/2023	TS	0	5.6	10.4	0.0	N	30.23	
GP38	10/31/2023	TS	0	2.5	15.7	0.0	N	30.23	

Appendix C2

On-Site Building Monitoring Forms

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

Building Location: Training office / Supervisor Office

Make and Model of Detector: Techamor

Monthly Check Press test button and confirm indicator light is illuminated.		
Pass	**Date**	**Initials**
☑	3/14/23	BL
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.		
Pass	**Date**	**Initials**
☑	3/14/23	BL
☐		
☐		
☐		

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

Building Location: Mens bathroom

Make and Model of Detector: Technamor

Monthly Check Press test button and confirm indicator light is illuminated.		
Pass	**Date**	**Initials**
☑	3/14/23	ml
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.		
Pass	**Date**	**Initials**
☑	3/14/23	ml
☐		
☐		
☐		

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

Building Location: Training Office | Supervisor Office

Make and Model of Detector: Technor

Monthly Check Press test button and confirm indicator light is illuminated.		
Pass	**Date**	**Initials**
☑	6/12/23	mr
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.		
Pass	**Date**	**Initials**
☑	6/12/23	mr
☐		
☐		
☐		

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

Building Location: Mens bathroom

Make and Model of Detector: Technamor

Monthly Check Press test button and confirm indicator light is illuminated.		
Pass	**Date**	**Initials**
☑	6/13/23	m
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.		
Pass	**Date**	**Initials**
☑	6/13/23	m
☐		
☐		
☐		

SOUTH PARK LANDFILL

SPPD ON-SITE BUILDING

METHANE ALARM INSPECTION CHECKLIST

Building Location: Training office | Supervisor Office

Make and Model of Detector: Teenamor

Monthly Check Press test button and confirm indicator light is illuminated.		
Pass	**Date**	**Initials**
☑	9/12/23	WL
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.		
Pass	**Date**	**Initials**
☑	9/12/23	WL
☐		
☐		
☐		

Code on mens restroom door

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

Building Location: Mens restroom

Make and Model of Detector: Techamor

Monthly Check

Press test button and confirm indicator light is illuminated.

Pass	Date	Initials
☑	9/12/23	wr
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.

Pass	Date	Initials
☑	9/12/23	m
☐		
☐		
☐		

* Found unplugged

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

Building Location: Training Office

Make and Model of Detector: Techamor

Monthly Check Press test button and confirm indicator light is illuminated.		
Pass	**Date**	**Initials**
☐	12/12/23	mm
☑		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.		
Pass	**Date**	**Initials**
☑	12/12/23	mm
☐		
☐		
☐		

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

Building Location: Mens Restroom

Make and Model of Detector: Techamor

Monthly Check

Press test button and confirm indicator light is illuminated.

Pass	Date	Initials
☑	12/12/23	MM
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

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.

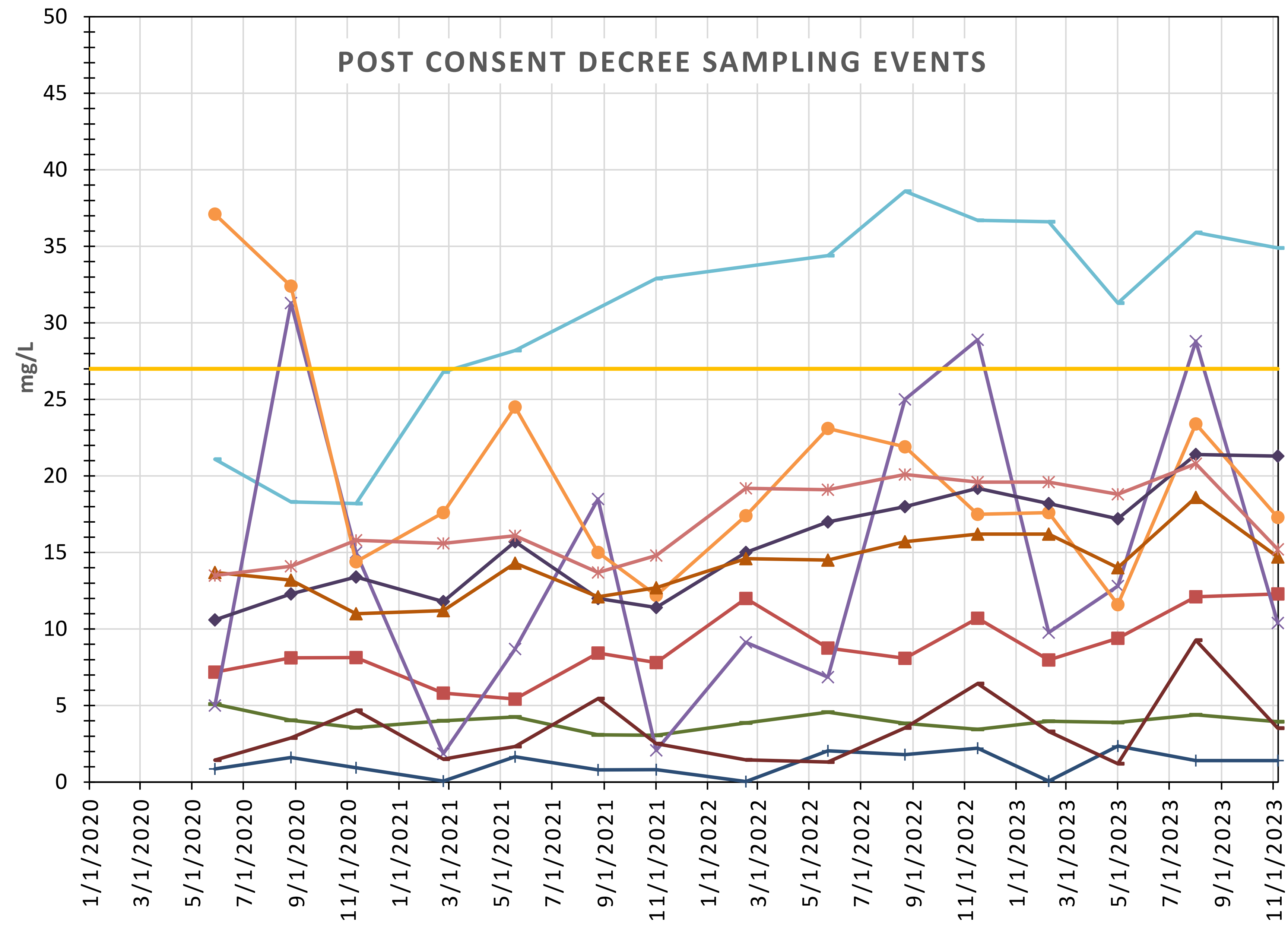
Pass	Date	Initials
☑	12/12/23	MM
☐		
☐		
☐		

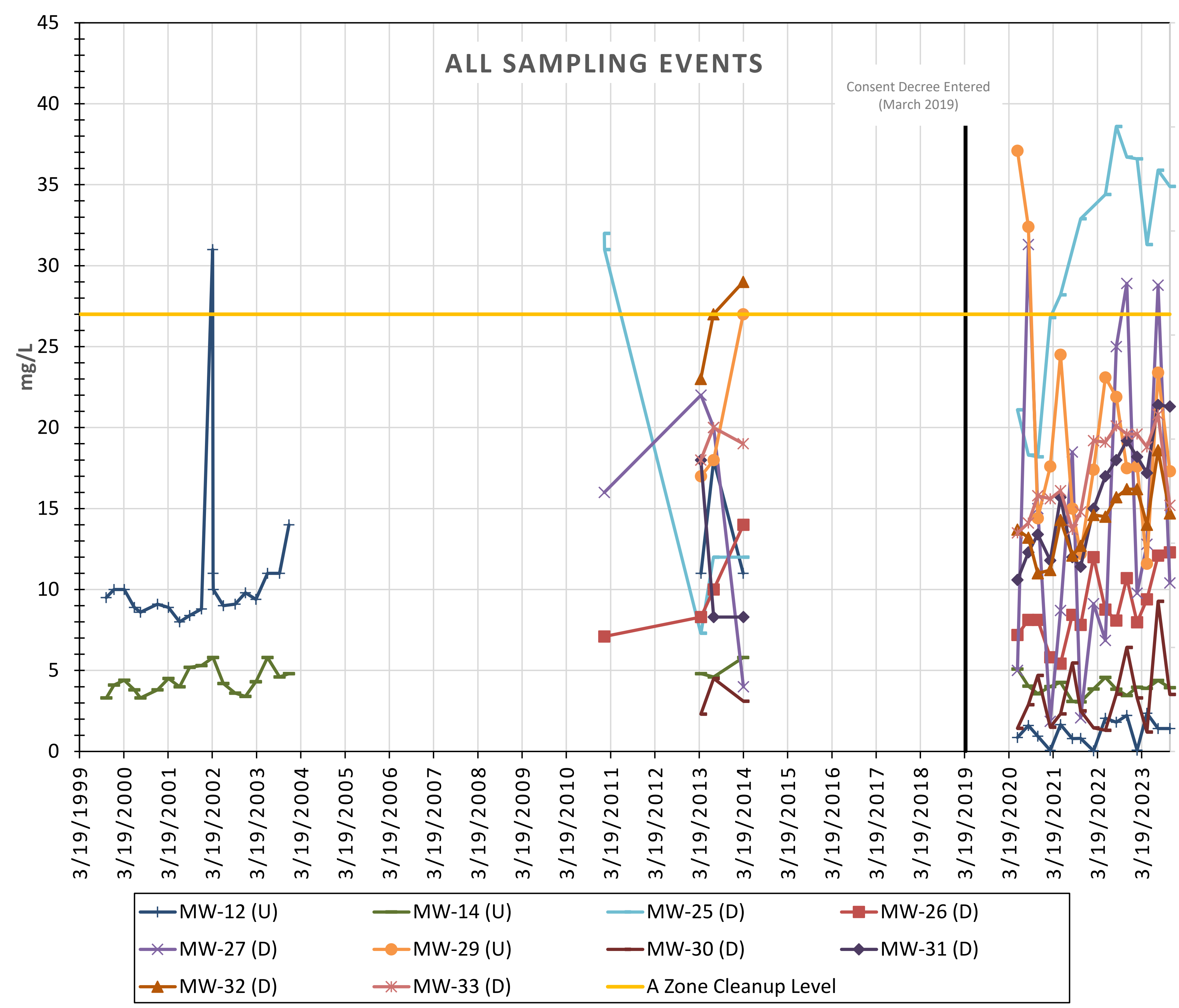
Appendix D

Groundwater Monitoring

Appendix D1

Time-Series Plots

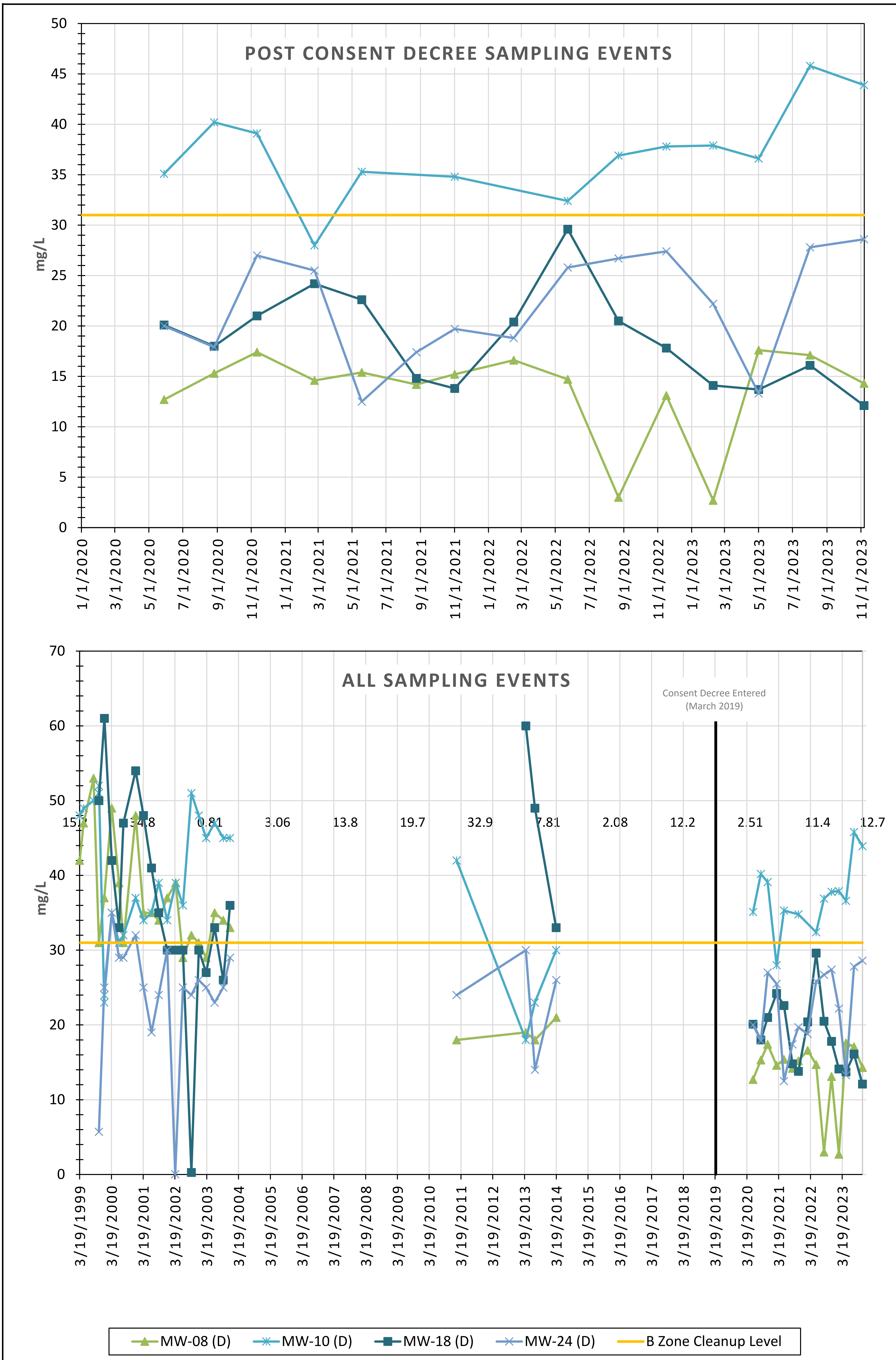




Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Total Iron Concentrations
A-Zone CPOC Wells
South Park Landfill

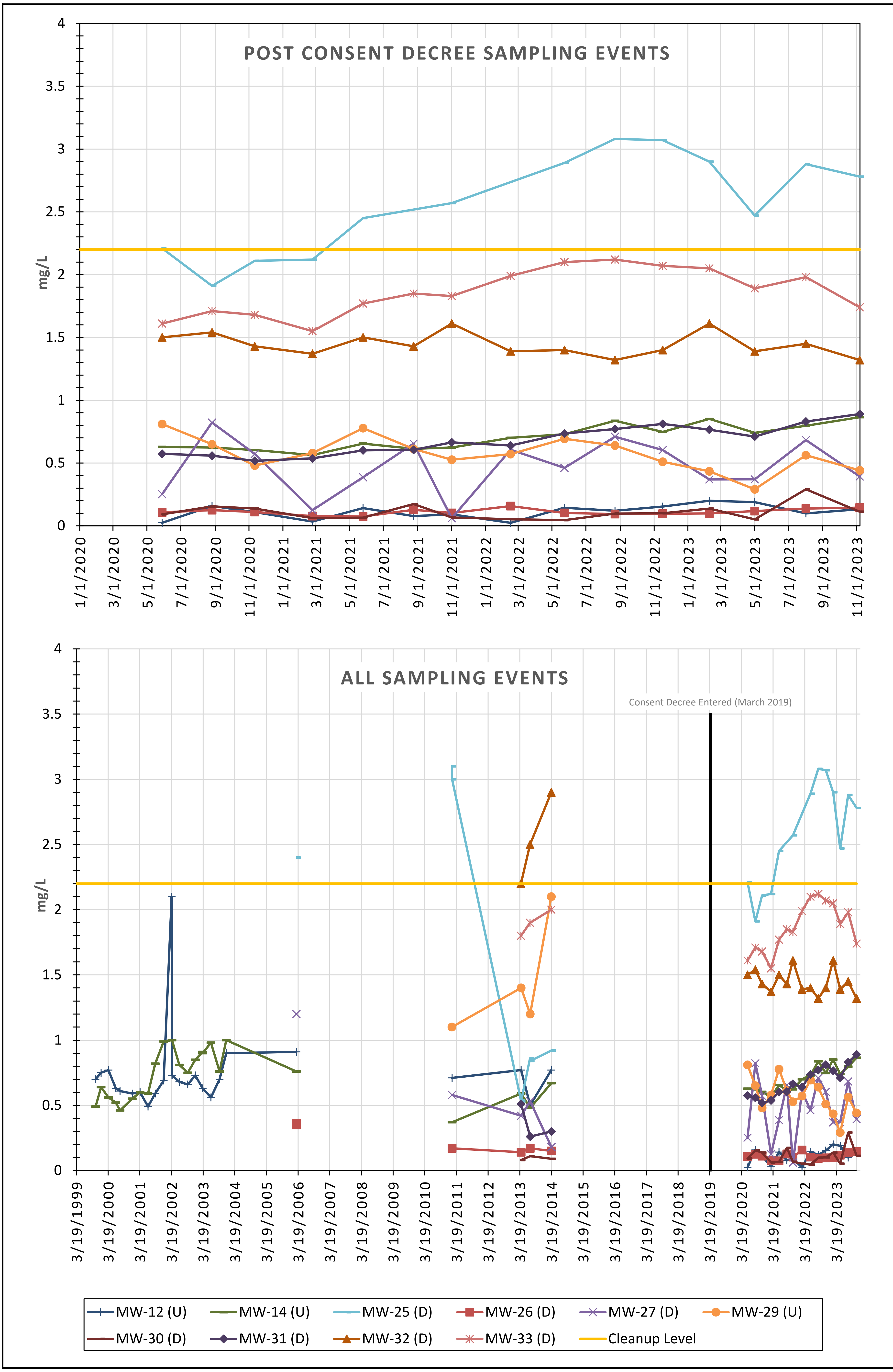
D = Downgradient
U = Upgradient



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

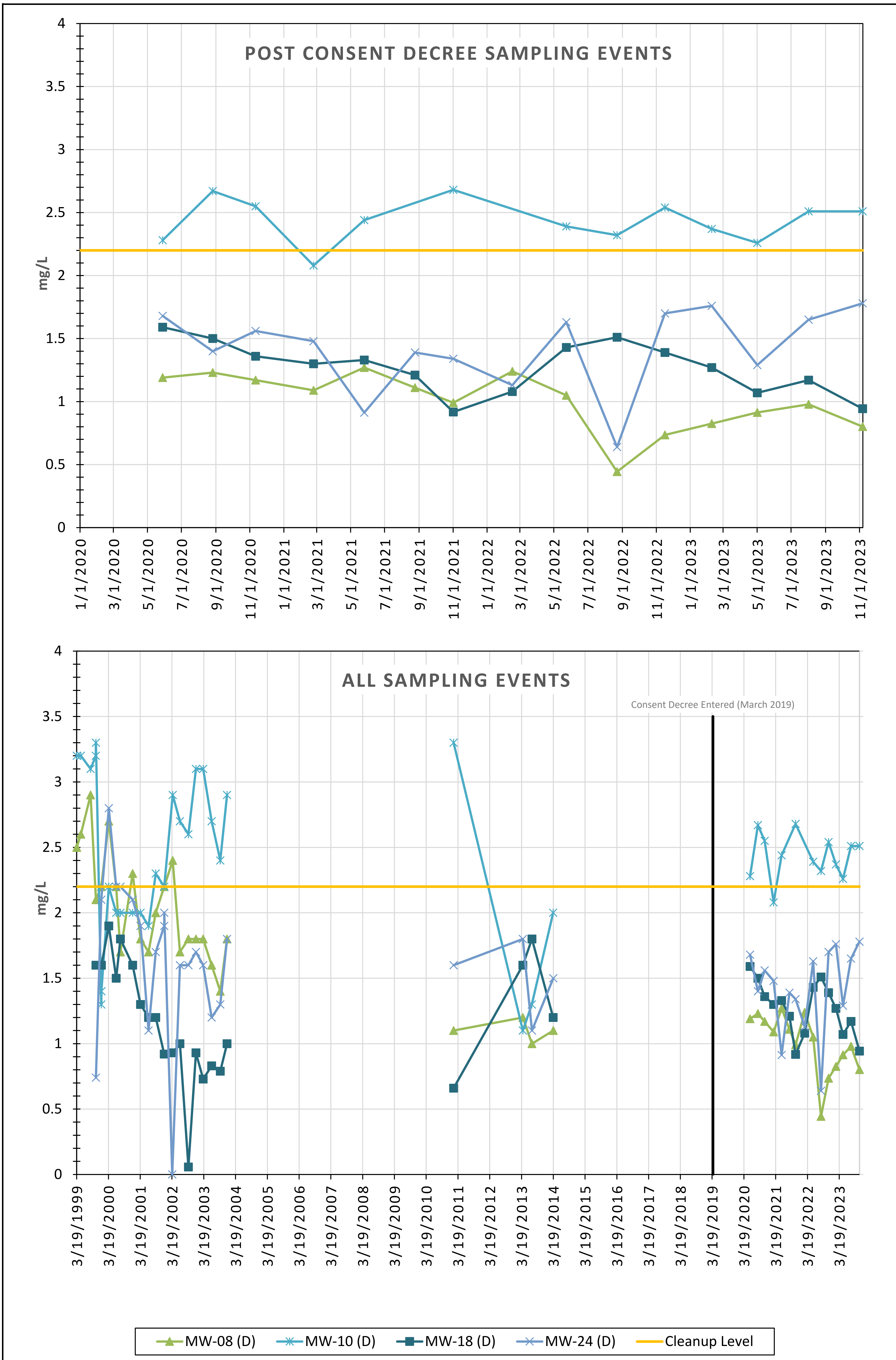
Total Iron Concentrations
B-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Total Manganese Concentrations
A-Zone CPOC Wells
South Park Landfill

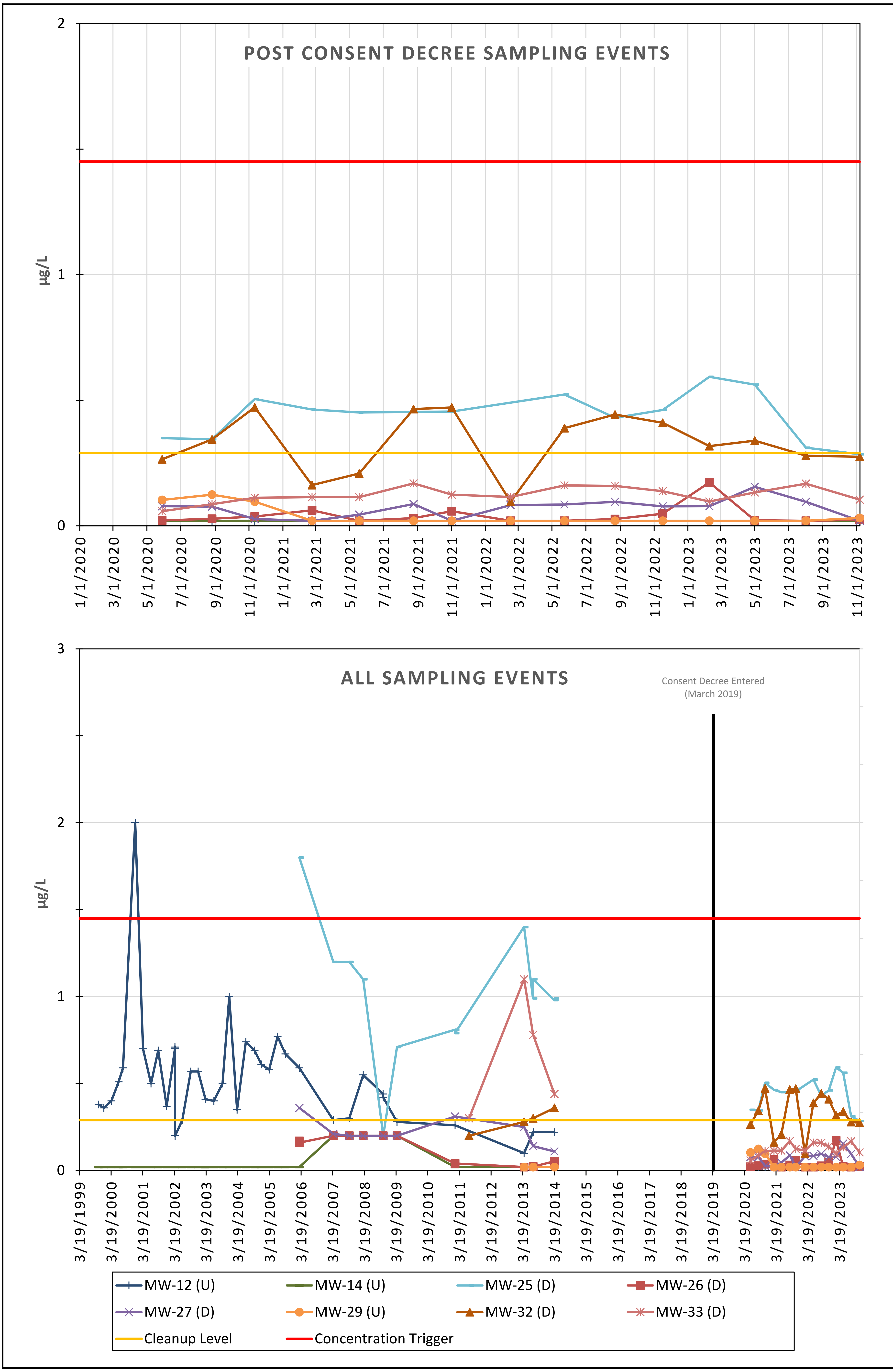
D = Downgradient
U = Upgradient



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

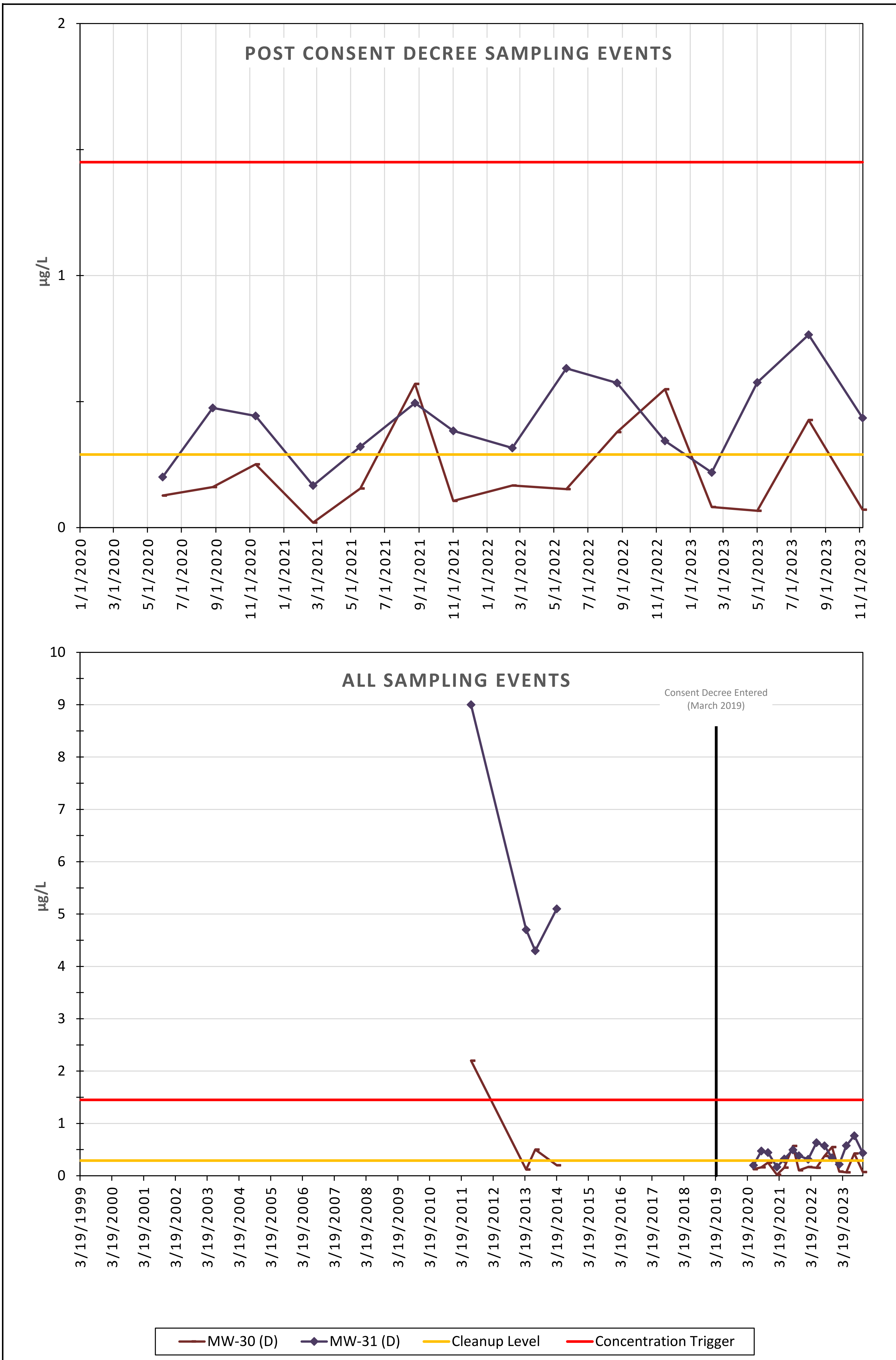
Total Manganese Concentrations
B-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

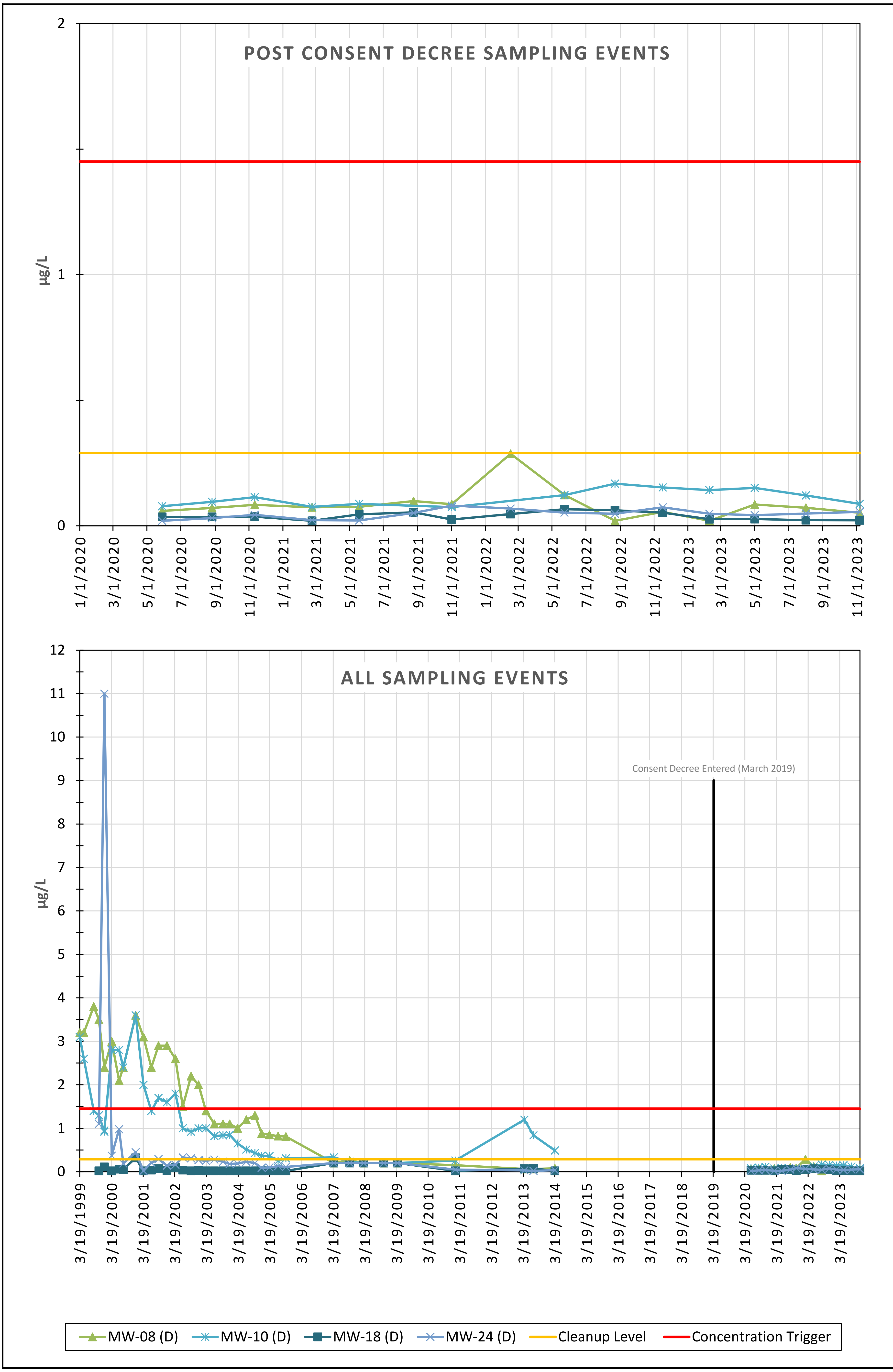
Vinyl Chloride Concentrations
A-Zone CPOC Wells
South Park Landfill



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

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

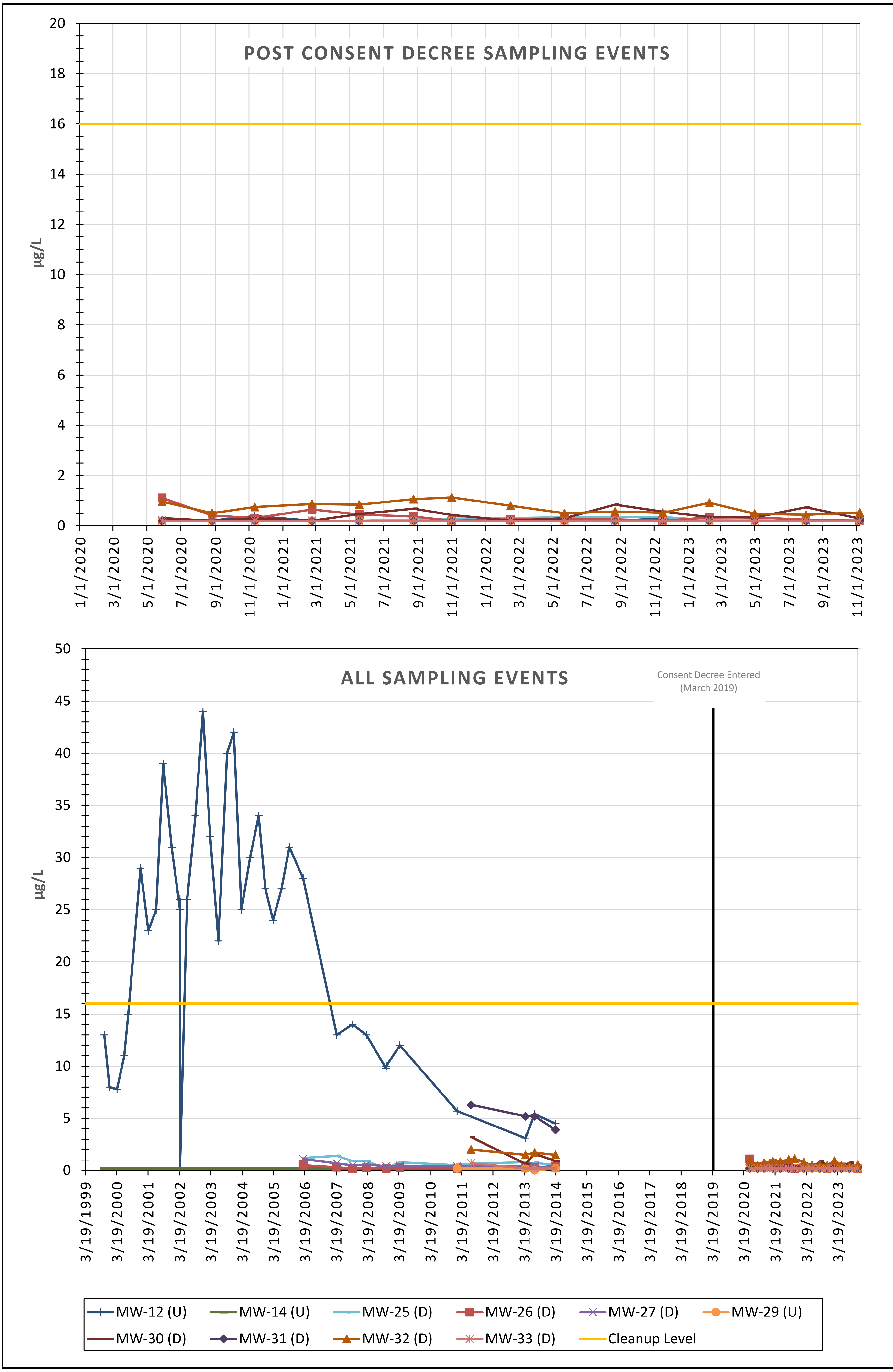
D = Downgradient
U = Upgradient



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Vinyl Chloride Concentrations
B-Zone CPOC Wells
South Park Landfill

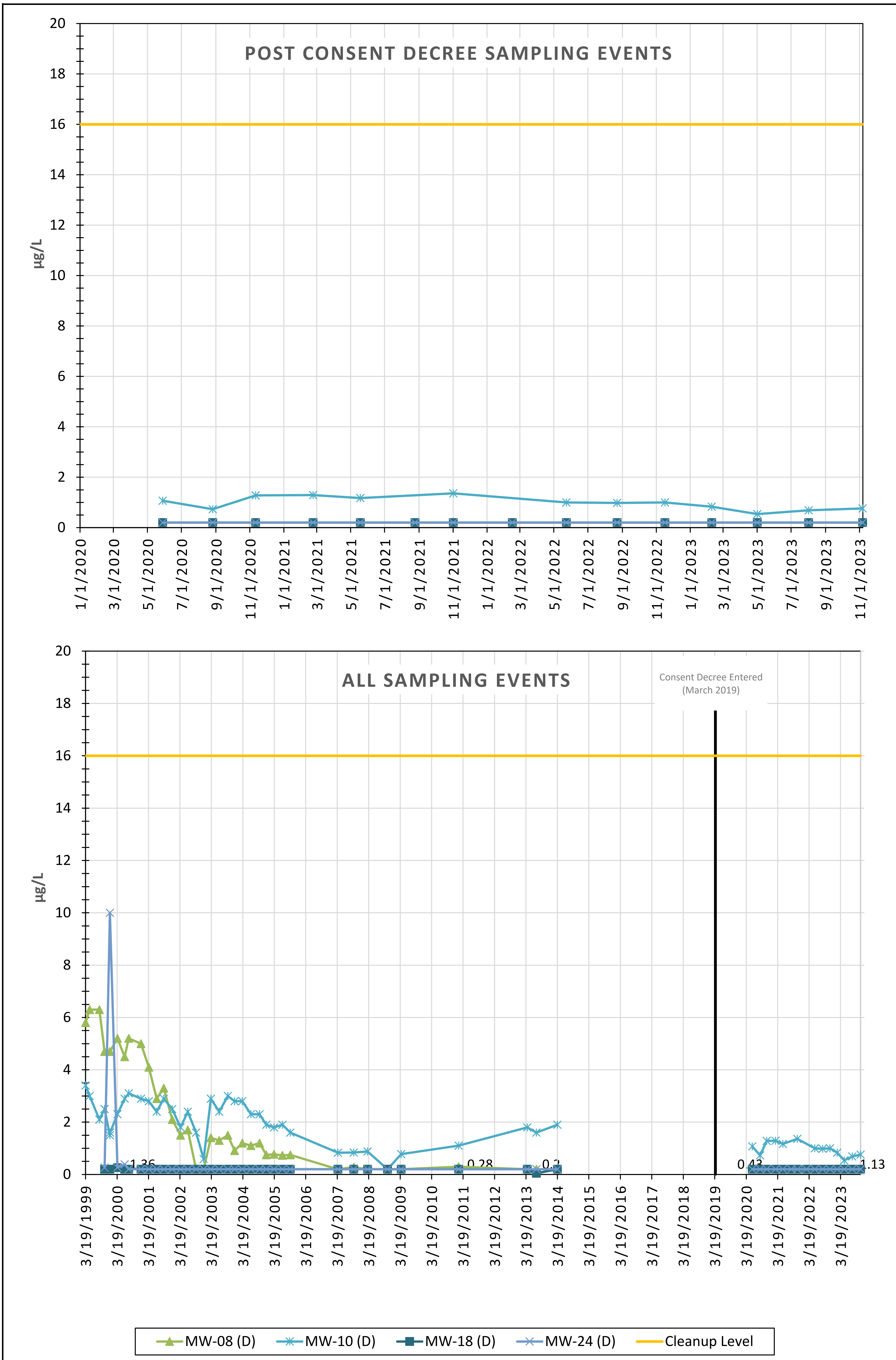
D = Downgradient
U = Upgradient



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

D = Downgradient
U = Upgradient

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



Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

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

D = Downgradient
U = Upgradient

Appendix D2

Trend Analyses

APPENDIX D2

Trend Analyses

Per the CAP, the Mann-Kendall test was used to statistically evaluate groundwater quality trends for vinyl chloride (µg/L), total iron (mg/L), and total manganese (mg/L) using monitoring data collected in 2020 through 2023. The Mann-Kendall test is a nonparametric trend evaluation procedure that can be used when there are missing values or when the data do not conform to any particular distribution. The Mann-Kendall test only uses directional differences (positive, zero, negative) of the data rather than the measured values. In statistical terms, the Mann-Kendall test is a nonparametric test for zero slope of the linear regression of time-ordered data versus time (Gilbert 1987). For the Mann-Kendall test, the null hypothesis (H_0) is no trend (i.e., the observations are randomly ordered in time), which is tested against the alternative hypothesis (H_A) of an increasing or decreasing monotonic trend.

