

October 2023 Monthly Compliance Report

Solid Waste Permit No. 588
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INTRODUCTION

On behalf of the City of Bristol, Virginia (City), SCS Engineers has prepared this report to the Virginia Department of Environmental Quality (VDEQ) in accordance with item 8.iii in Appendix A of the Consent Decree between the City and VDEQ. This report provides updates regarding the progress towards completion of the items outlined in Appendix A of the Consent Decree between the City and VDEQ. The following sections outline progress during the month of October 2023 related to Solid Waste Permit (SWP) No. 588.

1.0 GAS COLLECTION

The following sections describe the steps the City, in collaboration with its consultants and contractors, has taken to improve the operation, monitoring, and performance of the facility's landfill gas collection and control system (GCCS).

1.1 SURFACE AND LEACHATE COLLECTION EMISSIONS

1.1.1 Surface Emissions

1.1.1.1 Quarterly SEM

SCS performed the Third Quarter surface emissions monitoring event on August 23, 2023. The results of the Quarterly SEM were summarized in the August 2023 Compliance Report for the SWP No. 588 Landfill.

1.1.1.2 Weekly SEM

In addition to the standard regulatory quarterly surface emissions monitoring, SCS performed additional surface emissions monitoring on October 5, 2023; October 9, 2023; October 18, 2023; October 24, 2023; and October 30, 2023. These weekly surface emissions monitoring (SEM) Events were performed in accordance item 1.i in Appendix A of the Consent Decree between the City and VDEQ.

The monitoring in October generally conforms to the requirements of 40 CFR 63.1960(c) and (d), and 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The surface emission monitoring route included the entire waste footprint of the Permit No. 588 landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint.

SCS submitted letters to VDEQ outlining the results of the October monitoring events on October 11, 2023; October 18, 2023; October 25, 2023; November 1, 2023; and November 8, 2023. Copies of those submittals are included in Appendix A. Table 1 summarizes the results of the five monitoring events in October.

Table 1. Summary of October Surface Emissions Monitoring

Description	October 5, 2023	October 9, 2023	October 18, 2023	October 24, 2023	October 30, 2023
Number of Points Sampled	177	177	177	177	177
Number of Points in Serpentine Route	100	100	100	100	100
Number of Points at Surface Cover Penetrations	77	77	77	77	77
Number of Exceedances	1	4	0	5	4
Number of Serpentine Exceedances	0	0	0	0	0
Number of Pipe Penetration Exceedances	1	4	0	5	4

There were no serpentine exceedance detected in October 2023. However, new exceedances were detected at pipe penetrations of seven vertical extraction wells (EW-66, EW-68, EW-82, EW-91, EW-92, EW-95, and EW-98). Exceedances at these locations can be attributed to a variety of factors. Many of these wells are equipped with a dewatering pump, that when operating effectively, will lower the water in the well and allow greater gas collection from the area. It seems that many of these exceedances correspond to periods of pump down time. In addition, insufficient cover soil was identified at a few of the exceedance locations. By the final weekly monitoring event of the month, many of these issues had been resolved with only four ongoing exceedances remaining (EW-66, EW-90, EW-95, and EW-98). Additional corrective actions at these locations may include additional soil, addition of a well-bore skirt addition, installation of a foam or bentonite seal, continued and improved dewatering activities, and well tuning to increase gas extraction. Corrective actions to address these exceedances are planned for the month of November 2023.

1.1.2 Leachate Collection Emissions

SCS Field Services (SCS-FS) visited the Bristol Landfill on October 9 and 11, 2023, and performed monitoring of the leachate, witness zone, and gradient control clean-outs at the northern and southern ends of the landfill. The results of that monitoring are included in Table 2. Table 2 also lists the cleanout pipe description based on site records and a review of correspondence.

LC10 has been sampled twice (both October 9 and 11). NC7 was not sampled.

Table 2. Leachate Cleanout Pipe Monitoring Results

Description	ID#	Record Date	CH4 (% by Vol)	CO2 (% by Vol)	O2 (% by Vol)	Balance Gas (% by Vol)	Initial Temp (°F)	Adj Temp (°F)	Initial Static Pressure (in H2O)	Adj Static Pressure (in H2O)	System Pressure (in H2O)
Southern Cleanouts Gradient West	LC01	10/11/2023	3.0	2.5	19.3	75.3	56.8	56.9	-0.12	-0.04	-0.04
Southern Cleanouts Gradient East	LC02	10/11/2023	2.7	2.0	19.6	75.8	57.3	57.4	-0.18	-0.15	-0.15
Southern Cleanouts Leachate Center	LC03	10/11/2023	2.5	1.7	19.7	76.1	57.1	57.1	-0.22	-0.19	-0.19
Southern Cleanouts Witness East	LC04	10/11/2023	15.3	13.5	13.9	57.3	57.0	57.0	-12.29	-12.73	-12.29
Southern Cleanouts Leachate West	LC05	10/11/2023	34.9	28.7	1.5	34.9	57.2	57.3	-12.51	-12.51	-12.51
Southern Cleanouts Gradient Center West	LC06	10/11/2023	20.5	22.1	13.3	44.1	57.3	57.2	-12.17	-12.97	-12.17
Southern Cleanouts Leachate East	LC07	10/11/2023	15.6	16.2	13.0	55.1	56.9	57.0	-10.94	-10.48	-10.48
Southern Cleanouts Leachate East	LC08	10/11/2023	25.6	20.0	2.9	51.6	57.1	57.1	-10.14	-10.48	-10.14
Southern Cleanouts Gradient Center East	LC09	10/11/2023	40.2	33.4	5.1	21.4	56.9	56.7	-10.39	-10.31	-10.31
Southern Cleanouts Leachate West	LC10	10/9/2023	43.3	56.6	0.1	0.0	69.3	69.2	-9.97	-9.97	-9.97
Southern Cleanouts Leachate West	LC10	10/11/2023	43.3	34.5	4.2	18.0	56.6	56.6	-10.67	-10.48	-10.48
Northern Cleanouts Leachate Center	NC02	10/9/2023	42.8	57.2	0.0	0.0	69.1	69.1	-9.38	-9.13	-9.13
Northern Cleanouts Leachate West	NC03	10/9/2023	20.5	26.5	11.5	41.6	68.6	68.5	-10.31	-10.01	-10.01
Northern Cleanouts Witness East	NC04	10/9/2023	11.8	17.1	17.3	53.9	68.2	68.2	-9.97	-9.97	-9.97
Northern Cleanouts Witness Center	NC05	10/9/2023	10.1	14.3	18.9	56.7	67.9	67.9	-10.31	-10.31	-10.31
Northern Cleanouts Witness West	NC06	10/9/2023	15.8	15.4	6.9	61.9	67.9	67.8	-10.31	-10.31	-10.31
Northern Cleanouts Gradient Center East	NC08	10/9/2023	36.2	40.5	5.3	18.0	67.7	67.7	-10.98	-10.21	-10.21
Northern Cleanouts Gradient Center West	NC09	10/9/2023	35.7	37.5	7.1	19.8	67.6	67.7	-9.75	-9.63	-9.63
Northern Cleanouts Gradient West	NC10	10/9/2023	22.8	20.8	16.7	39.7	67.1	67.1	-9.38	-9.29	-9.29

1.2 EXISTING GAS EXTRACTION SYSTEM PERFORMANCE

SCS and SCS-FS have been coordinating with the City to improve the performance of the existing gas system. Specific actions taken to maintain and improve the system are detailed in the following sections of this report. Additional actions taken by SCS-FS include the following:

- Primary flare troubleshooting and ignition
- Troubleshooting air compressor

- Investigation of high oxygen levels
- Replacing a Kanaflex on sidewall odor mitigation system wellheads
- Modifications to lateral piping

1.3 REMOTE MONITORING SYSTEM

In the Fall of 2022, SCS Remote Monitoring & Control (SCS-RMC) installed 25 industrial internet of things (IIoT) temperature sensors in the landfill gas wellheads. The purpose of the sensors is to record and transmit well-head gas temperatures via a cellular connection to a database managed by SCS-RMC.

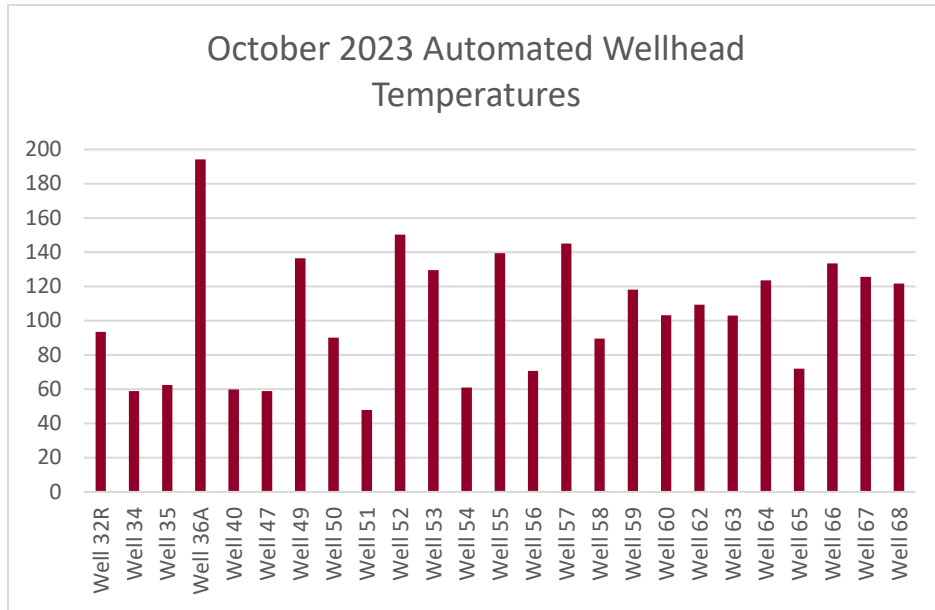
The City is providing average temperatures recorded by the sensors to VDEQ on a daily basis via e-mail. Average daily temperatures recorded by the remote monitoring system during the month of October are included in Appendix C. In addition, SCS previously prepared semi-monthly status updates to satisfy the conditions of compliance provision #2 of the Environmental Protection Agency (EPA) Region III letter, Approval of Higher Operating Temperature Values for Landfill Gas Wells and Submission of Gas Treatment Alternatives at the Bristol Virginia Integrated Solid Waste Management Facility, dated August 23, 2021. On August 2, 2023, VDEQ requested that such updates be included in the monthly compliance reports going forward. Accordingly, this section is a summary of temperature monitoring activities during the monthly monitoring period of October 2023.

1.3.1 Automated Wellhead Temperature Measurements

SCS reviewed the automated hourly temperature measurements from October 2023, and identified the following trends:

- **Temperatures over 145 °F:** Temperatures over the NESHAP AAAA compliance threshold of 145 °F were recorded consistently at EW-36A, EW-52, EW-55 and EW-57 in October. Although temperatures fluctuate throughout the wellfield, SCS is continuing to see high temperatures at certain wells during these monitoring periods. The highest average temperatures were measured at EW-36A (see Figure 1). SCS believes that the increase in temperatures at select well heads suggests that, with the increase of pneumatic pump operations and increased liquids removal, the collection system is being more effectively dewatered. Removal of liquids from the well allows gas from deeper within the waste mass to be extracted. In some cases gas collected from lower elevations is hotter than gas from higher elevations and this temperature difference is reflected in the temperatures measured by the sensors. Liquids removal in combination with the addition of new LFG collection infrastructure from the recent GCCS expansion is likely providing more pathways for extraction of the warmer landfill gas from deeper in the waste mass, thus the increased average temperatures.
- **Low average temperatures at certain wells:** Repeated temperature readings of 0 °F at EW-50, EW-51, EW-56, and EW-65 appear to be erroneous and due to failing batteries. Batteries have been replaced at EW-50 and EW-56 already, a new battery has been ordered for EW-65, and the sensor at EW-51 was reset. SCS will continue to monitor EW-51.

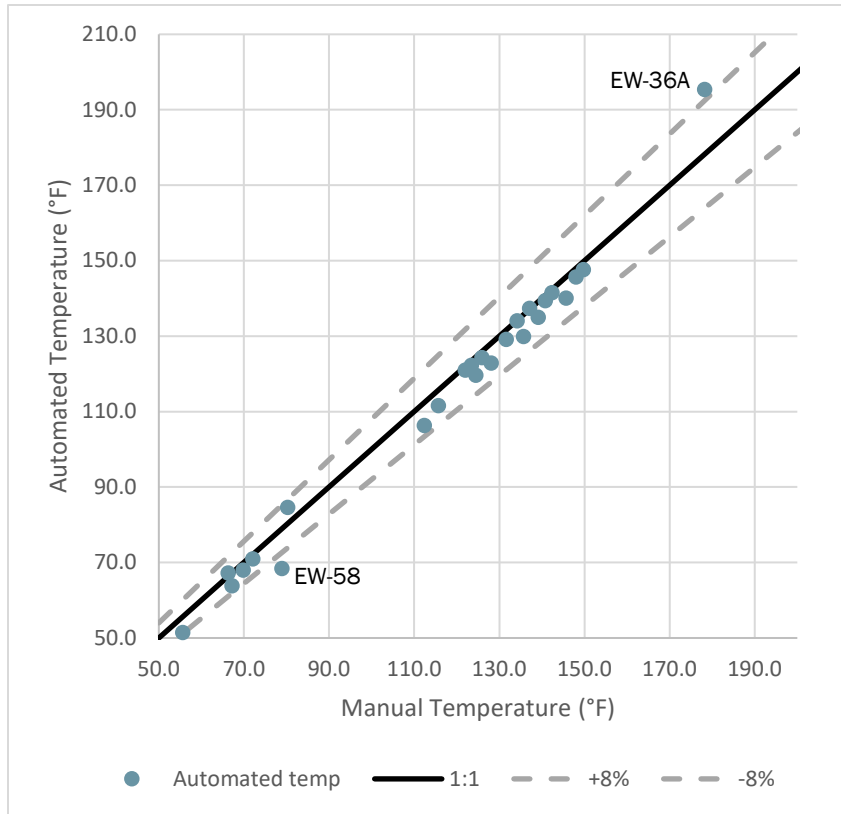
Figure 1. Average Automated Wellhead Temperatures



1.3.2 Comparison with Manual Temperature Measurements

Per the approval issued by VDEQ on August 2, 2023, the Facility ceased dedicated daily manual temperature measurements in the Permit No. 588 Landfill. In lieu of this comparison, the City has agreed to compare instantaneous hourly automated temperature measurements with temperatures measured at each wellhead with a handheld sensor during monthly compliance monitoring. These comparisons are shown in Figure 2, with the $\pm 8\%$ deviation goals as prescribed in the VDEQ approval.

Figure 2. Automated vs. Manual Temperature Measurements



Temperature comparisons outside the $\pm 8\%$ deviation goal lines were found for wells EW-36A and EW-58. At EW-36A, field technicians have experimented with different methods to overcome the thickness of the stainless-steel well casing and better measure the temperature in the gas stream. The 10% differential achieved by the most recent reading on 10/23/23 is an improvement from previous measurements. SCS will continue investigating alternatives to measure temperature more accurately with a portable instrument. We believe temperature disparity at EW-58 can be attributed to a change in temperature between 9:00 AM to 10:00 AM on the day of the manual temperature reading. At 9:00 AM on 10/12/23, the automated temperature sensor at EW-58 recorded 68.4 °F and at 10:00 AM it recorded 85.7 °F. Because the manual temperature measurement of 78.9 °F at 9:19 AM aligns closely with the average temperature recorded by the automated sensors during the 9:00-10:00 hour (77.1 °F), it appears that the manual temperature equipment and automated sensor are working properly.

1.3.3 Monthly Regulatory Wellhead Temperature Measurements

Routine monthly temperature monitoring for purposes of complying with 40 CFR 60.36f(a)(5) was conducted October 10, 2023, with follow-up monitoring several days after. Additionally, SCS typically measures wellhead temperatures at the SWP No. 588 Landfill on a bimonthly basis. During this monitoring period, temperature exceedances were resolved at EW58, EW-74, EW-87, EW-91 and EW-98. A HOV request was submitted for EW-53, EW-61, EW-84, EW-86, EW-89, EW-90, and EW-100 to VDEQ on August 8, 2023. SCS received approval for this HOV request on September 28, 2023. See Table 3 for the statuses of all exceedances recorded during this monitoring period.