An assumption underlying the Mann-Kendall test is that the time-ordered data are monotonic (Salmi et al. 2002); that is, the successive values in the data set consistently increase or decrease, but not necessarily in a linear manner, and they display no seasonal or other cycle. If the data are not monotonic, then the statistical power of the Mann-Kendall trend test is reduced. One example of non-monotonic data is precipitation, which can vary seasonally as well as by larger time intervals (e.g., years or decades). Statistical power is the strength of a test to identify an actual release of contaminated groundwater or difference from a compliance standard (EPA 2009). In the case of the Mann-Kendall test, statistical power is the strength to correctly identify an increasing or decreasing trend in a set of time-ordered data.

The Mann-Kendall test computes an ***S*** statistic based on pair-wise differences between each time-ordered value and all earlier values. A positive ***S*** value indicates an increasing trend, zero indicates no trend, and a negative value indicates a decreasing trend. The magnitude of ***S*** does not indicate the slope of the trend; instead, large positive values of ***S*** indicate that measurements taken later in time tend to be larger than those taken earlier. Similarly, large negative values of ***S*** indicate that measurements taken later in time tend to be smaller than those taken earlier (Gilbert 1987).

Significance of the Mann-Kendall test ***S*** statistic is a function of the magnitude of ***S*** and the number of measurements, with a larger positive or negative value of ***S*** and a greater number of measurements leading to a higher statistical significance (Gilbert 1987).

To evaluate trends in the monitoring data using the Mann-Kendall test, the EPA (2022) program ProUCL (version 5.2.0) was used. Per the CAP and Washington Department of Ecology guidance (Ecology 2005), groundwater monitoring data were evaluated at a 95 percent confidence level (5 percent significance level). That is, a trend was considered statistically significant if the confidence level was greater than 95 percent (the significance level was less than 5 percent).

Table 1 lists the percent non-detects by chemical for each of the 14 wells evaluated. For data sets with non-detect, or “censored”, results, per the Ecology *Guidance for Monitoring at Landfills and Other Facilities* (Ecology 2018), the censored data were handled as follows:

- ProUCL guidance (EPA 2022) states that the substitution of half detection limits for censored values is not recommended, as the bias cannot be quantified with certainty. Because the Mann-Kendall test is a nonparametric test, it was not necessary to substitute censored values with half detection limits for wells with fewer than 15 percent non-detects. The Mann-Kendall test only uses directional differences (positive, zero, negative), which are not affected by use of detection limits or half detection limits for censored values.

- For all wells, censored values were replaced with estimated values using the ROS method prior to statistical analysis. The ROS method fits a regression line to the uncensored data, then assigns values from that line below the detection limit to estimate concentrations for the censored observations. The uncensored values are then combined with the estimated censored values for further statistical analysis.
- Wells with more than 50 percent but less than 90 percent non-detects for a specific chemical were analyzed using the Mann-Kendall test; however, the results should be interpreted with caution, as significance of the analysis may be diminished due the large number of censored data. Statistical evaluations are typically not performed on data sets with more than 50 percent non-detects because meaningful trends are difficult to determine due to the large number of censored values.

For wells with more than 90 percent non-detects (indicating only one or no detected values), Mann-Kendall tests were not run (see Table 1). No vinyl chloride, total iron, or total manganese values from any wells were detected at an order of magnitude higher than all other results (see time-series plot in Appendix D1) or means (per Ecology 2018), so no statistical outliers were suggested in the data.

REFERENCES

Ecology (Washington State Department of Ecology). 2005. Implementation Guidance for the Ground Water Quality Standards. Washington State Department of Ecology Publication #96-02. Olympia, WA.

Ecology. (Washington State Department of Ecology). 2018. Guidance for Monitoring at Landfills and Other Facilities Regulated Under Chapters 173-304, 173-306, 173-350, and 173-351 WAC, Revised December 2018. Washington State Department of Ecology Publication no. 12-07-072.

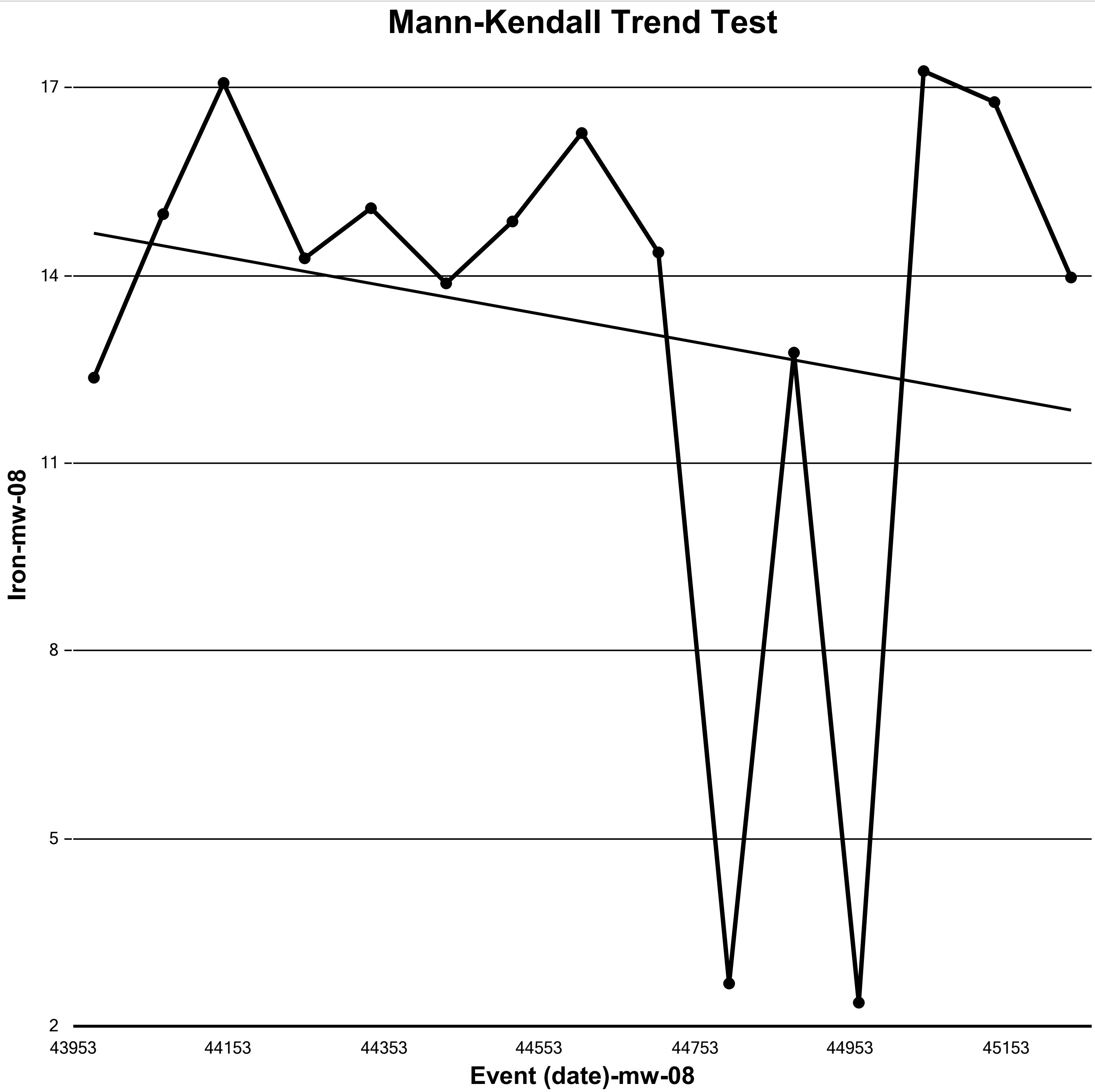
EPA (U.S. Environmental Protection Agency). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530/R-09-007. March 2009. U.S. Environmental Protection Agency Office of Resource and Recovery. Washington, D.C.

EPA (U.S. Environmental Protection Agency). 2022. ProUCL Version 5.2.0 Technical Guide: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. April 2022. Prepared by Neptune and Company, Inc., Lakewood, CO. Prepared for 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.

Table 1. Summary of Data Sets Used for Trend Tests

	Vinyl Chloride				Total Iron				Total Manganese			
Well	Sample Size	Number of Detects	Number of Non-detects	Percent of Non-detects	Sample Size	Number of Detects	Number of Non-detects	Percent of Non-detects	Sample Size	Number of Detects	Number of Non-detects	Percent of Non-detects
MW-08	15	13	2	13.33	15	15	0	0	15	15	0	0
MW-10	13	13	0	0	13	13	0	0	13	13	0	0
MW-12	15	0	15	100	15	13	2	13.33	15	15	0	0
MW-14	15	0	15	100	15	15	0	0	15	15	0	0
MW-18	15	14	1	6.67	15	15	0	0	15	15	0	0
MW-24	15	14	1	6.67	15	15	0	0	15	15	0	0
MW-25	13	13	0	0	13	13	0	0	13	13	0	0
MW-26	15	11	4	26.67	15	15	0	0	15	15	0	0
MW-27	15	12	3	20.00	15	15	0	0	15	15	0	0
MW-29	15	4	11	73.33	15	15	0	0	15	15	0	0
MW-30	15	14	1	6.67	15	15	0	0	15	15	0	0
MW-31	15	15	0	0	15	15	0	0	15	15	0	0
MW-32	15	15	0	0	15	15	0	0	15	15	0	0
MW-33	15	15	0	0	15	15	0	0	15	15	0	0



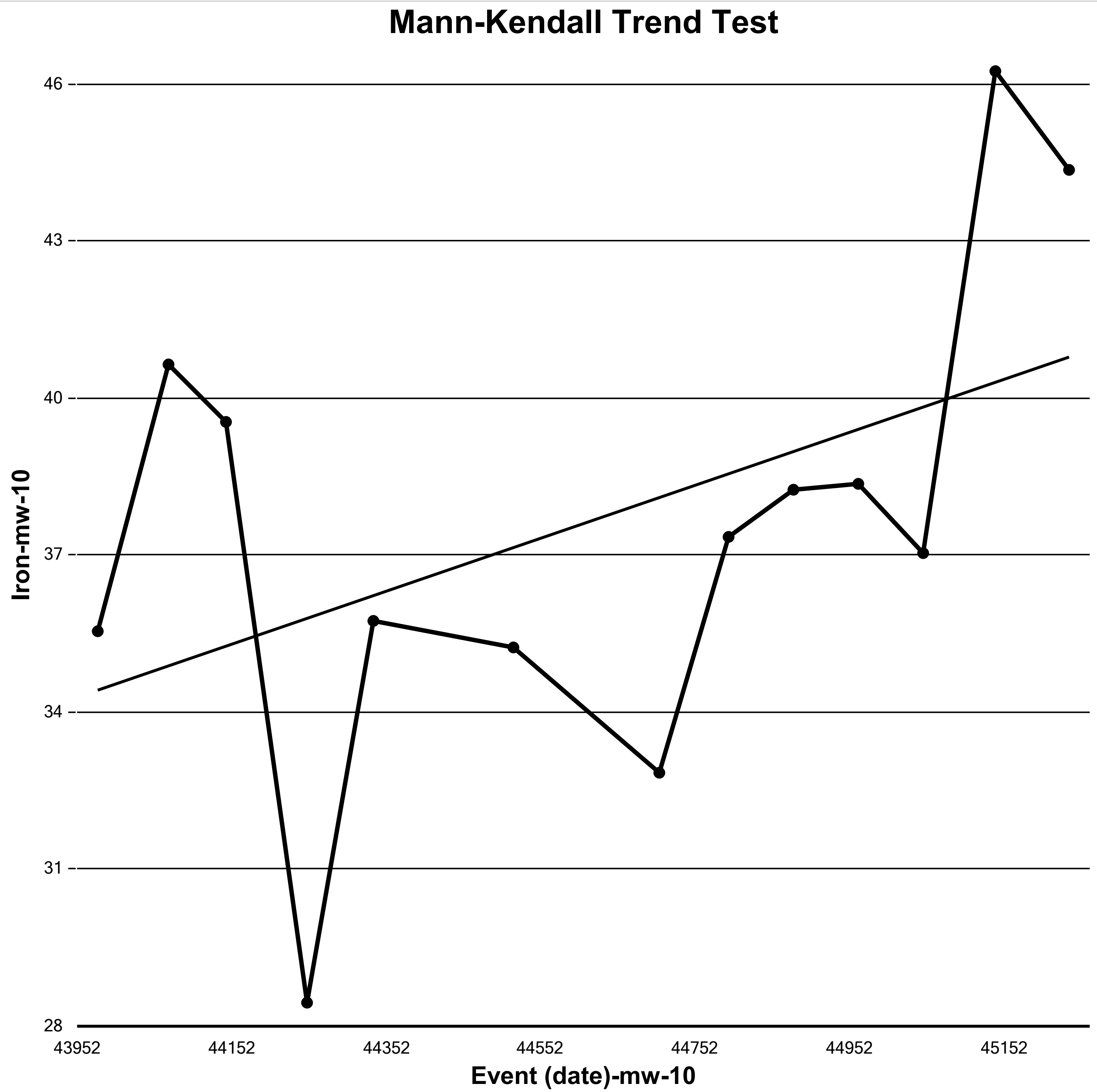
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.1979
M-K Test Value (S)	-5
Tabulated p-value	0.4230
Approximate p-value	0.4215

OLS Regression Line (Blue)

OLS Regression Slope	-0.0022
OLS Regression Intercept	113.5132

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



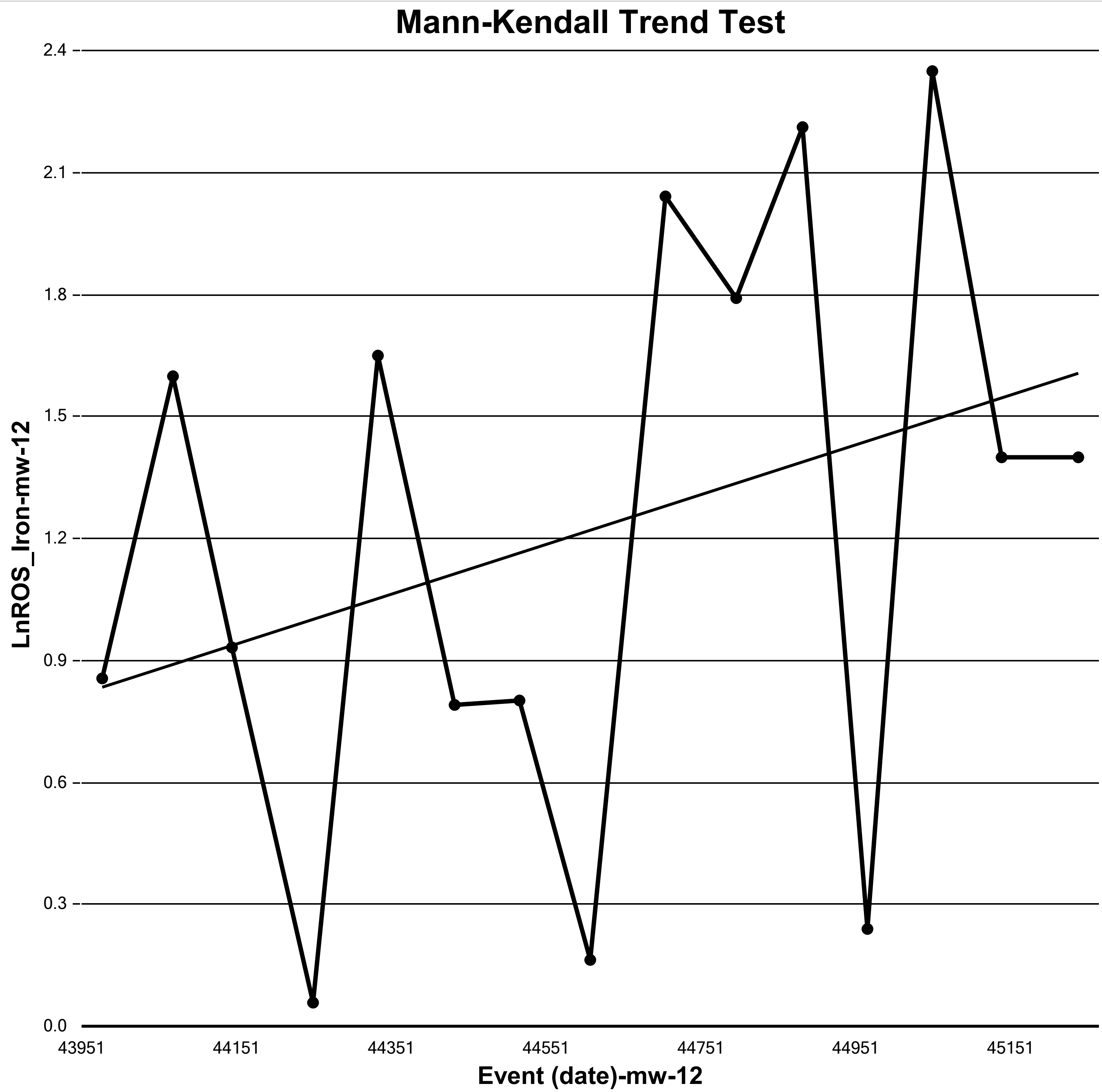
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3911
Standardized Value of S	1.4032
M-K Test Value (S)	24
Tabulated p-value	0.0820
Approximate p-value	0.0803

OLS Regression Line (Blue)

OLS Regression Slope	0.0051
OLS Regression Intercept	-188.8632

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



Mann-Kendall Trend Analysis

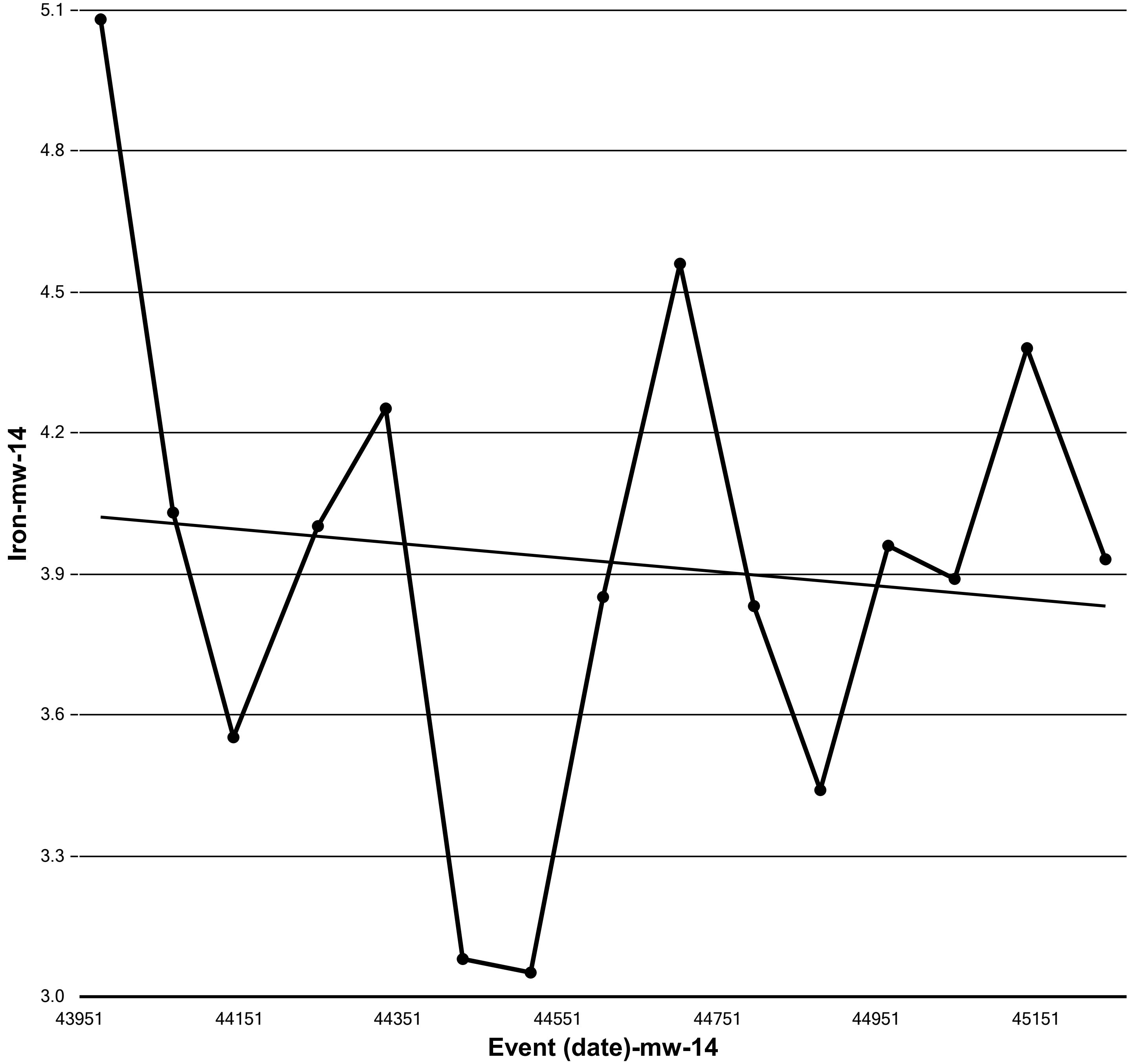
n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	1.1396
M-K Test Value (S)	24
Tabulated p-value	0.1200
Approximate p-value	0.1272

OLS Regression Line (Blue)

OLS Regression Slope	0.0006
OLS Regression Intercept	-26.0498

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

Mann-Kendall Trend Test



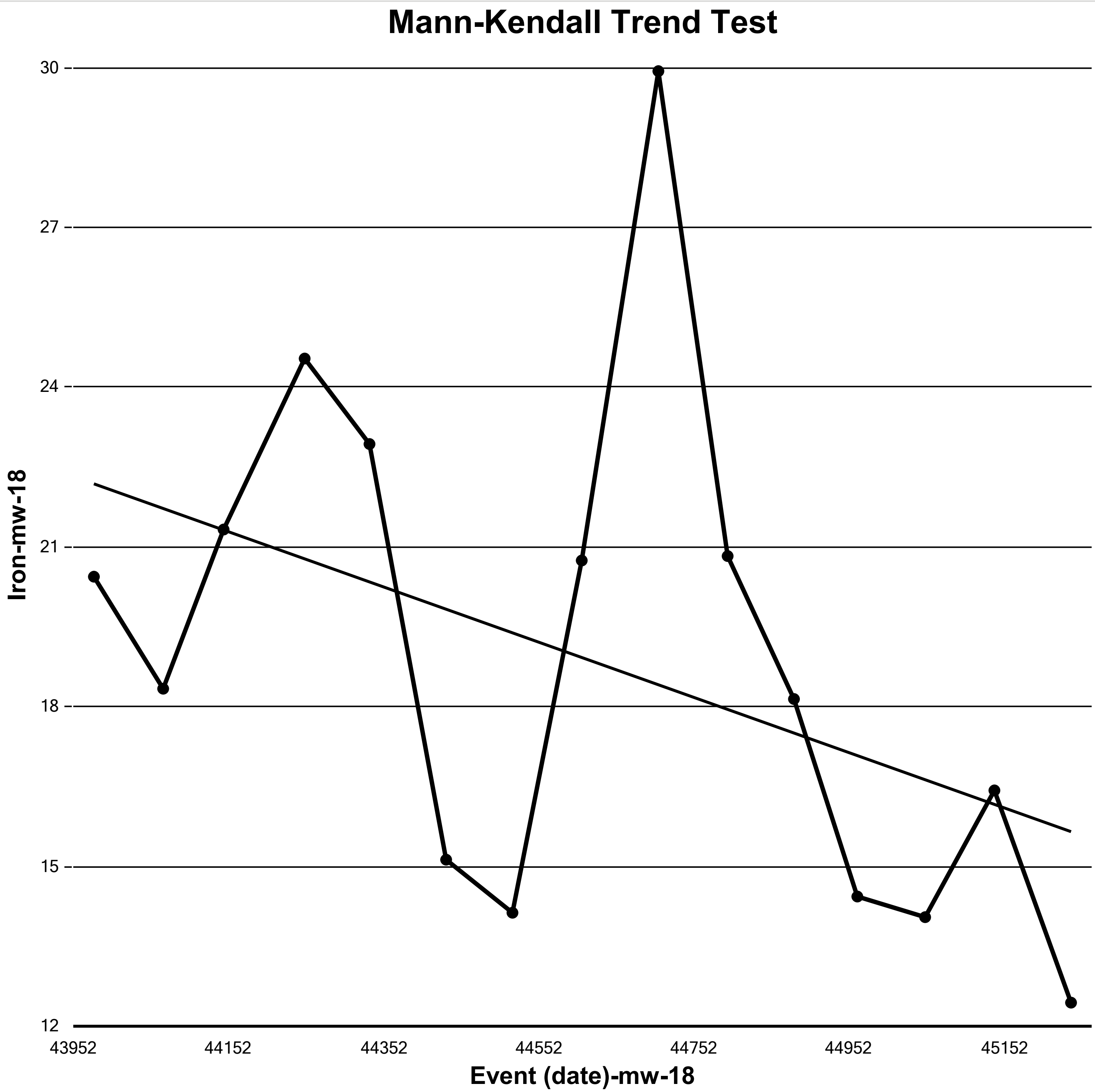
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.2969
M-K Test Value (S)	-7
Tabulated p-value	0.3850
Approximate p-value	0.3833

OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	10.7391

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



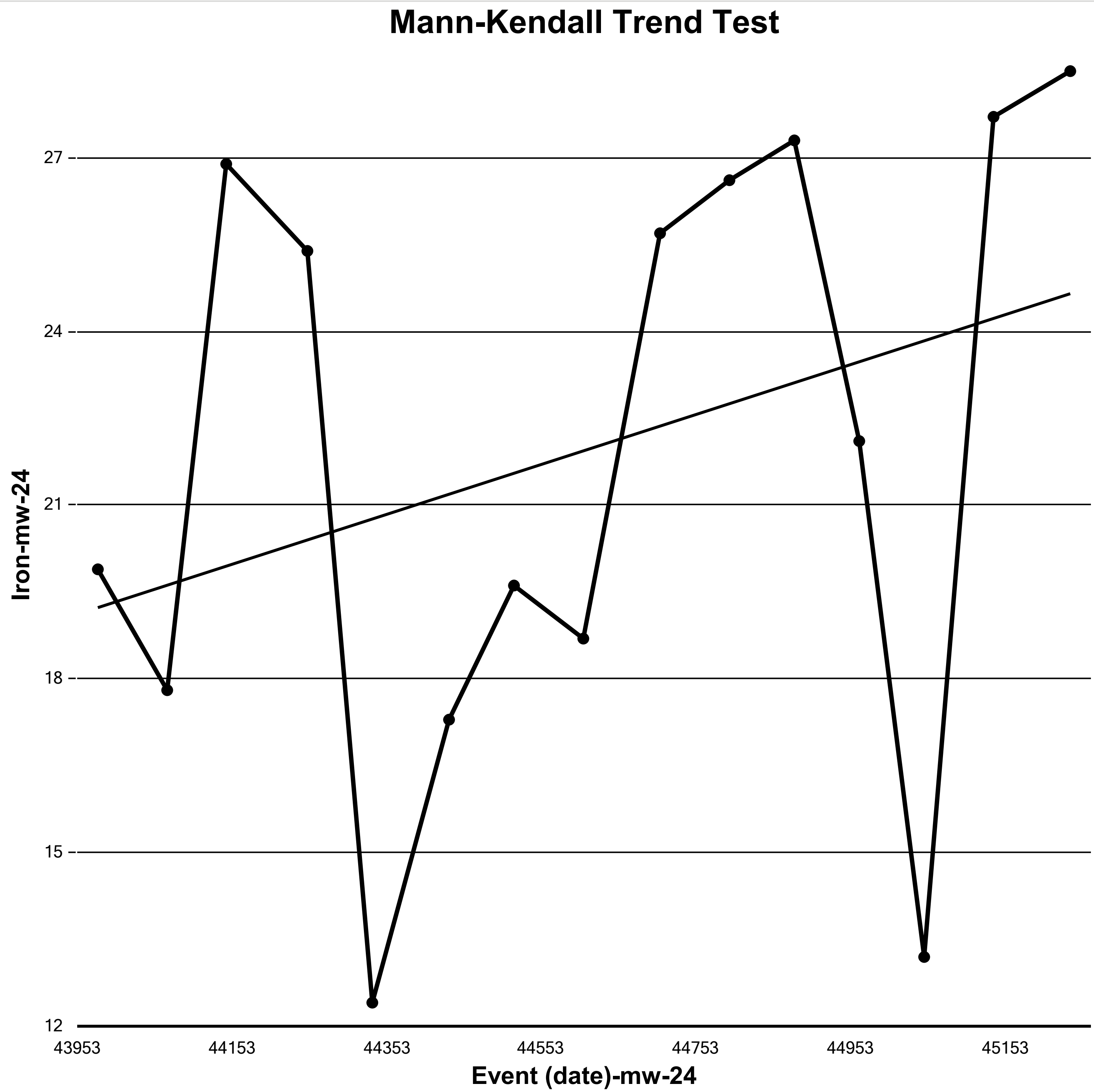
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-1.9795
M-K Test Value (S)	-41
Tabulated p-value	0.0230
Approximate p-value	0.0239

OLS Regression Line (Blue)

OLS Regression Slope	-0.0052
OLS Regression Intercept	249.1622

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



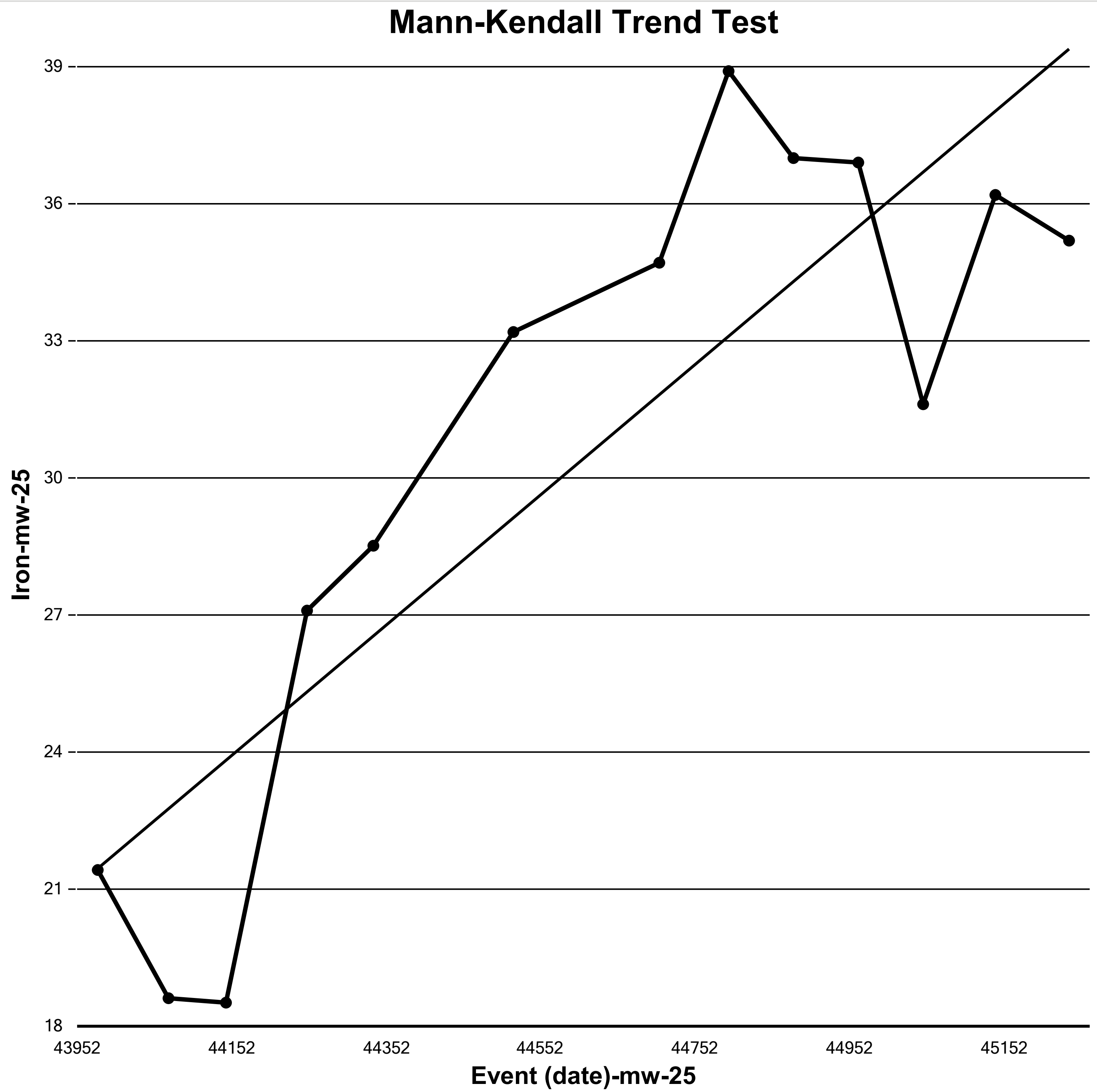
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.6826
M-K Test Value (S)	35
Tabulated p-value	0.0460
Approximate p-value	0.0462

OLS Regression Line (Blue)

OLS Regression Slope	0.0043
OLS Regression Intercept	-169.9340

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



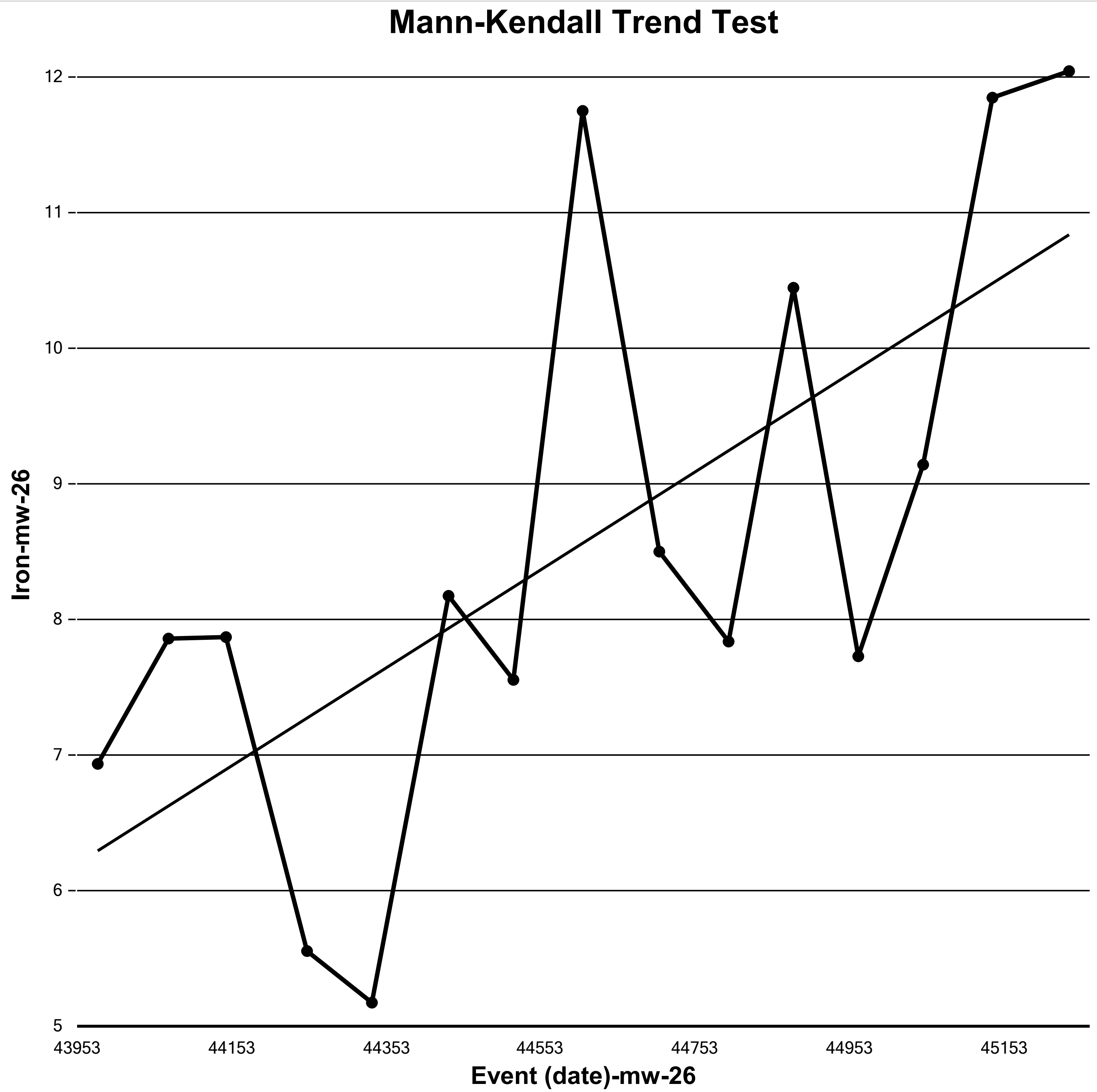
Mann-Kendall Trend Analysis

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	0.0142
OLS Regression Intercept	-605.3099

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



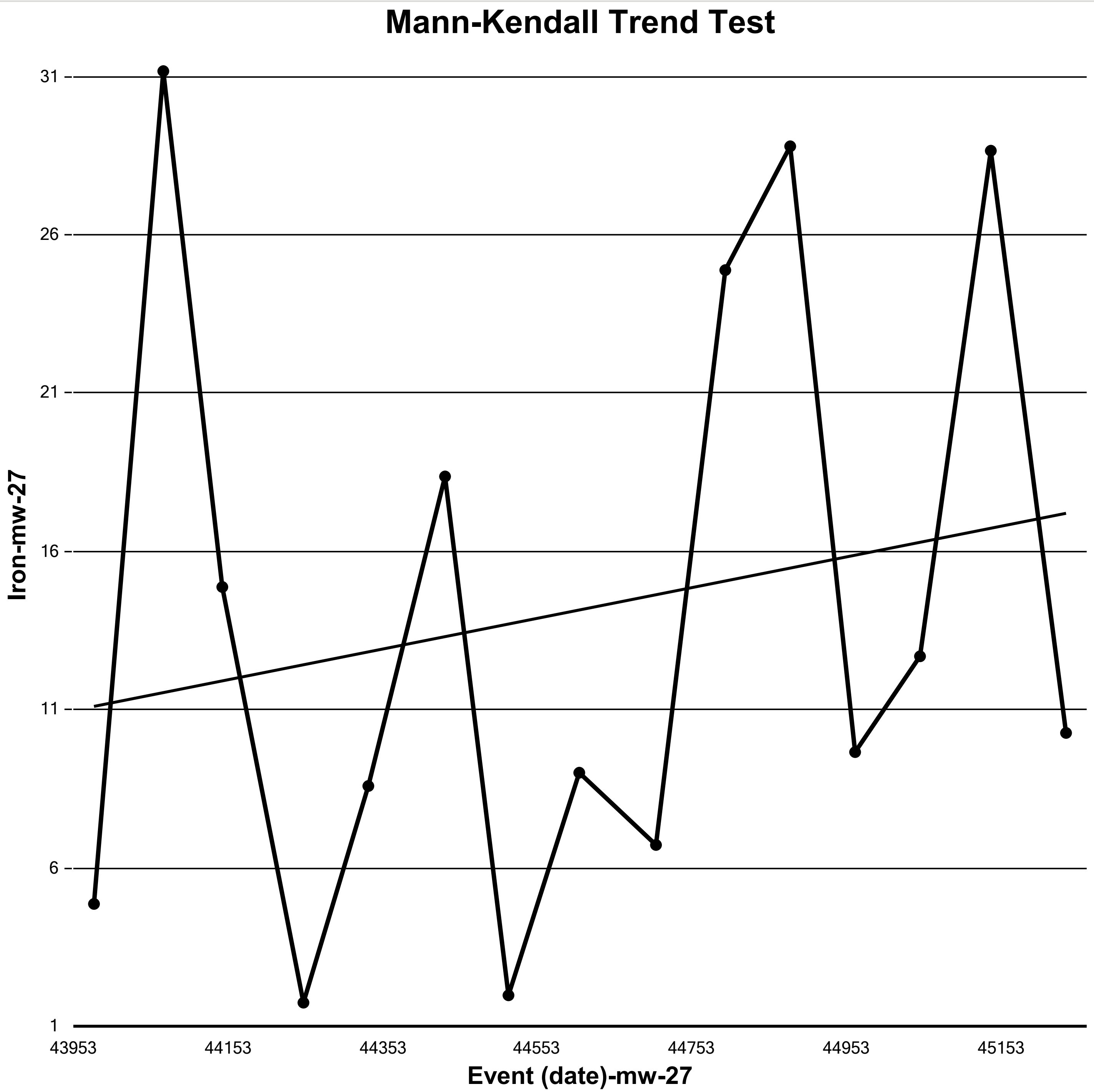
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	2.5733
M-K Test Value (S)	53
Tabulated p-value	0.0040
Approximate p-value	0.0050

OLS Regression Line (Blue)

OLS Regression Slope	0.0036
OLS Regression Intercept	-152.0194

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



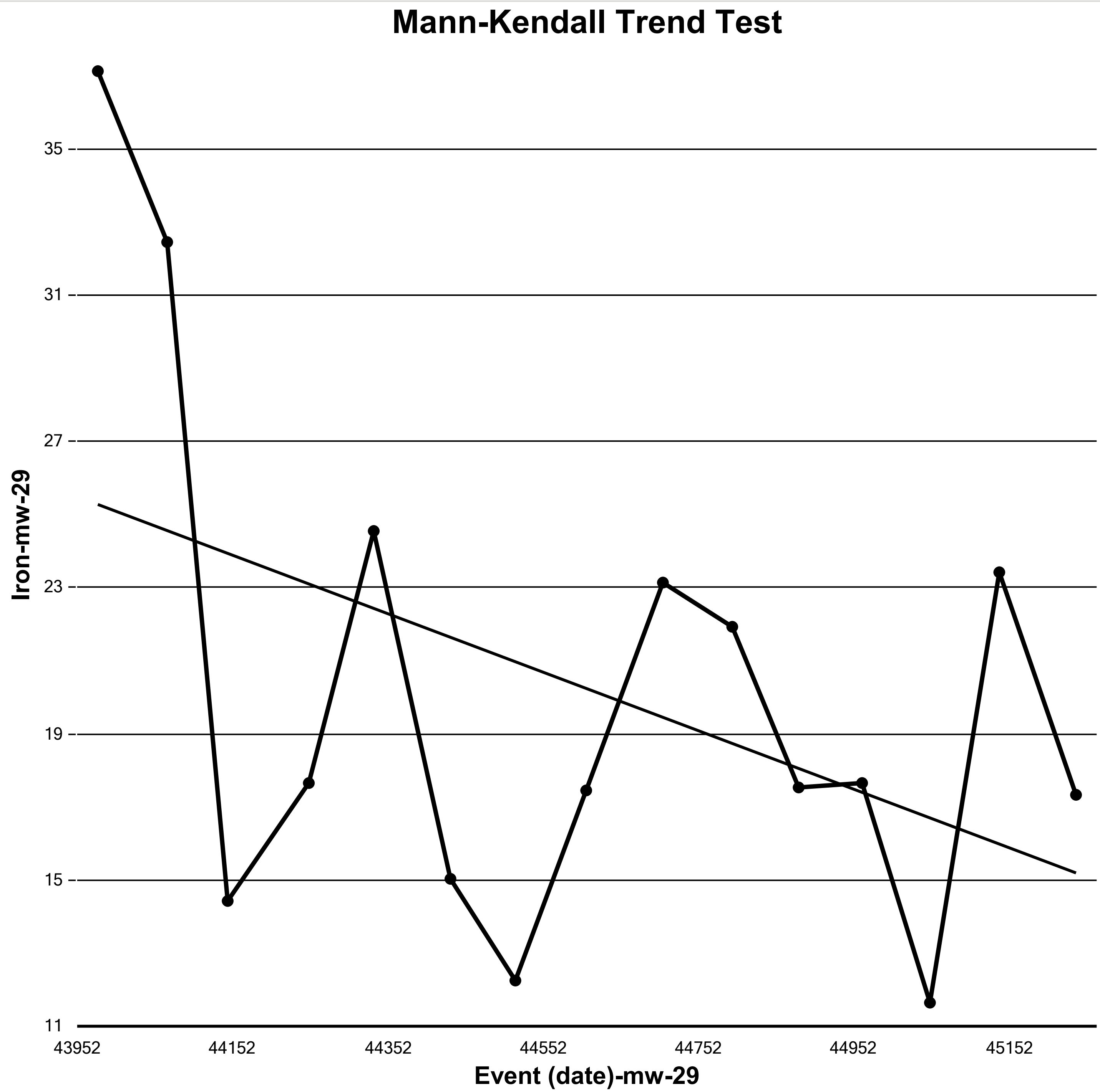
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.0887
M-K Test Value (S)	23
Tabulated p-value	0.1410
Approximate p-value	0.1381

OLS Regression Line (Blue)

OLS Regression Slope	0.0049
OLS Regression Intercept	-202.1814

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



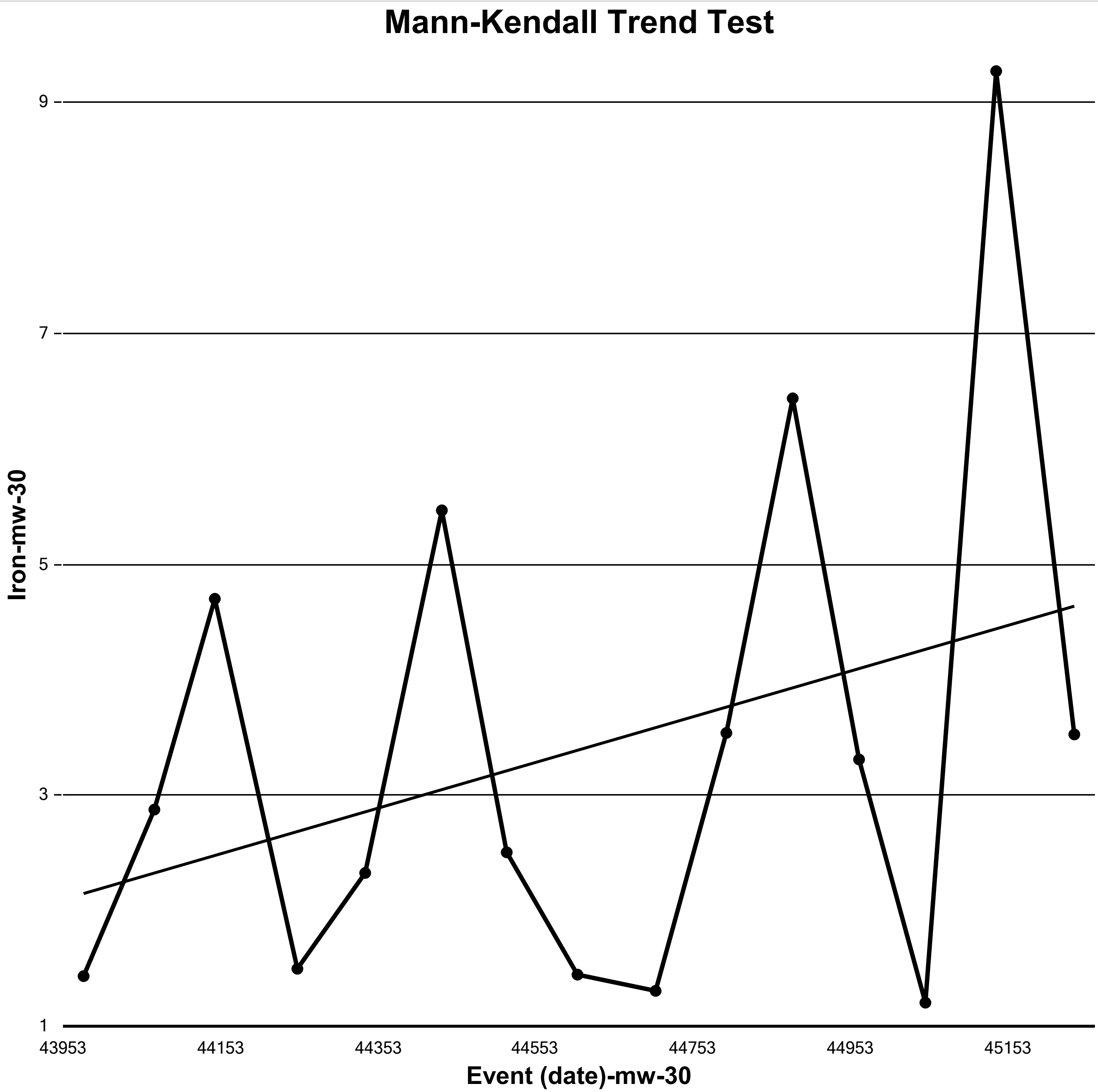
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	-1.1396
M-K Test Value (S)	-24
Tabulated p-value	0.1200
Approximate p-value	0.1272

OLS Regression Line (Blue)

OLS Regression Slope	-0.0080
OLS Regression Intercept	377.2906

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



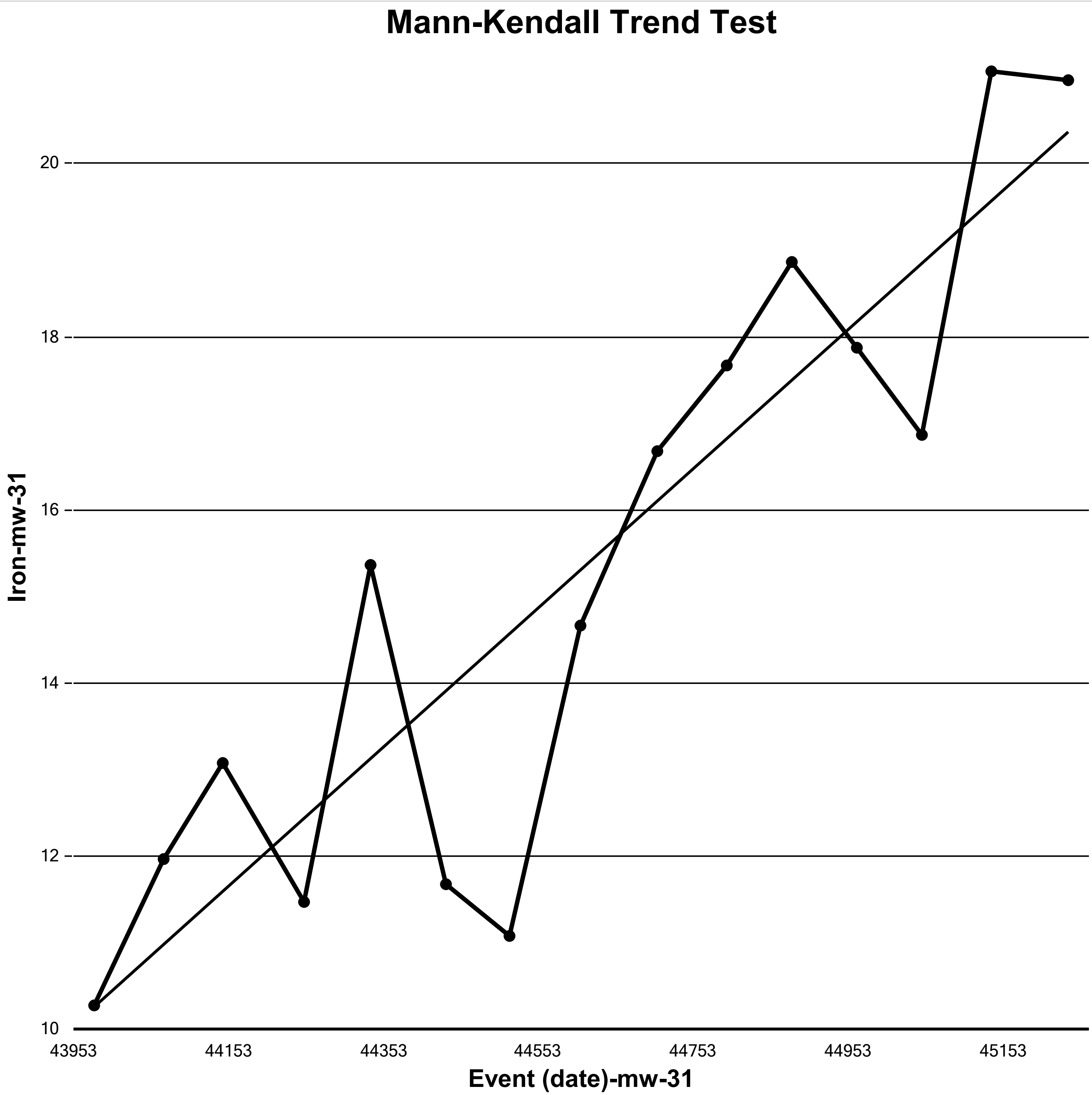
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	0.7918
M-K Test Value (S)	17
Tabulated p-value	0.2180
Approximate p-value	0.2142

OLS Regression Line (Blue)

OLS Regression Slope	0.0020
OLS Regression Intercept	-84.5376

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



Mann-Kendall Trend Analysis

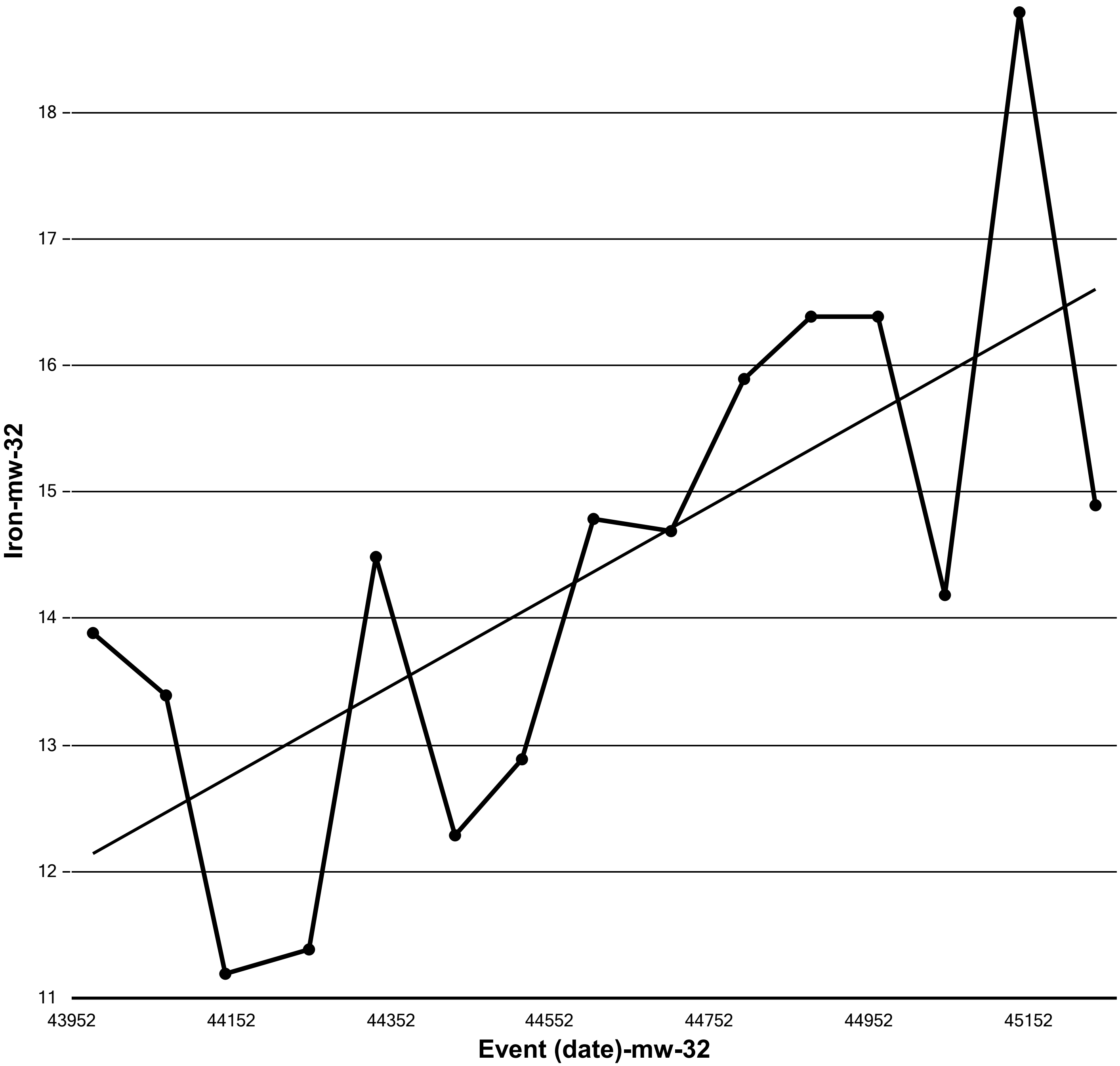
n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	3.5631
M-K Test Value (S)	73
Tabulated p-value	0.0000
Approximate p-value	0.0002

OLS Regression Line (Blue)

OLS Regression Slope	0.0080
OLS Regression Intercept	-343.0846

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

Mann-Kendall Trend Test



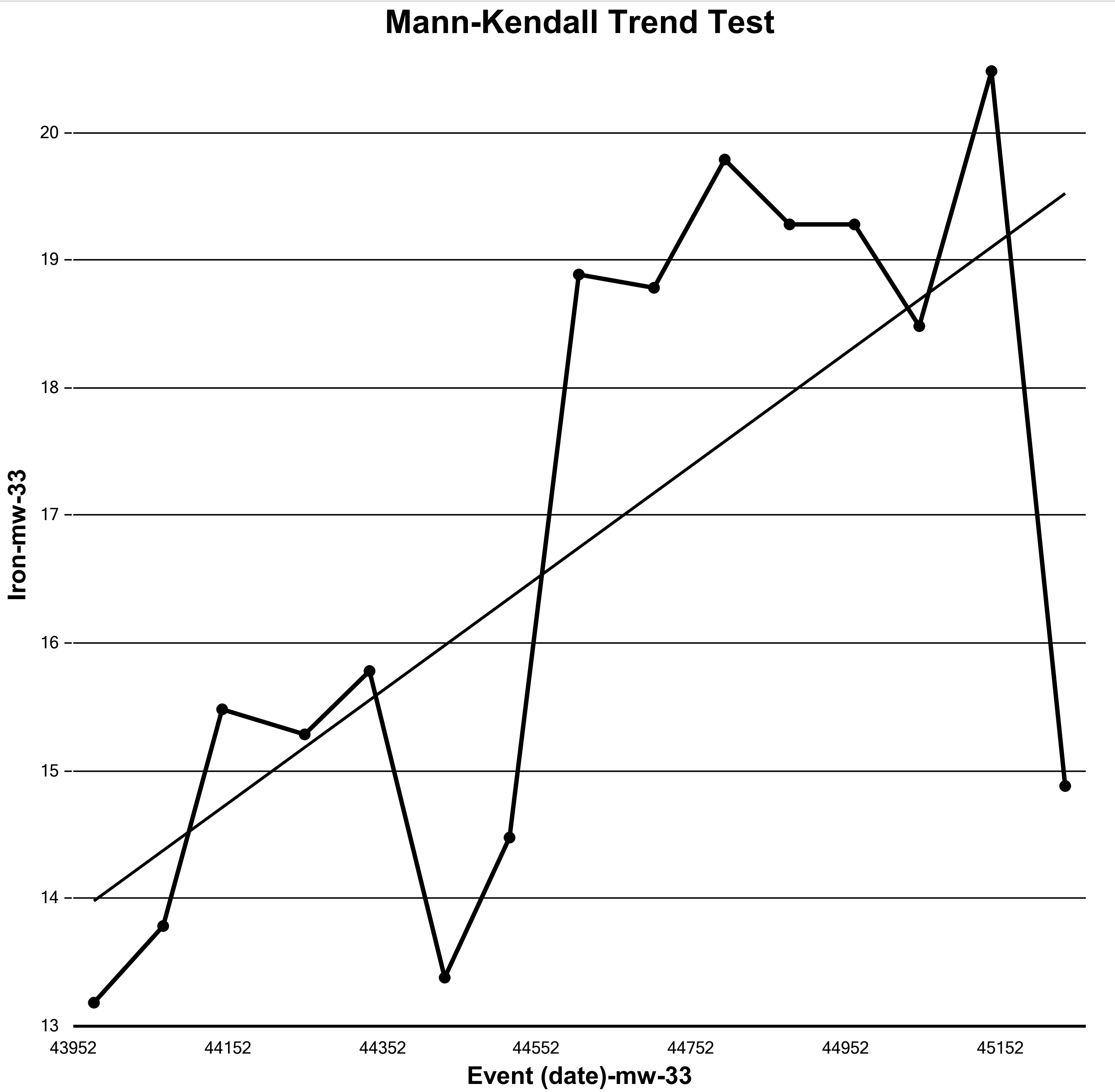
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	2.9233
M-K Test Value (S)	60
Tabulated p-value	0.0010
Approximate p-value	0.0017

OLS Regression Line (Blue)

OLS Regression Slope	0.0036
OLS Regression Intercept	-144.2312

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



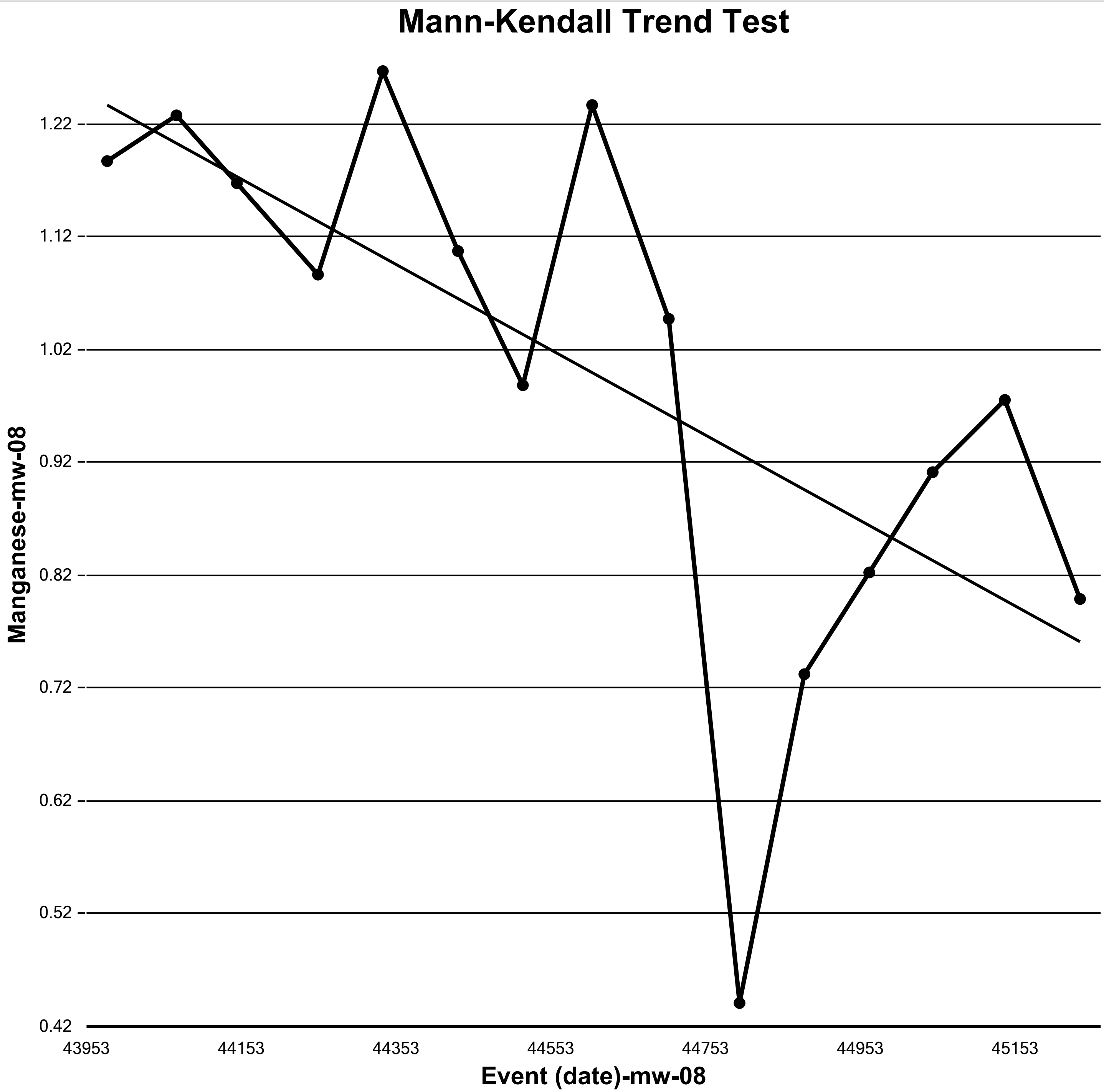
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	2.5269
M-K Test Value (S)	52
Tabulated p-value	0.0040
Approximate p-value	0.0058

OLS Regression Line (Blue)

OLS Regression Slope	0.0044
OLS Regression Intercept	-179.3496

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



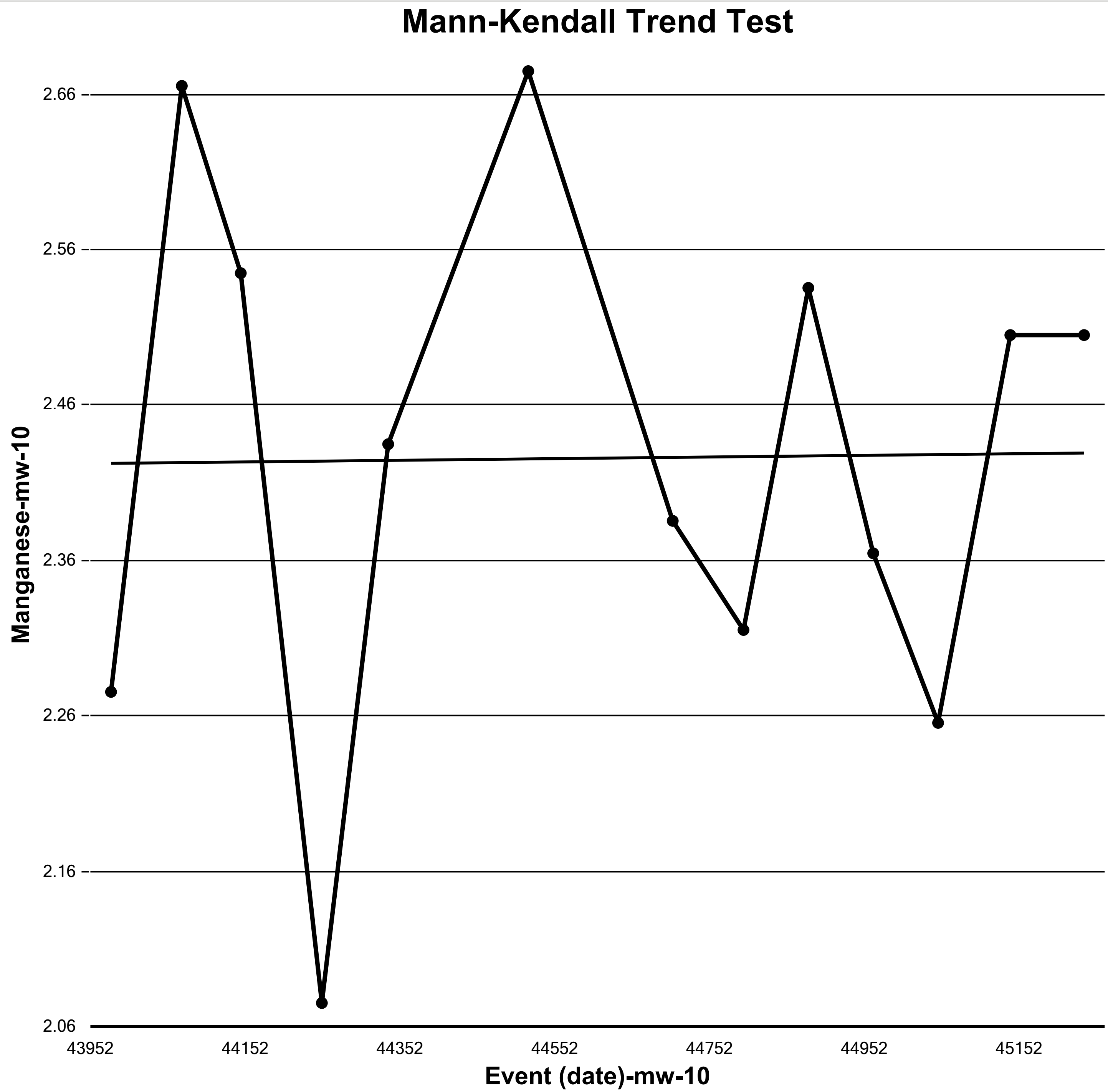
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-2.6723
M-K Test Value (S)	-55
Tabulated p-value	0.0030
Approximate p-value	0.0038

OLS Regression Line (Blue)

OLS Regression Slope	-0.0004
OLS Regression Intercept	17.8786

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



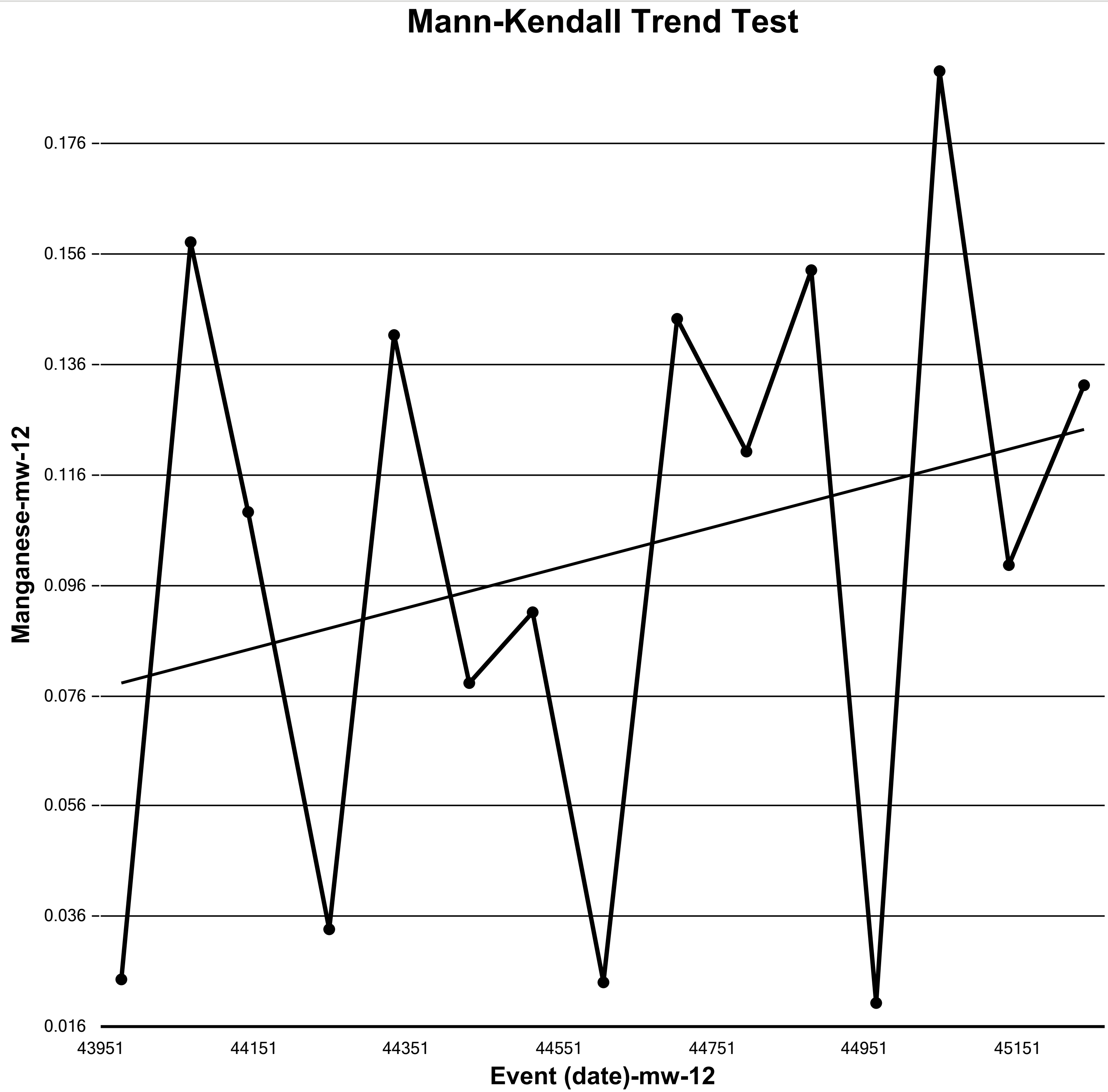
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3605
Standardized Value of S	-0.2445
M-K Test Value (S)	-5
Tabulated p-value	0.4290
Approximate p-value	0.4034

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	2.1948

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



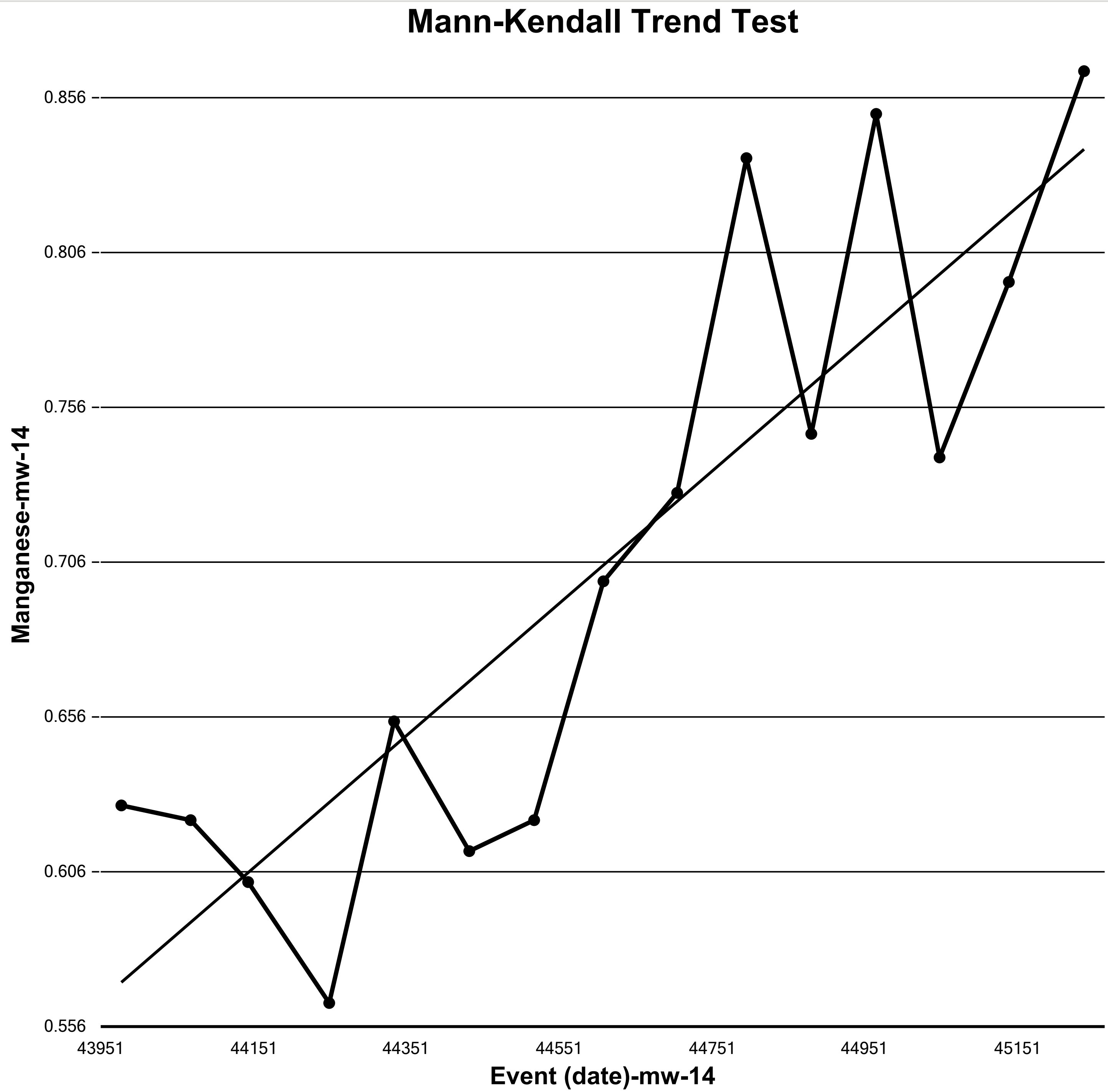
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	0.6928
M-K Test Value (S)	15
Tabulated p-value	0.2480
Approximate p-value	0.2442