Table 3. October Temperature Exceedance Summary

Well ID	Initial Exceedance Date	Last date/temperature measured	Duration of Exceedance	Status as of 10/24/23
EW-52	8/15/23	10/23/23 173.0°F	69 days	Ongoing, within 120-day timeline
EW-53	8/28/23	10/23/23 144.6°F	n/a	Resolved, HOV approved 9/28/23
EW-55	10/23/23	10/23/23 165.0°F	1 day	Ongoing, within 15-day timeline
EW-58	9/27/23	10/12/23 79.0°F	15 days	Resolved, within 15-day timeline
EW-61	6/27/23	10/10/23 166.1°F	n/a	Resolved, HOV approved 9/28/23
EW-64	8/24/23	10/19/23 145.5°	56 days	Ongoing, within 60-day timeline
EW-74	9/25/23	10/10/23 65.2°F	15 days	Resolved, within 15-day timeline
EW-81	9/25/23	10/19/23 169.0°F	24 days	Ongoing, within 60-day timeline
EW-84	4/27/23	10/23/23 161.7°F	n/a	Resolved, HOV approved 9/28/23
EW-85	10/10/23	10/19/23 173.3°F	9 days	Ongoing, within 15-day timeline
EW-86	9/11/23	10/23/23 154.9°F	n/a	Resolved, HOV approved 9/28/23
EW-87	10/9/23	10/23/23 135.2°F	14 days	Resolved, within 15-day timeline
EW-88	9/25/23	10/19/23 148.4°F	24 days	Ongoing, within 60-day timeline
EW-89	5/30/23	10/23/23 173.9°F	n/a	Resolved, HOV approved 9/28/23
EW-90	8/28/23	10/23/23 177.3°F	n/a	Resolved, HOV approved 9/28/23
EW-91	9/25/23	10/23/23 134.5°F	28 days	Resolved, within 60-day timeline
EW-92	9/25/23	10/9/23 142.3°F	14 days	Resolved, within 15-day timeline
EW-92	10/23/23	10/23/23 162.0°	1 day	Ongoing, within 15-day timeline
EW-98	10/9/23	10/12/23 58.2°	3 days	Resolved, within 15-day timeline
EW-100	4/27/23	10/23/23 163.0°	n/a	Resolved, HOV approved 9/28/23

1.3.4 LFG Sampling

SCS collected LFG samples from wells with temperature exceedances lasting more than 7 days using 1.5-L Summa canisters on September 22, 2023; September 28, 2023, and October 5, 2023, to fulfill the requirement in 40 CFR 63.1961(a)(5). The samples were sent to Enthalpy Analytical for lab analysis of carbon monoxide (CO) and hydrogen (H₂) content. Lab results are summarized in Table 4.

Table 4. LFG Wellhead Sampling Summary

Sample Date		9/22/23	9/28/23	10/5/23
36A	CO (ppmv)	851	--	--
	H2 (Vol. %)	16.6	--	--
52	CO (ppmv)	ND	196	90
	H2 (Vol. %)	2.80	6.73	3.86
58	CO (ppmv)	--	351	276
	H2 (Vol. %)	--	6.88	7.01
61	CO (ppmv)	131	119	--
	H2 (Vol. %)	4.54	4.07	--
64	CO (ppmv)	ND	ND	ND
	H2 (Vol. %)	0.41	ND	ND
81	CO (ppmv)	--	304	238
	H2 (Vol. %)	--	5.55	4.22
84	CO (ppmv)	359	309	--
	H2 (Vol. %)	7.13	6.17	--
86	CO (ppmv)	142	108	--
	H2 (Vol. %)	2.28	1.62	--
88	CO (ppmv)	--	263	541
	H2 (Vol. %)	--	7.30	9.59
89	CO (ppmv)	1130	1160	1200
	H2 (Vol. %)	29.8	30.5	31.3
90	CO (ppmv)	149	118	--
	H2 (Vol. %)	2.59	2.22	--
91	CO (ppmv)	--	321	267
	H2 (Vol. %)	--	7.64	6.88
92	CO (ppmv)	--	1860	1910
	H2 (Vol. %)	--	28.8	29.2
99	CO (ppmv)	ND	--	--
	H2 (Vol. %)	1.08	--	--
100	CO (ppmv)	ND	ND	--
	H2 (Vol. %)	4.08	4.77	--

The presence of hydrogen in the samples collected during this monitoring period indicates that combustion reactions are unlikely. For EW-64, a result of non-detect for hydrogen was observed throughout this reporting period. Since carbon monoxide was also non-detect, it is unlikely that combustion reactions are occurring in this area as well.

The wells with corresponding charts in Figures 3, 4, 5, and 6 have been sampled for carbon monoxide and hydrogen for the last five weeks or more. Trends appear to be fairly consistent over time at for three wells. Well EW-52 experienced a spike in reported carbon monoxide and hydrogen concentrations in early September, which coincided with temperatures temporarily increasing to approximately 170°F, from approximately 145°F.

Figure 3. EW-52 Enhanced Monitoring Trends

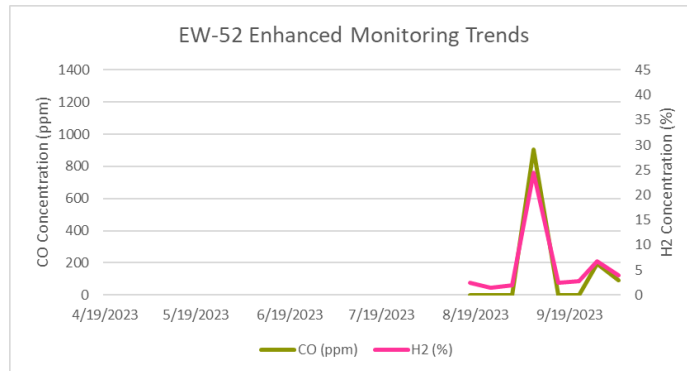


Figure 4. EW-64 Enhanced Monitoring Trends

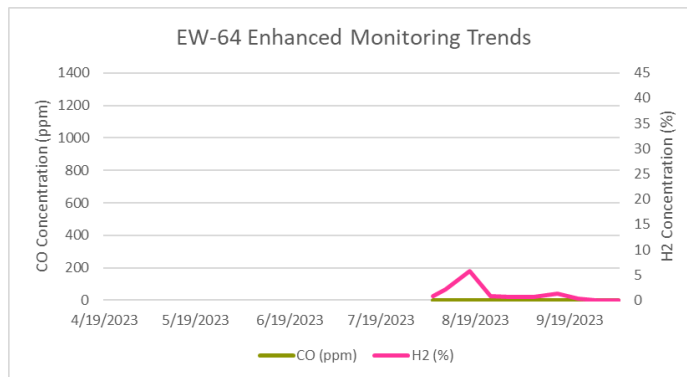
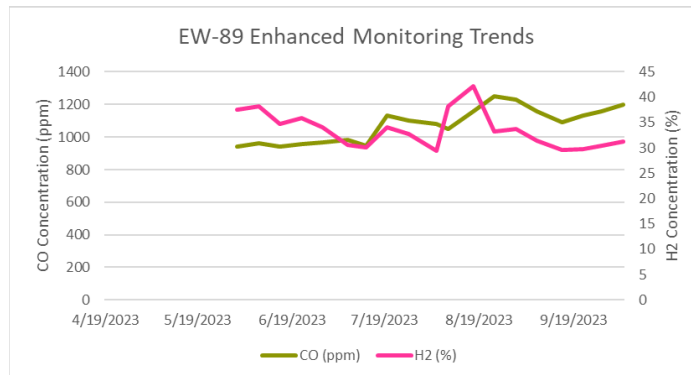


Figure 5. EW-89 Enhanced Monitoring Trends



1.4 LARGE-DIAMETER DUAL-PHASE EXTRACTION WELLS

SCS completed design work on an expansion of the existing GCCS during the month of December 2022. The proposed expansion includes at least 5 large diameter dual-phase extraction wells. SCS submitted the design to VDEQ prior to December 31, 2022. The City commenced solicitation of contractor's bids for this project by advertising for bids and received one bid for the project from SCS Field Services Construction (SCS-CONS). On January 26, 2023, the City awarded the project to SCS-CONS.

During the month of October, work on the expansion of the GCCS focused on wrapping up the GCCS Expansion project, including final connections of the new LFG lateral piping to the existing system as well as installation of an additional sump (CS-3) between wells EW-78 and EW-82. The construction crew left site as of project completion on October 12, 2023. A photo of CS-3 is depicted in Figure 6.

Figure 6. Sump CS-3 Installation at the SWP No. 588 Landfill



The first 5 liquids removal pumps were installed in June of 2023, satisfying item 1.iv of Appendix A of the Consent Decree between the Department and the City. The City and SCS-CONS have received the delivery of additional pumps, and installed them in the LFG extractions wells that SCS deemed as the best fit for the Blackhawk pumps. These pumps serve to supplement the initial 5 pumps that were installed in June of 2023. Based on field observations, the expanded GCCS and its newly connected wells and pumps continue to increase gas and liquids extraction for the landfill. A photo of upgraded 12" HDPE piping with installed CMP is shown in Figure 7.

Figure 7. CMP Installation, Protecting 12" HDPE for Future Road Crossing at the SWP No. 588 Landfill



1.5 VDEQ CONCURRENCE ON WELLS

As described in previous monthly compliance reports, the City engaged with VDEQ in discussions about the proposed approach for landfill GCCS improvements and expansions. Upon completion of the landfill gas collection system, SCS will submit updated as-built drawings depicting the completed system to VDEQ. The City intends to delay installation of interim or final cover systems until the City and VDEQ agree that the GCCS is sufficient.

2.0 SIDEWALL ODOR MITIGATION

The City has designed and is constructing a system to control fugitive emissions emanating from the quarry sidewalls. Specific aspects of the proposed design features are described in the following sections.

2.1 PERIMETER GAS COLLECTION SYSTEM

SCS's design of the GCCS expansion described in Section 1.4 included perimeter LFG wells. These wells are closer to the sidewall to intercept landfill gas that potentially could migrate to the quarry wall. These wells will supplement the sidewall odor mitigation system described in Section 2.2. The City completed bidding and contracting of construction for the perimeter LFG wells as part of the large diameter dual extraction well installation described in Section 1.4.

As described in the April 2023 Monthly Compliance Report for the SWP No. 588 Landfill, construction of the perimeter gas collection system was completed. SCS submitted a letter to VDEQ documenting completion of the Perimeter Gas Collection System on May 1, 2023.

2.2 SIDEWALL ODOR MITIGATION SYSTEM

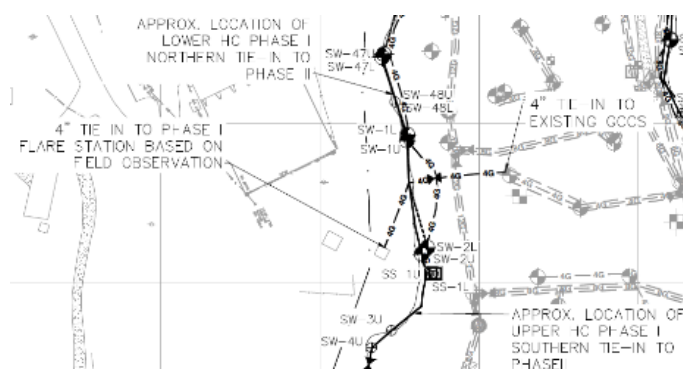
On behalf of the City and in an effort to capture emissions from the quarry sidewall, SCS designed a sidewall odor mitigation system (SOMS) during the month of October 2022. On October 20, 2022 SCS provided an overview of the proposed system to VDEQ staff. The design of this system was prepared and submitted to VDEQ on November 1, 2022. A project manual detailing the specifications of the system was developed concurrently with the design of the system.

2.3 PILOT SYSTEM CONSTRUCTION

SCS-CONS completed substantial construction of Phase 1 of the SOMS during the month of February 2023, SCS-FS began monitoring Phase 1 connected Horizontal Collector (HC) wellheads during the month of March, and SCS-FS continued weekly wellhead monitoring into the month of May 2023. Phase 1 is considered the pilot system portion of the SOMS. SCS submitted a design engineer certification to VDEQ on February 10, 2023 that documented the substantial completion of Phase 1 of the SOMS. Details of Phase 1 construction progress and monitoring can be found in the monthly compliance reports for the SWP No. 588 landfill.

Figure 8 shows the Phase 1 as-built, which includes the locations of the HC wellheads and HC sumps installed in Phase I, as well as the 4" header connection to the existing LFGCCS. The lower collector installed as part of Phase II was tied-in to the north end of the Phase I lower collector, and the upper collector installed as part of Phase II was tied-in to the south end of the Phase I upper collector.

Figure 8. SOMS Phase I As-Built¹



Both the upper and lower collectors of Phase 1 of the system have been connected to the substantially completed Phase 2 of the system. Collection of landfill gas by both the upper and lower collectors indicates that the system is working as intended. Based on this data, Phase 2 was constructed utilizing the same general configuration.

2.4 FULL SYSTEM CONSTRUCTION

SCS-CONS substantially completed construction of Phase 2 of the SOMS during the month of June 2023 as Phase 2 was connected to vacuum as of June 14, 2023. Cover soil placement continued into the month of October, and ceased when the construction crew left site on October 12, 2023 upon project completion. Figure 9 shows SOMS Phase 2 wellhead installation and connections at HC wells along the southeastern perimeter of the landfill.

Figure 9. Phase 2 SOMS Wellhead Connections



¹ Location data was collected using mapping grade global positioning system equipment.

During the month of October 2023, SCS-FS collected monitoring data at each wellhead under vacuum. A summary of those measurements is shown in Table 5.

Table 5. Sidewall HC Wellhead Gas Quality Measurements – System Averages

Record Date	Average CH4 [%]	Average CO2 [%]	Average O2 [%]	Average Bal Gas [%]
10/11/2023	8.0	16.3	14.2	61.5
10/25/2023	6.7	12.2	15.9	65.2

During the month of October, the sidewall system was connected to the GCCS in additional locations along the main 12” and 8” LFG header. Isolation valves have been installed accordingly to allow for manipulation of flow routed to the supplemental flare, currently being leased. The flare was constructed by Perennial Energy Incorporated (PEI). The gas is being re-routed to the supplemental flare because of the lower quality of the gas. The City is attempting to improve the quality of the gas directed to the primary flare and energy generation facility.

The sidewall system average gas composition indicates lower methane content than typical landfill gas collection systems. The gas quality measurements indicate that the SOMS is functioning as designed because landfill gas is being withdrawn and oxygen intrusion is acceptable. The wide-ranged gas composition may indicate that some areas of the landfill may be experiencing higher landfill gas concentrations than areas where methane content is seemingly insignificant. SCS-FS will adjust SOMS wellheads based on gas quality to increase flow from sections of the system with high methane content and reduce flow from sections of the system with low methane content. Phase 2 lower and upper collectors locations, including HC wellhead riser and sump locations, are shown in the as-built depicted as Figure 10².

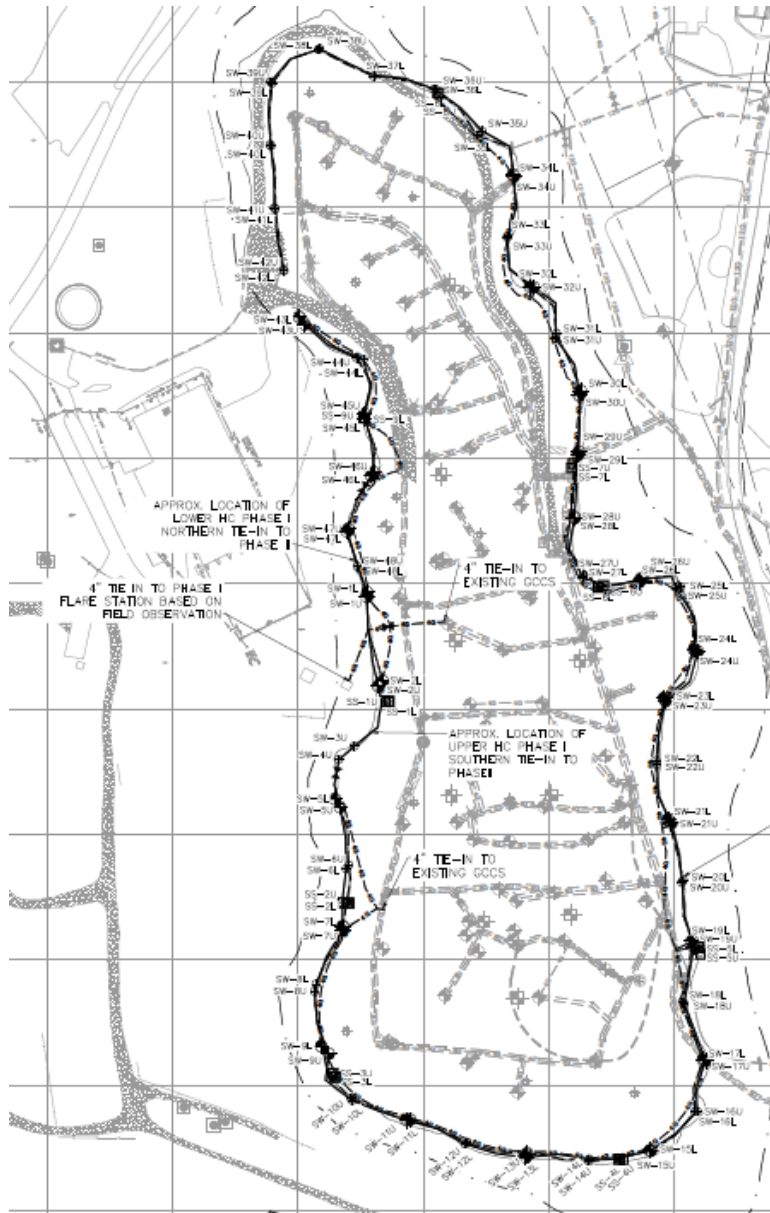
During construction, some sections of the SOMS had to be temporarily taken offline during soil placement and header construction activities. Additionally, placement of dewatering pumps required risers to be open while pumps were connected. As a result of portions of the system being offline, visible sidewall emissions appeared for some periods during construction. SCS and the City will continue to monitor the sidewalls for visible emissions and will take action to address emissions identified.