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.5243

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



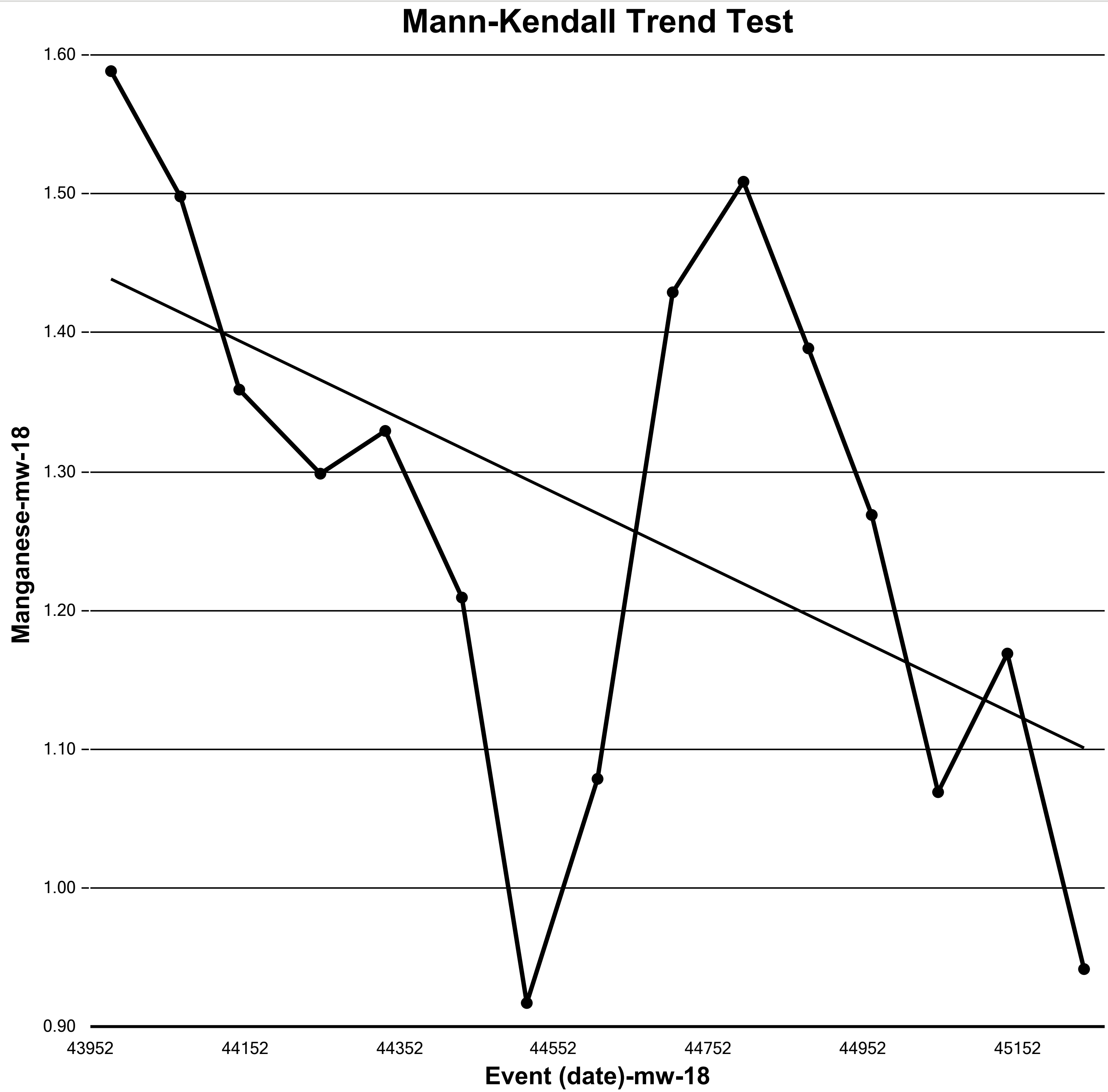
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	3.4188
M-K Test Value (S)	70
Tabulated p-value	0.0000
Approximate p-value	0.0003

OLS Regression Line (Blue)

OLS Regression Slope	0.0002
OLS Regression Intercept	-8.8180

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



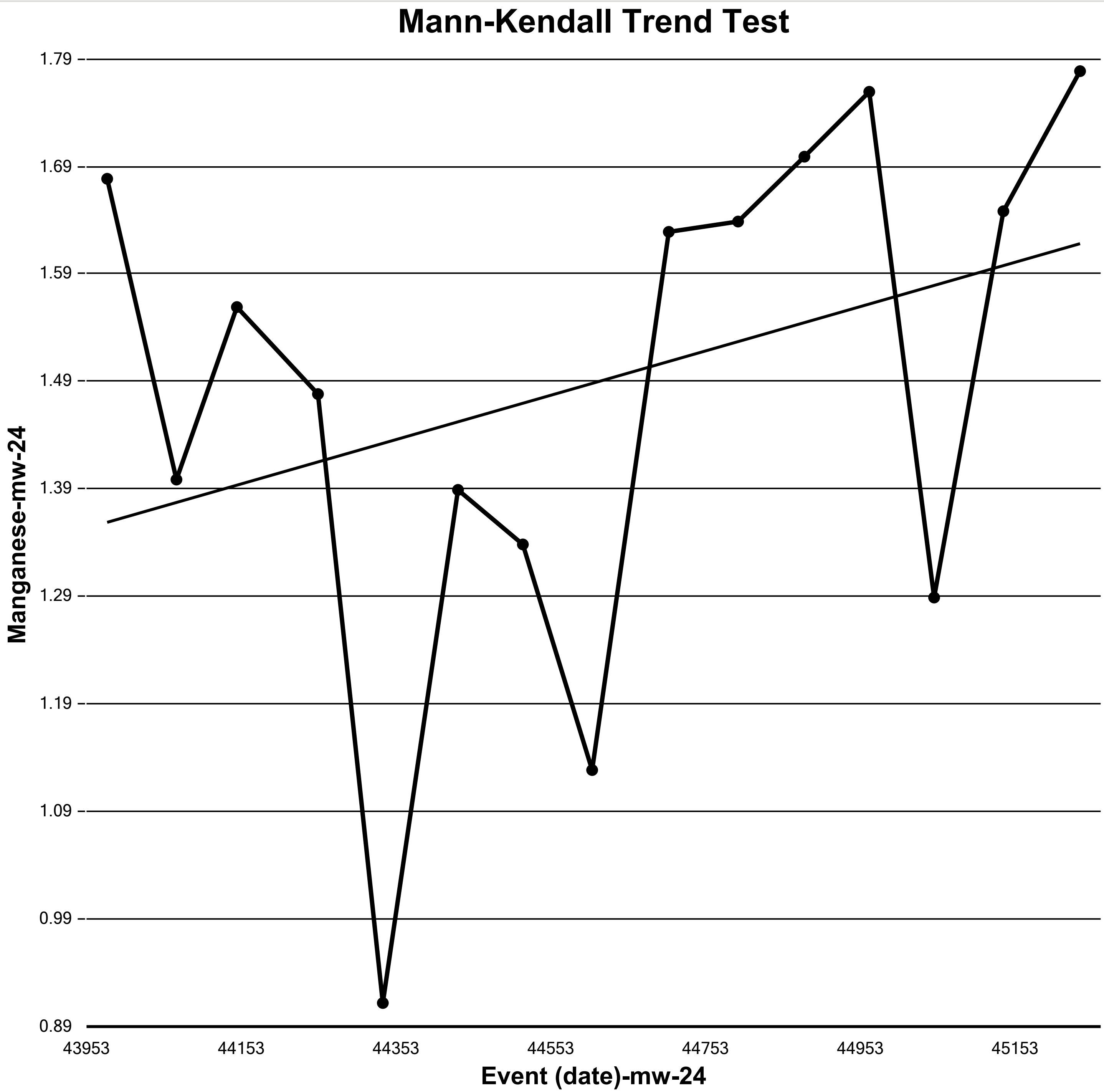
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-2.1774
M-K Test Value (S)	-45
Tabulated p-value	0.0140
Approximate p-value	0.0147

OLS Regression Line (Blue)

OLS Regression Slope	-0.0003
OLS Regression Intercept	13.2101

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



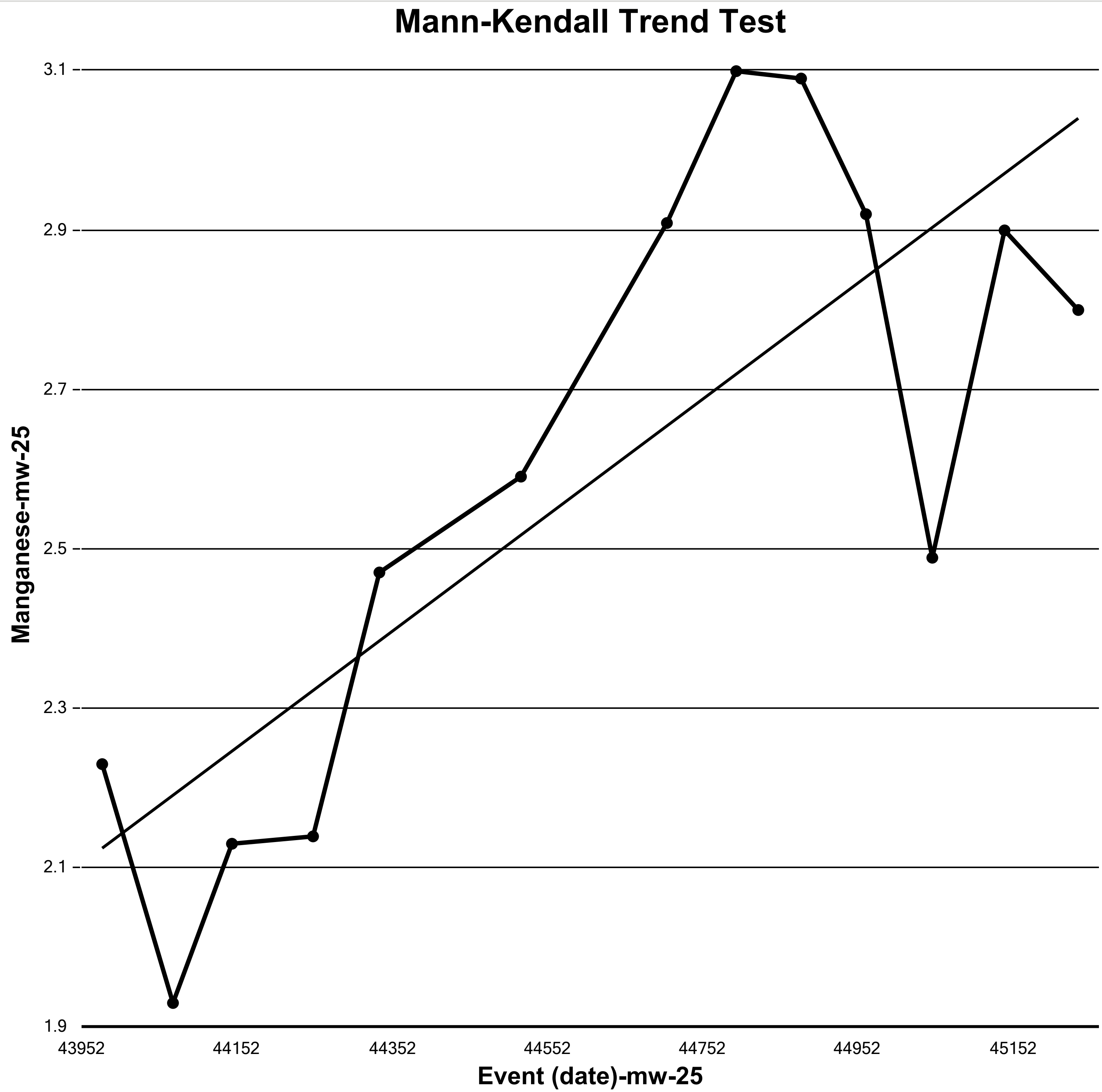
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.3856
M-K Test Value (S)	29
Tabulated p-value	0.0840
Approximate p-value	0.0829

OLS Regression Line (Blue)

OLS Regression Slope	0.0002
OLS Regression Intercept	-7.6749

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



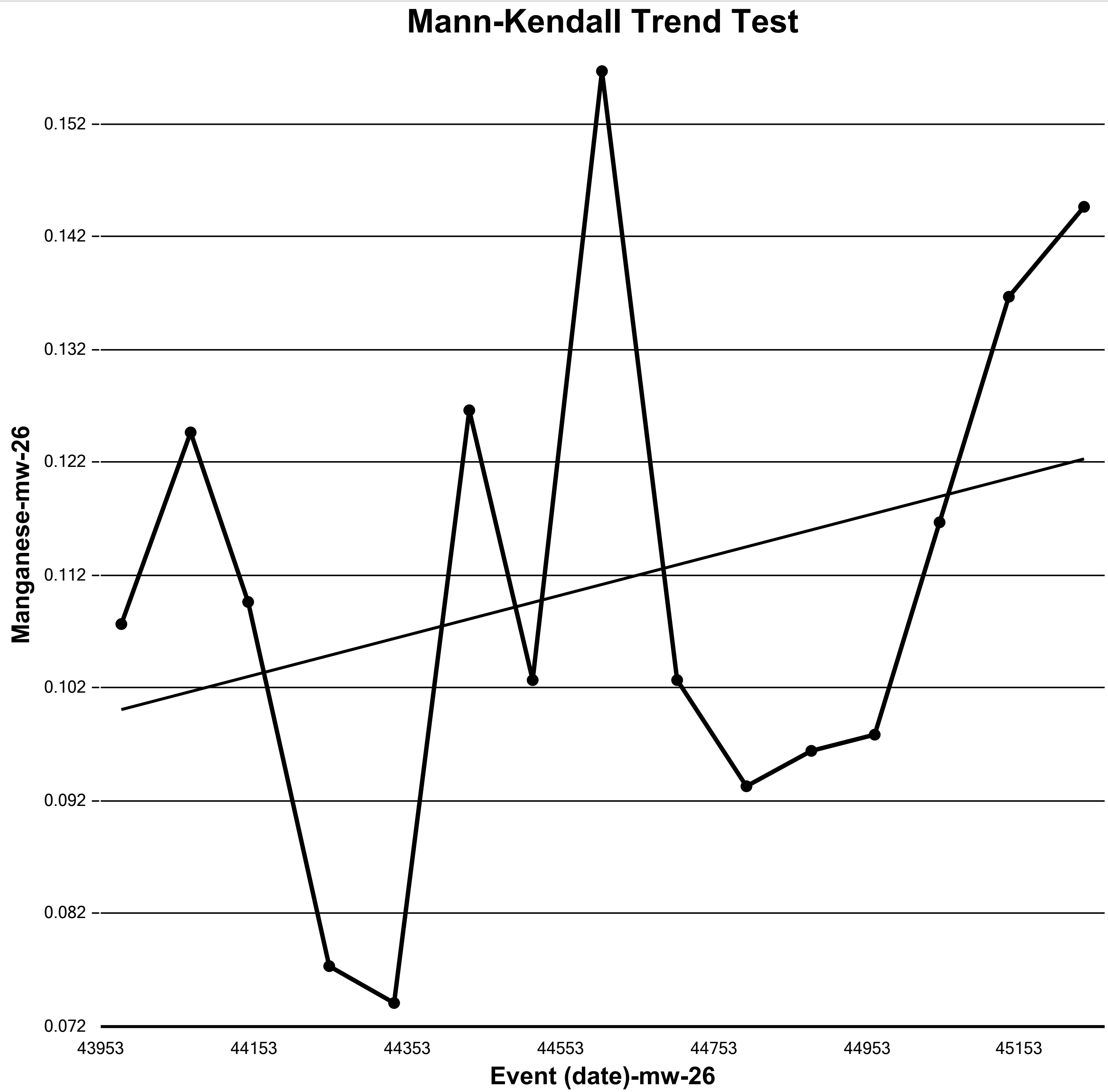
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3911
Standardized Value of S	2.2573
M-K Test Value (S)	38
Tabulated p-value	0.0110
Approximate p-value	0.0120

OLS Regression Line (Blue)

OLS Regression Slope	0.0007
OLS Regression Intercept	-29.9451

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



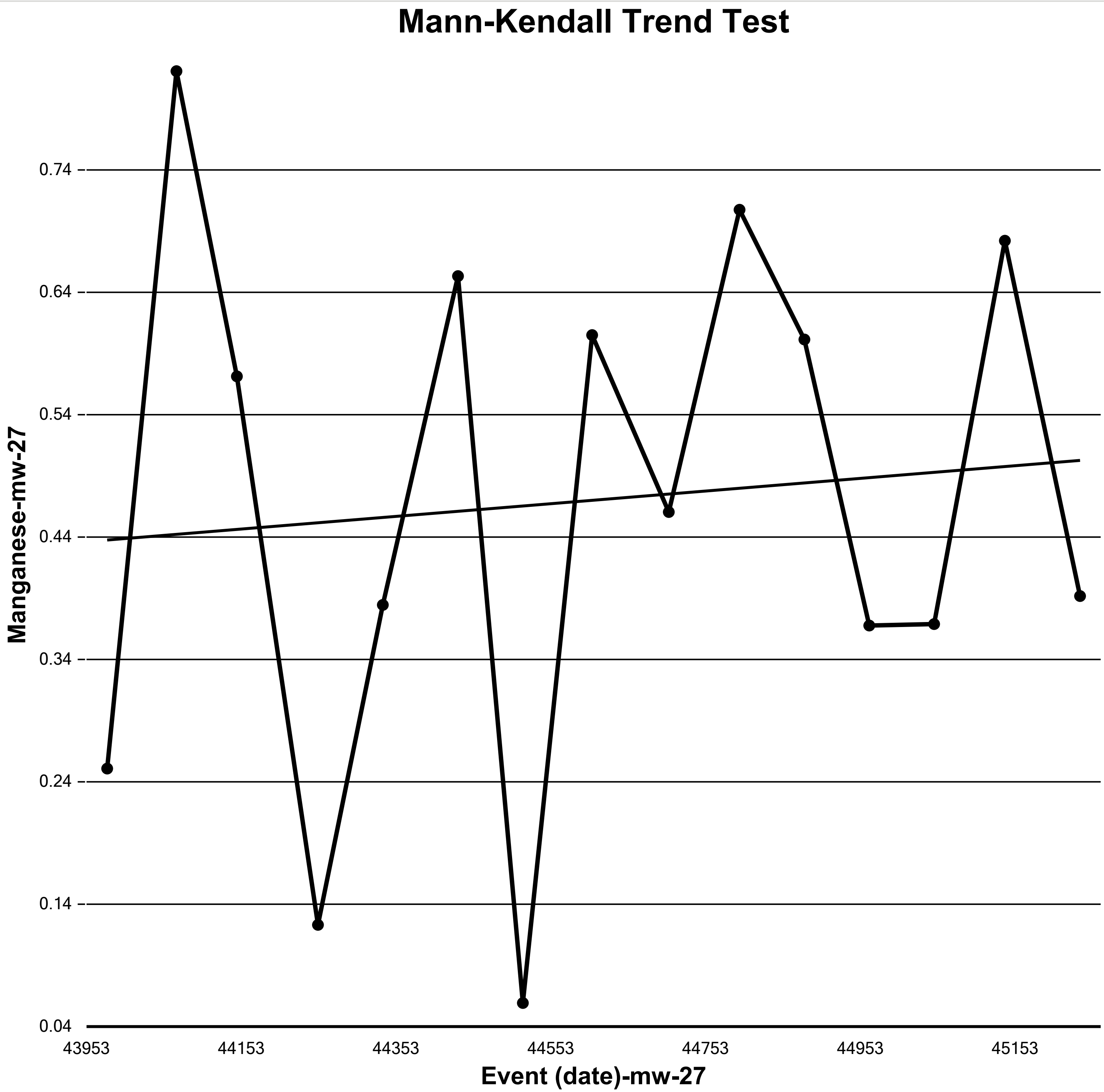
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	0.8423
M-K Test Value (S)	18
Tabulated p-value	0.1900
Approximate p-value	0.1998

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-0.6780

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



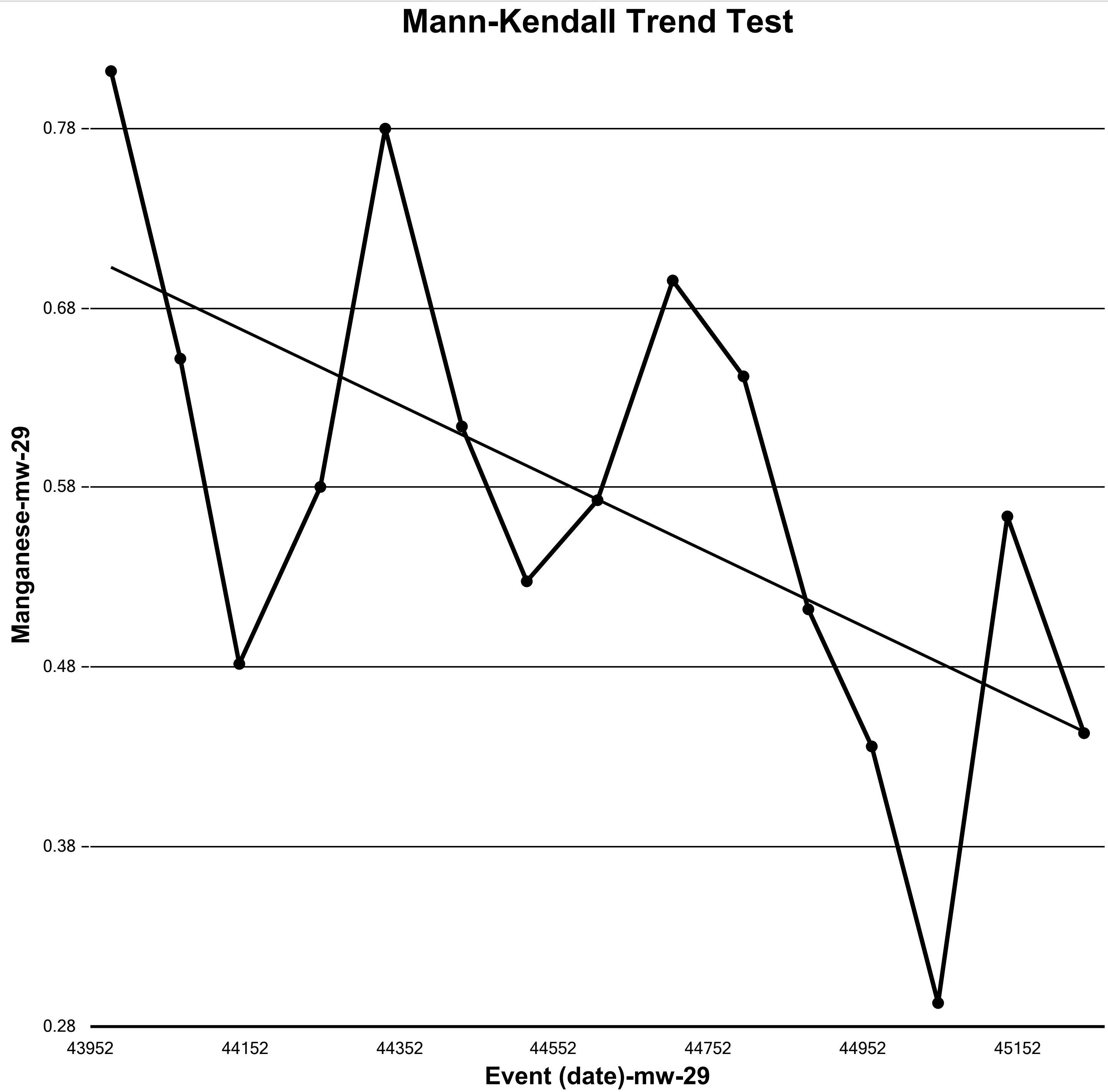
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	0.1979
M-K Test Value (S)	5
Tabulated p-value	0.4230
Approximate p-value	0.4215

OLS Regression Line (Blue)

OLS Regression Slope	0.0001
OLS Regression Intercept	-1.8321

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



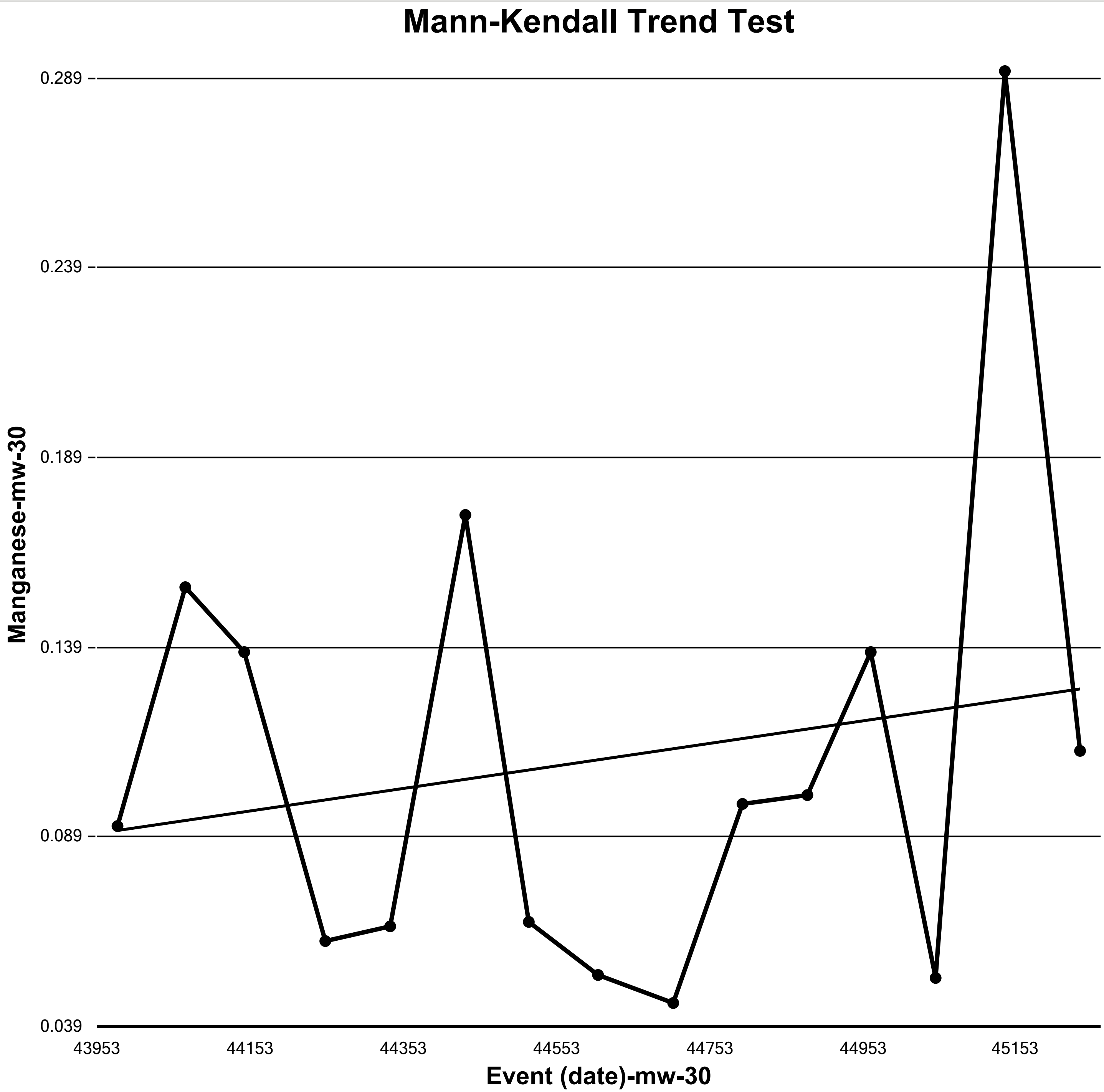
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-2.3754
M-K Test Value (S)	-49
Tabulated p-value	0.0080
Approximate p-value	0.0088

OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	9.7135

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



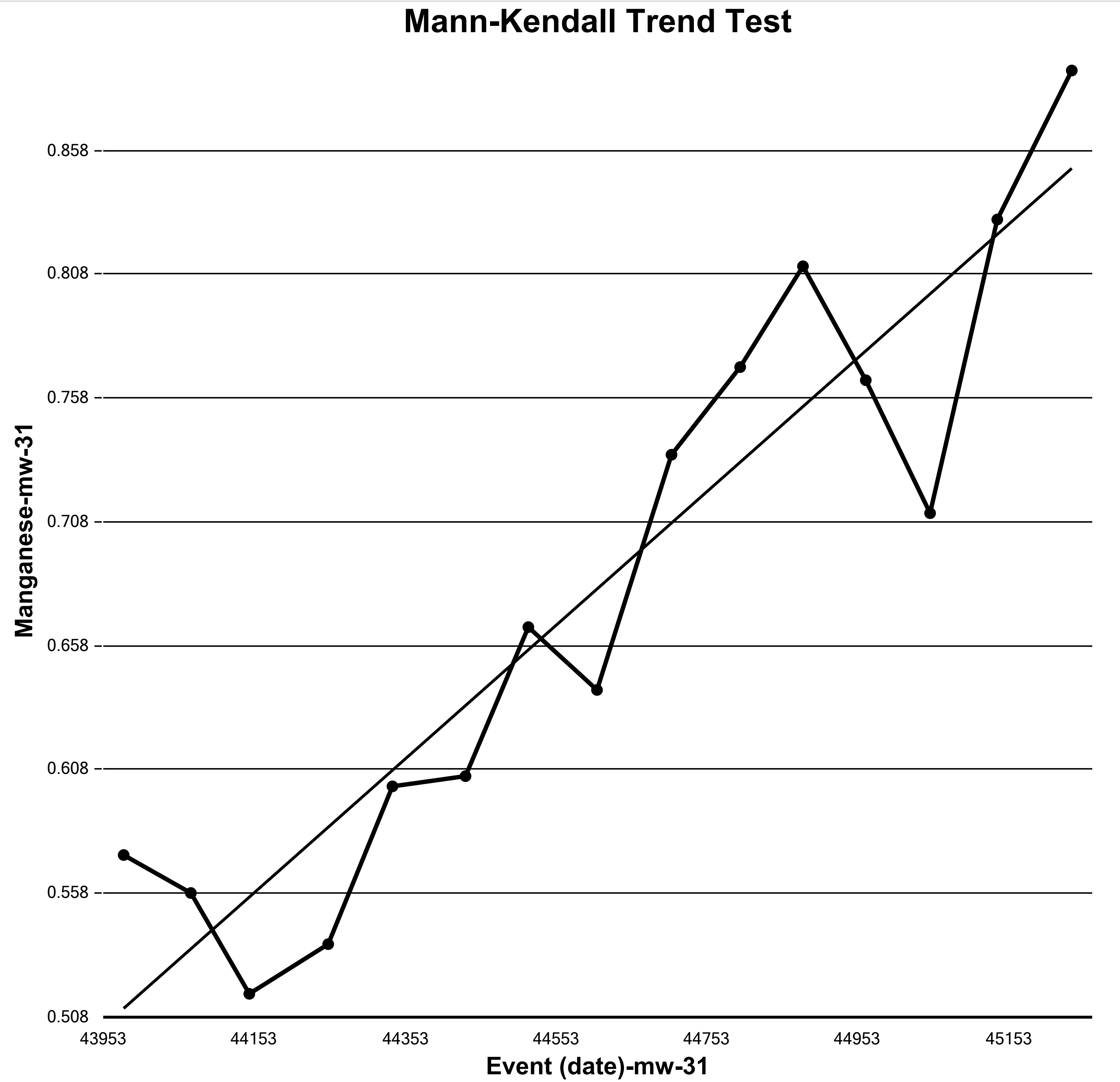
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	0.1486
M-K Test Value (S)	4
Tabulated p-value	0.4230
Approximate p-value	0.4409

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.2098

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



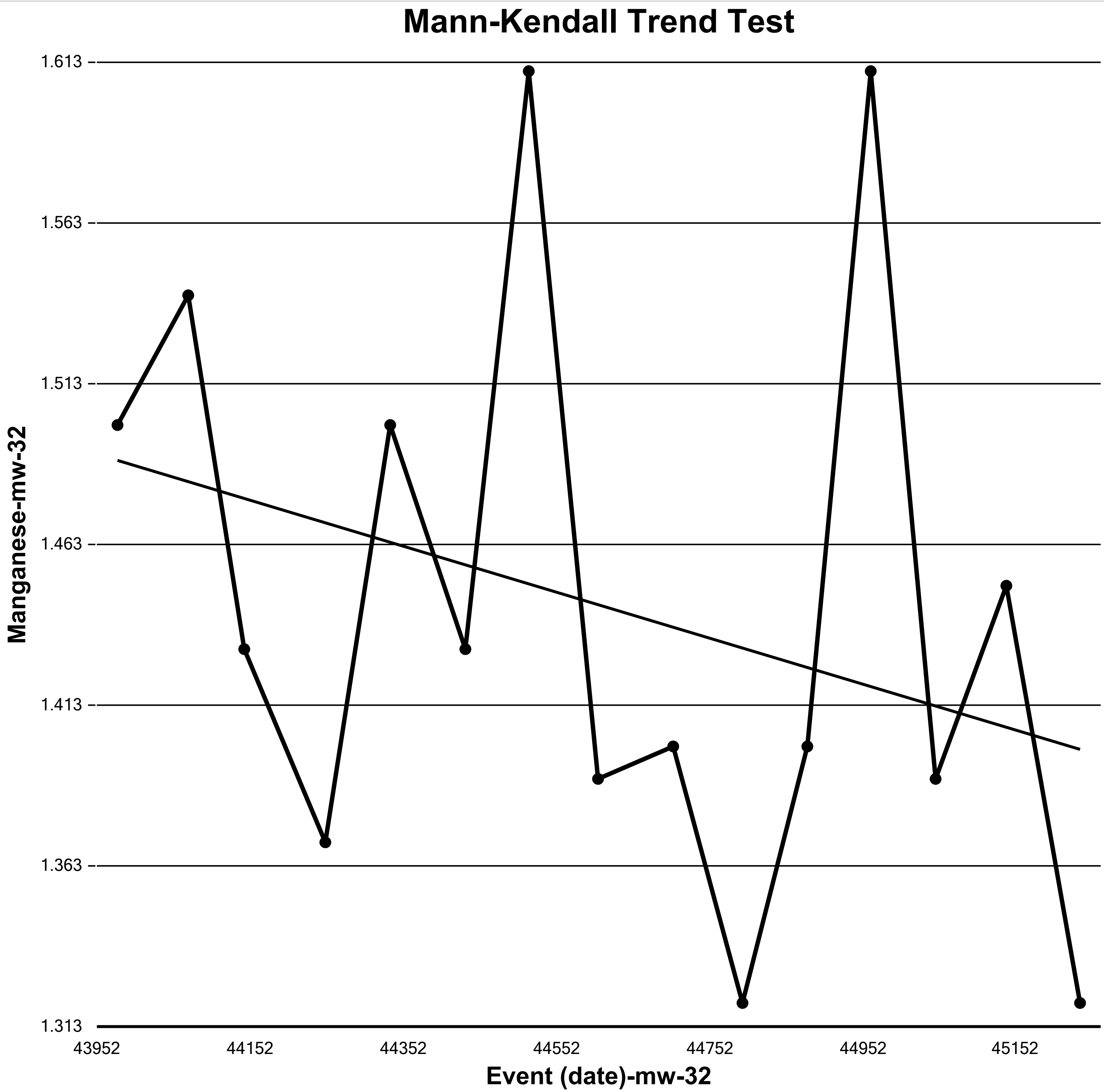
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	3.9590
M-K Test Value (S)	81
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	0.0003
OLS Regression Intercept	-11.3583

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



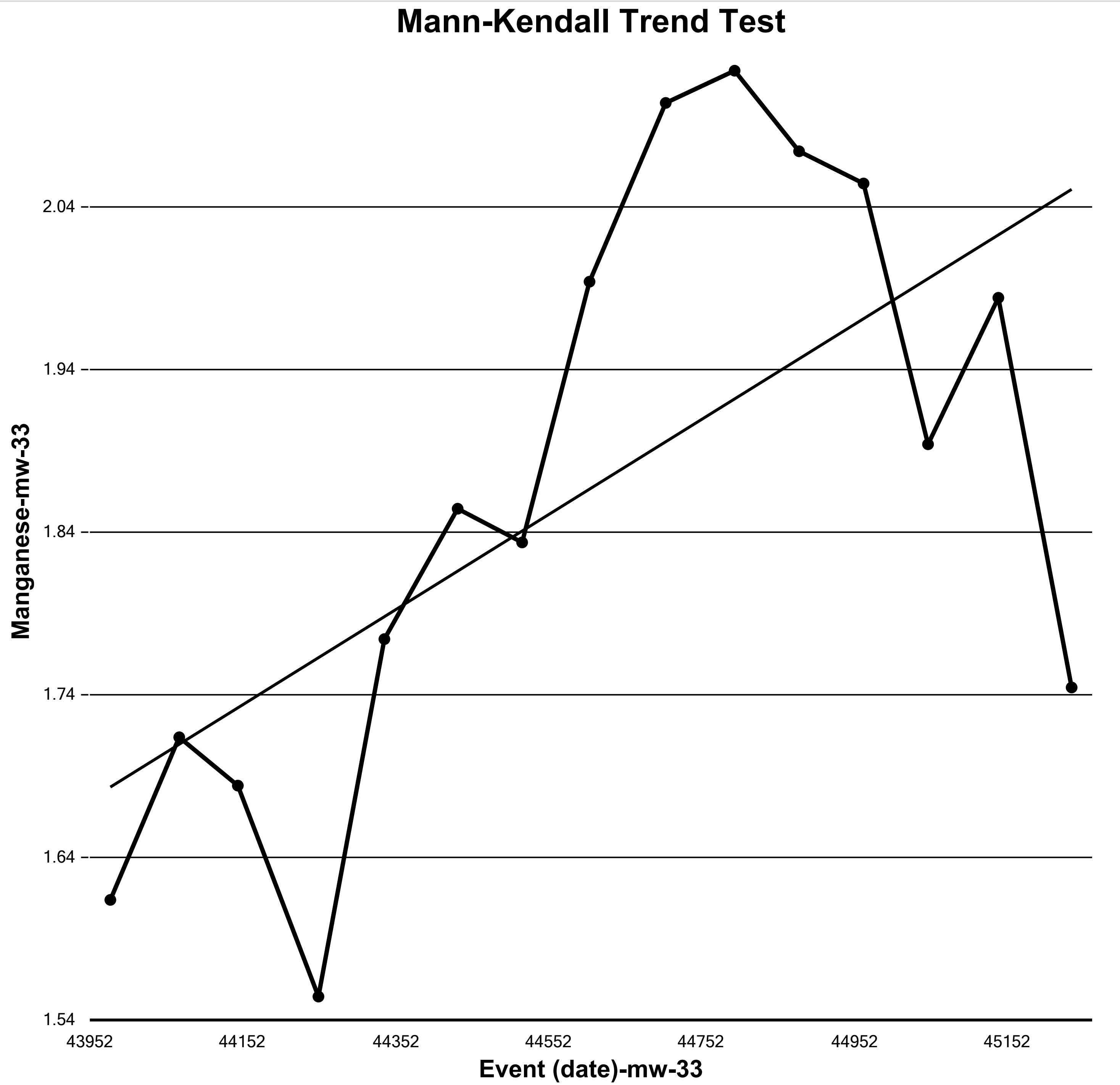
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.0582
Standardized Value of S	-1.2962
M-K Test Value (S)	-27
Tabulated p-value	0.1010
Approximate p-value	0.0974

OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	4.6216

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



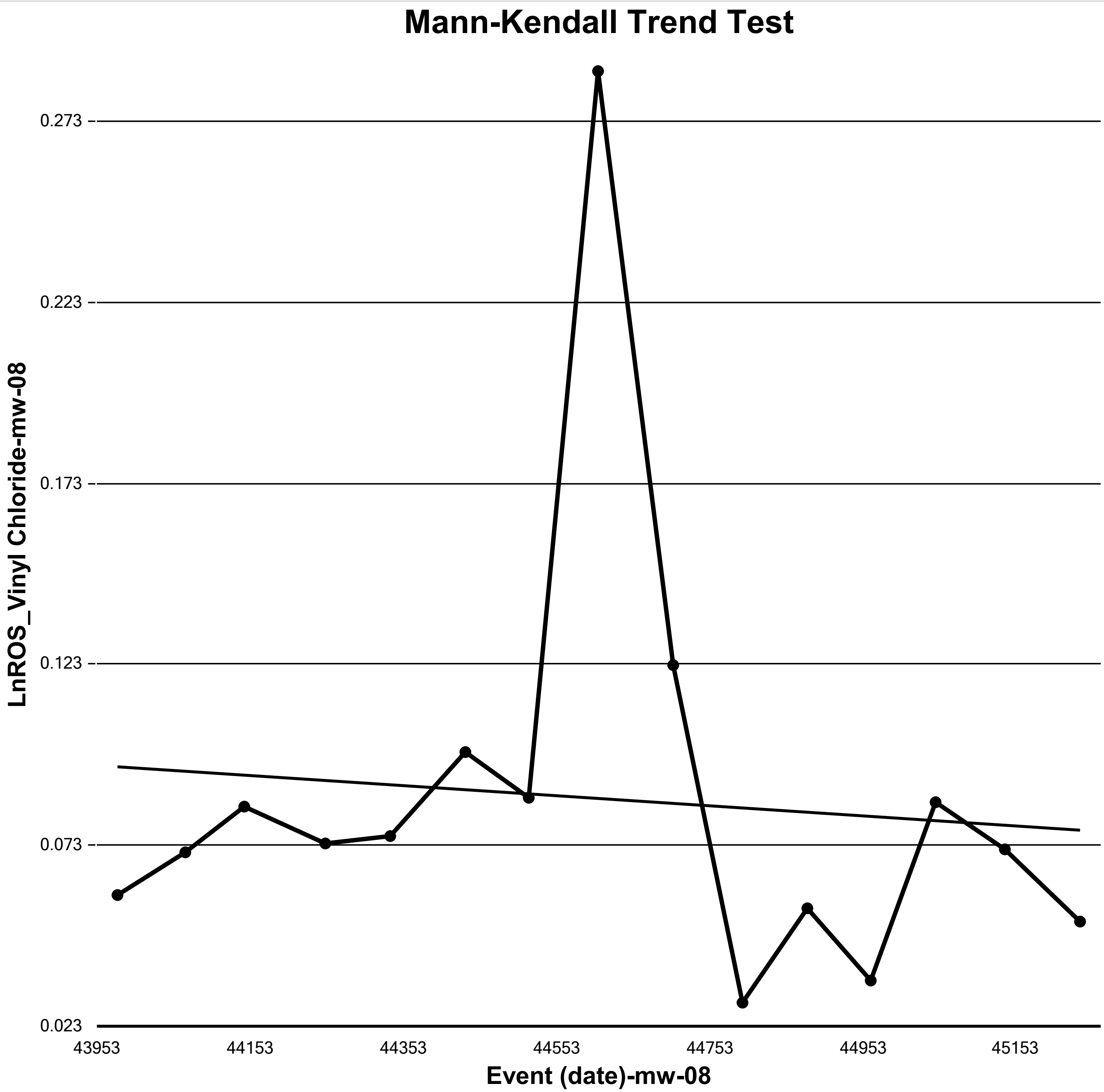
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	2.1774
M-K Test Value (S)	45
Tabulated p-value	0.0140
Approximate p-value	0.0147

OLS Regression Line (Blue)

OLS Regression Slope	0.0003
OLS Regression Intercept	-11.1588

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



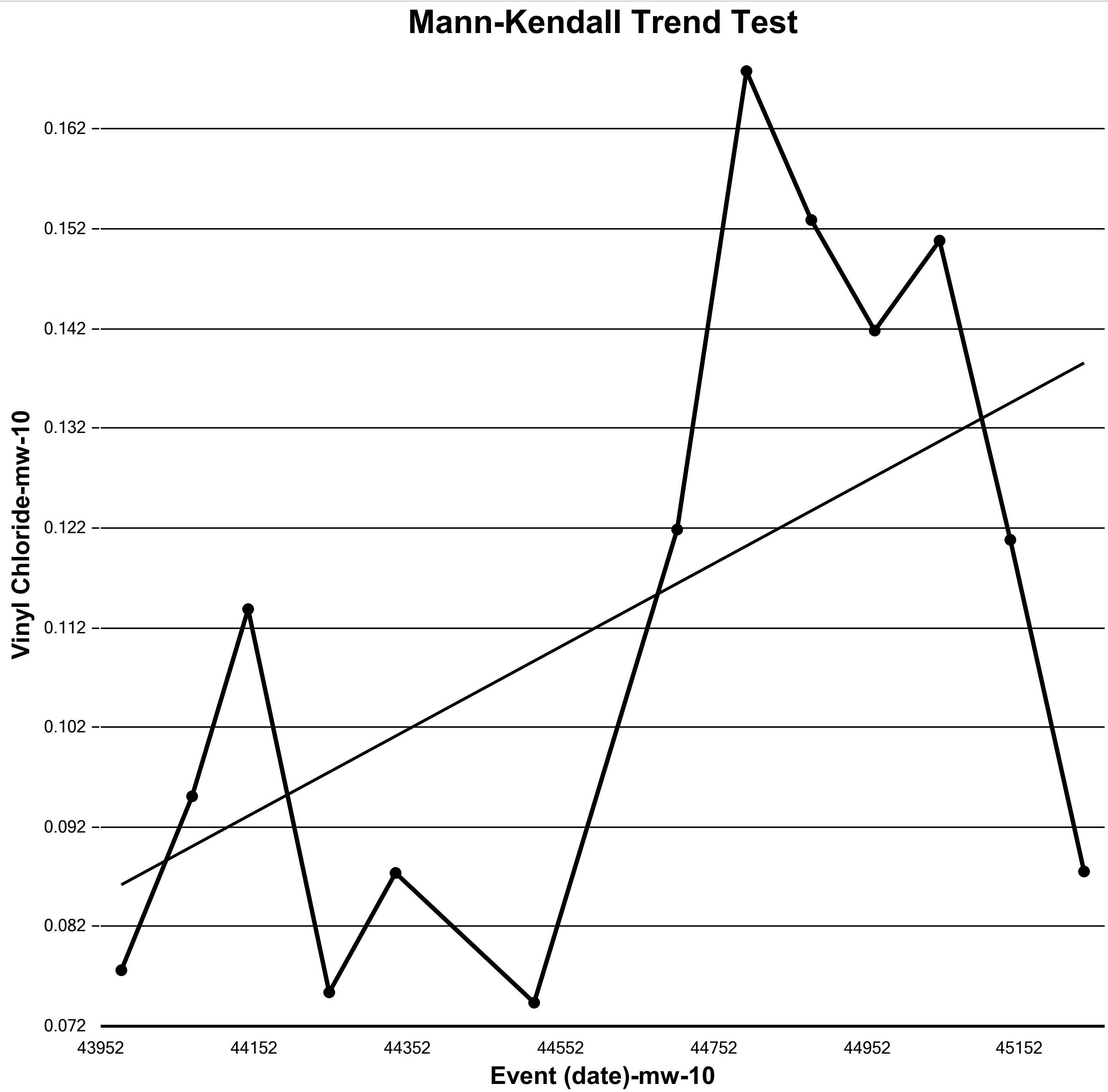
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.2969
M-K Test Value (S)	-7
Tabulated p-value	0.3850
Approximate p-value	0.3833

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.7075

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



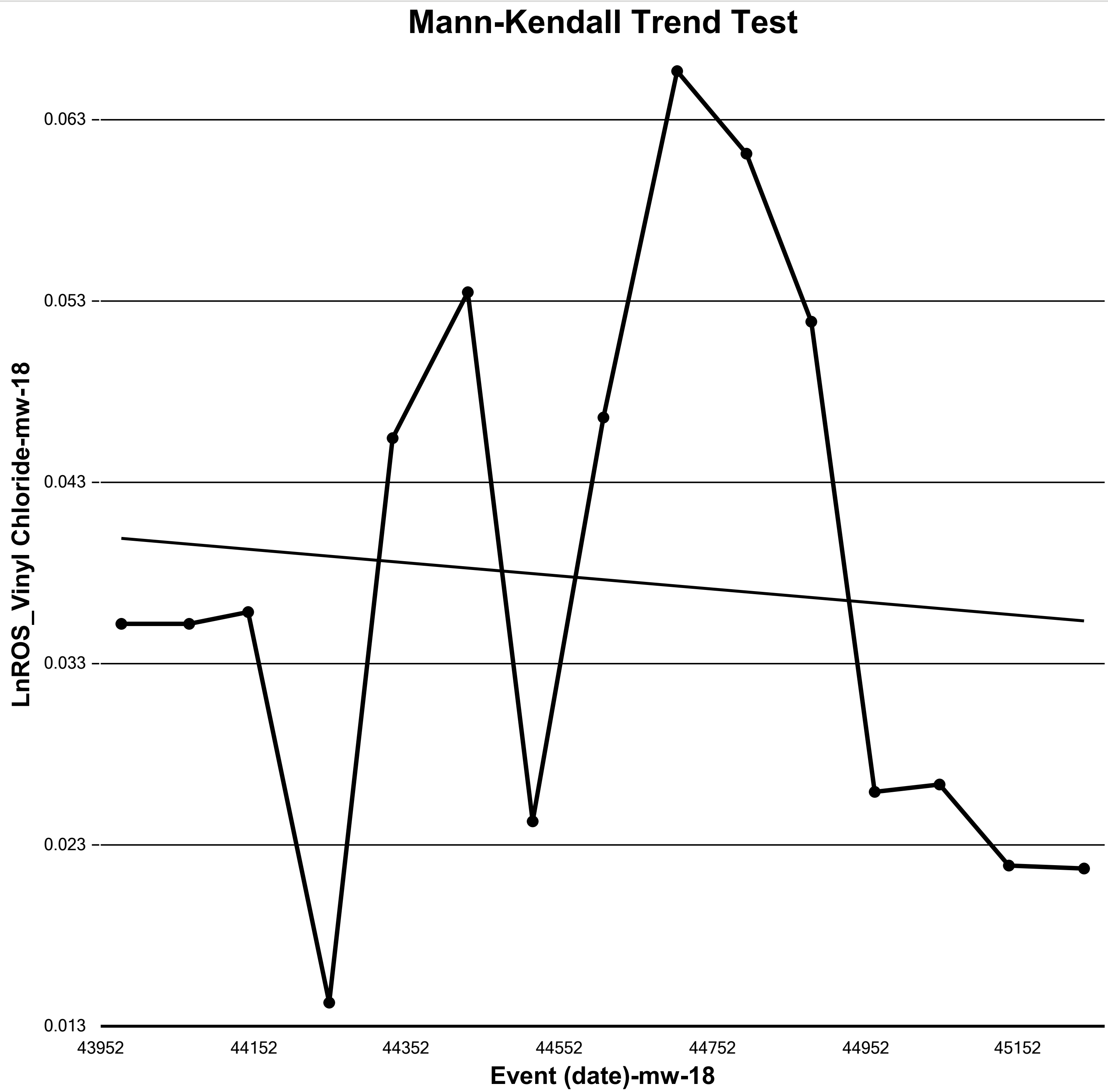
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3911
Standardized Value of S	1.2812
M-K Test Value (S)	22
Tabulated p-value	0.1020
Approximate p-value	0.1001

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.7428

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



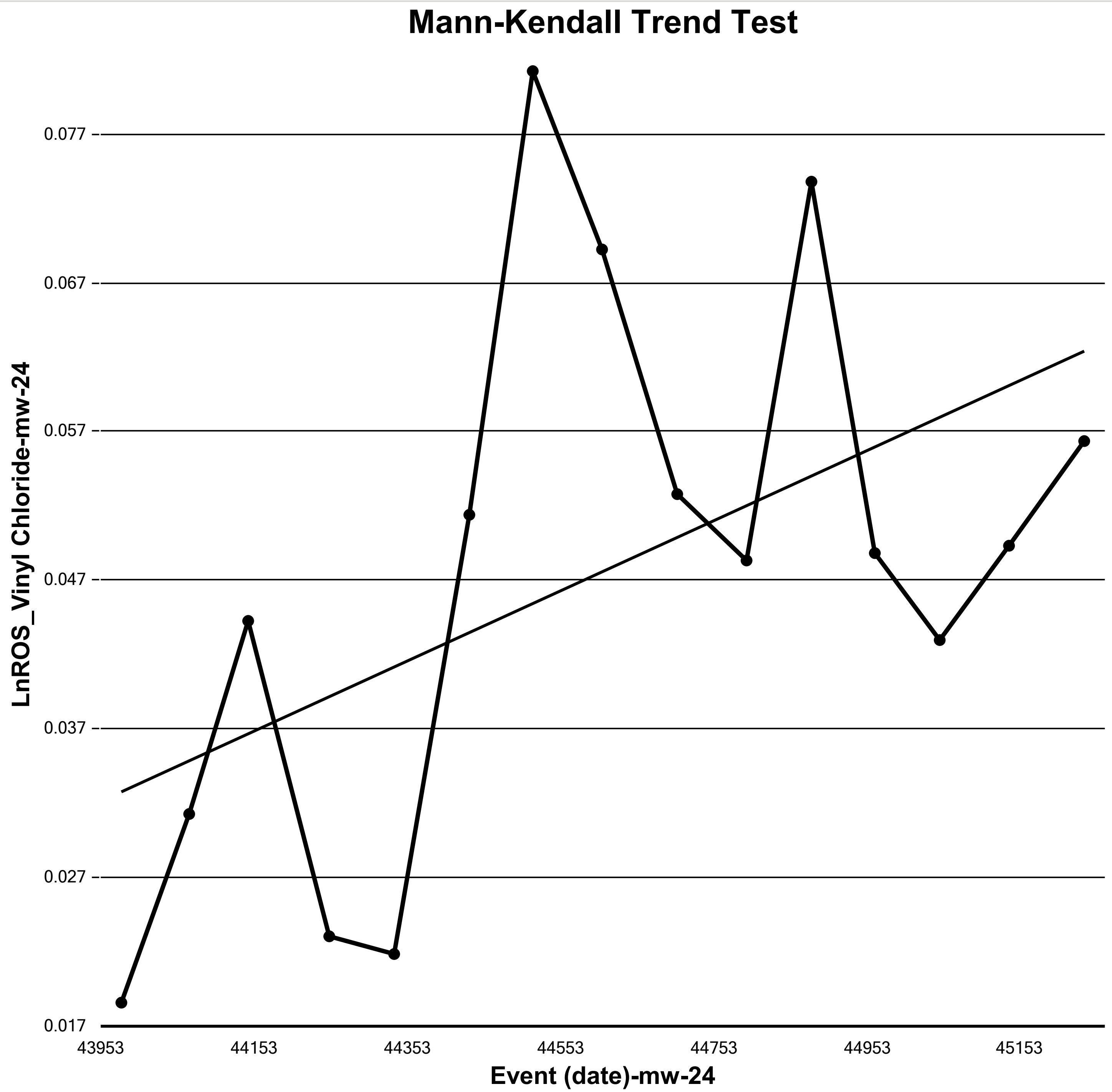
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	-0.3468
M-K Test Value (S)	-8
Tabulated p-value	0.3490
Approximate p-value	0.3644

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.2002

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



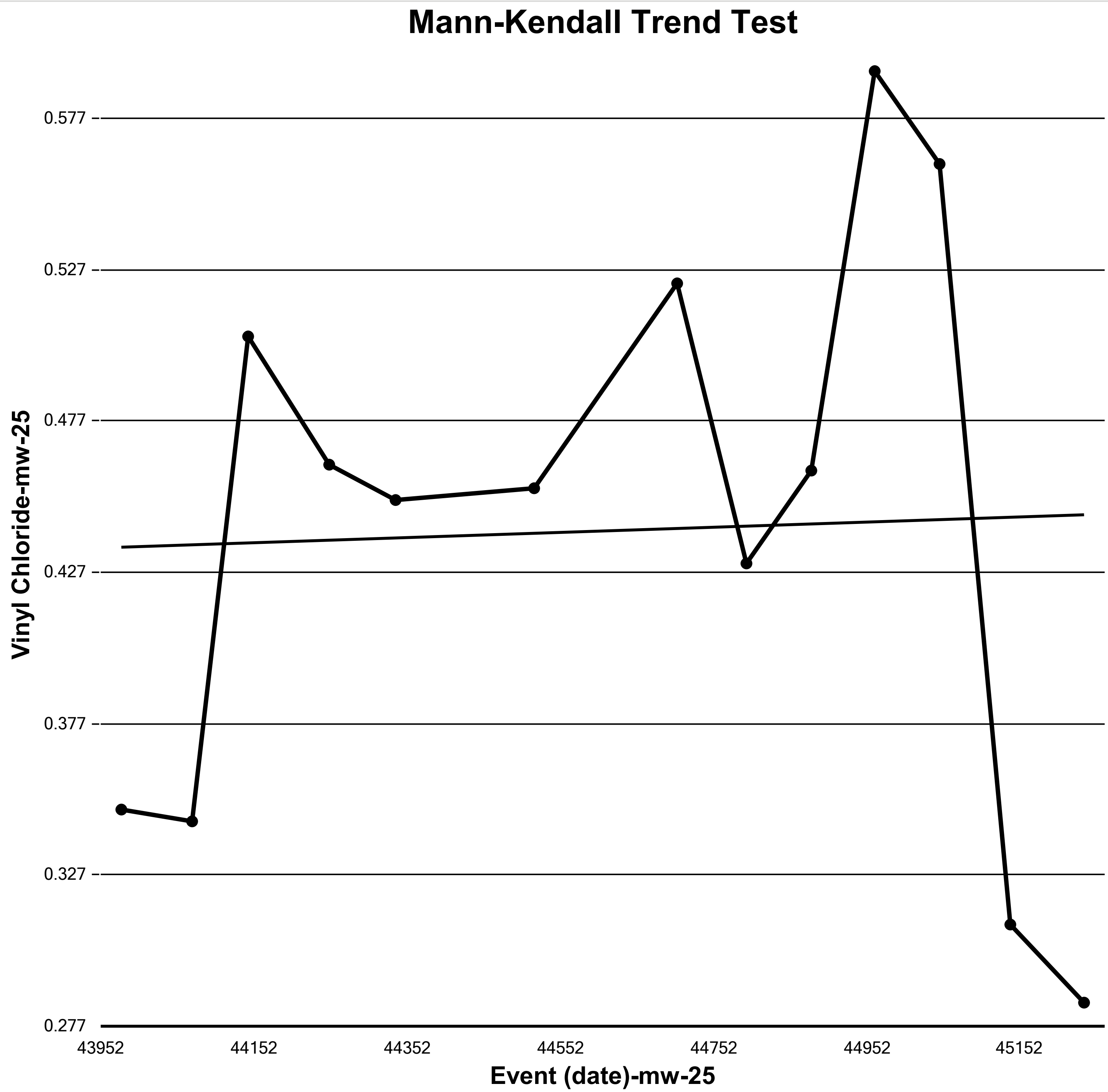
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.7815
M-K Test Value (S)	37
Tabulated p-value	0.0370
Approximate p-value	0.0374

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.0060

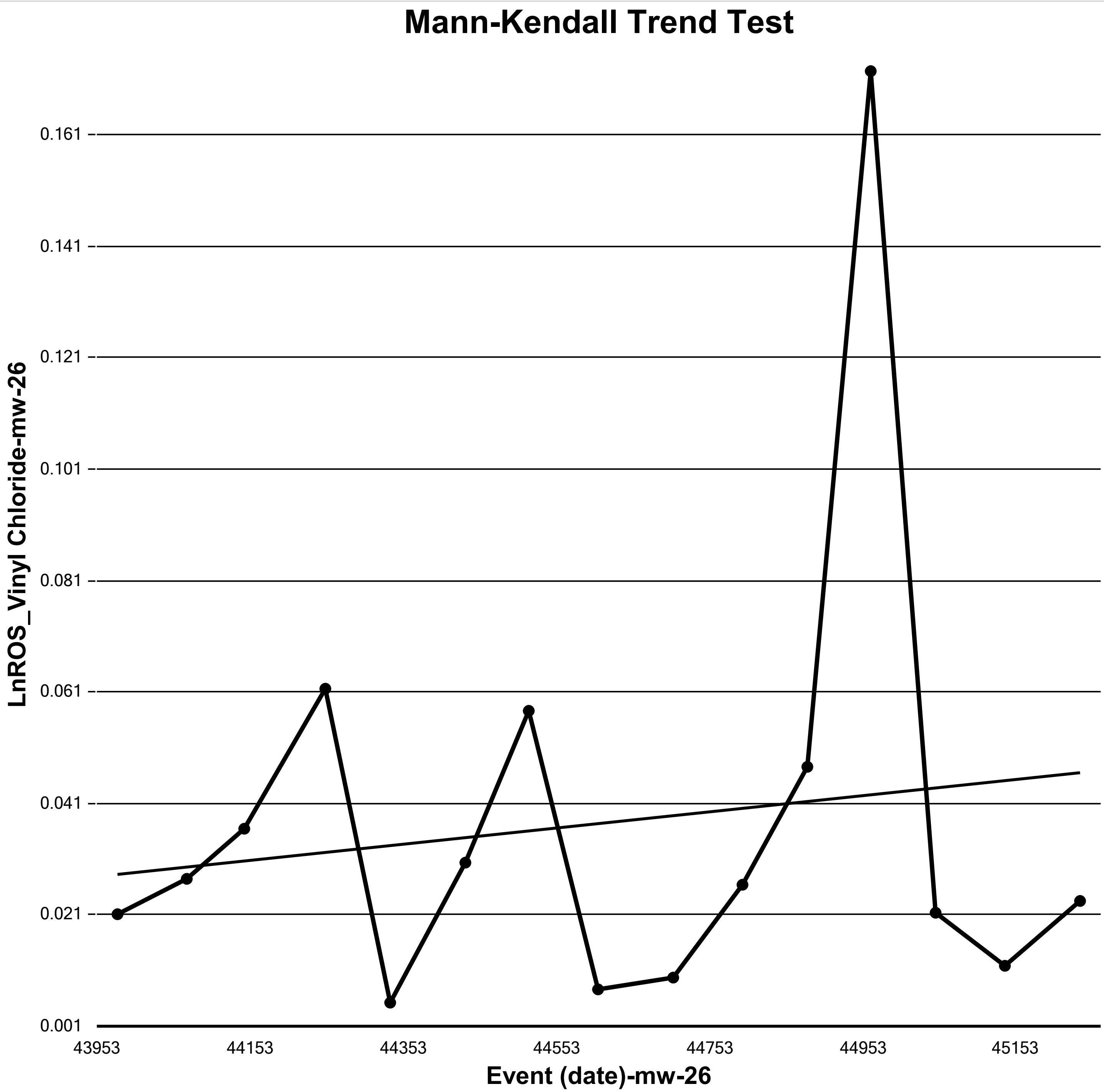
Statistically significant evidence of an increasing trend at the specified level of significance.



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	0.0610
M-K Test Value (S)	2
Tabulated p-value	0.4760
Approximate p-value	0.4757

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.0522

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



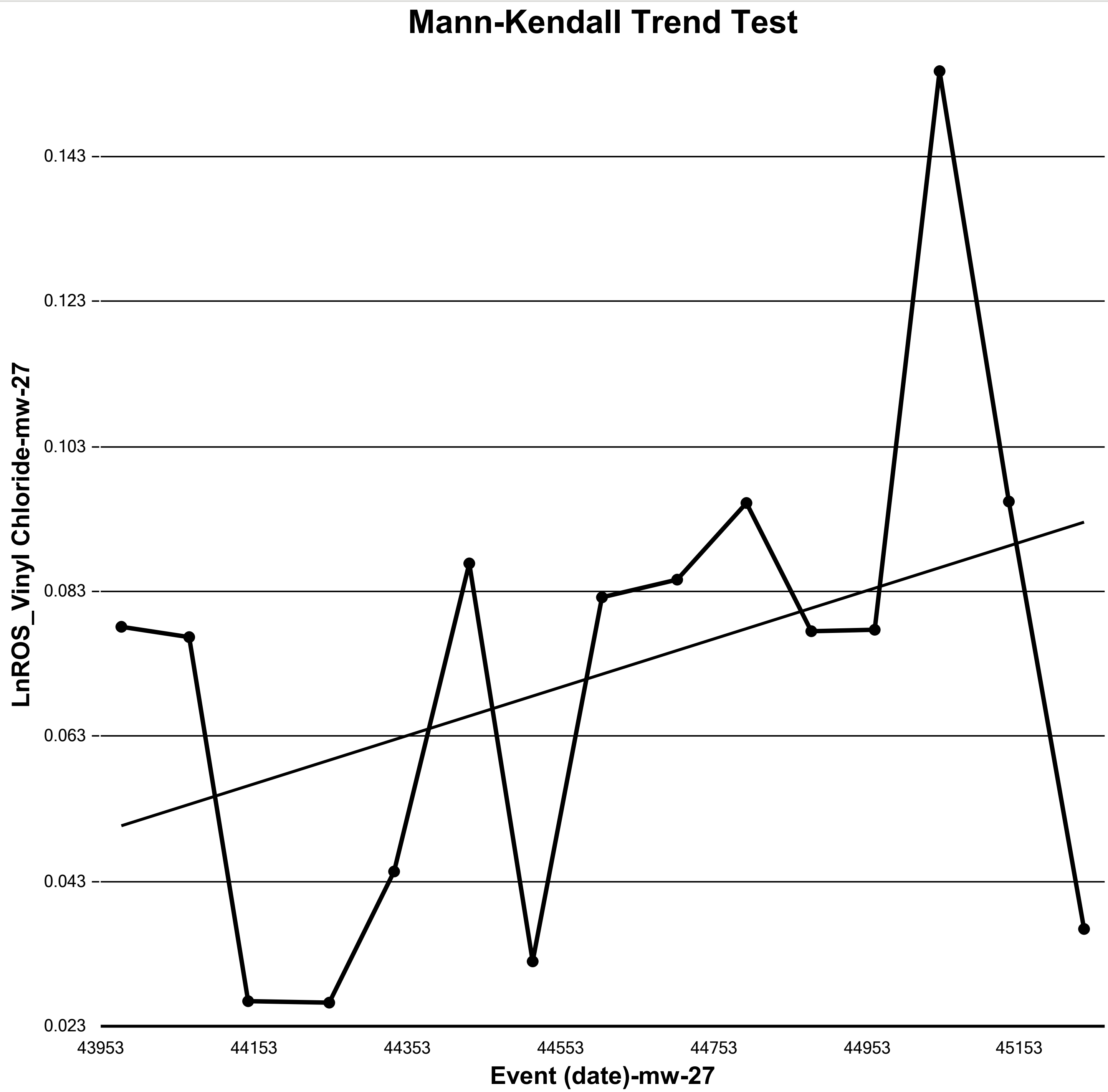
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	0.0000
M-K Test Value (S)	1
Tabulated p-value	0.5000
Approximate p-value	0.5000

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-0.6021

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



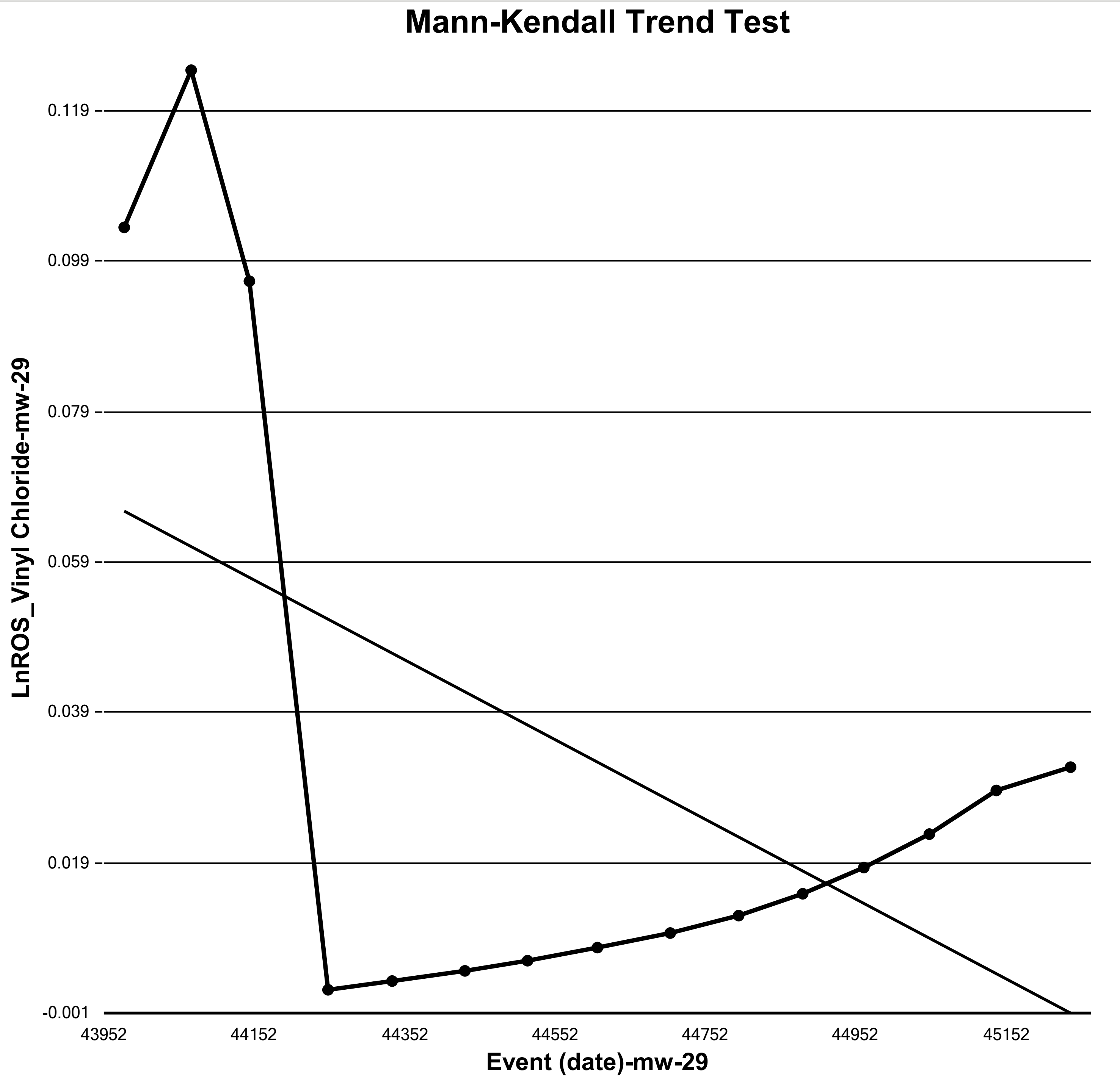
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.5836
M-K Test Value (S)	33
Tabulated p-value	0.0570
Approximate p-value	0.0566

OLS Regression Line (Blue)

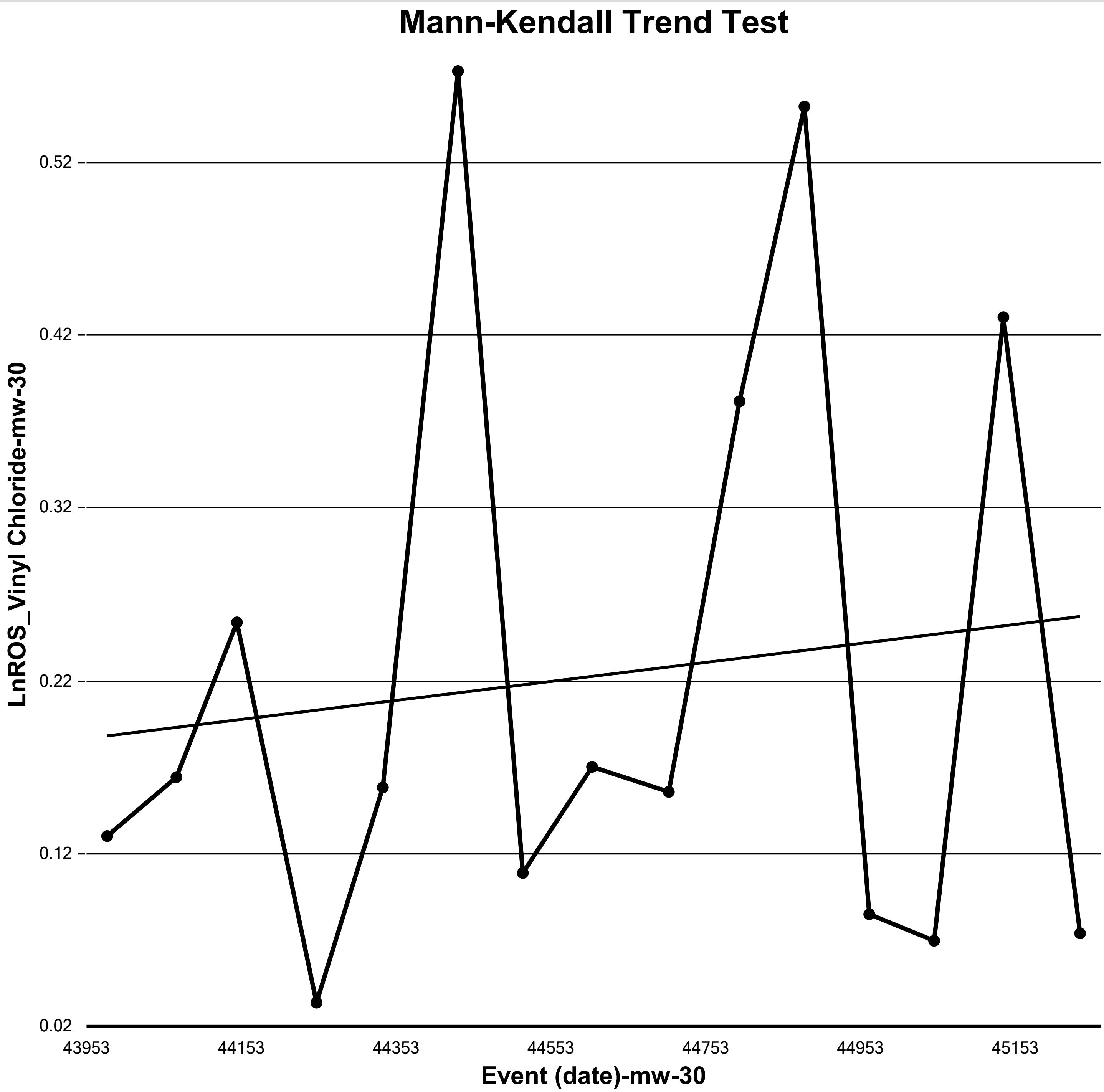
OLS Regression Slope	0.0000
OLS Regression Intercept	-1.4146

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



Mann-Kendall Trend Analysis	
n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.3856
M-K Test Value (S)	29
Tabulated p-value	0.0840
Approximate p-value	0.0829
OLS Regression Line (Blue)	
OLS Regression Slope	-0.0001
OLS Regression Intercept	2.4048

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



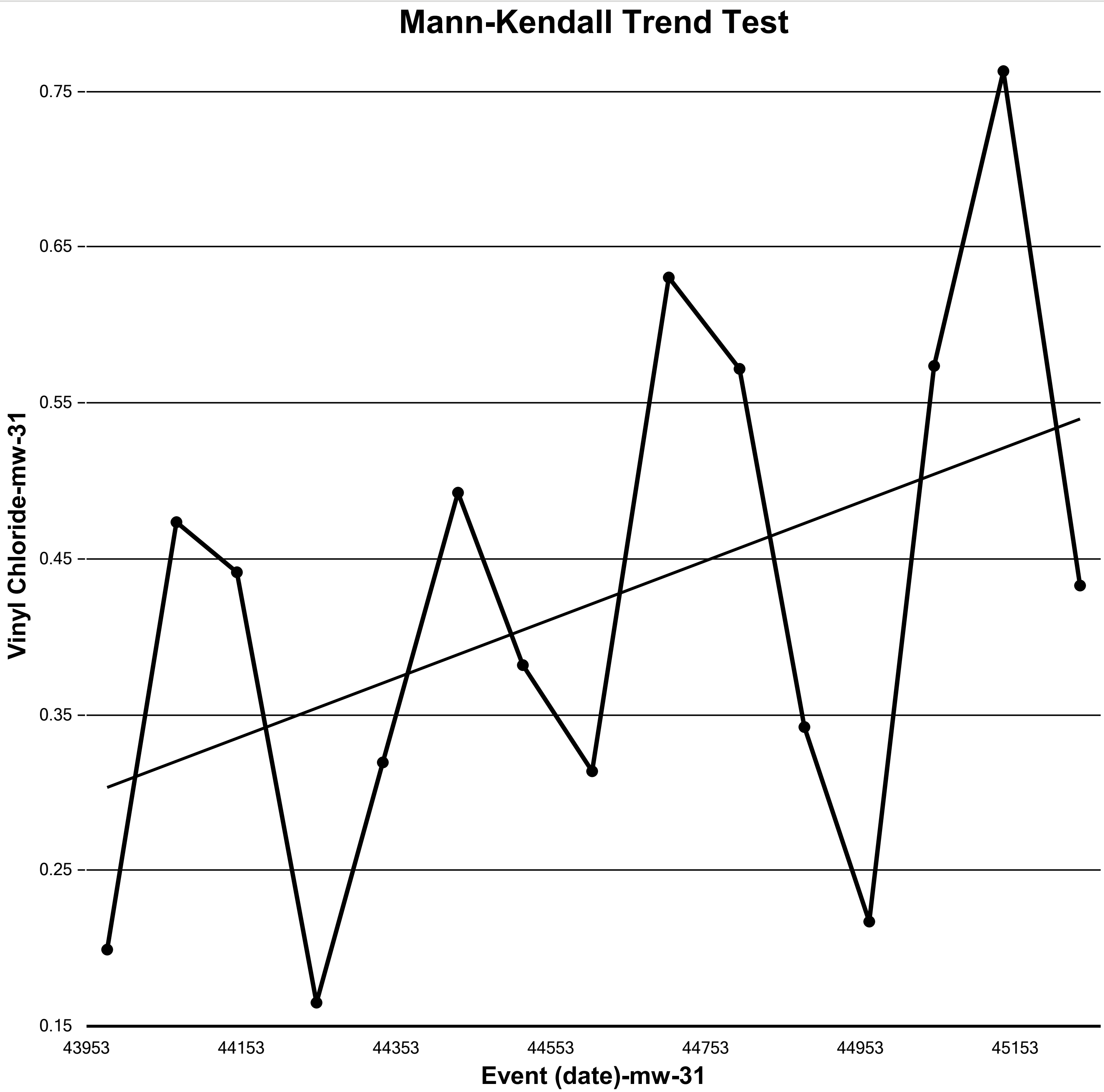
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.0990
M-K Test Value (S)	-3
Tabulated p-value	0.4610
Approximate p-value	0.4606