During the month of October, there were some visible emissions around a few portions of the sidewall. Colder ambient temperatures likely increased visibility of the fugitives in these sections. There were three visible sidewall emissions locations, and these areas of the sidewall received application of an enhanced Posi-Shell® mixture.

The Posi-Shell® serves as a durable seal to fill remaining voids in the sidewall system which landfill gas may be escaping through. The Posi-Shell® is enhanced through the addition of 4 pounds of Portland cement and 0.06 pounds of fiber reinforcement for every pound of Posi-Shell® used. The material was applied to the problem areas in order to mitigate fugitive emissions. Based on field visual observations, the application appears effective at reducing emissions.

² During construction, redundant risers were put in place to accommodate supplemental wellhead and installation in the future. Figure 10 shows all riser and sump locations. The final submittal to VDEQ, Revised June 26, 2023, shows the locations of actual wellhead installation. The facility may relocate wellheads based on field conditions.

Figure 10. Phase 2 Sidewall Odor Mitigation System Progress As-Built³



At this time, not every SOMS horizontal collector riser has a wellhead installed, but HC risers may receive a wellhead at a future date as warranted by field conditions. Posi-Shell® application on top of the installed liner in the southeastern area of the landfill shown in Figure 11.

³ Location data was collected using mapping grade global positioning system equipment.

Figure 11. Phase 2 SOMS Lower and Upper Collector Construction Maintenance



3.0 WASTE TEMPERATURE MONITORING

On behalf of the City, SCS designed a temperature monitoring system to collect temperature data throughout the waste mass. The steps taken by the City to implement this system are described in the following sections.

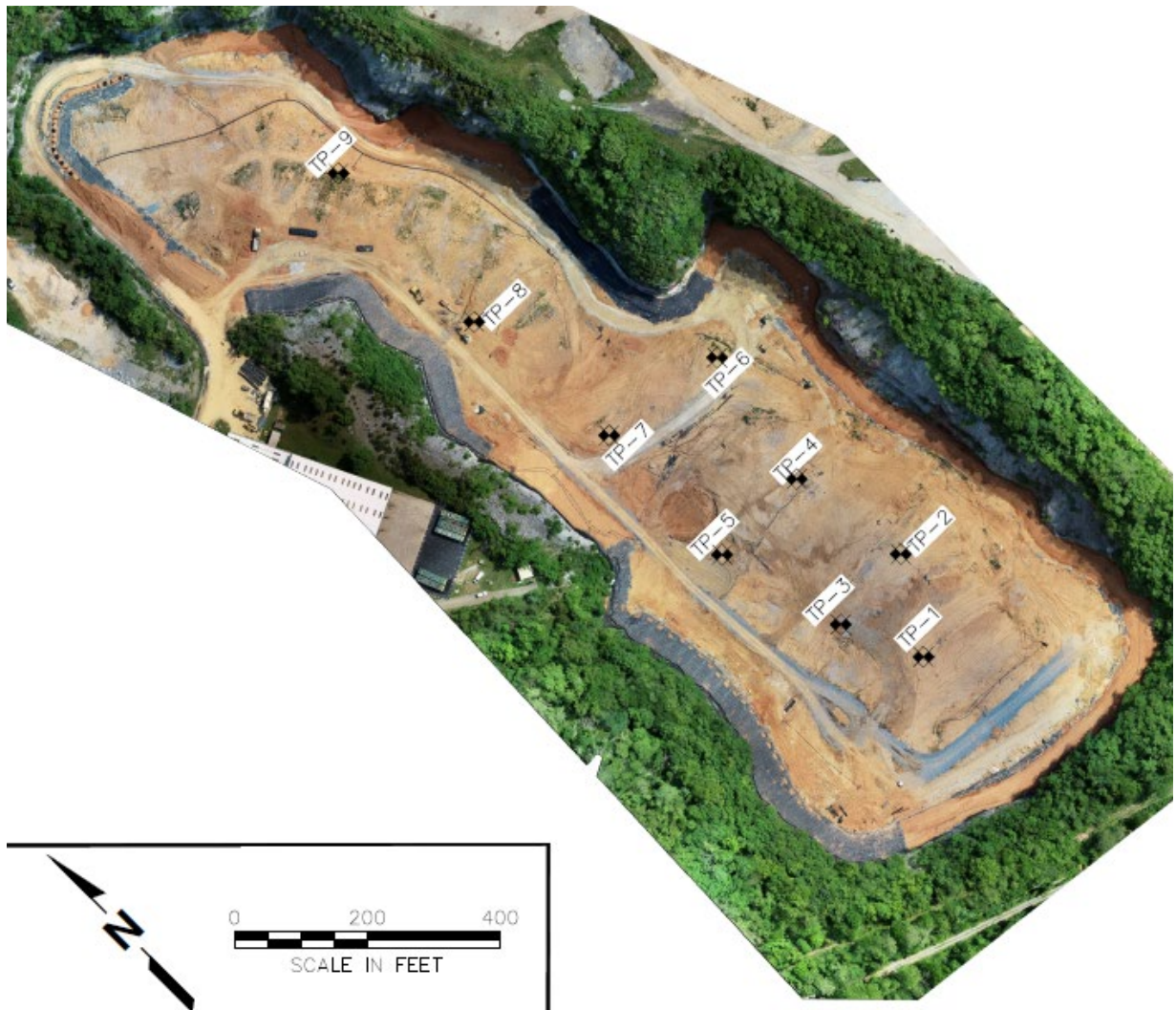
3.1 TEMPERATURE MONITORING SYSTEM DESIGN

The temperature monitoring system consists of 9 boreholes drilled into the waste mass. A steel casing was placed in each borehole and the hole was backfilled around the casing with aggregate. A series of temperature sensors was placed inside the steel casing. At the top of each borehole, an IloT transmitter collects the data from the sensors and transmits it to a cloud-based RMC system. The City submitted design of the temperature monitoring system to VDEQ on November 30, 2022.

3.2 TEMPERATURE MONITORING SYSTEM INSTALLATION

Installation of the in-situ Landfill Temperature Monitoring System began in October of 2022 and installation of replacement sensors was completed in February of 2023. Details of construction progress can be found in the monthly compliance reports for the SWP No. 588 Landfill. The locations of the temperature probes are shown in Figure 12.

Figure 12. Temperature Monitoring Probe Locations



SCS began collecting temperature data daily on February 15, 2023. The temperature sensors continued to transmit temperature data during the month of October. Average daily temperatures recorded by the sensors for the Month of October are included in Appendix D. Each week the average temperatures from a select day of that week are downloaded and compared to temperatures recorded during the previous week. Average daily temperatures recorded on select days during the month of October are shown in Appendix B. The average temperatures recorded during the months of March through October are shown in Figures 13 through 22 on the following pages.

Figure 13 shows daily average temperatures in Temperature Probe 1 (TP-1) during the months of March through October. Based on the data, temperatures were consistent from March through May and saw increases during the months of June, July and August at depths or 100 feet and below. In September, average temperatures showed little change when compared to August and in some cases, show a small decrease. In October, temperatures stayed consistent from readings taken in September.

TP-1 was originally drilled to a depth of 180 feet, but the contractor was unable to install the casing beyond a depth of 160 feet. TP-1 did not record temperatures between July 23, 2023 and July 30, 2023 due to a dead battery. The battery was replaced and TP-1 began recording temperatures again on July 31, 2023.

Figure 13. Average Temperatures within TP-1 During the Months of March through October

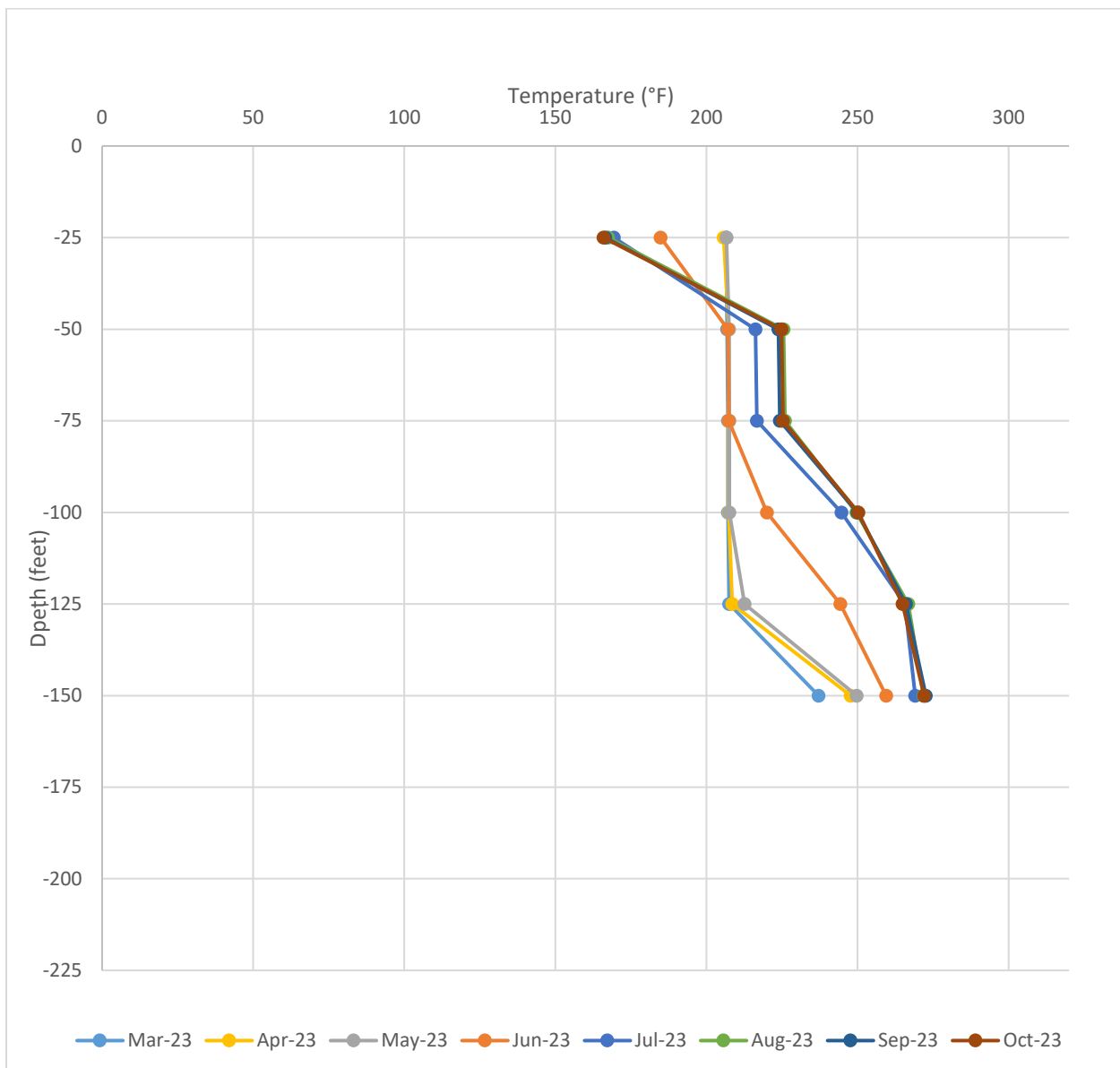


Figure 14 shows daily average temperatures in Temperature Probe 2 (TP-2) during the months of March through October. Based on the data, temperatures have been consistent during the last eight months.

TP-2 was originally drilled to a depth of 160 feet. TP-2 did not record temperatures between August 15, 2023 and September 17, 2023 due to a dead battery. A replacement battery was installed in September of 2023 and TP-2 recording temperatures again on September 18, 2023.

Figure 14. Average Temperatures within TP-2 During the Months of March through October

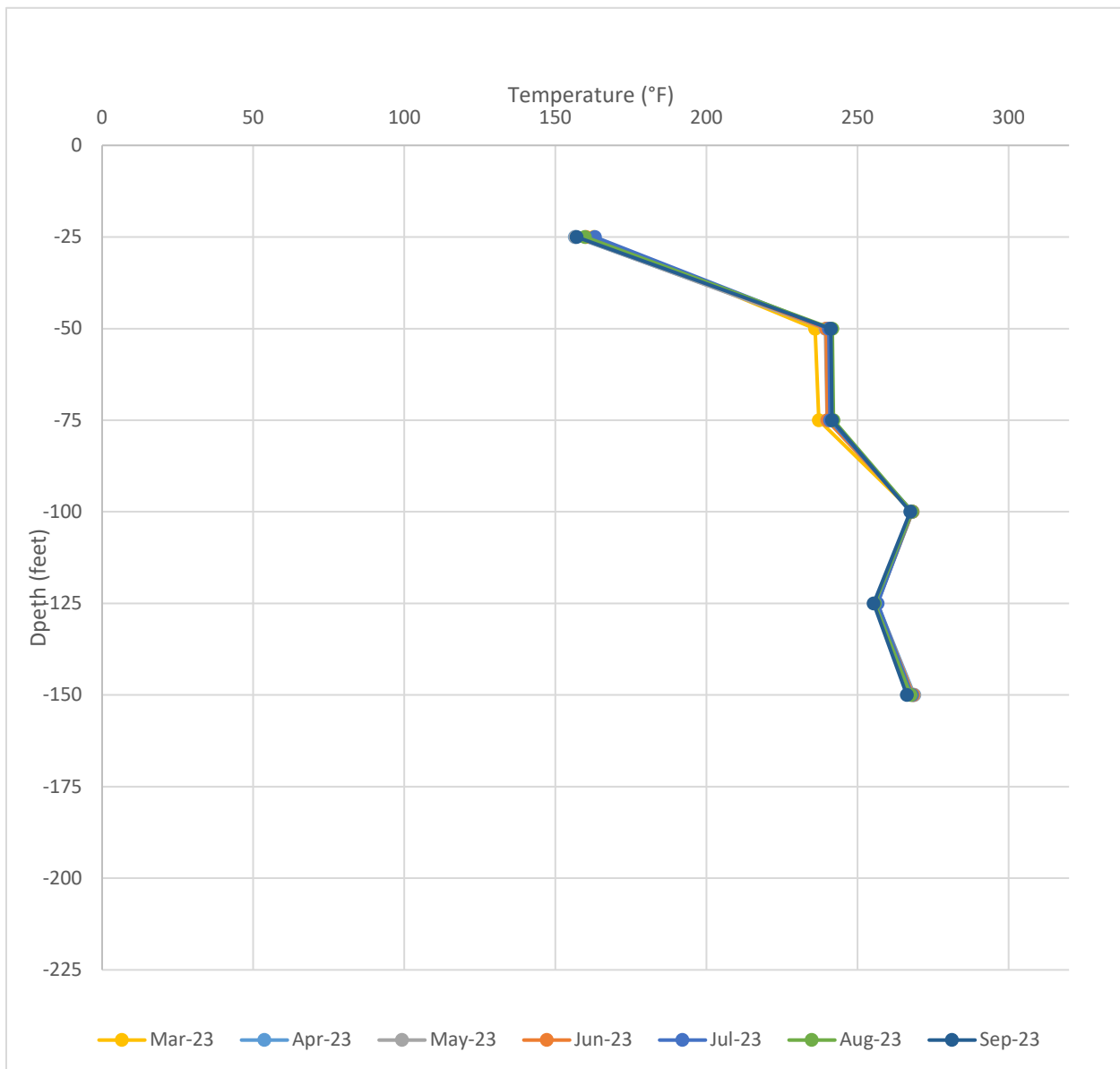


Figure 15 shows daily average temperatures in Temperature Probe 3 (TP-3) during the months of March through October. Based on the data, temperatures have been generally consistent during the

last eight months. There has been an increase in temperatures during the month of October at the 50-foot and 75-foot depths. SCS noted that a forcemain check valve near an adjacent well had failed. This may have limited liquids removal in the area and resulted in higher temperatures. SCS will continue to review temperature data recorded by this probe.