OLS Regression Line (Blue)

OLS Regression Slope	0.0001
OLS Regression Intercept	-2.2093

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



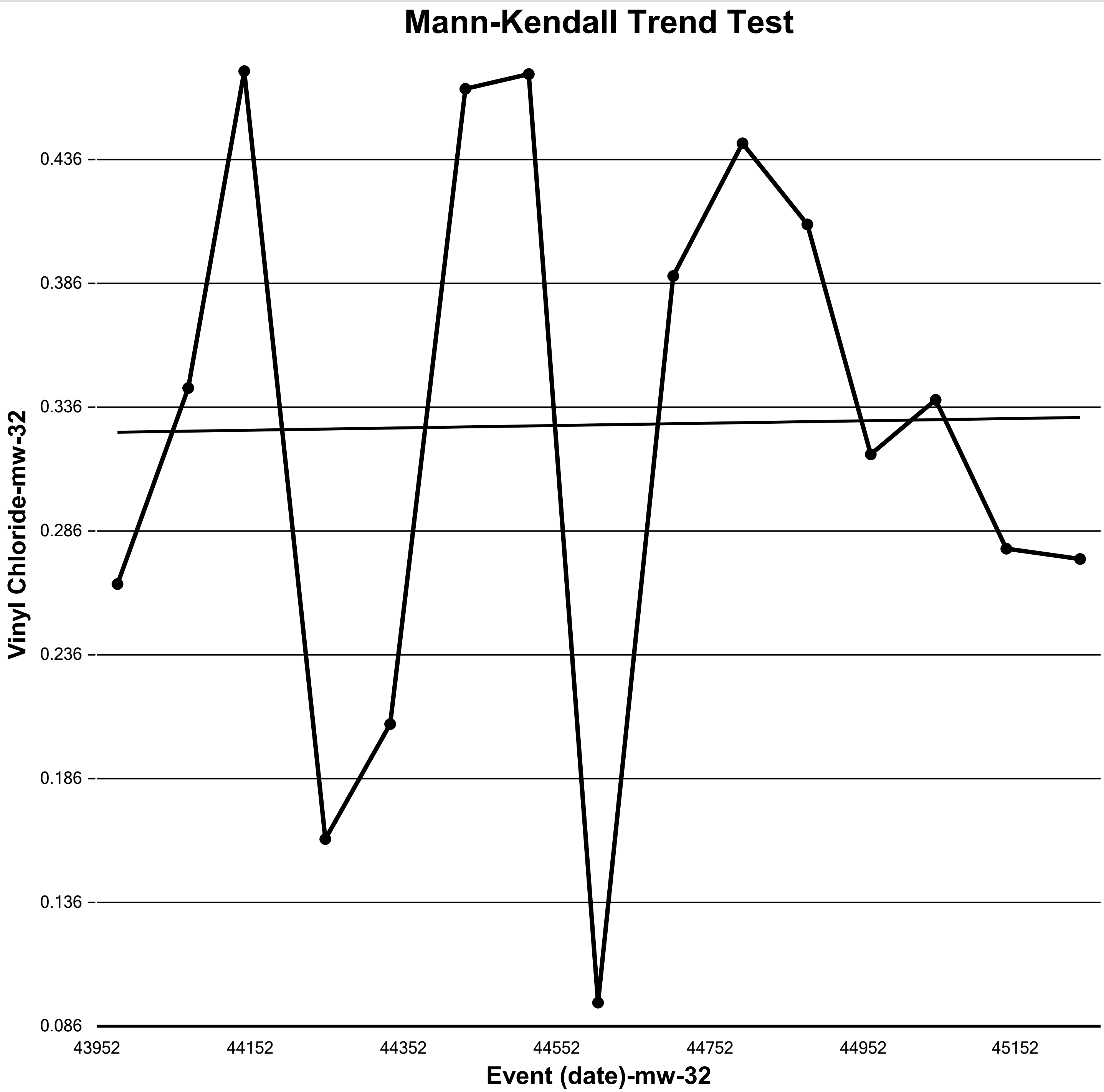
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	1.3856
M-K Test Value (S)	29
Tabulated p-value	0.0840
Approximate p-value	0.0829

OLS Regression Line (Blue)

OLS Regression Slope	0.0002
OLS Regression Intercept	-7.9565

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



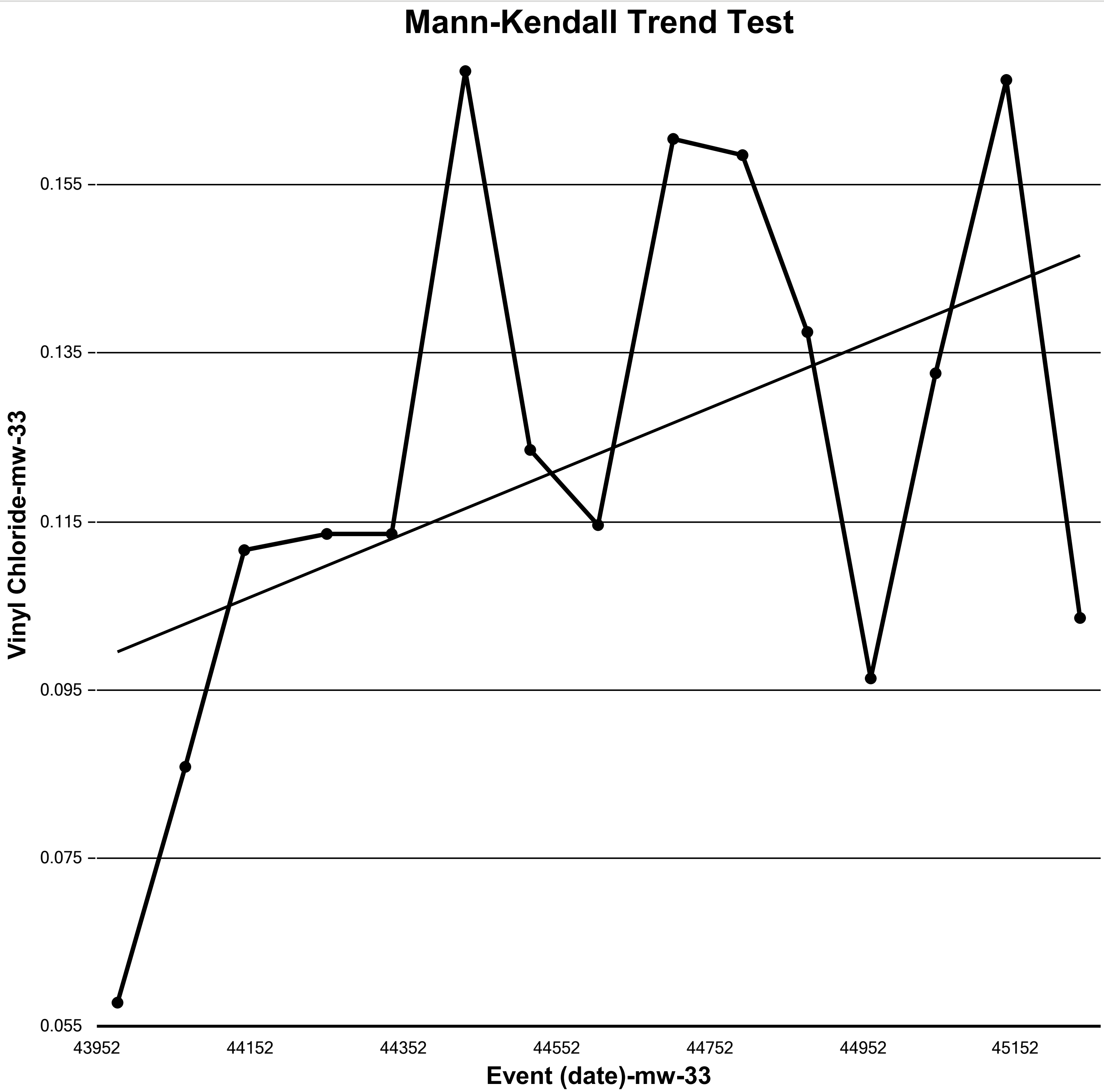
Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.4949
M-K Test Value (S)	-11
Tabulated p-value	0.3130
Approximate p-value	0.3103

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.1097

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	1.7342
M-K Test Value (S)	36
Tabulated p-value	0.0370
Approximate p-value	0.0414

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.5522

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

Appendix D3

Groundwater Monitoring Well Data and Field Forms

PARAMETRIX

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

Water Level Measurement Field Report

DATE 2/6/23	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER overcast	TEMP low 40's ° at 810 AM; Mid 40's ° at 1210 PM
PRESENT AT SITE C. Bourgeois, N. Kapise, officer Chittenden	

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	11:43	~~6.6~~ 5.6		TOC	15.3	10-15	1.52
MW-14	11:47	2.40		TOC	21.8	11.5-21.5	0.8
** MW-29	11:52	7.40*		TOC	30	20-30	-0.29
MW-18	11:38	14.60		TOC	40.4	30-40	1.25
MW-25	8:14	13.13		TOC	27	22-27	2.79
MW-32	12:05	10.03		TOC	24	19-24	-0.44
MW-33	1210	10.17		TOC	25	20-25	-0.47
MW-26	1115	8.84		TOC	25	15-25	2.39
MW-27	1128	7.52		TOC	20	10-20	2.04
* MW-10	818	12.37		TOC	45	35-45	1.65
MW-24	11:18	8.08		TOC	45.3	35-45	1.56
MW-08	11:25	7.56		TOC	45.6	35.5 – 45.5	1.88
MW-30	1100	9.20		TOC	13	8-13	-0.53
MW-31	1105	10.24		TOC	23	35.5-45.5	-0.46

Comments:

TOC – top of PVC casing SG – staff gauge

SIGNED: CB

** GW rising; @ 11:55 GW @ 6.80

* add 0.03' because we had to remove cap to fit sounder

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/23 Well ID: MW-08

Sampling Organization: Parametrix Samplers: NK + CB

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

Initial Depth of Water (Ft below TOC): 7.02 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 14:02 End Purge Time: 1430

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	liters Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
14:05	7.12	2.33	250	1.0	11.2	0.29	552.6	7.06	49.9	9.97	white turbid.
14:10	7.46	"	"	2.5	11.3	0.20	554.9	7.08	7.6	9.83	"
14:15	7.46	"	"	3.5	11.3	0.20	554.8	7.08	-2.4	7.84	" + orange
14:20	"	"	"	4.75	11.4	0.15	554.7	7.08	-11.3	3.51	"
14:25	"	"	"	6.0	11.5	0.16	554.8	7.07	-16.7	4.41	"
14:30	"	"	"	7.0	11.5	0.11	555.1	7.08	-20.3	3.46	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW08-0223 Time Collected: 1435 Weather: Overcast/40s

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Used peristaltic pump

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/23 Well ID: MW-10

Sampling Organization: Parametrix Samplers: L. Bourgeois & M. Kappler

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

Initial Depth of Water (Ft below TOC): 12.37 Purge Water Disposal Method: O/WS

Purge Device: peristaltic Pump Intake Depth: 30.0 ft dedicated

Begin Purge Time: 830 End Purge Time: 905

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged (liters)	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
835		2.5	250		13.3	6.49	1267	6.88	-92.8	184	dark brown
840	12.36				13.3	0.42	1259	6.85	-98.8	47.6	clearer
845					13.3	0.35	1265	6.89	-107.1	25.8	low turb.
8:50	12.37				13.4	0.30	1271	6.92	-112.0	7.37	
8:55					13.4	0.29	1290	6.95	-115.6	4.80	
9:00	12.41				13.4	0.28	1297	6.92	-118.4	3.35	
9:05				11	13.4	0.27	1299	6.93	-120.1	3.41	Clear
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW10-0223 Time Collected: 910 Weather: overcast

Sample Description (Color, Turbidity, Odor, Other): clear, no odor noted.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/8/23 Well ID: MW-12

Sampling Organization: Parametrix Samplers: NK + CB

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

Initial Depth of Water (Ft below TOC): 5.44 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 8:20 End Purge Time: 9:10

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
8:30	5.44		350	2.25L	9.6	1.88	364.8	6.57	188.0	3.93	Clear
8:35	5.45	16psi	200ML	3.75L	9.7	1.86	362.3	6.53	186.3	1.11	"
8:40	"	"	"	4.25L	9.7	1.73	365.2	6.53	185.7	0.93	"
8:45	"	"	"	5 L	9.7	1.63	365.9	6.53	185.5	0.67	"
8:50	"	"	"	6 L	9.6	1.59	366.5	6.53	185.0	0.67	"
8:55	"	"	"	6.75L*	9.8	1.57	367.2	6.51	185.1	0.71	"
9:00	"	"	"	7.2L	9.7	1.49	368.3	6.50	185.0	0.82	"
9:05	"	"	"	8L	9.7	1.48	368.7	6.51	184.8	0.80	"
9:10	"	"	"	8.75L	9.7	1.47	368.4	6.52	184.6	0.82	"
9:15											
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW12-0223 Time Collected: 9:15 Weather: cold, partly cloudy

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

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

This well head requires use of the surface dedicated tubing, at the others we've used silicon and LDPE to connect.

* took vol reading at end of parameter readings

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/8/23 Well ID: MW-14

Sampling Organization: Parametrix Samplers: NK & CB

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

Initial Depth of Water (Ft below TOC): 2.37 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 9:50 End Purge Time: 11:02

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:55	2.55	10psi	225	3.75	12.8	0.67	477.8	6.91	62.2	93.3	orange tint
10:00	2.55	"	"	4.75	12.5	0.44	477.9	6.91	-0.9	81.7	clearer but still turbid
10:05	"	"	"	5.9	12.6	0.58	473.1	6.89	-20.4	54.4	"
10:10	"	"	"	6.75	12.7	0.35	471.1	6.88	-27.6	54.3	"
10:15	"	"	"	7.9	12.8	0.26	469.2	6.88	-32.7	42.5	"
10:20	"	"	"	8.5	12.9	0.37	469.2	6.87	-34.9	30.8	"
10:25	"	"	"	9.75	13.0	0.34	468.8	6.87	-37.0	16.9	"
10:30	"	"	"	10.75	13.0	0.24	469.1	6.87	-38.3	14.7	"
10:35	"	"	"	11.75	13.0	0.29	468.8	6.87	-39.4	11.2	"
10:40	"	"	"	13.0	13.2	0.28	468.7	6.87	-40.3	8.18	"
10:45	"	"	"	14.0	13.0	0.26	468.9	6.87	-40.6	7.06	less turbid
10:50	"	"	"	15.0	12.9	0.27	469.0	6.87	-41.1	4.96	"
10:55	"	"	"	16.0	12.9	0.26	468.4	6.87	-41.8	4.77	"
11:00	"	"	"	17.0	12.9	0.26	468.4	6.87	-42.2	4.61	"
11:05											
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW14-0223 Time Collected: 1105 Weather: overcast / 40s

Sample Description (Color, Turbidity, Odor, Other): minor turbidity, clear color, no noted odor

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

same well head issue as MW-12. Though, no leaks noted at either. Dedicated surface tube very dirty.

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/23 Well ID: MW-18

Sampling Organization: Parametrix Samplers: CB + NK

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 14.56 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 14:34 End Purge Time: 1505

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
14:40	14.56	8/4 (psi)	200	1L	13.4	1.06	806	6.82	15.6	2.93	Slight yellow Tint
14:45	14.56	↓	↓	1.75L	13.4	0.40	795	6.79	-39.2	2.81	"
14:50	14.56			2.75L	13.5	0.29	791	6.79	-54.8	1.12	"
14:55	14.56			3.5L	13.5	0.22	787	6.79	-62.5	1.22	clearing up
15:00	14.56			4.0L	13.5	0.19	786	6.78	-66.2	0.76	Clear
15:05	14.59			5L	13.5	0.16	785	6.79	-69.5	0.59	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW18-0223 Time Collected: ~~1515~~ ~~1505~~ 1510 Weather: Overcast / Mid 40s

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

Duplicate Sample Collected: ☐ Yes ☒ No If yes, ID: MW-60 @ 1545

MS/MSD Collected: ● Yes ☐ No

Additional Information/Comments

X

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/23 Well ID: MW-24

Sampling Organization: Parametrix Samplers: NK + CB

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.05 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1055 End Purge Time: 11:32

Time	Depth to Water (feet below MP)	psi Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1100	7.96				9.9	3.33	789	6.99	49.3	6.77	visible turb.
1105	7.97	48	150		10.0	1.76	820	6.85	10.8	6.03	"
1110	7.98	52	250		10.5	0.64	868	6.80	-30.3	3.80	"
1115	7.96	"	"	3.0	11.6	0.31	896	6.79	-53.2	4.15	"
1120	7.95	"	"	4.5	11.5	0.19	908	6.80	-72.1	2.83	"
1125	"	"	"	5.5	11.6	0.16	909	6.80	-76.0	2.21	"
11:30	"	"	"	6.5	11.6	0.16	911	6.80	-80.0	2.27	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW24-0223 Time Collected: 11:35 Weather: rainy, cold, windy

Sample Description (Color, Turbidity, Odor, Other): minor turbidity, no odor noted.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☐ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/23 Well ID: MW-25

Sampling Organization: Parametrix Samplers: L. Bourgeois & N. Kapise

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

Initial Depth of Water (Ft below TOC): 13.11 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 937 End Purge Time: 1005

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:45	13.11	8/4	325	2 L	13.5	~~7~~ 0.75	1066	6.75	-87.7	2.68	clear
9:50	13.11	↓	200	2.9 L	13.2	0.49	1076	6.76	-92.6	1.16	clear
9:55	13.11		↓	4 L	13.2	0.32	1082	6.76	-98.1	0.66	"
10:00	13.11			4.9 L	13.3	0.31	1085	6.76	-100.6	0.98	"
10:05	13.11			5.9	13.3	0.24	1089	6.77	-103.0	0.56	"
				Stabilization Criteria	3%	10%	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW25-0223 Time Collected: 10:10 Weather: cold, overcast.

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

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

minor sheen on ~~to~~ surface of purge bucket

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/23 Well ID: MW-26

Sampling Organization: Parametrix Samplers: NK + CB

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

Initial Depth of Water (Ft below TOC): 8.71* Purge Water Disposal Method: O/WS

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

Begin Purge Time: 12:17 End Purge Time: 13:16

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
12:20	8.71	30psi	300	0.75 L	11.5	2.98	249.1	6.35	33.3	69.8	turbid
12:25	8.71	"	250**	1.75 L	11.6	1.13	232.9	6.27	48.9	64.9	"
12:30	8.71	"	"	2.75 L	11.7	0.57	225.9	6.25	48.3	49.1	"
12:35	8.71	"	"	4 L	11.6	0.46	221.7	6.23	46.8	34.0	"
12:40	8.71	"	"	5 L	11.7	0.28	222.0	6.23	44.7	22.4	Sl. clearer
12:45	"	"	"	6 L	11.7	0.24	224.2	6.23	42.0	13.4	clearer
12:50	"	"	"	6.75	11.8	0.19	224.9	6.23	40.5	12.7	"
12:55	"	"	"	7.75	11.8	0.19	225.9	6.23	38.9	8.82	"
13:00	"	"	"	8.75	11.9	0.17	226.5	6.22	37.7	7.54	"
13:05	"	"	"	9.75	12.0	0.15	227.6	6.22	36.7	6.73	clear
13:10	"	"	"	10.75	12.0	0.16	228.3	6.22	36.0	6.82	"
13:15	"	"	"	11.75	12.0	0.15	227.8	6.22	35.2	6.28	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW26-0223 Time Collected: 13:20 Weather: Rain / 40s

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments * reading taken after 1 gal purged; ** reading taken at same pump setting but better time tracking so more accurate than 1st reading

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/23 Well ID: MW-27

Sampling Organization: Parametrix Samplers: NK + CB

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

Initial Depth of Water (Ft below TOC): 7.38 Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump 1500 Pump Intake Depth: 15.0 ft

Begin Purge Time: 1500 End Purge Time: 16:06

Time	Depth to Water (feet below MP)	Pump Setting (psi)	Purge Rate (mL/min)	Cum. Vol. Purged (& liter)	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1505	7.42	20	250	2.0	10.4	2.51	288.5	6.72	87.3	581	looks like Tang.
15:10	7.42	"	"	3L	10.8	0.71	266.2	6.68	93.9	459	"
15:15	7.42	"	"	4L	10.8	0.48	281.1	6.68	94.0	375	"
15:20	7.42	"	"	5L	10.9	0.35	307.5	6.68	87.6	542	"
15:25	7.42	"	"	6L	10.9	0.24	338.7	6.68	71.9	306	Little clearer
15:30	7.42	"	"	6.75	11.0	0.20	354.4	6.69	48.6	83.4	sig clearer
15:35	7.42	"	"	8L	11.0	0.20	363.8	6.69	34.2	49.2	semi turbid
15:40	7.42	"	"	9L	11.0	0.20	371.8	6.70	22.4	35.8	"
15:45	7.42	"	"	10L	11.0	0.16	376.3	6.70	10.9	26.6	clearer
15:50	7.42	"	"	11L	11.0	0.15	378.8	6.70	2.9	24.9	pretty clear
15:55	7.42	"	"	12.5L	11.0	0.14	380.6	6.70	-2.9	18.7	"
16:00	7.42	"	"	13.25L	11.0	0.13	382.4	6.71	-7.7	19.5	"
16:05	7.42	"	"	14L	11.0	0.15	384.5	6.71	-12.9	18.7	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW27-0223 Time Collected: 1610 Weather: part sun/40s

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/23 Well ID: MW-29

Sampling Organization: Parametrix Samplers: NK + CB

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

Initial Depth of Water (Ft below TOC): 7.03 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 25.0 ft

Begin Purge Time: 16:02 End Purge Time: 16:37

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
16:05	7.03	2.5	250	.75L	11.7	2.16	470.6	6.91	8.8	20.2	clearish
16:10	7.26	"	"	1.5L	11.7	1.79	476.5	6.92	-38.0	8.32	clearer
16:15	7.31	"	"	3L	11.8	0.23	501.6	6.91	-81.4	2.51	"
16:20	7.32	"	"	4L	11.8	0.16	512.2	6.91	-95.7	2.58	
16:25	7.33			5L	11.9	0.12	522.4	6.95	-102.5	3.47	
16:30	7.34			6L	11.9	0.12	526.0	6.94	-106.8	1.07	
16:35	7.34			7L	11.9	0.11	526.4	6.94	-108.5	0.92	
16:40											
16:45											
				Stabilization Criteria	**3%**	**10%, or 3<0.5**	**3%**	**± 0.1**	**± 10 mv**	**10% or 3 <5 NTU**	

Sampling Data

Sample ID: SPL-GW_MW29-0223 Time Collected: 16:40 Weather: overcast / mid 40s

Sample Description (Color, Turbidity, Odor, Other): ~~slight~~ NK clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☒ Yes ■ No If yes, ID: ~~SPL-GW_MW00-1122~~

MS/MSD Collected: ☒ Yes ■ No

Additional Information/Comments

* Took initial GW measurement right after started purging

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/23 Well ID: MW-30

Sampling Organization: Parametrix Samplers: C. Bourgeois & N. Kapisa

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

Initial Depth of Water (Ft below TOC): 9.22 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 839 End Purge Time: 9:27

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
845	9.36	2.5	300	1.75L	11.1	0.46	1166	6.36	18.0	7.35	minor turbidity
8:50	9.36	2.0	290	3L	11.1	0.45	1001	6.37	27.5	6.12	"
8:55	9.36	"	"	3.85L	11.1	0.52	946	6.37	28.7	4.32	"
9:00	9.36	"	"	5.0L	11.1	0.49	880	6.38	30.5	4.77	"
9:05	9.36	"	"	6.5L	11.1	0.48	822	6.37	32.5	3.83	"
9:10	9.36	"	"	7.75L	11.1	0.56	785	6.37	36.4	2.49	"
9:15	"	"	"	8.75L	11.1	0.59	751	6.37	38.9	1.96	"
9:20	"	"	"	9.75L	11.1	0.59	740	6.36	40.0	1.77	"
9:25	"	"	"	11.0L	11.1	0.55	740	6.37	39.9	1.37	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW30-0223 Time Collected: 930 Weather: rainy & cold

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/23 Well ID: MW-31

Sampling Organization: Parametrix Samplers: NK + CB

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

Initial Depth of Water (Ft below TOC): 10.17 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 934 End Purge Time:

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
940	10.16	10 psi		1L	12.6	9.79	418.8	6.66	-10.7	35.4	fine turbid
9:45	10.16	"	200	2L	12.8	0.39	433.4	6.63	-40.3	11.1	"
9:50	"	"	"	2.75L	12.7	0.27	437.6	6.63	-47.3	8.42	"
9:55	"	"	"	3.25L	12.7	0.22	438.7	6.63	-50.5	6.10	clearing up
10:00	"	"	"	3.75L	12.7	0.24	439.9	6.63	-52.2	4.92	"
10:05	"	"	"	4.25L	12.6	0.31	439.4	6.63	-53.2	3.63	clear
10:10	"	"	"	5L	12.7	0.32	439.4	6.63	-53.8	2.87	Clear
			Stabilization Criteria		3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW31-0223 Time Collected: 10:15 Weather: cold & rainy

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☐ ~~Yes~~ ☒ No If yes, ID: ~~SPL-GW_MW61-1122~~

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/23 Well ID: MW-32

Sampling Organization: Parametrix Samplers: C. Bourgeois & N. Kapise

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.03 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 1220 End Purge Time: 1250

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1225	10.03	2.5	260		13.3	1.17	710	6.98	-90.5	10.04	clear
12:30	"	"	"	2.9L	13.4	0.22	779	7.01	-105.3	9.95	orange flecks
12:35	"	"	"	~~3~~3.9L	13.3	0.19	760	7.01	-110.7	8.05	"
12:40	"	"	"	5.2L	13.4	0.17	761	6.99	-113.4	3.18	"
12:45	"	"	"	7L	13.4	0.17	756	7.00	-114.3	4.03	"
12:50	"	"	"	8L	13.4	0.14	754	6.99	-115.2	1.43	~~Sl~~ clearer
			Stabilization Criteria		3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW32-0223 Time Collected: 1255 Weather: cold, drizzle

Sample Description (Color, Turbidity, Odor, Other): Sparse orange flecks, earth odor?

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese, dissolved arsenic

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/23 Well ID: MW-33

Sampling Organization: Parametrix Samplers: CB & NK

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

Initial Depth of Water (Ft below TOC): 10.17 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: ~~22.5ft~~ 17.5, see comments

Begin Purge Time: 1324 End Purge Time: 1350

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1330	10.17	2.6	300	1.75L	14.6	0.29	1106	6.91	-85.2	6.02	yellow tint
13:35	10.17	2.5	260	3 L	14.6	0.21	1272	6.89	-104.7	4.58	"
13:40	10.18	"	"	4 L	14.6	0.20	1308	6.89	-109.8	2.96	clearer/still tint
13:45	"	"	"	5 L	14.6	0.18	1311	6.89	-112.5	2.33	
13:50	"	"	"	6 L	14.6	0.20	1306	6.89	-114.4	3.49	still yellowish tint
13:55											
14:00											
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW33-0223 Time Collected: 1355 Weather: rain / mid 40s

Sample Description (Color, Turbidity, Odor, Other): yellow tint, no odor noted.

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

* couldn't advance tubing more than 17.5 ft
* Fizzy reaction in VOA

purgewater orange brown in bucket

Parametrix

PARAMETRIX

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

Water Level Measurement Field Report

DATE 5/1/23	JOB NO. 553-1550-067	
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities	
LOCATION: Seattle, WA		
WEATHER overcast	TEMP 50's ° at 8:00 AM; 50's ° at 13:00 PM	
PRESENT AT SITE N. Johnson & C. Bourgeois		

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	1152	5.69		TOC	15.3	10-15	1.52
MW-14	1157	2.52		TOC	21.8	11.5-21.5	0.8
MW-29	1204	6.86		TOC	30	20-30	-0.29
MW-18	12:12	14.70		TOC	40.4	30-40	1.25
MW-25	823	13.25		TOC	27	22-27	2.79
MW-32	1225	10.16		TOC	24	19-24	-0.44
MW-33	1240	10.29		TOC	25	20-25	-0.47
MW-26	1133	9.03		TOC	25	15-25	2.39
MW-27	1140	7.72		TOC	20	10-20	2.04
MW-10	819	12.60'		TOC	45	35-45	1.65
MW-24	1130	8.25		TOC	45.3	35-45	1.56
MW-08	1135	7.72		TOC	45.6	35.5 – 45.5	1.88
* MW-30	1118	9.59		TOC	13	8-13	-0.53
MW-31	1115	10.40		TOC	23	35.5-45.5	-0.46

Comments:

* hundreds of small black sugar ~~ants~~ ants in and around monument. on (but not inside of) well casing. Ants carrying small white material

TOC – top of PVC casing SG – staff gauge

SIGNED: CB

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/12/23 Well ID: MW-08

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 7.70 Purge Water Disposal Method: O/WS

Purge Device: peristaltic Pump Intake Depth: 40.0 ft

Begin Purge Time: 1330 End Purge Time: 1440

Time	Depth to Water (feet below MP)	Pump Setting	300 Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1335	7.73	2.5	~~250~~	2.00	12.7	1.9	760	6.68	-54.7	6.75	Clear,
1340	7.73	"	"	2.25	12.7	0.6	1039	6.63	-79.2	9.69	turbidity
1345	7.73	"	"	4.50	12.7	0.3	1118	6.67	-89.5	4.47	abundant
1350	7.73	"	"	5.75	12.8	0.2	1126	6.67	-94.9	51.8	
1355	7.73	"	"	7.00	12.7	0.2	1142	6.68	-98.5	22.8	
1400	7.73	2.25	230	8.00	13.0	0.1	1134	6.67	-102.1	30.7	coarse
1405	7.73	"	"	9.00	13.1	0.1	1134	6.66	-103.4	123	turbidity
1410	7.73	"	"	10.00	13.0	0.1	1139	6.67	-104.7	5.57	Clear
1415	7.73	"	"	11.00	13.0	0.1	1136	6.67	-105.5	4.39	
1420	7.73	"	"	12.00	13.0	0.1	1141	6.69	-106.6	11.9	Turbidity
1425	7.73	"	"	13.00	13.0	0.1	1136	6.73	-107.3	8.34	
1430	7.73	"	"	14.00	13.0	0.1	1139	6.73	-107.9	3.60	Clear
1435	7.73	"	"	15.00	13.0	0.1	1142	6.69	-107.1	3.62	
1440	7.73	"	"	16.00	13.0	0.1	1139	6.70	-106.9	4.75	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW08-0523 Time Collected: 1445 Weather: sunny, warm

Sample Description (Color, Turbidity, Odor, Other): Clear w/ turbidity (very large, orange)

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

sporadic large orange turbidity
used peristaltic and left 43' of ~~[illegible]~~ tubing

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/1/23 Well ID: MW-10

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

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

Initial Depth of Water (Ft below TOC): 12.60 Purge Water Disposal Method: O/WS

Purge Device peristaltic Pump Intake Depth: 40.0 ft

Begin Purge Time: 825 End Purge Time: 940

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate mL/min	Cum. Vol. Purged L	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
830	12.48	2.5	250	1.75	13.6	0.6	1422	2.36	113.8	39.6	Froth in bucket.
835	12.48	"	"	3.0	13.6	0.4	1416	2.92	82.7	10.5	no odor
840	12.47	"	"	4.0	13.6	0.4	1440	3.33	57.3	6.85	
845	12.47	"	"	5.0	13.6	0.3	1460	3.60	39.2	3.34	
850	12.47	"	"	6.25	13.7	0.3	1464	3.94	17.6	2.56	
855	12.47	"	"	6.75	13.7	0.2	1472	4.31	-3.7	2.05	
900	12.47	"	"	7.75	13.7	0.2	1474	4.61	-20.1	2.01	
905	12.47	"	"	10.0	13.7	0.2	1480	4.96	-39.9	1.51	
910	12.47	"	"	11.0	13.7	0.2	1490	5.12	-49.5	1.44	
915	12.47	"	"	12.5	13.7	0.2	1495	5.35	-62.7	1.44	
920	12.47	"	"	13.75	13.7	0.2	1499	5.51	-72.6	1.37	
925	12.47	"	"	14.5	13.7	0.2	1499	5.71	-83.5	1.11	
930	12.47	"	"	15.5	13.7	0.2	1502	5.89	-93.6	1.19	
935	12.47	"	"	16.5	13.7	0.2	1504	5.94	-96.7	0.91	
940	12.47	"	"	17.5	13.7	0.3	1506	6.06	-102.7	0.88	
	Stabilization Criteria				3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW10-0523 Time Collected: 9:50 Weather: Overcast, 50's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

pH readings very low, calibration was verified by vendor 4/25/23

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/3/2023 Well ID: MW-12

Sampling Organization: Parametrix Samplers: N. Johnson & L. Bourgeois

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

Initial Depth of Water (Ft below TOC): 5.78 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 826 End Purge Time: 910

Time	Depth to Water (feet below MP)	Pump Setting psi	Purge Rate ml/min.	Cum. Vol. Purged liters	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
835	5.77	5	225	2.1	11.7	1.8	432.0	6.31	67.7	5.63	slight yellow
840	5.77	"	"	3.2	11.2	1.6	436.6	6.30	60.9	6.00	hue
845	5.77	"	"	4.1	11.2	1.1	439.0	6.31	53.8	4.06	
850	5.77	"	"	5.1	11.3	0.9	439.4	6.31	48.4	2.88	clearer
855	5.77	"	"	6.0	11.3	0.8	441.3	6.32	44.4	2.36	"
900	5.77	"	"	6.9	11.4	0.7	441.3	6.32	43.4	2.60	"
905	5.77	"	"	7.8	11.4	0.7	441.2	6.32	41.5	2.53	"
910	5.77	"	less?	8.2	11.5	0.7	440.7	6.32	40.1	2.02	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW12-0523 Time Collected: 928 Weather: Sunny, warm

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

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

flow noticeably reduced at 910. Increased pump /flow rate to ~250 then sampled

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/3/23 Well ID: MW-14

Sampling Organization: Parametrix Samplers: C. Bourgeois & N. Johnson

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

Initial Depth of Water (Ft below TOC): 2.56 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1220 End Purge Time: 1315

Time	Depth to Water (feet below MP)	psi Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1225	2.64	9	250	1.8	13.8	1.7	564.9	6.83	-29.2	569	v. turbid
1230	2.64	"	"	3.5	13.4	0.5	509.3	6.69	-47.9	117	↑ less
1235	2.65	"	"	4.2	13.5	0.4	494.4	6.66	-46.1	71.6	
1240	2.65	"	"	5.0	13.4	0.2	486.3	6.64	-45.3	49.3	
1245	2.65	"	"	6.1	13.4	0.2	482.4	6.63	-45.5	25.9	clear, visual
1250	2.64	"	"	7.75	13.4	0.1	479.8	6.62	-46.3	15.4	turbidity
1255	2.64	"	"	8.25	13.4	0.1	479.5	6.62	-46.9	14.3	
1300	2.64	"	"	9.25	13.3	0.1	480.0	6.62	-47.4	11.1	
1305	2.64	"	"	10.20	13.3	0.1	478.0	6.62	-47.9	8.87	
1310	2.64	"	"	11.80	13.3	0.1	478.3	6.62	-48.8	8.61	
1315	2.64	"	"	12.70	13.4	0.1	478.5	6.61	-49.1	8.14	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW14-0523 Time Collected: 1325 Weather: warm, sunny

Sample Description (Color, Turbidity, Odor, Other): clear, very minor turbidity

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/3/23 Well ID: MW-18

Sampling Organization: Parametrix Samplers: C. Bourgeios & N. Johnson

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 14.72 Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump Pump Intake Depth: 35.0 ft

Begin Purge Time: 9:44 End Purge Time: 1020

Time	Depth to Water (feet below MP)	psi Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
950	14.73	20	250	1.00	14.5	2.9	815	6.57	28.7	2.94	Clear
955	14.73	"	"	2.00	14.4	1.0	822	6.58	-18.7	4.64	Visual
1000	14.72	"	"	3.20	14.5	0.5	829	6.57	-43.3	3.12	Turbidity
1005	14.72	"	"	4.10	14.6	0.3	830	6.58	-55.6	2.14	clear.
1010	14.72	"	"	5.00	14.6	0.2	830	6.58	-62.1	2.01	
1015	14.72	"	"	6.10	14.7	0.2	830	6.58	-66.4	2.18	
1020	14.72	"	"	7.20	14.7	0.2	831	6.58	-68.2	1.57	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW18-0523 Time Collected: 1030 Weather: warm, sunny

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Recommend replacing lock

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/23 Well ID: MW-24

Sampling Organization: Parametrix Samplers: [illegible] N. Johnson & C. Bourgeois

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.22 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1028 End Purge Time: 1100

Time	Depth to Water (feet below MP)	psi Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
10:35	8.24	23	250	2.00	11.8	0.4	894	6.62	-38.6	4.34	Clear
10:40	8.24	"	"	3.25	11.9	0.2	870	6.63	-47.3	8.82	
1045	8.25	"	"	~~5.00~~ 4.50	11.9	0.1	876	6.63	-58.0	5.79	
1050	8.25	"	"	5.75	12.0	0.1	880	6.63	-64.0	5.36	
1055	8.26	"	"	7.00	12.1	0.1	885	6.63	-68.1	5.59	
1100	8.26	"	"	8.25	12.1	0.1	889	6.63	-71.4	~~6.75~~ 5.85	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW24-0523 Time Collected: 1105 Weather: 60's, partly cloudy