Figure 15. Average Temperatures within TP-3 During the Months of March through October

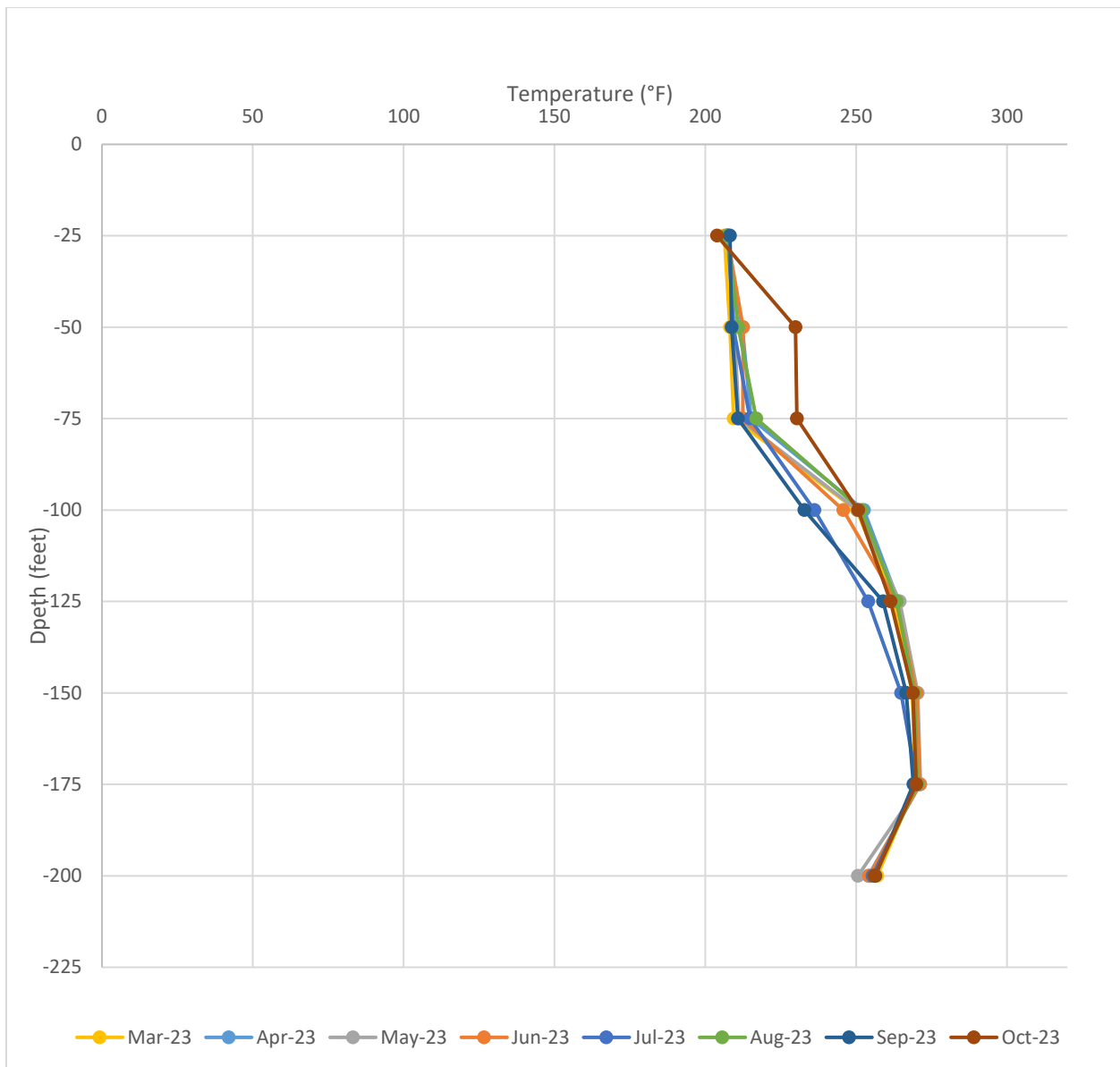


Figure 16 shows daily average temperatures in Temperature Probe 4 (TP-4) during the months of March through October. Based on the data, temperatures appeared to drop during the months of April and May, but returned to levels closer to baseline during the month of June, July, August, September, and October.

Figure 16. Average Temperatures within TP-4 During the Months of March through October

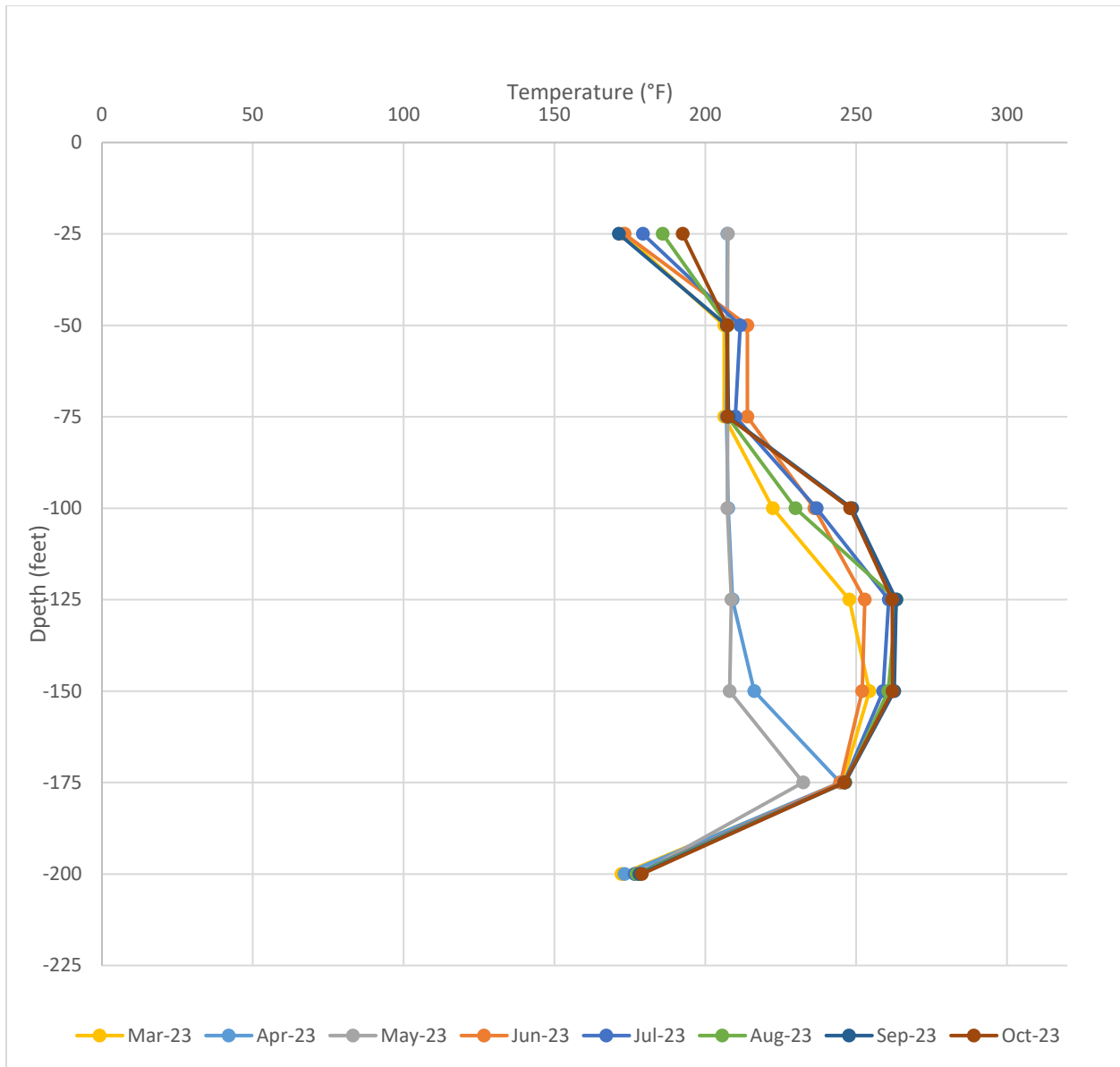
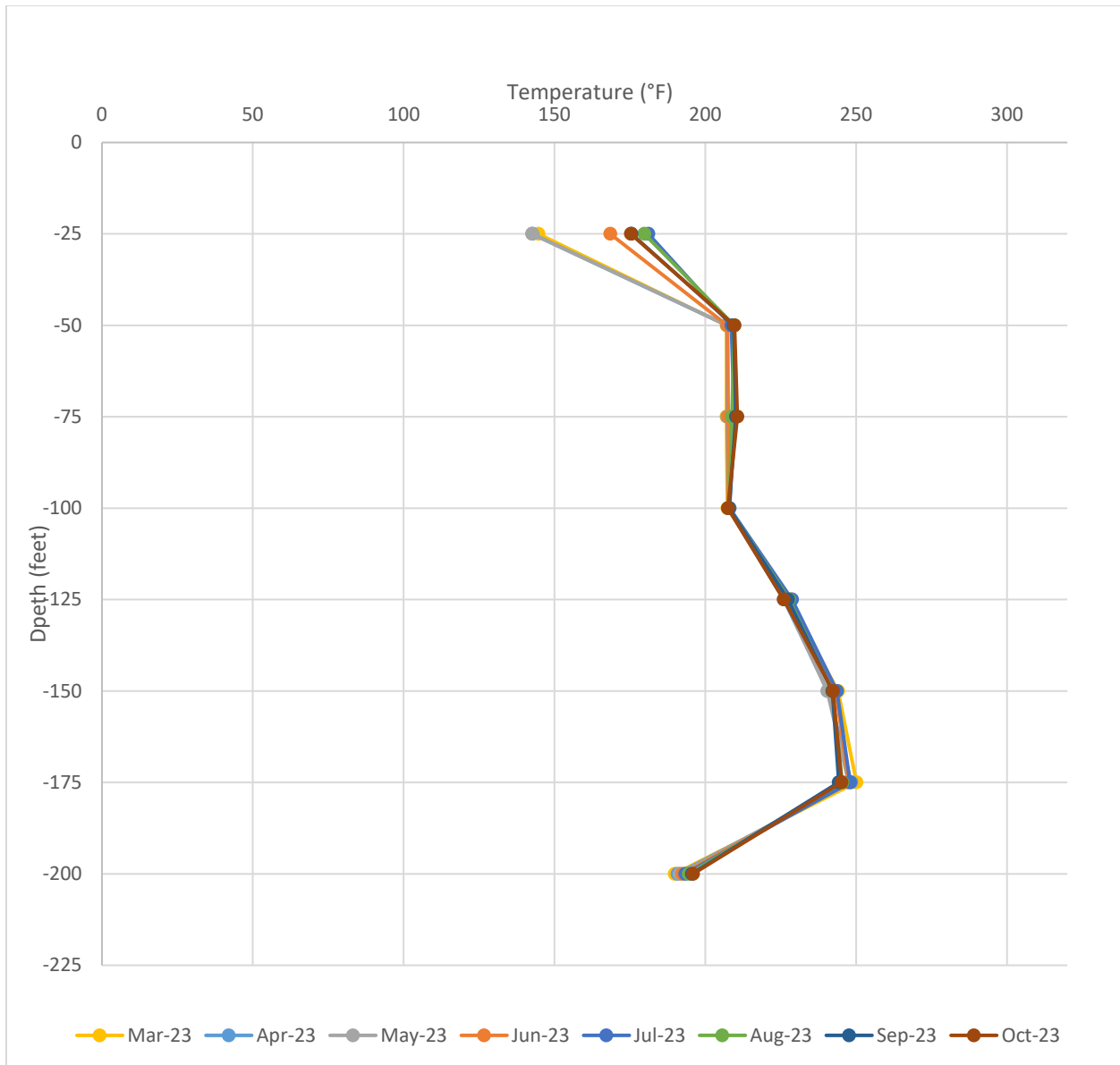


Figure 17 shows daily average temperatures in Temperature Probe 5 (TP-5) during the months of March through October. Based on the data, temperatures have been consistent during the last eight months. TP-5 had sensor failures below 175 ft starting on October 25, 2023, and sensor failures below 125 starting on October 28, 2023.

Figure 17. Average Temperatures within TP-5 During the Months of March through October



TP-5 was damaged in late October and the sensors at the 125-foot, 150-foot, 175-foot, and 200-foot depths stopped functioning. SCS is troubleshooting the software and hardware to determine if the sensors can be repaired. Figure 18 shows the damage to TP-5.

Figure 18. Damage to TP-5



Figure 19 shows daily average temperatures in Temperature Probe 6 (TP-6) during the months of March through October. Based on the data, temperatures have been generally consistent during the last seven months. A decrease at the 25-foot level was observed during the months of June, September, and October. Temperatures returned to baseline during the months of July and August. TP-6 was originally drilled to a depth of 208 feet and casing was installed to the full depth. During the installation of the replacement sensors, a blockage within the casing prevented placement of sensors below the 125-foot depth.

Figure 19. Average Temperatures within TP-6 During the Months of March through October

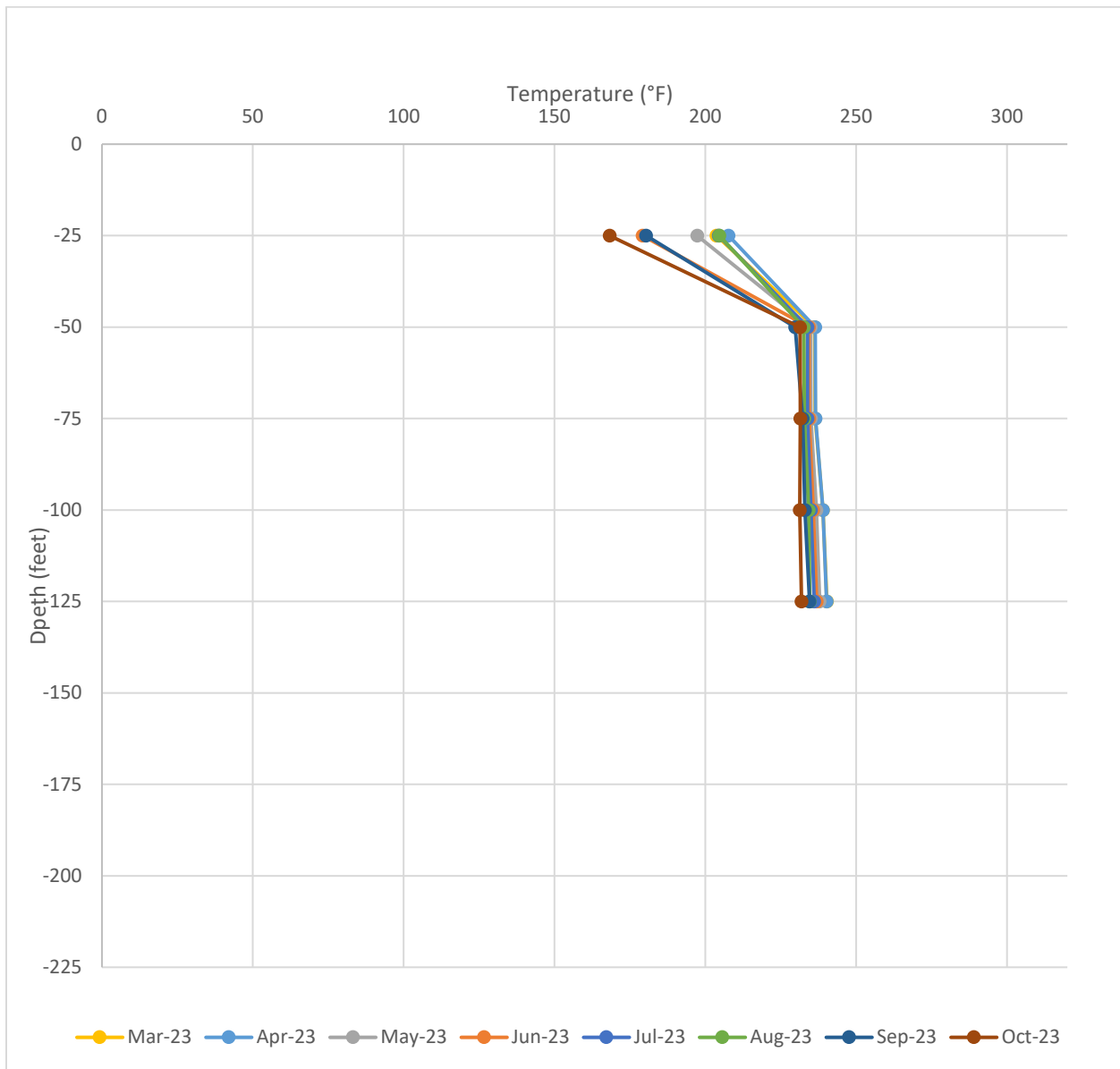


Figure 20 shows daily average temperatures in Temperature Probe 7 (TP-7) during the months of March through October. Based on the data, temperatures have been consistent during the last eight months with a general downward trend. TP-7 did not record temperatures between August 15, 2023 and September 17, 2023 due to a dead battery. A replacement battery was installed in September of 2023 and TP-7 recording temperatures again on September 18, 2023.

Figure 20. Average Temperatures within TP-7 During the Months of March through October

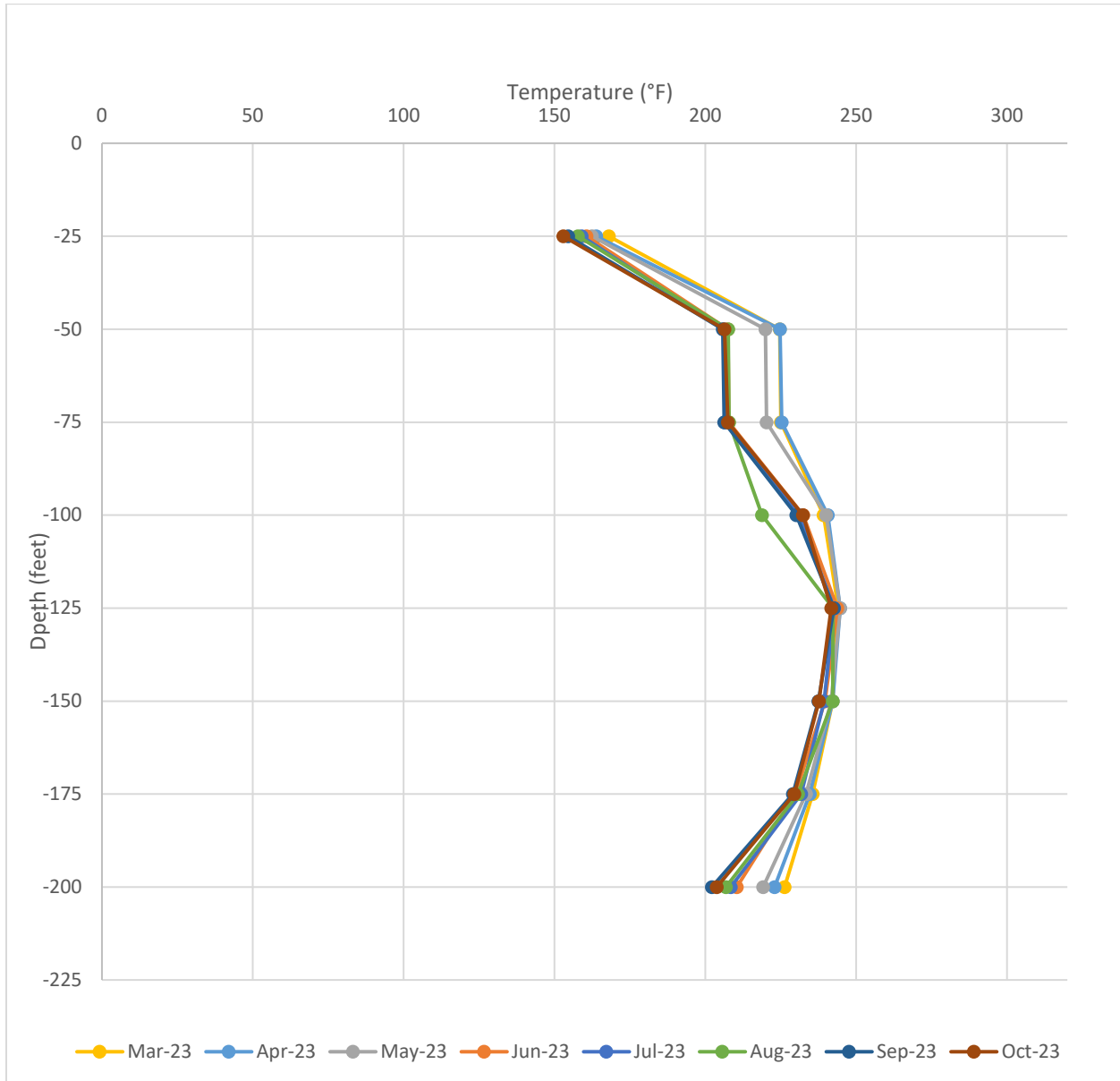


Figure 21 shows daily average temperatures in Temperature Probe 8 (TP-8) during the months of March through October. Based on the data, temperatures have increased during the last eight months. The rate of increase appears to have slowed between September and October.

Figure 21. Average Temperatures within TP-8 During the Months of March through October

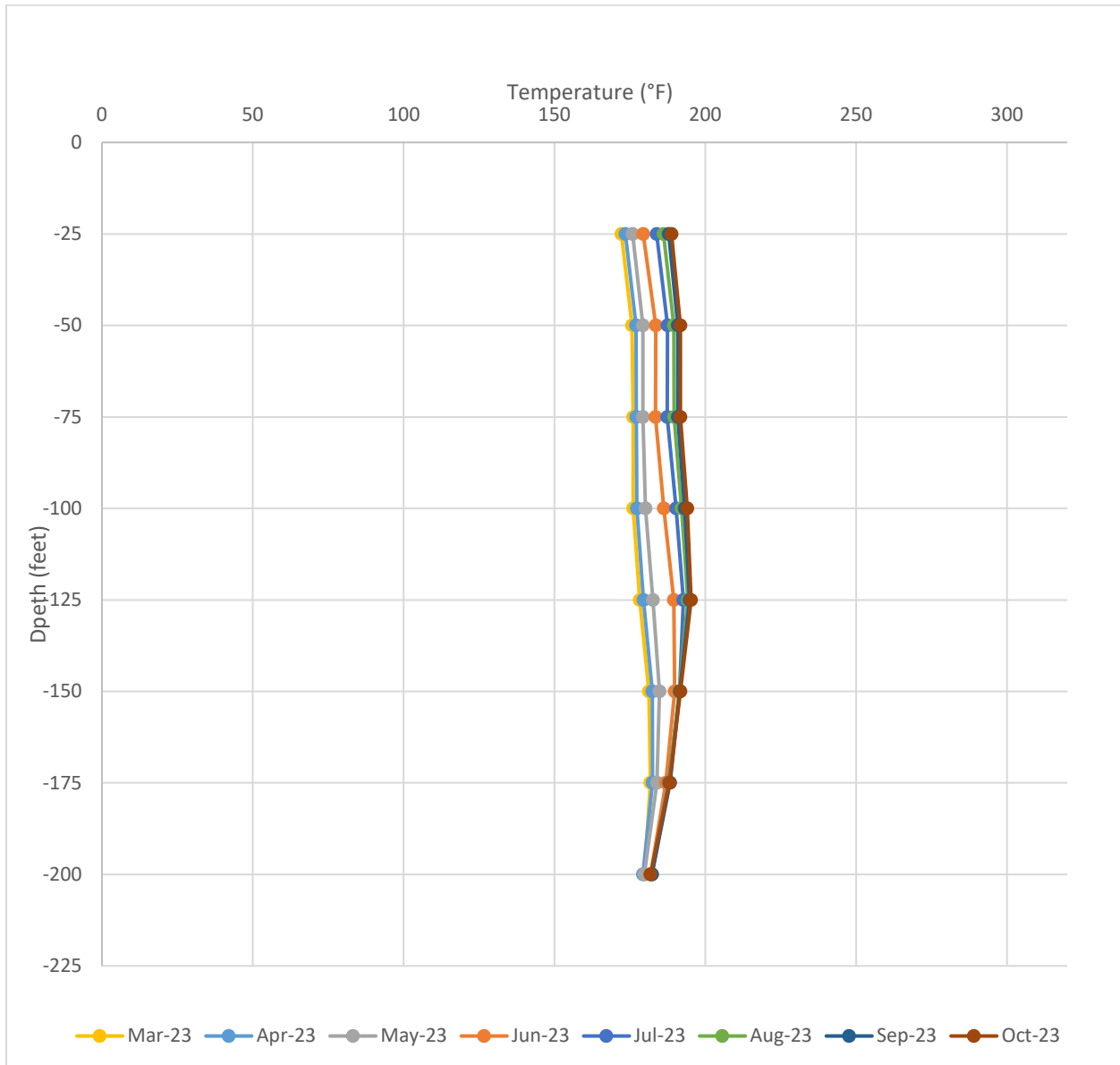
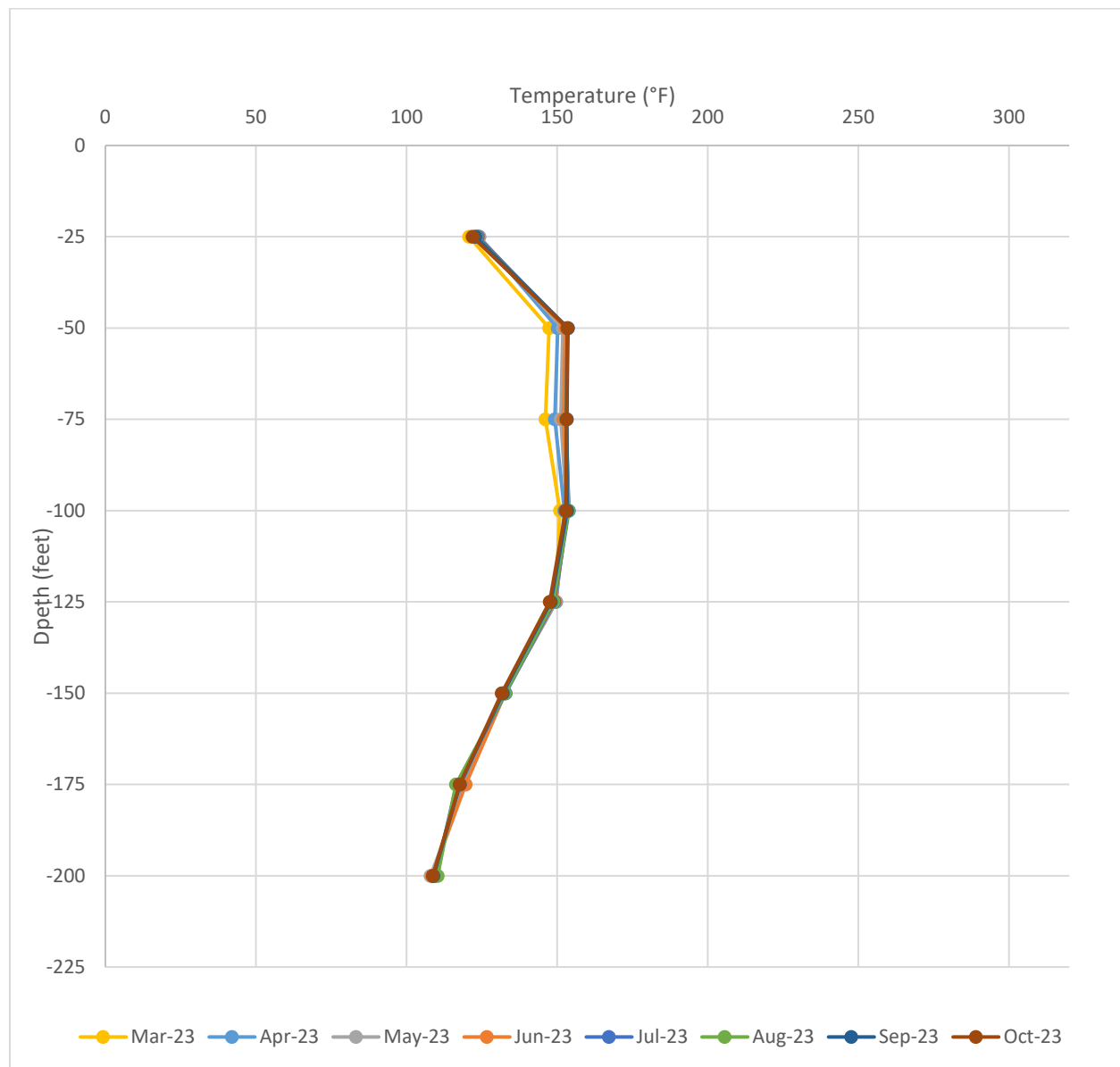


Figure 22 shows daily average temperatures in Temperature Probe 9 (TP-9) during the months of March through October. Based on the data, temperatures have been consistent during the last eight months.

TP-2 did not record temperatures between August 15, 2023 and September 17, 2023 due to a dead battery. A replacement battery was installed in September of 2023 and TP-2 recording temperatures again on September 18, 2023.

Figure 22. Average Temperatures within TP-9 During the Months of March through October



The data indicates that temperatures within the landfill are generally stable and are typical of those observed at elevated temperature landfills (ETLFs). During the months of May through September,

there has been substantial construction at the landfill including deep dual extraction wells that may have impacted temperatures within the waste mass adjacent to the probes. While quantifying the effect of the construction of addition wells is difficult, changes in wellhead temperature have been observed in existing wells adjacent to newly installed wells. The temperatures recorded are substantially lower than those associated with landfill fires or other combustion processes, which can exceed 1000°F. This further indicates that the elevated temperatures are due to sources other than combustion.

4.0 LEACHATE EXTRACTION AND MONITORING

The City has begun taking steps to improve the extraction of leachate from the waste mass and collect analytical data on leachate characteristics. The following sections detail steps taken to achieve these goals.

4.1 EXISTING SYSTEM OPTIMIZATION

During bimonthly gas extraction well monitoring, SCS also collected stroke counter data from the pumps installed in the GCCS extraction wells. Stroke count measurements are also collected weekly as part of routine pump maintenance. These stroke counts were collected from 42 wells on October 5, 2023, October 9, 2023, October 18, 2023, and October 26, 2023. The data collected is summarized in Table 6. Cells marked with “*” represent dates when the pump was removed from the well for maintenance or had not yet been installed.

Table 6. Summary of Dual Extraction Well Pump Stroke Counter Data

Well	October 5, 2023	October 9, 2023	October 18, 2023	October 26, 2023
EW33B	13	13	13	13
EW36A	609040	609040	609040	609040
EW49	777885	777885	777885	777885
EW50	1265815	1270868	1270868	1283390
EW51	1005567	1005994	1005994	1005994
EW52	279528	279528	285800	302334
EW53	2326265	2326282	2326959	2327624
EW54	597282	597282	597284	597284
EW55	603140	608620	608620	654821
EW57	704441	704441	704441	704441
EW58	2453658	2453658	2489929	2490468
EW59	2400498	2400498	2400518	2430672
EW60	484832	484832	493103	519847
EW61	244061	244061	244061	244061
EW62	196706	197197	197983	198799
EW64	177589	177589	177589	177589
EW67	436131	436131	617842	864971
EW68	2216423	2216429	2217918	2219072

Well	October 5, 2023	October 9, 2023	October 18, 2023	October 26, 2023
EW70	15	15	15	15
EW72	27	27	27	27
EW73	23	23	23	23
EW74	16	16	16	16
EW75	18	18	18	18
EW76	23	23	23	23
EW78	56687	58708	61375	65590
EW79	0	0	0	0
EW81	673816	707615	707615	856500
EW82	557742	594673	594673	698099
EW83	714010	714018	714018	772746
EW85	0	45454	45460	74385
EW87	718837	718837	718837	473174
EW88	0	0	0	0
EW89	0	0	0	0
EW90	170667	170667	170671	170671
EW91	774071	825003	387046	745042
EW92	758833	799959	306090	598217
EW94	252236	252240	519848	519848
EW95	10	10	*	*
EW96	481527	525751	982391	375626
EW98	1291185	1291188	1347784	1347784
EW99	0	12	*	*
EW100	244707	244708	299698	299698

Based on this data and stroke counts taken on October 26, 2023, SCS can estimate the number of gallons of liquid pumped from each well. SCS assumed that each stroke from a float-style pneumatic pump correlates to approximately 0.3 gallons of liquid removed from the well. Additionally, Blackhawk piston-style pumps remove approximately 0.11 gallons per stroke recorded. This data will then be used to repair or replace pumps or replace nonfunctional stroke counters. Estimates of the quantities of liquids removed between the reading dates are shown in Table 7.

Table 7. Summary of Dual Extraction Well Pump Liquids Removal

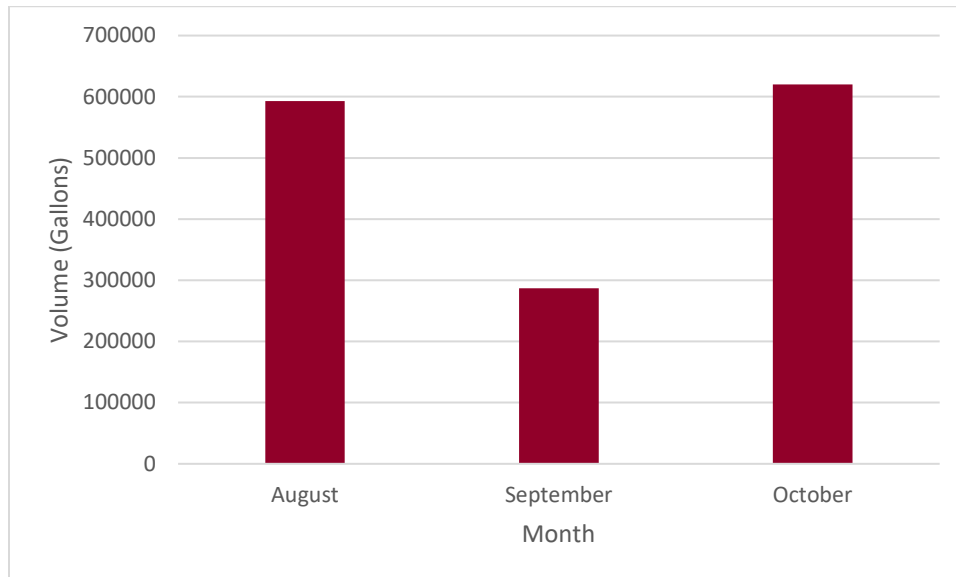
Well	Liquids Removed (gal) September 28, 2023 to October 5, 2023	Liquids Removed (gal) October 5, 2023 to October 9, 2023	Liquids Removed (gal) October 9, 2023 to October 18, 2023	Liquids Removed (gal) October 18, 2023 to October 26, 2023
EW33B	0	0	0	0
EW36A	0	0	0	0
EW49	14.4	0	0	0

Well	Liquids Removed (gal) September 28, 2023 to October 5, 2023	Liquids Removed (gal) October 5, 2023 to October 9, 2023	Liquids Removed (gal) October 9, 2023 to October 18, 2023	Liquids Removed (gal) October 18, 2023 to October 26, 2023
EW50	3699.6	1515.9	0	3756.6
EW51	0	128.1	0	0
EW52	7996.2	0	1881.6	4960.2
EW53	70.5	5.1	203.1	199.5
EW54	1.2	0	0.6	0
EW55	10005.6	1644	0	13860.3
EW57	9970.2	0	0	0
EW58	4768.8	0	10881.3	161.7
EW59	24	0	6	9046.2
EW60	3.3	0	2481.3	8023.2
EW61	0	0	0	0
EW62	571.8	147.3	235.8	244.8
EW64	5.7	0	0	0
EW67	16305.6	0	54513.3	74138.7
EW68	9.9	1.8	446.7	346.2
EW70	0.6	0	0	0
EW72	0	0	0	0
EW73	2.4	0	2.1	0
EW74	0	0.6	0	0
EW75	2.7	1.5	0	0
EW76	3	0	0	0
EW78	1732.8	606.3	800.1	1264.5
EW79	0	0	0	0
EW81	0	10139.7	0	44665.5
EW82	0	11079.3	0	31027.8
EW83	0	2.4	0	17618.4
EW85	0	13636.2	1.8	8677.5
EW87	0	0	0	226301.1
EW88	0	0	0	0
EW89	0	0	0	0
EW90	751.2	0	1.2	0
EW91	0	15279.6	168612.9	107398.8
EW92	0	12337.8	151839.3	87638.1
EW95	0	0	*	*
EW96	0	13267.2	136992	117970.5
EW98	18202.5	0.9	16978.8	0
EW99	0	3.6	*	*

Well	Liquids Removed (gal) September 28, 2023 to October 5, 2023	Liquids Removed (gal) October 5, 2023 to October 9, 2023	Liquids Removed (gal) October 9, 2023 to October 18, 2023	Liquids Removed (gal) October 18, 2023 to October 26, 2023
EW100	10987.5	0.3	16497	0

SCS estimates that approximately 620,000 gallons of liquids were removed from the landfill gas collection and control system during the month of October. This figure includes the amount of liquids that were removed by the Blackhawk pumps that were installed in September 2023. SCS-FS continues to implement an aggressive maintenance schedule for landfill gas liquids removal pumps. The Blackhawk pump at EW91 removed the largest amount of liquids at 103,000 gallons in October. EW-98 was the highest performing float-style pump at 35,000 gallons removed. The progress in landfill gas liquids removal over the last three months is depicted in Figure 23.