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Recommend replacing lock

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/1/23 Well ID: MW-25

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

Purpose Data Screened Interval (ft bgs): 22.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.25 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 10:03 End Purge Time: 1030

Time	Depth to Water (feet below MP)	psi Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
10:10	13.25	15	230	6.75	13.4	1.3	1173	6.53	-71.6	1.65	clear
10:15	13.25	"	"	8.00	13.5	0.7	1197	6.52	-87.2	1.18	
10:20	13.25	"	"	8.75	13.5	0.4	1208	6.53	-94.1	1.21	
10:25	13.25	"	"	10.00	13.6	0.3	1214	6.53	-100.4	0.80	
10:30	13.25	"	"	11.00	13.6	0.2	1218	6.53	-101.8	0.82	
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW25-0523 Time Collected: 10:35 Weather: Overcast, 50's

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

Sample Analyses: cis-1,2-DCE, benzene, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ■ No

Additional Information/Comments

6 liters purge volume leftover from MW10

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/23 Well ID: MW-26

Sampling Organization: Parametrix Samplers: C. Bourgeois & N. Johnson

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

Initial Depth of Water (Ft below TOC): 9.00 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1128 End Purge Time: 1235

Time	Depth to Water (feet below MP)	Pump Setting (psi)	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1135	8.99	10	250	1.75	11.9	1.5	303.2	6.01	21.6	89.9	Yellow hue
1140	8.99	"	"	2.80	11.8	1.0	302.7	6.00	24.0	73.5	abundant
1145	8.99	"	"	4.00	11.9	0.7	292.2	5.99	25.0	53.2	turbidity
1150	8.99	"	"	5.25	11.8	0.7	283.1	5.98	25.0	34.6	
1155	8.99	"	"	6.75	11.8	0.5	287.5	5.98	25.2	17.4	
1200	8.99	"	"	8.00	11.8	0.4	281.0	5.97	24.7	12.3	much clearer
1205	8.99	"	"	9.75	11.8	0.4	281.8	5.97	24.4	9.81	
1210	8.99	"	"	11.00	11.8	0.4	283.4	5.97	24.2	7.59	
1215	8.99	"	"	12.25	11.9	0.4	284.7	5.97	24.0	5.95	
1220	8.99	"	"	13.50	11.8	0.4	286.0	5.97	24.0	5.70	
1225	8.99	"	"	14.75	11.8	0.4	286.5	5.97	23.9	5.26	
1230	8.99	"	"	16.00	11.9	0.4	286.8	5.97	23.7	~~4.84~~ 4.98	
1235	8.99	"	"	17.25	11.9	0.4	287.1	5.97	23.4	5.41	

Stabilization Criteria	Temp	DO	Specific Conductivity	pH	ORP	Turbidity
	3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW26-0523 Time Collected: ~~[illegible]~~ 1240 Weather: sunny & cool

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☒ Yes ☐ No If yes, ID: SPL-GW_MW61-0523 @ 1310

MS/MSD Collected: ☒ Yes ☐ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/23 Well ID: MW-27

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

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

Initial Depth of Water (Ft below TOC): 7.69 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1454 End Purge Time: 1610

Time	Depth to Water (feet below MP)	Pump Setting psi	Purge Rate ml/min.	Cum. Vol. Purged liters	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1500	7.71	9	300	1.8	11.6	1.2	325.4	6.49	15.8	493	strong orange
1505	7.71	"	"	2.5	11.5	0.8	325.9	6.46	20.1	591	color
1510	7.71	"	"	3.5	11.6	0.4	354.6	6.46	8.5	450	
1515	7.71	"	"	5.0	11.6	0.3	378.6	6.46	-12.0	250	slightly
1520	7.71	"	"	6.0	11.7	0.3	399.7	6.46	-24.2	87.3	clearer
1525	7.71	"	"	7.0	11.6	0.2	411.3	6.46	-34.3	48.9	
1530	7.71	"	"	8.0	11.7	0.2	418.3	6.46	-41.1	39.3	
1535	7.71	"	"	9.1	11.7	0.2	422.1	6.46	-45.8	18.9	
1540	7.71	"	"	10.5	11.7	0.2	427.6	6.47	-51.7	18.7	
1545	7.71	"	"	11.9	11.6	0.1	430.1	6.47	-54.8	21.5	
1550	7.71	"	"	13.00	11.7	0.1	429.9	6.46	-58.2	20.0	
1555	7.71	"	"	14.00	11.6	0.1	431.6	6.47	-60.6	19.1	
1600	7.71	"	"	15.00	11.7	0.1	433.6	6.47	-64.0	13.6	
1605	7.71	"	"	16.00	11.6	0.1	434.5	6.47	-64.2	13.2	
1610	7.71	"	"	17.00	11.6	0.2	435.5	6.49	-64.0	12.3	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW27-0523 Time Collected: 1620 Weather: sunny, warm

Sample Description (Color, Turbidity, Odor, Other): clear, minor turbidity

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ■ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/3/23 Well ID: MW-29

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

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

Initial Depth of Water (Ft below TOC): 6.34 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 25.0 ft

Begin Purge Time: 10:54 End Purge Time: 1145

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1100	7.60	2.5	260	1.50	12.2	0.6	891	6.62	-82.3	17.8	Yellow hue
1105	7.72	"	"	3.00	12.2	0.4	888	6.61	-92.4	9.37	turbidity
1110	7.76	"	"	4.50	12.2	0.8	870	6.62	-94.6	8.44	present
1115	7.76	"	"	6.00	12.2	0.9	848	6.63	-92.3	5.23	
1120	7.76	"	"	7.50	12.2	0.9	840	6.64	-92.1	4.33	
1125	7.76	"	"	9.00	12.2	0.6	840	6.65	-94.6	2.94	
1130	7.76	"	"	10.25	12.2	0.5	843	6.65	-97.7	2.66	
1135	7.76	"	"	11.00	12.3	0.3	840	6.67	-101.8	1.74	
1140	7.76	"	"	12.50	12.2	0.2	832	6.67	-105.3	1.92	
1145	7.76	"	"	14.00	12.3	0.1	820	6.69	-108.7	1.72	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW29-0523 Time Collected: 1155 Weather: warm, sunny

Sample Description (Color, Turbidity, Odor, Other): clear, minor yellow hue

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: ~~5/1/23~~ 5/2/23 Well ID: MW-30

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

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

Initial Depth of Water (Ft below TOC): 9.60 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 8:22 End Purge Time: 845

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
825	9.72	2.5	300	1.50	11.3	0.9	946	6.24	72.5	13.8	clear
830	9.73	2.25	260	2.25	11.3	0.5	1008	6.23	61.8	8.53	"
835	9.73	"	"	3.25	11.3	0.4	1009	6.24	55.6	4.89	"
840	9.73	"	"	4.75	11.3	0.4	1001	6.26	51.4	4.01	"
845	9.73	"	"	6.00	11.3	0.4	995	6.27	49.4	2.47	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW30-0523 Time Collected: 855 Weather: overcast, low 50's

Sample Description (Color, Turbidity, Odor, Other): no odor, clear, ~~low turbidity~~ trace orange flecks.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

~~[illegible]~~ fewer ants in monument than on 5/1/23, but there are ants in the well.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/23 Well ID: MW-31

Sampling Organization: Parametrix Samplers: N. Johnson & L. Bourgeois

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

Initial Depth of Water (Ft below TOC): 10.37 Purge Water Disposal Method: O/WS

Purge Device ~~peristaltic pump~~ Dedicated. Pump Intake Depth: 20.5ft

Begin Purge Time: 9:08 End Purge Time: 955

Time	Depth to Water (feet below MP)	psi Pump Setting	mL/min Purge Rate	liters Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:15	10.37	15	350	2.25	13.1	0.3	489.5	6.37	-33.5	42.0	strong
9:20	10.37	13	260	4.00	13.2	0.2	493.8	6.37	-48.8	18.5	orange
9:25	10.37	"	"	4.75	13.2	0.1	494.3	6.37	-50.3		color
9:30	10.37	"	"	5.25	13.1	0.2	494.4	6.36	-51.3		
935	10.37	*2.5	300	5.5	13.1	1.8	492.2	6.37	-52.2	9.94	clear w/
940	10.40	"	300	6.25	13.1	0.2	495.2	6.36	-57.0	5.69	orange flecks
945	10.40	2.25	250	8.00	13.2	0.1	496.7	6.35	-60.6	4.58	
950	10.40	"	"	9.00	13.2	0.1	497.0	6.36	-62.6	3.15	
955	10.40	"	"	10.00	13.2	0.1	495.8	6.35	-64.6	3.59	

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW31-0523 Time Collected: 1010 Weather: overcast, cool.

Sample Description (Color, Turbidity, Odor, Other): abundant large orange flecks

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☐ Yes ■ No If yes, ID: ~~SPL-GW_MW01-1122~~ 0523

MS/MSD Collected: ☐ Yes ■ No

Additional Information/Comments

At 9:25, pump stopped inexplicably
Pump shut off again, switched to peristaltic @ 935. Suspect ~~St~~ the problem is from the battery. Finished purge and sampled w/ peristaltic (20.5' pump intake)

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/1/23 Well ID: MW-32

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.16 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 12:35 End Purge Time: 1310

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
45 ~~1235~~	10.18	2.5	250	1.25	13.2	1.2	520.8	6.68	36.2	5.68	Clear
1250	10.18	"	"	2.5	13.3	0.4	762	6.72	-66.5	3.93	With Turbidity
1255	10.18	"	"	3.75	13.4	0.3	817	6.73	-97.5	1.17	
1300	10.18	"	"	5.75	13.4	0.3	831	6.74	-106.0	1.84	
1305	10.18	"	"	6.75	13.4	0.2	835	6.74	-109.5	0.74	
1310	10.18	"	"	8.00	13.4	0.2	844	6.73	-112.8	0.87	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW32-0523 Time Collected: 1345 Weather: Overcast, 50's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☒ Yes ☐ No If yes, ID: SPL-GW_MW60-0523 @ 1320

MS/MSD Collected: ☒ Yes ☐ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/1/23 Well ID: MW-33

Sampling Organization: Parametrix Samplers: N. Johnson & C. Bourgeois

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

Initial Depth of Water (Ft below TOC): 16.30 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 22.5ft

Begin Purge Time: 1401 End Purge Time: 1425

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min.)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1405	10.30	2.5	44	<1	14.8	0.9	885	6.78	69.3	14.7	pale yellow
1410	10.30	2.5	275	1.8	14.9	0.4	1412	6.69	-97.6	2.37	hue, minor
1415	10.31	"	"	2.9	14.9	0.3	1447	6.68	-111.5	2.30	turbidity
1420	10.31	"	"	4.0	15.0	0.2	1451	6.69	-116.5	3.55	
1425		"	"	5.1	15.0	0.2	1450	6.69	-120.0	3.84	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW33-0523 Time Collected: 1435 Weather: overcast, high 50's

Sample Description (Color, Turbidity, Odor, Other): pale yellow hue (minor), very little turbidity

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☒ No

Additional Information/Comments

One non-preserved VOA cap defective. Will likely have bubble.

Parametrix

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

Water Level Measurement Field Report

DATE 7/31/2023	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER sunny	TEMP 65 F ° at 806 AM 70°F ° at 1010 PM
PRESENT AT SITE C. Bourgeois & S. Nguyen	

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	800	6.49		TOC	15.3	10-15	1.52
MW-14	807	3.75		TOC	21.8	11.5-21.5	0.8
* MW-29	819	8.33		TOC	30	20-30	-0.29
MW-18	824	15.85		TOC	40.4	30-40	1.25
MW-25	~~835~~ 857	~~[illegible]~~	14.19	TOC	27	22-27	2.79
MW-32	842	11.20		TOC	24	19-24	-0.44
MW-33	835	~~[illegible]~~ 11.36		TOC	25	20-25	-0.47
MW-26	95~~6~~7	~~[illegible]~~	10.09	TOC	25	15-25	2.39
MW-27	949	8.83		TOC	20	10-20	2.04
MW-10	852	13.45		TOC	45	35-45	1.65
MW-24	955	9.30		TOC	45.3	35-45	1.56
MW-08	946	~~[illegible]~~	8.83	TOC	45.6	35.5 – 45.5	1.88
MW-30	1010	10.71		TOC	13	8-13	-0.53
MW-31	1008	11.32		TOC	23	35.5-45.5	-0.46

Comments:

All toc (PVC)

* GW rising significantly after opening well.

TOC – top of PVC casing SG – staff gauge

SIGNED: ChB

949 8.83 @ well next to MW-8 (27)
957 10.09 @ well next to MW-24 (26)

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/1/23 Well ID: MW-08

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.82 Purge Water Disposal Method: O/WS

Purge Device: peristaltic Pump Intake Depth: 40.0 ft

Begin Purge Time: 820 End Purge Time: 915

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged (L)	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
820	8.82	55	190	1	14.4	1.70	1221	7.00	-61.4	32.4	
825	8.82	"	"	1.9	14.2	1.44	1161	6.99	-83.5	29.7	
830	8.83			2.8	14.2	1.48	1146	6.98	-92.5	23.0	
835	8.87			3.8	14.1	1.19	1140	6.97	-95.9	17.1	
840	8.81			4.9	14.0	1.08	1138	6.96	-99.1	10.5	
845	8.86			5.9	14.1	1.03	1135	6.98	-100.8	9.51	
850	8.85				14.3	1.69	1136	6.97	-98.7	7.23	
855	8.85			7.2	14.4	1.82	1125	6.96	-98.5	4.68	
900	8.96			8.1	14.4	6.76	1120	6.98	-95.6	~~[illegible]~~	4.28
905	8.84			9.2	14.1	0.34	1121	6.97	-98.9	4.33	
910	8.85			10.3	14.0	0.34	1119	6.98	-101.2	4.25	
915	8.85			11	14.1	0.28	1113	6.97	-102.5	4.23	

Stabilization Criteria	3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW08-0823 Time Collected: 920 Weather: Sunny, 65°F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☑ Yes ☐ No If yes, ID: SPL-GW_MW61-0823 @ 945

MS/MSD Collected: ☑ Yes ☐ No

Additional Information/Comments

Air bubbles; added tubing in silicon tube to try to minimize air bubbles @ 900

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/2/23 Well ID: MW-10

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 13.43 Purge Water Disposal Method: O/WS

Purge Device: peristaltic Pump Intake Depth: 40.0 ft

Begin Purge Time: 845 End Purge Time: 920

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
850	13.45	2.6	~~125~~ 300	1.5	14.8	2.06	1389	6.89	-90.0	99.6	v. turbid
855	13.43	"	"	3.0	14.7	2.16	1378	6.90	-100.3	25.5	
900	"	"	"	4.5	14.8	0.26	1386	6.58	-108.5	12.2	less turbid
905	"	"	"	6.0	14.8	0.27	1405	6.92	-114.3	6.3	"
910	"	"	"	7.5	14.9	0.30	1416	6.95	-118.0	4.58	"
915	"	"	"	9.0	14.9	0.34	1427	6.96	-120.0	4.25	
920	"	"	"	10.5	14.8	0.27	1428	~~7.02~~ 6.96	-123.0	3.73	

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW10-0823 Time Collected: 925 Weather: Sunny, 70's

Sample Description (Color, Turbidity, Odor, Other): clear, odorless 1 less bottle (HCl - VOA)

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

South Park Landfill

Project No.: 553-1550-067 Date: 8/1/23 Well ID: MW-12

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 6.57 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1126 End Purge Time: 1205

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1130	6.48	18"	180		16.0	1.09	495.4	6.53	50.5	24.8	
1135	6.52	20"	280	3.9	15.1	0.44	503.0	6.56	53.8	14.0	
1140	6.65	"	"	4.8	15.1	0.31	501.6	6.53	51.7	11.0	
1145	6.57	"	"	5.8	15.2	0.47	499.5	6.54	49.1	7.53	
1150	6.49	"	"	7.0	15.2	0.35	499.6	6.54	46.3	5.36	
1155	"	"	"	9.0	15.2	0.30	500.4	6.54	44.7	4.86	
1200	"	"	"	10.5	15.1	0.24	500.5	6.54	43.6	4.22	
1205	"	"	"	12.0	15.2	0.22	500.4	6.54	43.6	4.08	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW12-0823 Time Collected: 1210 Weather: Sunny, 70's

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

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese

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: 8/1/23 Well ID: MW-14

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 3.45 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump 1223 Pump Intake Depth: 16.5 ft

Begin Purge Time: 1233 End Purge Time: 1320

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate ml/min.	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1235	~~[illegible]~~	20	200	0.25	17.1	1.76	524.7	7.13	25.7	15.5	
1245	3.55	"	"	2.75	16.6	0.49	541.7	7.01	-46.9	10.8	
1250	"	"	"		16.5	0.29	535.6	6.95	-46.8	8.58	
1255	3.56			5.0	16.5	0.25	533.1	6.94	-47.2	8.01	
1300	3.52	"	"	5.5	16.4	0.22	533.2	6.94	-47.5	6.17	
1305	"	"	"	6.5	16.4	0.24	531.0	6.94	-48.2	5.16	
1310	3.53	"	"	7.5	16.4	0.26	532.6	6.94	-49.7	4.55	
1315	3.54	"	"	8.8	16.4	0.26	533.1	6.94	-50.7	4.09	
1320	3.56	"	"	9.5	16.5	0.28	533.0	6.94	-51.8	4.03	

Stabilization Criteria	3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU		

Sampling Data

Sample ID: SPL-GW-MW14-0823 Time Collected: 1325 Weather: Sunny, mid 70's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

South Park Landfill

Project No.: 553-1550-067 Date: 8/1/23 Well ID: MW-18

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 15.82 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 35.0 ft

Begin Purge Time: 1500 End Purge Time: 1540

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1505	15.82	50'	280	~1.0	16.9	3.72	732	6.92	-21.7	14.0	
1510	"	"	"	2.5	16.7	1.66	745	6.90	-52.7	7.69	
1515	"	"	"	4.0	16.6	1.29	745	6.90	-63.7	5.94	
1520	"	"	"	6.5	16.6	1.07	741	6.90	-68.7	4.69	
1525	"	"	"	7.1	16.5	1.00	739	6.90	-72.3	4.35	
1530	"	"	"	9.0	16.6	0.86	738	6.89	-74.4	3.89	
1535	"	"	"	10.0	16.4	0.84	740	6.89	-75.6	3.81	
1540	"	"	"	11.25	16.6	0.87	738	6.89	-77.4	3.75	

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW18-0823 Time Collected: 1545 Weather: Sunny, 70's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 7/31/23 Well ID: MW-24

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 40.0 ft

Begin Purge Time: 1239 End Purge Time: ~~1~~ 1310

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1240	9.40	55	250ml/min	1.9	12.7	0.76	974	6.80	-55.2	7.19	
1245	9.41	"	"	3.1	12.6	0.38	987	6.83	-74.9	6.36	
1250	9.45	"	"	4.8	12.5	0.29	997	6.83	-82.6	1.98	
1255	9.44	"	"	6.0	12.5	0.27	1002	6.83	-87.1	3.20	
1300	9.42	"	"	7.8	12.5	0.29	1001	6.82	-89.5	2.41	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW24-0823 Time Collected: 1305 Weather: Sunny, 70's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/2/23 Well ID: MW-25

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

Purge Data Screened Interval (ft bgs): 22.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 14.20 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 805 End Purge Time: 840

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (L)	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
810	14.21	35	260	1.5	14.6	1.09	1169	6.83	-72.9	23.20	
815	14.24	"	"	3.0	14.6	0.48	1184	6.82	-82.3	14.50	
820	14.20	"	"	4.1	14.7	0.32	1187	6.84	-87.2	9.00	
825	14.20	"	"	5.5	14.7	0.24	1192	6.84	-91.4	9.09	
830	14.20	"	"		14.8	0.20	1195	6.85	-94.2	4.74	
835	14.20	"	"	8.2	14.8	0.16	1198	6.84	-96.5	3.33	
840	14.20	"	"	9.9	14.8	0.16	1200	6.85	-98.1	3.68	
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW25-0823 Time Collected: 845 Weather: Sunny, 70° F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 7/31/23 Well ID: MW-26

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 10.18 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1320 - End Purge Time: 1402

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate ml/min	Cum. Vol. Purged L	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1322	10.14	~~[illegible]~~ 25	270	12.8	12.7	2.89	377.3	6.40	10.7	21.9	
1327	10.15	"	"	13	12.9	2.34	234.00	6.31	21.1	20.8	
1332	10.16	"	"	14.1	12.5	1.44	232.95	6.32	21.2	23.5	
1337	10.16	"	"	1	12.5	1.38	238.3	6.33	20.6	15.4	
1342	10.15	"	"	2.5	12.6	1.30	338.3	6.32	19.5	9.93	
1347	10.15	"	"	2.8	12.6	1.20	338.0	6.32	17.7	7.96	
1352	10.15	"	"	4	12.6	1.07	337.2	6.32	16.2	4.69	
1357	10.15	"	"	5	12.8	1.01	338.0	6.32	15.2	3.81	
1402	|	"	"	6	12.6	0.92	338.5	6.32	14.3	3.76	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW26-0823 Time Collected: 1405 Weather: Sunny, 70°F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Continued vol. from MW-24. new bucket @ 1235

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/1/23 Well ID: MW-27

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 8.80 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 948 End Purge Time: 1040

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
950	8.85	20'	275	2	15.1	1.67	454.2	6.84	-41.7	60.8	yellow hue
955	"	"	"	2.80	13.9	0.56	482.7	6.87	-65.1	40.7	"
1000	"	"	"	4.0	13.9	0.37	499.9	6.85	-74.9	41.6	"
1005	"	"	"	5.0	13.8	0.37	508.0	6.85	-77.1	35.5	"
1010	"	"	"	6.8	13.8	0.26	517.5	6.81	-82.5	26.6	"
1015	8.82	"	"	8.5	13.7	0.24	521.1	6.78	-81.9	26.2	"
1020	8.85	"	"	9.5	13.7	0.21	521.6	6.81	-86.1	19.1	"
1025	8.80	"	"	11.0	13.8	0.19	520.0	6.83	-88.7	20.0	"
1030	8.82	"	"	12.25	13.7	0.18	520.6	6.83	-89.0	15.9	"
1035	8.82	"	"	14.0	13.7	0.16	518.5	6.83	-90.1	15.4	"
1040	8.81	"	"	15.25	13.8	0.15	521.3	6.85	-90.9	15.9	"
			Stabilization Criteria		3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW27-0823 Time Collected: 1045 Weather: Sunny, 70's

Sample Description (Color, Turbidity, Odor, Other): ~~[illegible]~~ ~~yellow~~ clear, odorless

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 | Date: 8/1/23 | Well ID: MW-29

Sampling Organization: Parametrix | Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 8.86 | Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump ~~1353~~ | Pump Intake Depth: 25.0 ft

Begin Purge Time: 1353 | End Purge Time: 1440

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1400 ~~1355~~	10.10	2.5	250	1.0	13.7	0.83	821	6.93	-74.1	19.9	
1405	10.23	"	"	~~2.0~~ 2.5	13.5	0.36	812	6.95	-87.3	21.5	orange turb.
1410	10.28	"	"	~~3.0~~ 4	13.6	0.53	781	6.96	-85.1	10.8	less turbid
1420	"	"	"	6	13.6	0.43	776	6.96	-87.5	8.5	
1425	10.30	"	"	7.5	13.6	0.34	770	6.97	-91.9	6.21	less turbid
1430	"	"	"	9.1	13.6	0.27	773	6.98	-96.6	4.60	
1435	~~10.3~~ 10.31	"	"	10.75	13.5	0.21	772	7.06	-100.9	4.10	
1440	10.32	"	"	12.5	13.4	0.16	765	7.03	-105.6	3.59	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW29-0823 | Time Collected: 1445 | Weather: Sunny, 70's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☐ Yes ☑ No | If yes, ID:

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 7/31/23 Well ID: MW-30

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 10.71 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: ~~10.5 ft~~ 12.0

Begin Purge Time: 1025 End Purge Time: 1045

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged (litres)	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1025	11.13	2.5	250	0.70	15.0	0.67	1029	6.36	-4.7	~~[illegible]~~ 15.5	
1030	11.25	"	"	2.20	15.0	0.39	1026	6.38	-31.1	4.88	
1035	11.31	"	"	3.90	14.9	0.34	1035	6.40	-39.3	3.27	
1040	11.32	"	"	5.06	14.9	0.33	1054	6.37	-41.3	2.17	
1045	11.36	"	"	6.20	14.9	0.28	1066	6.38	-41.3	0.24	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW30-0823 Time Collected: 1050 Weather: Sunny

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 7/31/23 Well ID: MW-31

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 11.38 (taken after pump) Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 20.5ft

Begin Purge Time: 1105 End Purge Time: 1155

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate mL/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1110	11.25	25'	275	10.8*	14.2	0.37	485.6	6.65	-52.0	24.5	
1115	11.40	"	"	12.0	14.2	0.24	491.7	6.64	-67.2	14.7	
1120	11.36	"	"	13.0	14.1	0.21	492.2	6.66	-74.6	12.0	
1125	11.36	"	"	15.0	14.1	0.18	494.5	6.64	-81.7	7.5	
1130	11.39	"	"	1.0	14.2	0.16	493.2	6.64	-84.4	6.67	
1135	11.41	"	"	2.0	14.1	0.15	494.9	6.66	-87.8	5.67	
1140	11.37	"	"	3.5'	14.2	0.15	494.8	6.66	-89.6	5.57	
1145	11.38	"	"	5.0	14.2	0.15	494.2	6.65	-92.0	4.79	
1150	11.39	"	"	6.9	14.2	0.14	493.4	6.66	-93.6	4.81	
1155		"	"	9.2	14.2	0.14	493.6	6.67	-96.0	4.32	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW31-0823 Time Collected: 1204 Weather: Sunny 70°F

Sample Description (Color, Turbidity, Odor, Other): small orange flecks

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

* used bucket from MW-30

→ new bucket @ 1130

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/2/23 Well ID: MW-32

Sampling Organization: Parametrix Samplers: C. Bourgeois & S. Nguyen

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.15 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 1109 End Purge Time: 1130

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1115	11.18	2.9	300	3.0	15.2	0.43	838	7.08	-90.4	4.15	
1120	11.20	"	"	3.5	15.1	0.37	839	7.04	-104.0	4.26	
1125	11.19	"	"	4.5	15.1	0.38	845	7.07	-107.7	3.11	
1130	11.20	"	"	6.5	15.3	0.36	850	7.06	-109.6	4.30	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW32-0823 Time Collected: 1135 Weather: Sunny, 70's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Couldn't advance tubing to 21.5'

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067   Date: 8/2/23   Well ID: MW-33

Sampling Organization: Parametrix   Samplers: C. Bourgeois & S. Nguyen

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

Initial Depth of Water (Ft below TOC): 11.32   Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump   Pump Intake Depth: 22.5ft

Begin Purge Time: 958   End Purge Time: 1025

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1005	11.34	2.6	280	2.0	15.8	1.04	1369	7.00	-90.4	8.31	turbid.
1010	11.34	"	"	3.5	15.7	0.31	1361	7.00	-101.1	6.81	"
1015	11.35	"	"	5.0	15.8	0.22	1347	7.00	-107.7	4.81	"
1020	"	"	"	7.0	15.8	0.19	1332	7.01	-112.3	3.16	pale orange
1025	"	"	"	8.25	15.8	0.20	1321	7.01	-114.7	2.51	
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW33-0823   Time Collected: 1030   Weather: Sunny, 70's

Sample Description (Color, Turbidity, Odor, Other): visible turbidity   1 less HCl - VOA

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☑ Yes ☐ No   If yes, ID: SPL-GW-MW60-0823 @ 1100

MS/MSD Collected: ☑ Yes ☐ No

Additional Information/Comments

Parametrix

PARAMETRIX

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

Water Level Measurement Field Report

DATE 11/6/2023	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER overcast - slight drizzle	TEMP 49° F ° at 0821 AM ° at PM
PRESENT AT SITE	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	916	4.58		TOC	15.3	10-15	1.52
MW-14	920	2.33		TOC	21.8	11.5-21.5	0.8
MW-29	934	8.52		TOC	30	20-30	-0.29
MW-18	901	15.09		TOC	40.4	30-40	1.25
MW-25	910	13.41		TOC	27	22-27	2.79
MW-32	955	10.41		TOC	24	19-24	-0.44
MW-33	948	10.59		TOC	25	20-25	-0.47
MW-26	838	9.30		TOC	25	15-25	2.39
MW-27	847	8.11		TOC	20	10-20	2.04
MW-10	907	12.63		TOC	45	35-45	1.65
MW-24	823	8.55		TOC	45.3	35-45	1.56
MW-08	849	8.15		TOC	45.6	35.5 – 45.5	1.88
MW-30	0822	10.06		TOC	13	8-13	-0.53
MW-31	0821	10.50		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: 11/7/23 Well ID: MW-08

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.25' Purge Water Disposal Method: O/WS

Purge Device: peristaltic Pump Intake Depth: 40.0 ft

Begin Purge Time: 1440 End Purge Time: 1455

Time	Depth to Water (feet below MP)	Pump Setting (TSI)	Purge Rate (ml/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1440	8.25	20	225	"	12.8	0.28	0.67	6.79	-108.8	8.40	Clear (mostly
1445	8.25	"	"	"	12.9	0.26	0.65	6.77	-109.3	4.72	clear (mostly
1450	8.25	"	"	"	12.9	0.23	0.66	6.76	-109.4	3.70	clear (mostly)
1455	8.25	"	"	"	12.9	0.21	0.67	6.76	-109.6	2.56	clear (mostly
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW08-1123 Time Collected: 1500 Weather: Overcast; 50's 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:

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Had issues with discharge line fittings at well head [illegible]

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 11/6/2023 ~~10~~/6/23

Well ID: MW-10

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-44.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 12.70

Purge Water Disposal Method: O/WS

Purge Device: peristaltic

Pump Intake Depth: 40.0 ft

Begin Purge Time: 12:45

End Purge Time: 1:06

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate mL/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1245	12.69	2.5	248 mL/min		14.1	0.83	1.13	6.68	-119.2	13.1	clear
1250	12.69	2.5	248 mL/min		14.1	0.52	1.13	6.70	-124.7	5.18	clear
1255	12.69	2.5	248		14.1	0.40	1.14	6.74	-131.2	3.00	clear
1300	12.69	2.5	248		14.0	0.35	1.15	6.75	-134.3	2.80	clear
1305	12.69	2.5	248	6 L	14.1	0.31	1.15	6.76	-135.3	1.51	clear

Stabilization Criteria			3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW10-1123

Time Collected: ~~1306~~ 1310

Weather: Raining ≈ 45° F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: ☑ Yes ☐ No

If yes, ID: SPL-GW-MW60-1123 @ 1350

MS/MSD Collected: ☑ Yes ☐ No

Additional Information/Comments

South Park Landfill

Project No.: 553-1550-067 Date: 11/8/23 Well ID: MW-12

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 4.81 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 815 End Purge Time: 900

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
820	4.81	20'	250	"	14.2	3.25	0.301	6.51	97.1	24.8	clear (mostly)
825	4.81	"	"	"	14.4	1.88	0.277	6.42	91.1	4.08	clear (mostly)
830	4.82	"	"	"	14.4	1.39	0.271	6.38	77.2	2.25	clear (mostly)
835	4.82	"	"	"	14.5	1.13	0.272	6.35	68.5	1.55	clear (mostly)
840	4.82	"	"	"	14.5	1.02	0.273	6.33	64.1	1.73	clear (mostly)
845	4.82	"	"	"	14.5	0.93	0.274	6.33	60.2	1.20	clear (mostly)
850	4.82	"	"	"	14.6	0.88	0.276	6.33	55.7	1.21	clear (mostly)
855	4.82	"	"	"	14.4	0.83	0.277	6.33	52.4	1.21	clear (mostly)
900	4.82	"	"	"	14.6	0.81	0.278	6.33	48.9	1.06	clear (mostly)
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW12-1123 Time Collected: 905 Weather: Sunny; 50's F

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

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

South Park Landfill

Project No.: 553-1550-067 Date: 11/8/23 Well ID: MW-14

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): * N/A - see comment Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1300 End Purge Time: 1345

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate mL/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1305	N/A	20	245	"	15.5	0.37	0.449	6.73	-41.3	10.2	clear (mostly
1310	N/A	"	"	"	15.6	0.27	0.447	6.71	-42.4	12.9	clear (mostly
1315	N/A	"	"	"	15.6	0.22	0.447	6.71	-44.2	11.8	clear (mostly)
1320	N/A	"	"	"	15.6	0.18	0.446	6.71	-45.6	13.0	clear (mostly)
1325	N/A	"	"	"	15.7	0.20	0.447	6.71	-47.3	9.45	clear (mostly
1330	N/A	"	"	"	15.7	0.17	0.447	6.71	-48.7	6.05	clear (mostly
1335	N/A	"	"	"	15.7	0.17	0.447	6.71	-49.9	4.41	clear (mostly
1340	N/A	"	"	"	15.7	0.17	0.447	6.71	-50.6	3.90	clear (mostly
1345	N/A	"	"	"	15.7	0.16	0.446	6.71	-51.4	3.95	clear (mostly
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW14-1123 Time Collected: 1350 Weather: Sunny; 50's F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

* DTW not measured because WL meter inoperable.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/8/2023 Well ID: MW-18

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 15.33 Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump Pump Intake Depth: 35.0 ft

Begin Purge Time: 1100 End Purge Time: 1125

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate ml/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1100	15.33	50'	250	"	14.7	1.68	0.51	6.85	-50.5	1.91	clear (mostly)
1105	15.33	"	"	"	14.7	0.88	0.50	6.83	-63.9	2.21	clear (mostly)
1110	15.33	"	"	"	14.7	0.51	0.50	6.82	-71.6	2.05	clear (mostly)
1115	15.33	"	"	"	14.7	0.40	0.50	6.80	-75.7	2.04	clear (mostly)
1120	15.33	"	"	"	14.8	0.34	0.50	6.79	-78.6	1.29	clear (mostly)
1125	15.33	"	"	"	14.7	0.30	0.50	6.78	-80.9	1.40	clear (mostly)
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW18-1123 Time Collected: 1130 Weather: Sunny; 50's F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/17/22 Well ID: MW-24

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-45.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.78 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1100 End Purge Time: 1115

Time	Depth to Water (feet below MP)	Pump Setting PSI	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1100	8.78	60	250	"	12.1	0.65	0.74	6.53	-59.6	6.08	clear
1105	8.78	60	250	"	12.1	0.44	0.75	6.53	-69.0	2.27	clear
1110	8.78	"	"	"	12.1	0.32	0.75	6.53	-74.6	4.68	clear
1115	8.78	"	"	"	12.1	0.20	0.75	6.54	-78.1	1.18	clear
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW24-1123 Time Collected: 1120 Weather: Overcast; 50's F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/6/2023 Well ID: MW-25

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 22.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.43 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1400 End Purge Time: 1420

Time	Depth to Water (feet below MP)	Pump Setting (PSI)	Purge Rate (ml/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1400	13.43	18	500		14.0	1.41	0.94	6.59	-88.8	5.31	
1405	13.43		300		13.9	0.62	0.94	6.61	-100.5	4.01	clear
1410	13.43		300		14.0	0.44	0.95	6.61	-104.2	3.32	clear
1415	13.43		300		14.0	0.33	0.95	6.61	-108.1	2.81	clear
1420	13.43		300		14.0	0.21	0.96	6.61	-110.8	1.88	clear
Stabilization Criteria					3%	10%	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW25-1123 Time Collected: 1430 Weather: Rainy ≈ 45°F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/7/2023 Well ID: MW-26

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 9.48 * Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1150 End Purge Time: 12:25

Time	Depth to Water (feet below MP)	PSI Pump Setting	ml/min Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1150	9.50	35	250	"	12.2	2.30	0.300	6.13	29.7	13.8	clear (mostly)
1155	9.50	"	"	"	12.2	1.04	0.309	6.08	30.5	16.8	clear (mostly)
1200	9.50	"	"	"	12.2	0.71	0.311	6.05	29.8	12.3	clear (mostly)
1205	9.50	"	"	"	12.1	0.49	0.312	6.04	27.9	9.67	clear (mostly)
1210	9.50	"	"	"	12.1	0.41	0.314	6.03	26.7	6.76	clear (mostly)
1215	9.50	"	"	"	12.1	0.34	0.315	6.03	25.0	3.93	clear (mostly)
1220	9.50	"	"	"	12.0	0.30	0.314	6.03	23.7	3.54	clear (mostly)
1225	9.50	"	"	"	12.0	0.28	0.314	6.02	15.5	2.90	clear (mostly)
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW26-1123 Time Collected: 12:30 Weather: overcast, 50's F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

* initial depth of TOC measured 3 mins after pump

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/7/23 Well ID: MW-27

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 8.22 Purge Water Disposal Method: O/WS

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

Begin Purge Time: 1250 End Purge Time: 1325

Time	Depth to Water (feet below MP)	Pump Setting (PSI)	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1255	8.22	30'	225	"	13.4	3.66	0.321	6.51	14.2	16.7	clear (mostly
1300	8.22	"	"	"	13.4	1.60	0.320	6.57	-1.1	12.1	clear (mostly)
1305	8.22	"	"	"	13.4	0.92	0.317	6.53	-3.0	10.7	clear (mostly
1310	8.22	"	"	"	13.4	0.60	0.315	6.50	-3.3	10.5	clear (mostly
1315	8.22	"	"	"	13.3	0.49	0.315	6.49	-5.0	10.4	clear (mostly)
1320	8.22	"	"	"	13.3	0.36	0.315	6.47	-8.2	10.2	clear (mostly
1325	8.22	"	"	"	13.3	0.32	0.316	6.47	-11.1	10.0	clear (mostly)

Stabilization Criteria	3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW27-1123 Time Collected: 1330 Weather: overcast, minor drizzle

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: SPL-GW-MW61-1123 @ 1410

MS/MSD Collected: ☑ Yes ☐ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067   Date: 11/8/2023   Well ID: MW-29

Sampling Organization: Parametrix   Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 7.03   Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump   Pump Intake Depth: 25.0 ft

Begin Purge Time: 950   End Purge Time: 1015

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate ml/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
950	N/A	2.5	275	"	14.5	1.07	0.420	6.70	-5.0	3.90	clear (mostly)
955	N/A	"	"	"	12.9	0.63	0.428	6.75	-77.4	2.40	clear (mostly)
1000	"	"	"	"	12.8	0.40	0.437	6.76	-92.9	0.81	clear (mostly)
1005	"	"	"	"	12.8	0.39	0.444	6.78	-100.4	0.62	clear (mostly)
1010	"	"	"	"	12.8	0.28	0.451	6.80	-105.4	0.77	clear (mostly)
1015	"	"	"	"	12.7	0.25	0.452	6.81	-107.9	0.78	clear (mostly)
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW29-1123   Time Collected: 1020   Weather: sunny, 50's 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:

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments Tubing required weight of water level indicator to submerge - cannot record changes

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/7/23 Well ID: MW-30

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 10.02 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 927 End Purge Time: 1020

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (litres)	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
930	10.18	2.5	240		14.9	0.30	0.55	6.35	-28.3	7.94	orange + fibrous
935	10.18	"	"		14.9	0.28	0.54	6.35	-26.8	4.94	turbidity
940	10.18	"	"		14.9	0.46	0.52	6.35	-24.0	4.12	less turbid
945	10.18	"	"		14.9	0.51	0.486	6.34	-21.7	2.17	"
950	10.18	"	"		14.9	0.61	0.459	~~6.35~~	-18.4	2.48	clear (mostly
955 ~~1000~~	10.18	"	"		14.9	0.63	0.451	6.32	-15.8	1.05	"
1000	10.18	"	"		14.9	0.69	0.440	6.32	-14.0	0.76	"
1005	10.18	"	"		15.0	0.75	0.437	6.30	-11.8	0.97	"
1010	10.18	"	"		15.0	0.82	0.430	6.30	-9.8	1.97	"
1015	10.18	"	"		15.0	0.85	0.430	6.30	-8.4	1.41	"
1020	10.18	"	"		15.0	0.89	0.428	6.30	-6.6	1.49	"

Stabilization Criteria: Temp 3%; DO 10%, or 3<0.5; Specific Conductivity 3%; pH ±0.1; ORP ±10 mv; Turbidity 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW30-1123 Time Collected: 10:25 Weather: overcast 50's

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/7/23 Well ID: MW-31

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 10.73 Purge Water Disposal Method: O/WS

Purge Device ~~peristaltic pump~~ bladder Pump Intake Depth: 20.5ft

Begin Purge Time: 820 End Purge Time: 915

Time	Depth to Water (feet below MP)	PSI Pump Setting	ml/min Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (μS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
825	10.73	30	300		14.1	1.17	0.408	6.56	-55.1	35.1	slightly dirty
830	10.73	30	300		14.2	0.60	0.416	6.53	-62.7	24.0	slightly dirty
835	10.73	30	300		14.2	0.44	0.419	6.49	-66.1	15.6	clear (mostly
840	10.73	30	300		14.2	0.34	0.419	6.47	-67.8	13.4	clear (mostly
845	10.73	30	300		14.3	0.30	0.421	6.46	-69.7	10.9	clear (mostly
850	10.73	30	300		14.2	0.27	0.421	6.46	-71.2	9.60	clear (mostly
855	10.73	30	300		14.3	0.27	0.421	6.46	-72.8	8.01	clear (mostly
900	10.73	30	300		14.3	0.26	0.422	6.46	-73.5	6.92	clear (mostly
905	10.73	30	300		14.3	0.26	0.422	6.45	-74.5	6.30	clear (mostly)
910	10.73	30	300		14.3	0.23	0.422	6.44	-75.2	5.89	clear (mostly)
915	10.73	30	300	3.5 gal	14.3	0.22	0.422	6.44	-76.1	5.81	clear (mostly)

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW31-1123 Time Collected: 920 Weather: overcast ≈ 47°F

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

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Parametrix

South Park Landfill

Project No.: 553-1550-067 Date: 11/6/23 Well ID: MW-32

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.41 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 1013 End Purge Time: 1040

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1015	10.41	2.5	250	~0	13.9	1.90	0.62	6.76	-102.6	2.15	clear
1020	10.45				13.9	0.24	0.67	6.79	-121.5	1.38	clear
1025	10.45				13.9	0.53	0.66	6.82	-125.7	1.58	clear
1030	10.45				13.8	0.42	0.65	6.81	-125.3	3.93	clear
1035	10.51				13.9	0.36	0.62	6.81	-121.7	1.80	clear
1040	10.50				13.8	0.31	0.62	6.80	-121.9	1.16	clear
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW_MW32-1123 Time Collected: 10:45 Weather: drizzle, 50's

Sample Description (Color, Turbidity, Odor, Other): clear w/ red flecks

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/6/23 Well ID: MW-33

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

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

Initial Depth of Water (Ft below TOC): 10.60 Purge Water Disposal Method: O/WS

Purge Device: peristaltic pump Pump Intake Depth: 22.5ft @ 16'

Begin Purge Time: 11:30 End Purge Time: 1155

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1135		2.5	245mL/m		15.1	6.23	0.171	6.95	97.7	2.68	clear
1140					15.0	0.87	0.55	6.93	75.4	1.65	clear
1145					15.1	0.44	1.04	6.76	-110.2	0.88	clear
1150					15.1	0.33	1.06	6.74	-113.4	1.01	clear
1155				2.5 gal.	15.1	0.30	1.07	6.74	-116.9	1.23	clear
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 <5 NTU	

Sampling Data

Sample ID: SPL-GW-MW33-1123 Time Collected: 12:00 pm Weather: windy, drizzle

Sample Description (Color, Turbidity, Odor, Other): pale yellow hue

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

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

MS/MSD Collected: ☐ Yes ☑ No

Additional Information/Comments

Used sounder to advance tubing

Appendix D4

Laboratory Reports
(contained in Volume II)

Appendix D5

Data Validation Memoranda

First Quarter 2023 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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Prepared by

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In Association with

HWA GeoSciences Inc.
DBE/MWBE

March 2023 | 553-1550-067 (03.00)

CITATION

Parametrix and HWA GeoSciences, Inc., 2022. First Quarter 2023
Groundwater Sampling Event South Park Landfill Data Validation Report.
Prepared by Parametrix, Seattle, Washington.
March 2023.