Figure 23. Estimated Volume of Liquids Removed from Landfill Gas Wells



The City and SCS understand that operations of dewatering pumps are critical to address issues related to heat, odors, and the efficient operation of the GCCS. The landfill conditions present a challenging environment for pump operations. Pumps require servicing after relatively short intervals. During the month of October 2023, pump maintenance occurred on October 3, 2023; October 10, 2023; October 17, 2023; and October 24, 2023. Additionally, minor pump modifications and repairs were made throughout the month to extend pump runtimes before failure.

In some cases, low volumes of landfill liquids removed correlate to low measured liquid levels within the gas wells. During the landfill gas well liquids monitoring event, the following wells were noted to be dry or have low liquid levels: EW-49, EW-53, EW-58, EW-60, EW-63, EW-69, EW-70, EW-72, EW-74, EW-80, EW-81, EW-82, EW-83, EW-84, and EW-95. When this condition is identified, pump may be relocated to wells with consistently higher liquid levels. For example, on October 17, 2023, EW-95 and EW-99 had their pneumatic float-style pumps removed due to being dry. These pumps will be redeployed at an applicable extraction well in the future. The liquids removed from these two wells are reflected as part of this report but will be removed in November and going forward.

No additional pumps were installed during the month of October 2023. The performance of the eleven Blackhawks that were installed in September are being monitored routinely and adjustments are being made as necessary. Each Blackhawk pump installed also has a corresponding stroke counter. These liquids will be tracked going forward and will contribute to the overall gallons totals of liquids removed from SWP no. 588.

During the construction of the LFGCCS expansion outlined in Sections 1.4 and 2.1, multiple types of leachate extraction pumps were installed. The City and SCS will evaluate the performance of those pumps in the coming months. Based on that evaluation, the City will select the pump type that is most effective given the landfill conditions.

4.2 SAMPLING AND ANALYSIS PLAN

On November 1, 2022, SCS submitted to VDEQ the Dual Phase Landfill Gas Extraction Well Leachate Monitoring Plan for the Bristol Integrated Solid Waste Management Facility Solid Waste Permit No. 588 Landfill and the plan was subsequently revised on December 1, 2022. Refer to the November 2022 and December 2022 Compliance Reports for the SWP No. 588 Landfill for additional information.

4.2.1 Sample Collection

On October 11, 2023, SCS collected leachate samples from three Dual Phase LFG-EWs (EW-55, EW-78, and EW-87). At the time of sample collection dissolved oxygen, oxidation-reduction potential, pH, specific conductance, temperature, and turbidity were measured and recorded. The sample collection log is included in **Appendix F**.

SCS' field staff were not able to collect samples from the following wells for the following reasons:

- No discharge was occurring at the time of monitoring from the following wells: EW-36A, EW-91, EW-92, EW-96.
- Pumps were not running at the time of monitoring for the following wells: EW-33B, EW-49, EW-51, EW-54, EW-57, EW-59, EW-60, EW-61, EW-62, EW-64, EW-67, EW-68, EW-70, EW-73, EW-76, EW-85, EW-89, EW-90, EW-94, EW-95, EW-98, and EW-99.
- Pump was disconnected or there was no pump for the following wells: EW-50, EW-52, EW-56, EW-63, EW-65, EW-71, EW-75, EW-77, EW-79, EW-80, EW-86, EW-93, EW-97, and EW-100.
- The pump was not running and the well appeared to be dry at the time of monitoring for the following wells: EW-58, EW-81, EW-82, and EW-83.
- There is no pump or pump was disconnected and well appeared to be dry at the time of monitoring for the following wells: EW-53, EW-72, and EW-84
- There is no sample port and pumps were not running at the time of monitoring for the following wells: EW-69 and EW-88. The City and SCS-FS are coordinating to get sample ports installed on these wells.
- There is no sample port and well appeared to be dry at the time of monitoring for well EW-74. The City and SCS-FS are coordinating to get sample port installed on this well.

The samples were delivered to Enthalpy Analytical (Enthalpy) in Richmond, Virginia and Weck Laboratories, Inc (Weck) in City of Industry, California for analysis. The Enthalpy's Virginia Division of Consolidated Laboratory Services (VELAP) certifications are provided on the certificate of analysis (COA) included in **Appendix F**. The samples were analyzed for the parameters utilizing the analytical methods described in the Dual Phase Landfill Gas Extraction Well Leachate Monitoring Plan.

4.2.2 Quality Assurance and Quality Control

Field quality control (QC) involved the collection and analysis of trip blanks to verify that the sample collection and handling processes did not impair the quality of the samples. Trip blanks were prepared for VOC analysis via Solid Waste (SW)-846 Method 8260D. In conjunction with the preparation of the groundwater sample collection bottle set, laboratory personnel filled each trip blank sample bottle with distilled/deionized water and transported them with the empty bottle kits to SCS. Field personnel handled the trip blanks like a sample; they remained un-opened, were transported in the sample cooler, and were returned to the laboratory for analyses. A trip blank is used to indicate potential contamination due to the potential migration of VOCs from the air at the site or in the sample shipping containers, through the septum or around the lid of the sampling vials and into the sample.

Laboratory quality assurance/quality control (QA/QC) involves the routine collection and analysis of method reagent blanks, matrix spike (MS) and matrix spike duplicate (MSD) samples, and laboratory control samples (LCS). A summary of each of these is presented below:

- **Method Blank** – The method blank is deionized water subjected to the same reagents and manipulations to which site samples are subjected. Positive results in the method blanks may indicate either contamination of the chemical reagents or the glassware and implements used to store or prepare the sample and resulting solutions.
- **MS/MSD** – A MS is an aliquot of a field sample with a known concentration of target parameter added to it. An MSD is an intra-laboratory split sample spiked with a known concentration of target parameter. Spiking for each occurs prior to sample analysis. MS/MSD samples are collected for every batch of twenty or fewer samples. Matrix spike recoveries are used to indicate what effect the sample matrix may have on the reported concentration and/or the performance of the sample preparation and analysis.
- **LCS** – These samples consist of distilled/deionized water injected with the parameters of interest for single parameter methods and selected parameters for multi-parameter methods according to the appropriate analytical method. LCS samples are prepared and analyzed for each batch containing twenty or fewer samples. LCS recoveries are used to monitor analytical accuracy.

Surrogate recoveries are also measured as a part of laboratory QA/QC. Surrogates are organic compounds that are like the parameters of interest in chemical composition, extraction, and chromatography, but are not normally found in environmental samples. These compounds are inserted into blank, standards, samples, and spiked samples prior to analysis for organic parameters only. Percent recoveries are calculated for each surrogate. Spike recoveries at or below acceptance criteria indicate whether analytical results can be considered biased high or biased low.

No method or trip blank detects were identified for the October 2023 monitoring event. The laboratory analysis reports for the October 2023 monitoring event trip blanks are included in

Appendix F. The October 2023 monitoring event laboratory QA/QC reports, including the method blank results, are included in the COA in **Appendix F**.

4.2.3 Data Validation

To identify analytical data that may not represent valid results, data from the monitoring events were validated by the Laboratory and SCS in accordance with United States Environmental Protection Agency (EPA) guidance⁴. Data flagged with a “J” qualifier indicates the quantitation of the parameter is less than the laboratory’s limit of quantitation but greater than the laboratory’s limit of detection (LOD); thus, the concentration is considered estimated. Samples with parameter detections less than five times that of the trip blank, field blank, and/or method blank detection but greater than the laboratory’s LOD are flagged with a “B” qualifier. Samples with common laboratory contaminant parameter detections less than 10 times that of the trip blank, field blank, and/or method/laboratory blank detection but greater than the laboratory’s LOD are flagged with a “B” qualifier. Data with a “B” qualifier are considered not validated as the detection may be anomalous due to cross-contamination during sampling, transportation of samples, or laboratory analysis.

No leachate results were flagged with a “B” qualifier for the October 2023 monitoring event as no constituents were detected in the October 2023 method or trip blanks. The October 2023 detections flagged with a “J” qualifier are shown on **Table 8**.

4.2.4 Laboratory Analytical Results

The analytical results for the October 2023 leachate samples collected from extraction wells EW-55, EW-78, and EW-87 are summarized in **Table 8**. The associated COAs are included in **Appendix F**. Parameter results from October 2023 and previous monitoring events (November 2022 – September 2023) are presented on a table in **Appendix F**.

Table 8. Monthly LFG-EW Leachate Monitoring Event Summary

Well ID	EW-55	EW-78	EW-87	LOD	LOQ
Parameter	October 2023 Concentration				
Ammonia as N (mg/L)	1980	1730	2890	146	200
Biological Oxygen Demand (mg/L)	34600	690	37000	0.2	2
Chemical Oxygen Demand (mg/L)	---	5320	---	500	500
	51000	---	---	5000	5000
	---	---	63600	10000	10000
Nitrate as N (mg/L)	---	ND	---	0.35	1.35
	ND	---	---	1	3

⁴ United States Environmental Protection Agency. Guidance for Data Usability in Risk Assessment (Part A-14). April 1992.

United States Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. National Functional Guidelines for Inorganic Superfund Methods Data Review. January 2017.

United States Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. National Functional Guidelines for Organic Superfund Methods Data Review. January 2017.

Table 8. Monthly LFG-EW Leachate Monitoring Event Summary

Well ID	EW-55	EW-78	EW-87	LOD	LOQ
Parameter	October 2023 Concentration				
	---	---	ND	1.5	3.5
Nitrite as N (mg/L)	---	ND	---	0.25	1.25
	ND	---	ND	0.5	2.5
Total Kjeldahl Nitrogen (mg/L)	1050	---	1320	40	100
	---	4630	---	100	250
Total Recoverable Phenolics (mg/L)	---	4.13	---	0.15	0.25
	37	---	38.7	0.6	1
SEMI-VOLATILE ORGANIC COMPOUND (ug/L)					
Anthracene	---	---	ND	40	80
	---	ND	---	50	100
	ND	---	---	500	1000
TOTAL METALS (mg/L)					
Arsenic	---	0.24	0.31	0.0005	0.001
	0.36	---	---	0.001	0.002
Barium	---	0.664	---	0.002	0.01
	2.56	---	1.93	0.005	0.025
Cadmium	---	0.000171 J	ND	0.0001	0.001
	ND	---	---	0.0002	0.002
Chromium	---	0.144	0.194	0.0004	0.001
	0.273	---	---	0.0008	0.002
Copper	---	0.00361	0.000609 J	0.0003	0.001
	0.00806	---	---	0.0006	0.002
Lead	---	0.0036	0.0034	0.001	0.001
	0.0077	---	---	0.002	0.002
Mercury	0.00165	ND	0.00055	0.0004	0.0004
Nickel	---	0.2019	0.09206	0.001	0.001
	0.104	---	---	0.002	0.002
Selenium	---	0.00186	0.0044	0.00085	0.001
	0.00332	---	---	0.0017	0.002
Silver	---	ND	ND	0.00006	0.001
	ND	---	---	0.00012	0.002
Zinc	---	0.0622	---	0.0025	0.005
	0.203	---	633	0.005	0.01
VOLATILE FATTY ACIDS mg/L					
Acetic Acid	3200	720	4100	370	500

Table 8. Monthly LFG-EW Leachate Monitoring Event Summary

Well ID	EW-55	EW-78	EW-87	LOD	LOQ
Parameter	October 2023 Concentration				
Butyric Acid	1200	ND	2000	330	500
Propionic Acid	1300	ND	2000	340	500
VOLATILE ORGANIC COMPOUNDS (ug/L)					
2-Butanone (MEK)	---	211	---	15	50
	17800	---	33400	1500	5000
Acetone	---	79	---	35	50
	66900	---	92900	3500	5000
Benzene	---	399	---	2	5
	576	---	3100	20	50
Ethylbenzene	---	34.8	---	2	5
	42.5 J	---	247	20	50
Tetrahydrofuran	---	606	---	50	50
	4870	---	9140	500	500
Toluene	---	59.2	---	2.5	5
	37 J	---	235	25	50
Xylenes, Total	---	30.6	---	5	15
	134 J	---	328	50	150

--- = not available

J = Constituent was detected at a concentration above the laboratory's LOD but below the laboratory's LOQ.

Concentration is estimated and not validated.

LOD = laboratory's Limit of Detection

LOQ = laboratory's Limit of Quantitation

mg/L = milligrams per liter

ND = Not Detected

ug/L = micrograms per liter

5.0 SETTLEMENT MONITORING AND MANAGEMENT

The City is taking steps to track and manage settlement occurring in the landfill. A summary of actions taken to quantify and manage settlement is included in the sections below.

5.1 SETTLEMENT MONITORING AND MANAGEMENT PLAN

On behalf of the City, SCS submitted a settlement monitoring and management plan to VDEQ on November 15, 2022. Refer to the November Monthly Compliance Report for the SWP No. 588 Landfill for additional information.

5.2 MONTHLY SURVEYS

5.2.1 Topographic Data Collection

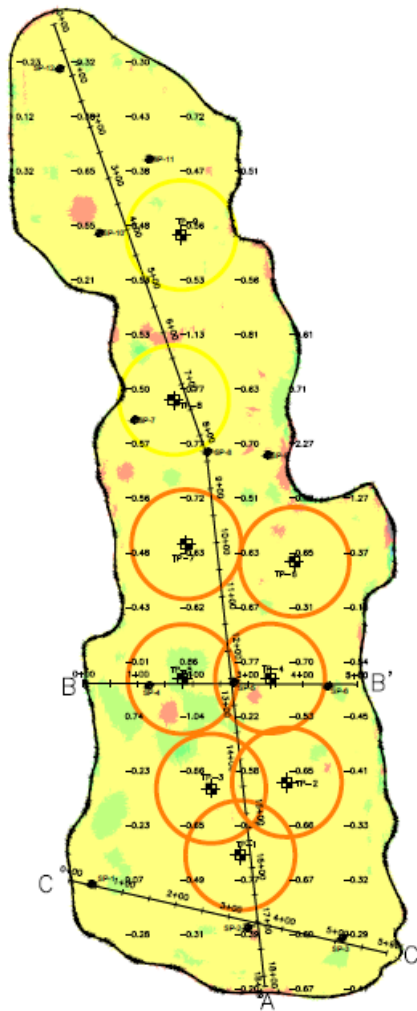
The City, through SCS, collected topographic data of the Solid Waste Permit No. 588 Landfill using photogrammetric methods via an unmanned aerial vehicle (UAV or drone). On October 12, 2023, the flight was completed and the topographic data collected. The topographic data collected is shown on Sheet 4 in Appendix E.

The topography within the landfill footprint was compared to topographic data collected by SCS using photogrammetric methods on September 15, 2023. A drawing depicting the September 15, 2023 topography is included as Sheet 3 in Appendix E.

Based on a comparison of the topographic data collected on those two dates, settlement occurred that reduced the volume of waste in the landfill by approximately 14,400 cubic yards. During that same time period, approximately 700 cubic yards of construction related fill were placed on the landfill. This fill was primarily soil stock-piled and placed as part of the sidewall odor mitigation system construction. This resulted in a net volume decrease of approximately 13,700 cubic yards.

A visual depiction of settlement and filling at the landfill during this time is depicted in Figure 24. Areas in red indicate where elevations decreased and areas in green indicate areas where elevations have increased. Darker colors indicate greater changes in elevation. This drawing is also included as Sheet 5 in Appendix E.

Figure 24. 1-Month Elevation Change Color Map



The locations of in-waste temperature monitoring probes are also shown on Figure 24 and Figure 25. The circles around the probes indicate how high the average temperatures measured by the probe are. The circles shown are offset from the probes for clarity only and do not necessarily indicate temperatures measured at locations away from the probe. Probes with a yellow circle around them, typically measure an average temperature across the full depth of the probe of less than 200 degrees Fahrenheit. Probes with an orange circle around them, typically measure an average temperature across the full depth of the probe greater than 200 degrees Fahrenheit and less than 250 degrees Fahrenheit. Probes with a red circle around them, typically measure an average temperature across the full depth of the probe greater than 250 degrees Fahrenheit and less than 300 degrees Fahrenheit.

The largest settlement occurred primarily in the middle-southern end of the landfill where the waste settled by approximately 0.6 feet or more in some areas. The southern end of the landfill is the location of the gas wells and temperature probes exhibiting higher temperatures. These higher settlement values are typical of elevated temperature landfill conditions. A small portion of the landfill exhibited an increase in elevation in some areas, likely due to continued soil placement associated with construction of the Sidewall Odor Mitigation System. Some soil stockpile locations

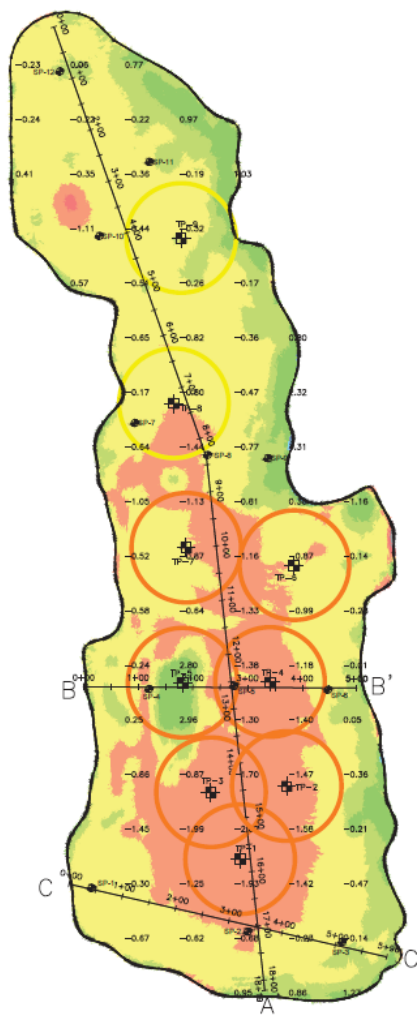
associated with the Sidewall Odor Mitigation System showed large elevation changes due to material removal from the stockpiles.

SCS calculated the waste footprint for purposes of analysis to be 752,610 square feet. Based on that area and the net volume change, the average elevation decrease was approximately 0.49 feet.

SCS also compared the topographic data collected in October to the topographic data collected on July 12, 2023. Based on a comparison of the topographic data collected on those two dates, settlement occurred that reduced the volume of waste in the landfill by approximately 19,000 cubic yards. During that same time period approximately 4,500 cubic yards of construction-related fill were placed on the landfill. This fill was primarily soil placed as part of the sidewall odor mitigation system construction. This resulted in a net volume decrease of approximately 14,500 cubic yards.

A visual depiction of settlement and filling at the landfill during this time is depicted in Figure 25. Areas in red indicate where elevations decreased and areas in green indicate areas where elevations have increased. Darker colors indicate greater changes in elevation. This drawing is also included as Sheet 6 in Appendix E.

Figure 25. 3-Month Elevation Change Color Map



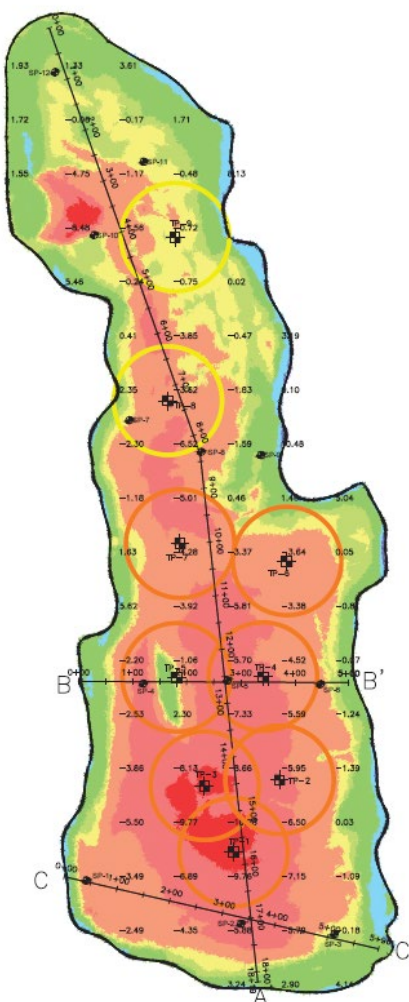
Based on the area of the landfill and the net volume change, the average elevation decrease was approximately 0.52 feet.

The largest settlement occurred primarily in the southern end of the landfill where the waste settled by approximately 2 feet or more in some areas. The southern end of the landfill is the location of the gas wells and temperature probes exhibiting higher temperatures. These higher settlement values are typical of elevated temperature landfill conditions. Settlement in the northern portion of the landfill was generally less substantial or was offset by soil placement associated with construction activities. Changes in elevation in these areas are more representative of typical settlement at municipal landfills. Some portions of the landfill perimeter exhibited an increase in elevation, likely due to sediment deposition during storm events and soil placement associated with construction of the Sidewall Odor Mitigation System. There were some large variations in elevation associated with soil stockpiling operations.

SCS also compared the topographic data collected in October to the topographic survey performed on October 7, 2022 by NV5 Geospatial. Based on a comparison of the topographic data collected on those two dates, settlement occurred that reduced the volume of waste in the landfill by approximately 75,000 cubic yards. During that same time period approximately 22,500 cubic yards of construction-related fill were placed on the landfill. This fill was primarily soil placed as part of the sidewall odor mitigation system construction. This resulted in a net volume decrease of approximately 52,500 cubic yards.

A visual depiction of settlement and filling at the landfill during this time is depicted in Figure 26. Areas in red indicate where elevations decreased and areas in green indicate areas where elevations have increased. Darker colors indicate greater changes in elevation. This drawing is also included as Sheet 7 in Appendix E.

Figure 26. 1-Year Elevation Change Color Map



The largest settlement occurred primarily in the southern end of the landfill where the waste settled by approximately 10 feet or more in some areas. These significant settlement values are typical of elevated temperature landfill conditions. The landfill perimeter exhibited an increase in elevation, likely due to soil placement associated with construction of the Sidewall Odor Mitigation System. There were variations in elevation associated with soil stockpiling operations.

Based on the landfill area and the net volume change, the average elevation decrease was approximately 1.88 feet.

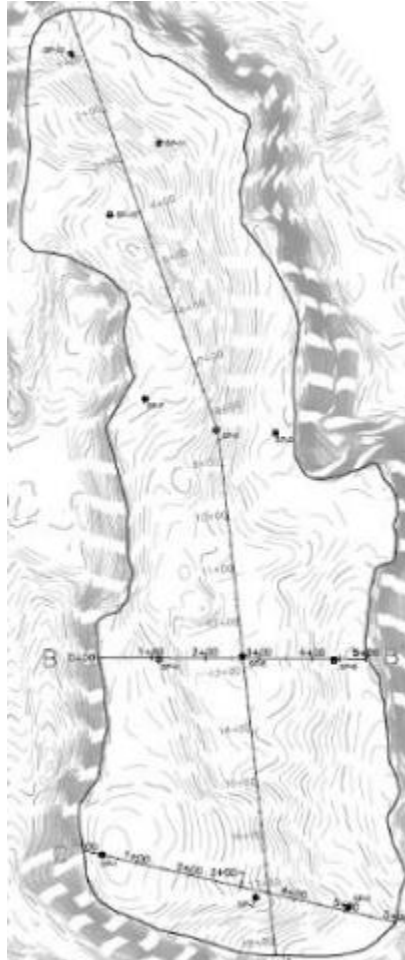
SCS will collect topographic data covering the landfill surface again in November using photogrammetric methods via UAV. This data will be compared to the data collected in October and August.

5.2.2 Settlement Plate Surveys

On November 7, 2022 SCS field services installed 12 settlement plates on the Solid Waste Permit No. 588 landfill. The construction and installation of the settlement plates generally conforms to the

design outline in the Settlement Monitoring and Management Plan. The tops of the PVC pipes were spray painted orange to improve visibility. The settlement plate locations are depicted in Figure 27 and on Sheet 1 in Appendix E.

Figure 27. Settlement Plate Locations



The locations of the settlement plates were surveyed by the City's surveyor on November 14, 2022. The settlement plates were surveyed again on December 13, 2022; January 3, 2023; February 6, 2023; March 8, 2023; April 3, 2023; May 11, 2023; June 5, 2023; July 10, 2023; August 17, 2023; September 11, 2023; and October 11, 2023. The surveyed coordinates⁵ and elevation changes of the settlement plates are shown in Table 9.

⁵ Settlement plate locations and coordinates are based on a local coordinate system.

Table 9. Settlement Plate Locations

Settlement Plate	Northing	Eastings	Elevation on October 11, 2023	Elevation Change Since September 11, 2023	Strain ⁶ Since September 11, 2023	Elevation Change Since Installation	Strain Since Installation
SP-1	3,397,886.8	10,412,079.2	1,831.2	-0.3	-0.4%	-3.2	-4.9%
SP-2	3,397,809.3	10,412,365.6	1,803.7	-0.7	-0.4%	-6.8	-4.2%
SP-3 ⁷	3,397,787.2	10,412,536.6	NA	NA	NA	NA	NA
SP-4 ⁸	3,398,250.7	10,412,186.8	1,809.8	-0.3	-0.2%	-7.6	-4.9%
SP-5	3,398,255.9	10,412,338.8	1,794.7	-0.7	-0.3%	-6.0	-2.4%
SP-6	3,398,248.8	10,412,510.2	1,775.5	-0.5	-0.3%	-2.1	-1.6%
SP-7 ⁹	3,398,735.3	10,412,158.0	1,826.3	-0.4	-0.4%	-2.4	-2.1%
SP-8	3,398,678.5	10,412,291.0	1,803.1	-0.4	-0.2%	-4.3	-1.7%
SP-9	3,398,673.3	10,412,400.9	1,782.9	-0.4	-0.4%	-2.9	-2.9%
SP-10	3,399,080.1	10,412,093.1	1,838.5	-0.3	-0.1%	-1.7	-0.6%
SP-11	3,399,216.3	10,412,183.6	1,815.5	-0.2	-0.1%	-0.8	-0.3%
SP-12	3,399,381.9	10,412,019.5	1,810.3	0.1	0.1%	-0.4	-0.3%

Settlement Plates 1, 2, 7, and 9 demonstrated larger settlements than at other locations. Settlement Plates 2 and 7 were damaged during construction operations. Settlement Plate 1 is located in the southern end of the landfill. This area is where waste was most recently placed and is expected to show the most rapid settlement. This area is also the location of the gas wells and temperature probes exhibiting higher temperatures. These higher settlement values are typical of elevated temperature landfill conditions.

The change in elevation at Settlement Plates 10, 11, and 12 was lower and more representative of typical settlement at municipal landfills. The change in elevation at Settlement Plates 4, 5, 6, and 8 falls somewhere in between these two categories. SCS believes that Settlement Plate 4 was disturbed by grading work on an adjacent roadway. Settlement Plate 3 was damaged and unable to be measured during September and October of 2023.

The settlement plates will be surveyed again during the month of November. The elevations surveyed will be compared to the elevations surveyed the previous months.

6.0 INTERMEDIATE COVER AND EVOH COVER SYSTEM

The City is taking steps to provide intermediate and temporary cover of the wastes in the landfill. The sections below outline the steps taken by the City.

⁶ Strain is defined as the change in elevation divided by the estimated waste depth.

⁷ SCS suspects that SP-3 was damaged as a result of construction activities.

⁸ Based on field observations SP-4 appears to have been disturbed during grading on an adjacent roadway.

⁹ Based on field observations SP-7 appears to have been disturbed during grading on an adjacent stockpile.

6.1 INTERMEDIATE COVER INSTALLATION

The City completed hauling and placement of a 12-inch thick intermediate cover across the entire landfill prior to October 10, 2022. The cover was placed in accordance with 9VAC20-81-140(B)(1)(d). SCS coordinated with the City to dig a series of test holes to verify cover thickness in select locations. Details of these verifications were discussed in the October 2022 Monthly Compliance Report for the SWP No. 588 Landfill.

6.2 EVOH COVER SYSTEM DESIGN

SCS submitted responses, including revised documents, on March 20, 2023 to comments received from VDEQ concerning the Interim EVOH Cover System Preliminary Design Plans. The submitted documents included a revised operations manual and settlement calculations for the proposed stormwater basin. On April 28, 2023, SCS submitted the EVOH Cover System Stormwater Management Plan to VDEQ for the No. 588 landfill. SCS received a comment letter dated May 16, 2023 concerning the stormwater management plan. SCS prepared a response letter with revised drawings, documents, and calculations. The response package was submitted to VDEQ on June 23, 2023.

SCS is preparing construction drawings for the EVOH Cover System, including revisions discussed in the response to comments letters. The construction drawings build upon the preliminary design plans and the stormwater management plan. Potential modifications to the stormwater management plan submitted to VDEQ on April 28, 2023 will be included in the construction drawings. Stormwater modeling calculations will be provided as an attachment. Other additions to the construction drawings include additional design cross sections, landfill gas management plans and details, access road design, and other items.

SCS held a call with VDEQ personnel on August 31, 2023 to discuss potential changes to the EVOH Cover System design. The modifications include installing three separate stormwater basins within the quarry rather than one single basin. The proposed stormwater pumping infrastructure will be expanded to meet the requirements of the three basins. SCS submitted a letter to VDEQ on October 17, 2023 documenting the proposed changes. A copy of SCS is preparing a revised stormwater management plan to submit to VDEQ.

SCS continues to prepare specifications and contract documents for the construction of the EVOH Cover System.

6.3 EVOH COVER SYSTEM PROCUREMENT

Drawings used for the purposes of bidding, procurement and construction of the EVOH cover system will generally conform to the layout and details in the drawings described in section 6.2. SCS also prepared and submitted to VDEQ a specification for the EVOH geomembrane on January 30, 2023 based upon industry standards and discussions with material manufacturers. This specification and drawing set represent the first steps in the procurement process. SCS and the City have coordinated with potential suppliers to specify a product that is not currently anticipated to have long lead times. SCS has received a pro-forma data sheet from one manufacturer which is preparing a customized EVOH product for the No. 588 landfill.

6.4 EVOH COVER SYSTEM INSTALLATION

Installation of the EVOH cover system will begin after the installation of other infrastructure is complete.

7.0 STORMWATER MANAGEMENT

The City is taking steps to implement a stormwater management plan at the landfill. The sections below outline the steps taken by the City.

7.1 STORMWATER MANAGEMENT PLAN DEVELOPMENT

The stormwater management plan was submitted to VDEQ on April 28, 2023. The plan addresses the stormwater volume calculations, assumptions, design, and control measures. SCS received a comment letter dated May 16, 2023 concerning the stormwater management plan. SCS prepared a response letter with revised drawings, documents, and calculations. The response package was submitted to VDEQ on June 23, 2023. A follow-up discussion was held with VDEQ on August 31, 2023 to discuss modifications to the stormwater management plan. The new modifications include increasing the number of stormwater basins within the quarry and reducing required earthwork.

The revised plan will propose a stormwater pumping system to convey stormwater collected atop the EVOH cover system to an existing discharge point permitted under VPDES permit VAR050053. The proposed system includes the construction of three stormwater collection basins in the quarry and the installation of pairs of skid-mounted stormwater pumps. The stormwater will be conveyed by force main pipes to the existing stormwater basins located west of the quarry.

The plan proposes modifications to the existing stormwater basins west of the quarry to achieve discharge quantity targets. Modifications include increasing the basin depths and installing new outlet riser structures.

7.2 STORMWATER MANAGEMENT BASIN DESIGN AND CONSTRUCTION

The landfill surface will be regraded to form the SWM basins proposed in the stormwater management plan. The earthwork will be completed as the first stage of the interim EVOH cover system installation project. A revised landfill gas management plan is being prepared to facilitate the regrading of the landfill, which will affect existing landfill gas infrastructure. The landfill gas system will be modified to accommodate the earthwork.

Attention is being given to settlement concerns in the vicinity of the stormwater basin or basins. Calculations provided to VDEQ on June 23, 2023 demonstrate the weight of the ponded water should not cause excessive settlement relative to ongoing settlement observed within the quarry. Including additional stormwater basins within the quarry will distribute the weight of ponded water over a wider area relative to the single stormwater basin design.

7.3 STORMWATER MANAGEMENT PLAN IMPLEMENTATION

The stormwater management plan design drawings are being incorporated into the overall construction drawings for the interim EVOH cover system. The interim EVOH cover system installation

and stormwater management features will be bid and constructed as one project to facilitate simultaneous progress and completion.

7.4 LONG-TERM STORMWATER CONTROL AND REMOVAL

The stormwater management plan is designed with resiliency and redundancy to promote long-term operation. Two stormwater pumps will be installed for each basin, with each pump capable of operating independently. The pumps may be operated in parallel in contingency scenarios. The City plans to install a backup generator for the stormwater pumps to allow for continued operation in the event of a temporary power loss. The pumps have been selected to include additional pumping capacity to allow for future settlement.

A variable frequency drive control system is planned for the stormwater pumping system. The water level will be gauged using a transducer cable or comparable monitoring system to allow for automation of the pumping system. Appropriate telemetry will be used to allow for remote monitoring of the pumping system.

The operations manual will be updated to discuss the long-term operation and maintenance of the pumping system and other stormwater management features. Periodic inspections of the stormwater management system will be completed. The regular inspections will include monitoring the rate of settlement. If excessive settlement occurs, repairs will be planned and conducted as necessary to maintain the stormwater management system and cover system integrity.