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 First Quarter 2023 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn	6020B Dissolved As
SPL-GW-MW29-0223	23B0111-01	MW-29	X	X	X	
SPL-GW-MW18-0223	23B0111-02	MW-18	X	X	X	
SPL-GW-MW18-0223	23B0111-03	MW-18				X
SPL-GW-MW32-0223	23B0111-04	MW-32	X	X	X	
SPL-GW-MW32-0223	23B0111-05	MW-32				X
SPL-GW-MW33-0223	23B0111-06	MW-33	X	X	X	
SPL-GW-MW33-0223	23B0111-07	MW-33				X
SPL-GW-MW10-0223	23B0111-08	MW-10	X	X	X	
SPL-GW-MW10-0223	23B0111-09	MW-10				X
SPL-GW-MW60-0223	23B0111-10	MW-18 DUP	X	X	X	
SPL-GW-MW60-0223	23B0111-11	MW-18 DUP				X
SPL-GW-MW80-0223	23B0111-12	TRIP BLANK	X	X		
SPL-GW-MW25-0223	23B0111-13	MW-25	X	X	X	
SPL-GW-MW25-0223	23B0111-14	MW-25				X
SPL-GW-MW30-0223	23B0160-01	MW-30	X	X	X	
SPL-GW-MW31-0223	23B0160-02	MW-31	X	X	X	
SPL-GW-MW24-0223	23B0160-03	MW-24	X	X	X	
SPL-GW-MW24-0223	23B0160-04	MW-24				X
SPL-GW-MW26-0223	23B0160-05	MW-26	X	X	X	
SPL-GW-MW26-0223	23B0160-06	MW-26				X
SPL-GW-MW08-0223	23B0160-07	MW-08	X	X	X	
SPL-GW-MW08-0223	23B0160-08	MW-08				X
SPL-GW-MW27-0223	23B0160-09	MW-27	X	X	X	
SPL-GW-MW27-0223	23B0160-10	MW-27				X
SPL-GW-MW61-0223	23B0160-11	MW-24 DUP	X	X	X	
SPL-GW-MW61-0223	23B0160-12	MW-24 DUP				X
SPL-GW-MW12-0223	23B0182-01	MW-12	X	X	X	
SPL-GW-MW12-0223	23B0182-02	MW-12				X
SPL-GW-MW14-0223	23B0182-03	MW-14	X	X	X	
SPL-GW-MW81-0223	23B0183-01	TRIP BLANK	X	X		

Groundwater samples were collected on February 6, 7, and 8, 2023 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 23B0111, 23B0160, 23B0182, and 23B0183. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese, and dissolved arsenic) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020 b, and 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-MW60-0223 is a duplicate of SPL-GW-MW18-0223. Sample SPL-GW-MW61-0223 is a duplicate of SPL-GW-MW24-0223.

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-MW80-0223 and SPL-GW-MW81-0223) in ARI Work Orders 23B0111 and 23B0183.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the three batches were 4.9, 2.6, and 5.8 degrees C, indicating adequate temperature control for sample preservation for all batches. No data were therefore qualified based on temperature issues.

Hold times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials were free of air bubbles. Therefore, no data were qualified based on VOC integrity issues.

2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD SW8260D

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	

Notes:

QC requirement findings further discussed in following sections (if required):

[1] Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
LCS and LCSD	Field duplicates
MS/MSD	

Notes:

QC requirement findings further discussed in following sections (if required):

1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese, and dissolved arsenic) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation[1]	Lab Control Sample
Extraction and analysis holding times	Laboratory Duplicate
Blank contamination (method)[1]	Target analyte list
Matrix Spike (MS)	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.

Some of the metals data were the result of a dilution and were flagged with "D" qualifier by the laboratory. The "D" qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Blank Contamination

In ARI Work Order 23B0182, the manganese samples were flagged "B" by the laboratory, indicating laboratory blank contamination. However, the lab provided the following narrative: *The method blank(s) were clean at the reporting limits. Manganese was detected between 1/2 the reporting limit and the reporting limit. As the samples are reported to the reporting limit, the method blank result is reported as a non-detect at the reporting limit. The sample concentrations are greater than 10X the blank detection and therefore the method blank detection is considered insignificant. All samples which contain analyte have been flagged with a "B" qualifier.* The associated samples were SPL-GW-MW-12-0223 and SPL-GW-MW-14-0223. In SPL-GW-MW-12-0223, manganese was not detected above the RL and in SPL-GW-MW-14-0223, manganese was detected at a concentration of 0.851 mg/L, more than 10 times the RL of 0.00500 mg/L. Therefore, none of the manganese results were qualified.

4.2.2 Matrix Spike

Sample specific QC was performed in association with samples 23B0111-03 (SPL-GW-MW-18-0223) in Total Metals batch BLB0481 and 23B0160-03 (SPL-GW-MW24-0223) in Total Metals batch BLB0482. The duplicate and MS/MSD RPDs were within control limits; however, the percent recoveries for Total Iron and Total Manganese were outside of control limits low for the matrix spike.

For Total Iron in sample 23B0111-03, the percent recovery was less than 75% and the results for 23B0111-03 have been flagged J-. For Total Manganese in 23B0111-03, 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. The sample concentration exceeded four times the spike concentration; therefore, the Total Manganese result for 23B0111-03 was not qualified.

In sample 23B0160-03, the sample recoveries for Total Iron and Total Manganese exceeded four times the spike concentration, so the data were not qualified.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. REFERENCES

ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.

ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.

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ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.

Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.

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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. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.

EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.

Appendix A

Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Validation Guidelines for Volatile Analysis by GC/MS
(Based on EPA 2020b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 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: J 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 and report at sample result • If sample result >/= CRQL and >/= 2x blank results, report sample result and J+ qualify or no qualification
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	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: • %R < Lower Limit, qualify J-+; %R> Upper Limit, qualify J+- For non-detects: • %R<, qualify results R; If %R >/= No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ

Validation Guidelines for Volatile Analysis by GC/MS (Based on EPA 2020b; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: • %R <Expanded Lower Limit (10%), qualify results J- • Expanded Lower Limit </=%R < specified Lower Limit, qualify results J- • %R > specified Upper Limit, qualify results J+ For non-detects: • %R < Expanded lower limit (10%), qualify results R • Expanded Lower Limit </=%R <specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

Validation Guidelines for Metals Analysis by ICP-MS
(Based on EPA 2020a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 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	For detects: samples received with pH>/=2 and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH>/= 2 and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: • Sample Detect <QL: Report at QL and qualify U • Sample >/= QL: J+ or no qualification If blank result <\= (-MDL) but > (-QL): • Sample Detect: qualify J- or no qualification • Sample Non-detect: qualify UJ If blank result >/= CRQL: • Sample Detect < CRQL: Report at QL and qualify U • Sample result >/=CRQL but <10 x the Blank results: Report at Blank Result and qualify J+ or R • >/=10x Blank results, no qualification If blank result </= (-QL): • Sample Detect < CRQL or >/= CRQL but <10x CRQL, qualify J- • Sample Non-detect qualify UJ • Sample result >/= 10x QL, 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 131-151%, J+ • If %R >150%, R For non-detects: • If %R<40%, R • If %R 40-69%, UJ • If %R>70%, no qualification

Validation Guidelines for Metals Analysis by GC/MS
(Based on EPA 2020a; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >/= 4x the spike added, report unqualified.	For detects: • J- if %R <30 to 74% • J+ if %R>125% • No qualification if %R 75-125% For Non-detects: • R if %R<30%, • UJ if %R <75% or • No qualification if %R 75 to >125
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 non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis

Data Validation			South Park Landfill						
QA/QC completed by: Lisa Gilbert			3/16/2023						
ARI Work Order		23B0111							
Sample numbers:		SPL-GW-MW18-0223; SPL-GW-MW60-0223							
Sample Date:		2/6/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-18**	**MW-60**						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
Vinyl chloride	ug/L	0.0264	0.0253	0.02585	0.00	4	y	0.0200	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	NA	NA
Groundwater		**sample**	**sample**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	14.1	15.9	15	-1.80	12	y	0.720	
Manganese	mg/L	1.27	1.20	1.235	0.07	6	y	0.0100	
Arsenic	ug/L	<0.200	<0.200	#DIV/0!	#VALUE!	#VALUE!		0.200	y
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									

Data Validation			South Park Landfill						
QA/QC completed by: Lisa Gilbert				3/16/2023					
ARI Work Order		23B0160							
Sample numbers:		SPL-GW-MW24-0223; SPL-GW-MW61-02223							
Sample Date:		2/7/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-24**	**MW-61**						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
Vinyl chloride	ug/L	0.0484	0.0482	0.0483	0.0002	0	y	0.0200	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	NA	NA
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	22.2	26.8	24.5	-4.60	19	y	0.0720	
Manganese	mg/L	1.76	1.77	1.765	-0.010	1	y	0.0100	
Arsenic	ug/L	<0.200	<0.200	#DIV/0!	#VALUE!	#VALUE!		0.200	y
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table First Quarter 2023 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW18-0223	23B0160-03	EPA 6010B	Total Iron	14.1	mg/L	*, D	J-	J-

Qualifiers:

D The result is from a dilution.

J- The result is an estimated quantity, but the result may be biased low.

Second Quarter 2023 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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HWA GeoSciences Inc.
DBE/MWBE

June 2023 | 553-1550-067 (03.00)

CITATION

Parametrix and HWA GeoSciences, Inc., 2023. Second Quarter 2023
Groundwater Sampling Event South Park Landfill - Data Validation Report.
Prepared by Parametrix, Seattle, Washington.
June 2023.

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 Second Quarter 2023 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW32-0523	23E0018-01	MW-32	X	X	X
SPL-GW-MW33-0523	23E0018-02	MW-33	X	X	X
SPL-GW-MW10-0523	23E0018-03	MW-10	X	X	X
SPL-GW-MW60-0523	23E0018-04	MW-32 DUP	X	X	X
SPL-GW-MW80-0523	23E0018-05	TRIP BLANK	X	X	
SPL-GW-MW25-0523	23E0018-06	MW-25	X	X	X
SPL-GW-MW12-0523	23E0077-01	MW-12	X	X	X
SPL-GW-MW14-0523	23E0077-02	MW-14	X	X	X
SPL-GW-MW29-0523	23E0077-03	MW-29	X	X	X
SPL-GW-MW18-0523	23E0077-04	MW-18	X	X	X
SPL-GW-MW30-0523	23E0077-05	MW-30	X	X	X
SPL-GW-MW31-0523	23E0077-06	MW-31	X	X	X
SPL-GW-MW24-0523	23E0077-07	MW-24	X	X	X
SPL-GW-MW26-0523	23E0077-08	MW-26	X	X	X
SPL-GW-MW08-0523	23E0077-09	MW-08	X	X	X
SPL-GW-MW27-0523	23E0077-10	MW-27	X	X	X
SPL-GW-MW61-0523	23E0077-11	MW-26 DUP	X	X	X
SPL-GW-MW81-0523	23E0077-12	TRIP BLANK	X	X	

Groundwater samples were collected on May 1, 2, and 3, 2023 and submitted to Analytical Resources, Inc. (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 23E0018 and 23E0077. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory’s Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 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-MW60-0523 is a duplicate of SPL-GW-MW32-0523. Sample SPL-GW-MW61-0523 is a duplicate of SPL-GW-MW26-0523.

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-MW80-0523 and SPL-GW-MW81-0523) in ARI Work Orders 23E0018 and 23E0077.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 4.0 and 8.0 degrees C, indicating adequate temperature control for sample preservation for batch 23E0018, and slightly elevated temperature for batch 23E0077, 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.

Hold times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials were free of air bubbles, except for one vial for sample SPL-GW-MW26-0523 and one vial for sample SPL-GW81-0523, a trip blank vial provided by the laboratory. There were enough other vials to complete the analyses, so no data were qualified based on VOC integrity issues.

The cooler receipt form associated with ARI work order 23E0018 indicated that not all VOA vials were free of air bubbles; however, no VOA vials were identified as having bubbles in the preservation confirmation section. The laboratory did not indicate that there was insufficient sample for any VOC analysis, therefore no data were qualified based on VOC integrity issues.

2. DATA VALIDATION REPORT SELECT VOCS BY EPA METHOD SW8260D

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[1]	

Notes:

QC requirement findings further discussed in following sections (if required):

[1] Quality control results are 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.

2.3 Matrix Spike/Matrix Spike Duplicate

Sample specific QC was performed in association with sample 23E0018-01 (SPL-GW-MW32-0523) in Volatile Organic Compounds batch BLE0087. The MS percent recoveries were out of control low for cis-1,2-Dichloroethene and Benzene; additionally, the MSD percent recovery for cis-1,2-Dichloroethene was out of control low. The cis-1,2-Dichloroethene result for sample 23E0018-01 has been flagged J. No benzene results were flagged, because benzene is not a monitored contaminant for the respective well (MW-32).

2.4 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
LCS and LCSD	Field duplicates
MS/MSD	

Notes:

QC requirement findings further discussed in following sections (if required):

1 Quality control results are discussed below, but no data were qualified.

Results for samples with vinyl chloride detections in ARI Work Order 22E0077 were qualified "M" as an estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters. Based on discussions with the laboratory, Vinyl Chloride was identified with the correct spectral peaks and with relative response times within the specified windows. The lab indicated the low spectral matches likely had little effect on the quantitation, but made the identifications less definitive. Vinyl chloride has historically been detected in all of the wells with M-qualified Vinyl Chloride results, at concentrations similar to those reported; therefore no data were qualified and the "M" qualifiers were removed from the final table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese) 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)	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.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. REFERENCES

ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.

ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.

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ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.

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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. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.

EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.

Appendix A

Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Validation Guidelines for Volatile Analysis by GC/MS
(Based on EPA 2020b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 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: J 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 and report at sample result • If sample result >/= CRQL and >/= 2x blank results, report sample result and J+ qualify or no qualification
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	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: • %R < Lower Limit, qualify J-+; %R> Upper Limit, qualify J+- For non-detects: • %R<, qualify results R; If %R >/= No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ

Validation Guidelines for Volatile Analysis by GC/MS (Based on EPA 2020b; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: • %R <Expanded Lower Limit (10%), qualify results J- • Expanded Lower Limit </=%R < specified Lower Limit, qualify results J- • %R > specified Upper Limit, qualify results J+ For non-detects: • %R < Expanded lower limit (10%), qualify results R • Expanded Lower Limit </=%R <specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

Validation Guidelines for Metals Analysis by ICP-MS
(Based on EPA 2020a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 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	For detects: samples received with pH>/=2 and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH>/= 2 and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: • Sample Detect <QL: Report at QL and qualify U • Sample >/= QL: J+ or no qualification If blank result <\= (-MDL) but > (-QL): • Sample Detect: qualify J- or no qualification • Sample Non-detect: qualify UJ If blank result >/= CRQL: • Sample Detect < CRQL: Report at QL and qualify U • Sample result >/=CRQL but <10 x the Blank results: Report at Blank Result and qualify J+ or R • >/=10x Blank results, no qualification If blank result </= (-QL): • Sample Detect < CRQL or >/= CRQL but <10x CRQL, qualify J- • Sample Non-detect qualify UJ • Sample result >/= 10x QL, 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 131-151%, J+ • If %R >150%, R For non-detects: • If %R<40%, R • If %R 40-69%, UJ • If %R>70%, no qualification

Validation Guidelines for Metals Analysis by GC/MS (Based on EPA 2020a; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >/= 4x the spike added, report unqualified.	For detects: • J- if %R <30 to 74% • J+ if %R>125% • No qualification if %R 75-125% For Non-detects: • R if %R<30%, • UJ if %R <75% or • No qualification if %R 75 to >125
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 non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis

Data Validation			South Park Landfill						
QA/QC completed by: Chris Bourgeois			6/18/2023						
ARI Work Order		23E0018							
Sample numbers:		SPL-GW-MW32-0523; SPL-GW-MW60-0523							
Sample Date:		5/1/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-32**	**MW-60**						
cis-1,2-DCE	ug/L	0.48	0.49	0.485	-0.01	2	y	0.20	
Vinyl chloride	ug/L	0.339	0.348	0.3435	-0.01	3	y	0.0200	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	NA	NA
Groundwater		**sample**	**sample**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	14.0	13.9	13.95	0.10	1	y	1.80	
Manganese	mg/L	1.39	1.38	1.385	0.01	1	y	0.0250	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									

QA/QC Completed by: Lisa Gilbert

Date Completed: 1/25/2024
South Park Landfill
553-1550-167

Data Validation			South Park Landfill						
QA/QC completed by: Chris Bourgeois				6/18/2023					
ARI Work Order		23E0077							
Sample numbers:		SPL-GW-MW26-0523; SPL-GW-MW61-0523							
Sample Date:		5/2/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-26**	**MW-61**						
cis-1,2-DCE	ug/L	0.34	0.33	0.335	0.01	3	y	0.20	
Vinyl chloride	ug/L	0.0219	0.0224	0.02215	-0.0005	2	y	0.0200	
Benzene	ug/L	NT	NT	#DIV/0!	#VALUE!	#VALUE!	NA	NA	NA
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	9.40	9.30	9.4	0.10	1	y	0.180	
Manganese	mg/L	0.117	0.109	0.113	0.008	7	y	0.0250	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table Second Quarter 2023 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW32-0523	23E0018-01	EPA 8260D	cis-1,2-Dichloroethene	0.48	ug/L		J	J
SPL-GW-MW18-0523	23E0077-04	EPA 8260D-SIM	Vinyl chloride	0.0268	ug/L	M		
SPL-GW-MW30-0523	23E0077-05	EPA 8260D-SIM	Vinyl chloride	0.0667	ug/L	M		
SPL-GW-MW31-0523	23E0077-06	EPA 8260D-SIM	Vinyl chloride	0.576	ug/L	M		
SPL-GW-MW24-0523	23E0077-07	EPA 8260D-SIM	Vinyl chloride	0.0425	ug/L	M		
SPL-GW-MW26-0523	23E0077-08	EPA 8260D-SIM	Vinyl chloride	0.0219	ug/L	M		
SPL-GW-MW08-0523	23E0077-09	EPA 8260D-SIM	Vinyl chloride	0.0850	ug/L	M		
SPL-GW-MW27-0523	23E0077-10	EPA 8260D-SIM	Vinyl chloride	0.155	ug/L	M		
SPL-GW-MW61-0523	23E0077-11	EPA 8260D-SIM	Vinyl chloride	0.0224	ug/L	M		

Qualifiers:

J The result is an estimated quantity.

M Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.

Third Quarter 2023 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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

Prepared by

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In Association with

HWA GeoSciences Inc.
DBE/MWBE

September 2023 | 553-1550-067 (03.00)

CITATION

Parametrix and HWA GeoSciences, Inc., 2023. Third Quarter 2023
Groundwater Sampling Event South Park Landfill - Data Validation Report.
Prepared by Parametrix, Seattle, Washington.
September 2023.

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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 Third Quarter 2023 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW30-0823	23H0010-01	MW-30	X	X	X
SPL-GW-MW31-0823	23H0010-02	MW-31	X	X	X
SPL-GW-MW24-0823	23H0010-03	MW-24	X	X	X
SPL-GW-MW26-0823	23H0010-04	MW-26	X	X	X
SPL-GW-MW81-0823	23H0010-05	TRIP BLANK	X	X	
SPL-GW-MW12-0823	23H0102-01	MW-12	X	X	X
SPL-GW-MW14-0823	23H0102-02	MW-14	X	X	X
SPL-GW-MW29-0823	23H0102-03	MW-29	X	X	X
SPL-GW-MW18-0823	23H0102-04	MW-18	X	X	X
SPL-GW-MW32-0823	23H0102-05	MW-32	X	X	X
SPL-GW-MW33-0823	23H0102-06	MW-33	X	X	X
SPL-GW-MW10-0823	23H0102-07	MW-10	X	X	X
SPL-GW-MW60-0823	23H0102-08	MW-33 DUP	X	X	X
SPL-GW-MW80-0823	23H0102-09	TRIP BLANK	X	X	
SPL-GW-MW25-0823	23H0102-10	MW-25	X	X	X
SPL-GW-MW08-0823	23H0102-11	MW-08	X	X	X
SPL-GW-MW27-0823	23H0102-12	MW-27	X	X	X
SPL-GW-MW61-0823	23H0102-13	MW-08 DUP	X	X	X

Groundwater samples were collected on July 31, August 1, and August 2, 2023 and submitted to Analytical Resources, LLC (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 23H0010 and 23H0102. The analytical methods include the following:

- Cis-1,2-DCE—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 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-MW60-0823 is a duplicate of SPL-GW-MW33-0823. Sample SPL-GW-MW61-0823 is a duplicate of SPL-GW-MW08-0823.

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-MW80-0823 and SPL-GW-MW81-0823) in ARI Work Orders 23H0102 and 23H0010.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 9.1 degrees C for batch 23H0010 and 2.1 and 0.3 degrees C for batch 23H0102, indicating adequate temperature control for sample preservation for batch 23H0102, and slightly elevated temperature for batch 23H0010, i.e., above the recommended 6 degrees C, but below 10 degrees C, in which case professional judgement may be used per EPA guidance. Additionally, the laboratory did not report any frozen samples, therefore no data were qualified as a result of container temperatures below 2.0 degrees C. No data were therefore qualified based on temperature issues.

Hold Times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials associated with ARI work order 23H0010 were free of air bubbles. The cooler receipt form associated with ARI work order 23H0102 indicated that not all VOA vials were free of air bubbles; however, no VOA vials were identified as having bubbles in the preservation confirmation section. The laboratory did not indicate that there was insufficient sample for any VOC analysis, therefore no data were qualified based on VOC integrity issues.

Additional Discrepancies

Additional discrepancies were noted in the Cooler Receipt form associated with ARI work order 23H0010. The COC entry for SPL-GW-MW26-0823 was crossed out prior to submittal to the laboratory. However, the entry contained the correct sample date, time, and number of bottles that were included in the submitted cooler.

2. DATA VALIDATION REPORT CIS-1,2-DCE BY EPA METHOD SW8260D

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 (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

QC requirement findings further discussed in following sections (if required):

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.

2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

QC requirement findings further discussed in following sections (if required):

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese) 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	Laboratory Duplicate
Extraction and analysis holding times	Target analyte list
Blank contamination (method)	Reporting limits and reported results
Matrix Spike (MS)[1] and Matrix Spike Duplicate (MSD)	Field duplicates
Laboratory Control Sample (LCS)	

QC requirement findings further discussed in following sections (if required):
1 Quality control results are discussed below, but no data were qualified.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Matrix Spike

Sample specific QC was performed in association with samples 23H0102-06 and 23H0102-11 (SPL-GW-MW33-0823 and SPL-GW-MW08-0823) in Total Metals batch BLH0390. The duplicate and MS/MSD RPDs were within control limits. However, the lab noted that for manganese, the natural concentration of the spiked analyte 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.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. REFERENCES

ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/16.

ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/17.

ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.

ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.

ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.

Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.

EPA (U.S. Environmental Protection Agency). 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA240R-02/004.

EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use. EPA 540-R-08-005. January 13, 2009.

EPA. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.

EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.

Appendix A

Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Validation Guidelines for Volatile Analysis by GC/MS
(Based on EPA 2020b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 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: J 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 and report at sample result • If sample result >/= CRQL and >/= 2x blank results, report sample result and J+ qualify or no qualification
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	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: • %R < Lower Limit, qualify J-+; %R> Upper Limit, qualify J+- For non-detects: • %R<, qualify results R; If %R >/= No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ

Validation Guidelines for Volatile Analysis by GC/MS (Based on EPA 2020b; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: • %R <Expanded Lower Limit (10%), qualify results J- • Expanded Lower Limit </=%R < specified Lower Limit, qualify results J- • %R > specified Upper Limit, qualify results J+ For non-detects: • %R < Expanded lower limit (10%), qualify results R • Expanded Lower Limit </=%R <specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

Validation Guidelines for Metals Analysis by ICP-MS
(Based on EPA 2020a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 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	For detects: samples received with pH>/=2 and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH>/= 2 and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: • Sample Detect <QL: Report at QL and qualify U • Sample >/= QL: J+ or no qualification If blank result <\= (-MDL) but > (-QL): • Sample Detect: qualify J- or no qualification • Sample Non-detect: qualify UJ If blank result >/= CRQL: • Sample Detect < CRQL: Report at QL and qualify U • Sample result >/=CRQL but <10 x the Blank results: Report at Blank Result and qualify J+ or R • >/=10x Blank results, no qualification If blank result </= (-QL): • Sample Detect < CRQL or >/= CRQL but <10x CRQL, qualify J- • Sample Non-detect qualify UJ • Sample result >/= 10x QL, 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 131-151%, J+ • If %R >150%, R For non-detects: • If %R<40%, R • If %R 40-69%, UJ • If %R>70%, no qualification

Validation Guidelines for Metals Analysis by GC/MS (Based on EPA 2020a; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >/= 4x the spike added, report unqualified.	For detects: • J- if %R <30 to 74% • J+ if %R>125% • No qualification if %R 75-125% For Non-detects: • R if %R<30%, • UJ if %R <75% or • No qualification if %R 75 to >125
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 non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis

Data Validation			South Park Landfill						
QA/QC completed by: Chris Bourgeois			8/26/2023						
ARI Work Order		23H0102							
Sample numbers:		SPL-GW-MW33-0823; SPL-GW-MW60-0823							
Sample Date:		8/2/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-33**	**MW-60**						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
Vinyl chloride	ug/L	0.168	0.164	0.166	0.00	2	y	0.0200	
Groundwater		**sample**	**sample**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	20.8	19.5	20.15	1.30	6	y	1.80	
Manganese	mg/L	1.98	1.92	1.95	0.06	3	y	0.0250	
Comments:									
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: Chris Bourgeois				8/26/2023					
ARI Work Order		23H0102							
Sample numbers:		SPL-GW-MW08-0823; SPL-GW-MW61-0823							
Sample Date:		8/1/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-08**	**MW-61**						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
Vinyl chloride	ug/L	0.0721	0.0704	0.07125	0.0017	2	y	0.0200	
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	17.1	16.1	16.6	1.00	6	y	0.720	
Manganese	mg/L	0.979	0.934	0.9565	0.045	5	y	0.0100	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table Third Quarter 2023 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
N/A*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Qualifiers:

*No data were qualified this Quarter.

Fourth Quarter 2023 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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DBE/MWBE

December 2023 | 553-1550-067 (03.00)

CITATION

Parametrix and HWA GeoSciences, Inc., 2023. Fourth Quarter 2023
Groundwater Sampling Event South Park Landfill - Data Validation Report.
Prepared by Parametrix, Seattle, Washington.
December 2023.

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CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

1. PROJECT NARRATIVE

1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Fourth Quarter 2023 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW32-1123	23K0184-01	MW-32	X	X	X
SPL-GW-MW33-1123	23K0184-02	MW-33	X	X	X
SPL-GW-MW10-1123	23K0184-03	MW-10	X	X	X
SPL-GW-MW60-1123	23K0184-04	MW-10 DUP	X	X	X
SPL-GW-MW80-1123	23K0184-05	TRIP BLANK	X	X	
SPL-GW-MW25-1123	23K0184-06	MW-25	X	X	X
SPL-GW-MW12-1123	23K0260-01	MW-12	X	X	X
SPL-GW-MW14-1123	23K0260-02	MW-14	X	X	X
SPL-GW-MW29-1123	23K0260-03	MW-29	X	X	X
SPL-GW-MW18-1123	23K0260-04	MW-18	X	X	X
SPL-GW-MW30-1123	23K0260-05	MW-30	X	X	X
SPL-GW-MW31-1123	23K0260-06	MW-31	X	X	X
SPL-GW-MW24-1123	23K0260-07	MW-24	X	X	X
SPL-GW-MW26-1123	23K0260-08	MW-26	X	X	X
SPL-GW-MW08-1123	23K0260-09	MW-08	X	X	X
SPL-GW-MW27-1123	23K0260-10	MW-27	X	X	X
SPL-GW-MW61-1123	23K0260-11	MW-27 DUP	X	X	X
SPL-GW-MW81-1123	23K0260-12	TRIP BLANK	X	X	

Groundwater samples were collected on November 6, 7, and 8, 2023 and submitted to Analytical Resources, LLC (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 23K0184 and 23K0260. The analytical methods include the following:

- Cis-1,2-DCE—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 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-MW60-1123 is a duplicate of SPL-GW-MW10-1123. Sample SPL-GW-MW61-1123 is a duplicate of SPL-GW-MW27-1123.

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-MW80-1123 and SPL-GW-MW81-1123) in ARI Work Orders 23K0184 and 23K0260.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 4.1 degrees C for batch 23K0184 and 1.6 and 1.3 degrees C for batch 23K0260, indicating adequate temperature control for sample preservation. The laboratory did not report any frozen samples, therefore no data were qualified as a result of container temperatures below 2.0 degrees C. No data were therefore qualified based on temperature issues.

Hold Times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials associated with ARI work order 23K0260 were free of air bubbles. The cooler receipt form associated with ARI work order 23K0184 indicated that not all VOA vials were free of air bubbles; however, no VOA vials were identified as having bubbles in the preservation confirmation section. The laboratory did not indicate that there was insufficient sample for any VOC analysis, therefore no data were qualified based on VOC integrity issues.

2. DATA VALIDATION REPORT CIS-1,2-DCE BY EPA METHOD SW8260D

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 (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD) [1]	Field Duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

QC requirement findings further discussed in following sections (if required):
[1] Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

2.3 Laboratory Control Sample Duplicate

The laboratory control sample and laboratory control sample duplicate (LCSD) spike recoveries and relative percent difference (RPD) were within control limits, except for the spike recovery for cis-1,2-dichloroethene in the LCSD for batch BLK0236, which was out of control high. Spike recovery for the laboratory control sample (LCS) and the LCS/LCSD RPD were within control limits, therefore no data were qualified.

2.4 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

QC requirement findings further discussed in following sections (if required):

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 6020B

This section documents the review of metals (total iron and manganese) 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	Laboratory Duplicate
Extraction and analysis holding times	Target analyte list
Blank contamination (method)	Reporting limits and reported results
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)[1]	Field duplicates
Laboratory Control Sample (LCS)	

Notes:

QC requirement findings further discussed in following sections (if required):

Some of the metals data were the result of a dilution and were flagged with "D" qualifier by the laboratory. The "D" qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 23K0184-03 and 23K0260-10 (SPL-GW-MW10-1123 and SPL-GW-MW27-1123) in total metals batches BLK0517 and BLK0518, respectively. The duplicate and MS/MSD RPDs were within control limits. However, the lab noted that for iron in batch BLK0517 and manganese in both batches, the natural concentration of the spiked analyte was so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. No data were qualified because in all cases 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.

All data, as reported by the laboratory, are acceptable for use.

5. REFERENCES

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EPA. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.

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Appendix A

Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Validation Guidelines for Volatile Analysis by GC/MS (Based on EPA 2020b; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: ≤ 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: J 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 and report at sample result • If sample result >/= CRQL and >/= 2x blank results, report sample result and J+ qualify or no qualification
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	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: • %R < Lower Limit, qualify J-+; %R> Upper Limit, qualify J+- For non-detects: • %R<, qualify results R; If %R >/= No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD < 30%	Qualify sample results J/UJ

Validation Guidelines for Volatile Analysis by GC/MS (Based on EPA 2020b; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: • %R <Expanded Lower Limit (10%), qualify results J- • Expanded Lower Limit </=%R < specified Lower Limit, qualify results J- • %R > specified Upper Limit, qualify results J+ For non-detects: • %R < Expanded lower limit (10%), qualify results R • Expanded Lower Limit </=%R <specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

Validation Guidelines for Metals Analysis by ICP-MS
(Based on EPA 2020a; ARI 2020a)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: ≤ 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	For detects: samples received with pH>/=2 and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH>/= 2 and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: • Sample Detect <QL: Report at QL and qualify U • Sample >/= QL: J+ or no qualification If blank result <\= (-MDL) but > (-QL): • Sample Detect: qualify J- or no qualification • Sample Non-detect: qualify UJ If blank result >/= CRQL: • Sample Detect < CRQL: Report at QL and qualify U • Sample result >/=CRQL but <10 x the Blank results: Report at Blank Result and qualify J+ or R • >/=10x Blank results, no qualification If blank result </= (-QL): • Sample Detect < CRQL or >/= CRQL but <10x CRQL, qualify J- • Sample Non-detect qualify UJ • Sample result >/= 10x QL, 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 131-151%, J+ • If %R >150%, R For non-detects: • If %R<40%, R • If %R 40-69%, UJ • If %R>70%, no qualification

Validation Guidelines for Metals Analysis by GC/MS (Based on EPA 2020a; ARI 2020a), continued

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >/= 4x the spike added, report unqualified.	For detects: • J- if %R <30 to 74% • J+ if %R>125% • No qualification if %R 75-125% For Non-detects: • R if %R<30%, • UJ if %R <75% or • No qualification if %R 75 to >125
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 non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis

Data Validation			South Park Landfill						
QA/QC completed by: Chris Bourgeois			12/17/2023						
ARI Work Order		23K0184							
Sample numbers:		SPL-GW-MW10-1123; SPL-GW-MW60-1123							
Sample Date:		11/6/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-10**	**MW-60**						
cis-1,2-DCE	ug/L	0.76	0.75	0.755	0.01	1	y	0.20	
Vinyl chloride	ug/L	0.0877	0.0850	0.08635	0.00	3	y	0.0200	
Groundwater		**sample**	**sample**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	43.9	44.5	44.2	-0.60	1	y	1.80	
Manganese	mg/L	2.51	2.63	2.57	-0.12	5	y	0.0250	
Comments:									
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: Chris Bourgeois			12/17/2023						
ARI Work Order		23K0260							
Sample numbers:		SPL-GW-MW27-1123; SPL-GW-MW61-1123							
Sample Date:		11/7/23							
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<35%**	**RL**	**w/in RL?**
units = ug/L		**MW-27**	**MW-61**						
cis-1,2-DCE	ug/L	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.20	y
Vinyl chloride	ug/L	<0.0200	<0.0200	#DIV/0!	#VALUE!	#VALUE!		0.0200	y
Groundwater		**sample**	**duplicate**	**avg**	**diff**	**rpd**	**=/<20%**	**RL**	**w/in RL?**
Iron	mg/L	10.4	10.5	10.5	-0.10	1	y	0.360	
Manganese	mg/L	0.393	0.397	0.395	-0.004	1	y	0.00500	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Appendix C

Qualified Data Summary Table

Table C.1
Qualified Data Summary Table Fourth Quarter 2023 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
N/A*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Qualifiers:

*No data were qualified this Quarter.