7.5 STORMWATER MONITORING

Stormwater monitoring will commence upon initial discharge of stormwater from the quarry stormwater pumping system. As stated in the stormwater management plan drawings, the stormwater shall be monitored in accordance with the facility's VPDES general permit for discharge of stormwater associated with industrial activity. Additional requirements include collecting additional stormwater samples at the discharge pipes for the quarry stormwater pumping system. The stormwater from the quarry basins will be sampled on a monthly basis prior to discharge to the upper stormwater ponds. The Operations Manual will be revised to include these additional requirements.

If the stormwater becomes contaminated or sampling indicates contamination above discharge limits, the stormwater will be diverted to the sanitary sewer system. The diversion to the sanitary sewer system will continue until the source of contamination is identified and resolved. The stormwater discharge pipe alignment will pass adjacent to the existing sanitary sewer manhole. A tee with isolation valves will be used to direct the stormwater to the upper basins or the sanitary sewer manhole.

8.0 MISCELLANEOUS

8.1 CEASE WASTE ACCEPTANCE

The City ceased acceptance of offsite waste at the Solid Waste Permit No. 588 landfill prior to September 12, 2022.

8.2 LONG-TERM PLAN

SCS submitted the Monitoring, Maintenance, and Repair Plan to VDEQ for the SWP No. 588 landfill on December 30, 2022. Refer to the December 2022 Monthly Compliance Report for the SWP No. 588 Landfill for additional information. The City has taken steps to implement the plan that were detailed in the March 2023 Monthly Compliance Report for the SWP No. 588 Landfill.


8.3 MONTHLY COMPLIANCE REPORTS

As described in the introduction this report is intended to provide comprehensive updates regarding progress towards completion of each item described in Appendix A of the Consent Decree between the City and VDEQ,

8.4 COMMUNITY OUTREACH PROGRAM

The City's consultant leading community outreach, McGuireWoods Consulting, described the actions taken as part of their community outreach efforts. For the month of October, those actions include:

- **October – ongoing basis:** Five posts on the BristolVALandfill.org site and the existing City of Bristol Landfill Notifications and Information page covering several important updates including:
 - Progress updates related to remediation efforts at the quarry landfill
 - Shared news article about Bristol, TN and Bristol, VA about borrowing of funds for remediation work at the landfill and about hiring a new Solid Waste Director for the City of Bristol, VA
- **Weekly updates on landing page on Bristolvalandfill.org titled “Air Sampling and Air Monitoring” that includes a summary of the air sampling and monitoring being conducted by Bristol, VA around the quarry landfill.**
 - Website now includes nineteen weekly monitoring reports starting with May 15th, 2023 and running through October 29th of 2023
- **E-mail communication sent to the list of members of the public signed up through the Bristol, VA website, the BristolVALandfill.org website, or at subsequent Open Houses to receive information via e-mail**
 - E-mails sent included weekly remediation progress update and links to website updates and latest news articles on the following days:
 - Monday, October 16th
 - Friday, October 20th



Appendix A
Surface Emissions Monitoring Summary Letters

November 8, 2023
File No. 02218208.04

Mr. Jonathan Chapman
Enforcement Specialist
Virginia Department of Environmental Quality
SW Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Subject: Weekly Surface Emissions Monitoring Event – October 30, 2023
Bristol Integrated Solid Waste Facility – Bristol, Virginia

Dear Mr. Chapman:

On behalf of the City of Bristol (City), SCS Engineers (SCS), is pleased to submit the results of the Weekly Surface Emissions Monitoring event performed at the Bristol Integrated Solid Waste Facility located in Bristol, Virginia on October 30, 2023. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Appendix A.1.i of the Consent Decree between the Commonwealth of Virginia and the City of Bristol.

The monitoring generally conforms to the requirements of 40 CFR 63.1960(c) and (d), and 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The monitoring route includes the entire waste footprint of the Permit No. 588 Landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint, including at the temperature probes and the newly installed and connected gas extraction wells. The approximate monitoring route and sampling locations are presented in the attached Drawing.

At the time of monitoring, all areas of the Permit No. 588 Landfill footprint are subject to regulatory monitoring based on the regulatory time schedule stipulated in 40 CFR 63.1960(b) and 40 CFR 60.36f(b). The Permit No. 588 Landfill has a surface area of approximately 17.3 acres. Therefore, the minimum number of sampling points to cover the appropriate portion of the landfill footprint, utilizing a 30-meter grid interval, is approximately 82 (4.75 points per acre). A summary of the results of the surface emissions monitoring is provided in Table 1.



Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	177
Number of Points in Serpentine Route	100
Number of Points at Surface Cover Penetrations	77
Number of Exceedances	4
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	4

REMONITORING OF ONGOING EXCEEDANCES

In accordance with 40 CFR 63.1960(c)(4)(ii) and 40 CFR 60.36f(c)(4)(ii), corrective actions and a remonitoring event are to be performed within 10 days of the initial exceedance. In accordance with 40 CFR 63.1960(c)(4)(iii) and 40 CFR 60.36f(c)(4)(iii) additional corrective actions and a second 10-day retest are to be performed if the initial 10-day retest indicates methane values greater than the regulatory threshold. The Facility performs corrective actions, as necessary, including wellhead vacuum adjustments, the installation of well-bore seals, and addition of soil cover prior to weekly monitoring events at locations that previously exhibited elevated methane concentrations.

In accordance with 40 CFR 63.1960(c)(4)(v) and 40 CFR 60.36f(c)(4)(v) a new well or collection device must be installed or an alternate remedy must be submitted within 120-days at locations that continue to exhibit methane concentrations above the regulatory threshold for two consecutive retests.

A summary of ongoing exceedance points is provided in Table 2.

Table 2. Ongoing Weekly SEM Exceedances

Point ID	Initial Exceedance Date	10/30/23 Event	10/30/23 Event Result	Comments
EW-55	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
Tag 69	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-58	7/21/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-52	8/4/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-90	8/11/23	N/A	Failed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-68	10/9/23	N/A	Passed	Requires 30-Day Retest
EW-95	10/9/23	2 nd 10-Day Retest	Failed	Requires 30-Day Retest
EW-91	10/24/23	10-Day Recheck	Passed	Requires 30-Day Retest
EW-92	10/24/23	10-Day Recheck	Passed	Requires 30-Day Retest
EW-82	10/24/23	10-Day Recheck	Passed	Requires 30-Day Retest
EW-98	10/24/23	10-Day Recheck	Failed	Requires 2 nd 10-Day Retest

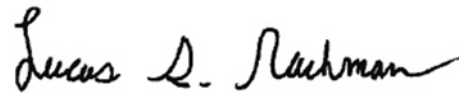
Mr. Jonathan Chapman
November 8, 2023
Page 4

If you have questions or require additional information, please contact either of the undersigned.

Sincerely,



William J. Fabrie
Staff Professional
SCS Engineers



Lucas S. Nachman
Senior Project Professional
SCS Engineers

LSN/WJF/cjw

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jonathan Hayes, City of Bristol
Jake Chandler, City of Bristol
Susan "Tracey" Blalock, VDEQ

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 30, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
1	1.9 PPM	OK			Start Serpentine Route
2	10 PPM	OK			
3	1.4 PPM	OK			
4	1.3 PPM	OK			
5	1.4 PPM	OK			
6	1.8 PPM	OK			
7	1.5 PPM	OK			
8	1.5 PPM	OK			
9	1.4 PPM	OK			
10	1.9 PPM	OK			
11	1.3 PPM	OK			
12	3.6 PPM	OK			
13	38.5 PPM	OK			
14	2.4 PPM	OK			
15	5 PPM	OK			
16	28.5 PPM	OK			
17	3.9 PPM	OK			
18	218 PPM	OK			
19	40.2 PPM	OK			
20	2.9 PPM	OK			
21	3.9 PPM	OK			
22	76.6 PPM	OK			
23	63.3 PPM	OK			
24	46.3 PPM	OK			
25	29 PPM	OK			
26	98.9 PPM	OK			
27	253 PPM	OK			
28	156 PPM	OK			
29	65.8 PPM	OK			
30	35.6 PPM	OK			
31	24.2 PPM	OK			
32	131 PPM	OK			
33	26.5 PPM	OK			
34	192 PPM	OK			
35	16.4 PPM	OK			
36	4 PPM	OK			
37	2.5 PPM	OK			
38	1.8 PPM	OK			
39	2.7 PPM	OK			
40	1.6 PPM	OK			
41	1.1 PPM	OK			
42	1.1 PPM	OK			
43	1.2 PPM	OK			
44	1.3 PPM	OK			
45	1.2 PPM	OK			
46	1 PPM	OK			
47	1 PPM	OK			
48	0.9 PPM	OK			
49	1.4 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 30, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
50	2.5 PPM	OK			
51	1.4 PPM	OK			
52	1.4 PPM	OK			
53	1.2 PPM	OK			
54	1.3 PPM	OK			
55	1.7 PPM	OK			
56	1.2 PPM	OK			
57	2.2 PPM	OK			
58	1.8 PPM	OK			
59	4.1 PPM	OK			
60	25.2 PPM	OK			
61	3.9 PPM	OK			
62	1.6 PPM	OK			
63	13.5 PPM	OK			
64	65 PPM	OK			
65	29.9 PPM	OK			
66	8.5 PPM	OK			
67	1.2 PPM	OK			
68	68.7 PPM	OK			
69	9.5 PPM	OK			
70	1.9 PPM	OK			
71	27.8 PPM	OK			
72	11.1 PPM	OK			
73	300 PPM	OK			
74	138 PPM	OK			
75	86.5 PPM	OK			
76	5.5 PPM	OK			
77	123 PPM	OK			
78	28.3 PPM	OK			
79	70.1 PPM	OK			
80	3.3 PPM	OK			
81	2.1 PPM	OK			
82	3.8 PPM	OK			
83	5.2 PPM	OK			
84	1.8 PPM	OK			
85	3.9 PPM	OK			
86	0.8 PPM	OK			
87	0.5 PPM	OK			
88	0.5 PPM	OK			
89	0.8 PPM	OK			
90	0.9 PPM	OK			
91	9.3 PPM	OK			
92	19.3 PPM	OK			
93	162 PPM	OK			
94	108 PPM	OK			
95	30.1 PPM	OK			
96	2.8 PPM	OK			
97	104 PPM	OK			
98	4.8 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 30, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
99	9.6 PPM	OK			
100	7.9 PPM	OK			End Serpentine Route
101	359 PPM	OK			EW-35
102	192 PPM	OK			EW-52
103	76.7 PPM	OK			TP-4
104	41.6 PPM	OK			EW-60
105	15.8 PPM	OK			EW-48
106	77.1 PPM	OK			TP-6
107	0.8 PPM	OK			EW-61
108	0.5 PPM	OK			EW-34
109	2.8 PPM	OK			EW-50
110	278 PPM	OK			EW-67
111	28 PPM	OK			EW-47
112	40.8 PPM	OK			EW-54
113	124 PPM	OK			EW-55
114	17.4 PPM	OK			EW-92
115	77.7 PPM	OK			EW-91
116	4.3 PPM	OK			EW-96
117	3.9 PPM	OK			TP-2
118	1825 PPM	HIGH_ALRM	36.59857	-82.14760	EW-66
119	183 PPM	OK			EW-58
120	65.7 PPM	OK			EW-57
121	64.1 PPM	OK			TP-1
122	9.1 PPM	OK			EW-59
123	162 PPM	OK			EW-56
124	44.3 PPM	OK			EW-97
125	22.3 PPM	OK			EW-41
126	76.3 PPM	OK			EW-53
127	45.2 PPM	OK			EW-40
128	9.6 PPM	OK			TP-3
129	424 PPM	OK			EW-51
130	84.1 PPM	OK			EW-39
131	12.8 PPM	OK			TP-5
132	320 PPM	OK			EW-68
133	41.6 PPM	OK			EW-87
134	43.9 PPM	OK			EW-38
135	24 PPM	OK			TP-7
136	0.8 PPM	OK			EW-49
137	0.8 PPM	OK			EW-83
138	0.4 PPM	OK			EW-31R
139	2.5 PPM	OK			EW-65
140	2.1 PPM	OK			EW-81
141	1.5 PPM	OK			TP-8
142	3.1 PPM	OK			EW-64
143	3.4 PPM	OK			EW-30R
144	0.5 PPM	OK			EW-63
145	0.1 PPM	OK			EW-42
146	14.4 PPM	OK			TP-9

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 30, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
147	0.1 PPM	OK			EW-33R
148	0 PPM	OK			EW-62
149	0 PPM	OK			EW-29R
150	0.5 PPM	OK			EW-74
151	1.2 PPM	OK			EW-32R
152	0.2 PPM	OK			EW-69
153	0.5 PPM	OK			EW-71
154	1.2 PPM	OK			EW-72
155	0.1 PPM	OK			EW-70
156	0.3 PPM	OK			EW-73
157	3.3 PPM	OK			EW-76
158	3.1 PPM	OK			EW-78
159	8.4 PPM	OK			EW-82
160	1.6 PPM	OK			EW-36A
161	18.1 PPM	OK			EW-85
162	0.3 PPM	OK			EW-88
163	339 PPM	OK			EW-89
164	1.2 PPM	OK			EW-93
165	168 PPM	OK			EW-94
166	9747 PPM	HIGH_ALRM	36.59822	-82.14703	EW-98
167	37.7 PPM	OK			EW-100
168	15.9 PPM	OK			EW-99
169	1972 PPM	HIGH_ALRM	36.59828	-82.14833	EW-95
170	2771 PPM	HIGH_ALRM	36.59877	-82.14825	EW-90
171	142 PPM	OK			EW-86
172	1.1 PPM	OK			EW-84
173	0.3 PPM	OK			EW-80
174	1 PPM	OK			EW-79
175	0.6 PPM	OK			EW-77
176	0.9 PPM	OK			EW-33B
177	2.3 PPM	OK			EW-75

Number of locations sampled:	177
Number of exceedance locations:	4

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 30, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
NOTES:					
Points 1 through 100 represent serpentine SEM route.					
Points 101 through 177 represent SEM at Pipe Penetrations					
Weather Conditions: Cloudy 62°F Wind: NW 7 MPH					
<u>Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm</u>					
10/30/2023	10:05	ZERO	0.1		PPM
10/30/2023	10:10	SPAN	502.0		PPM
<u>Background Reading:</u>					
10/30/2023	10:16	Upwind	1.8		PPM
10/30/2023	10:21	Downwind	3.5		PPM

October 11, 2023
File No. 02218208.04

Mr. Jonathan Chapman
Enforcement Specialist
Virginia Department of Environmental Quality
SW Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Subject: Weekly Surface Emissions Monitoring Event – October 5, 2023
Bristol Integrated Solid Waste Facility – Bristol, Virginia

Dear Mr. Chapman:

On behalf of the City of Bristol (City), SCS Engineers (SCS), is pleased to submit the results of the Weekly Surface Emissions Monitoring event performed at the Bristol Integrated Solid Waste Facility located in Bristol, Virginia on October 5, 2023. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Appendix A.1.i of the Consent Decree between the Commonwealth of Virginia and the City of Bristol.

The monitoring generally conforms to the requirements of 40 CFR 63.1960(c) and (d), and 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The monitoring route includes the entire waste footprint of the Permit No. 588 Landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint, including at the temperature probes and the newly installed and connected gas extraction wells. The approximate monitoring route and sampling locations are presented in the attached Drawing.

At the time of monitoring, all areas of the Permit No. 588 Landfill footprint are subject to regulatory monitoring based on the regulatory time schedule stipulated in 40 CFR 63.1960(b) and 40 CFR 60.36f(b). The Permit No. 588 Landfill has a surface area of approximately 17.3 acres. Therefore, the minimum number of sampling points to cover the appropriate portion of the landfill footprint, utilizing a 30-meter grid interval, is approximately 82 (4.75 points per acre). A summary of the results of the surface emissions monitoring is provided in Table 1.



Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	177
Number of Points in Serpentine Route	100
Number of Points at Surface Cover Penetrations	77
Number of Exceedances	1
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	1

REMONITORING OF ONGOING EXCEEDANCES

In accordance with 40 CFR 63.1960(c)(4)(ii) and 40 CFR 60.36f(c)(4)(ii), corrective actions and a remonitoring event are to be performed within 10 days of the initial exceedance. In accordance with 40 CFR 63.1960(c)(4)(iii) and 40 CFR 60.36f(c)(4)(iii) additional corrective actions and a second 10-day retest are to be performed if the initial 10-day retest indicates methane values greater than the regulatory threshold. The Facility performs corrective actions, as necessary, including wellhead vacuum adjustments, the installation of well-bore seals, and addition of soil cover prior to weekly monitoring events at locations that previously exhibited elevated methane concentrations.

In accordance with 40 CFR 63.1960(c)(4)(v) and 40 CFR 60.36f(c)(4)(v) a new well or collection device must be installed or an alternate remedy must be submitted within 120-days at locations that continue to exhibit methane concentrations above the regulatory threshold for two consecutive retests.

A summary of ongoing exceedance points is provided in Table 2.

Table 2. Ongoing Weekly SEM Exceedances

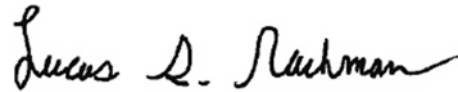
Point ID	Initial Exceedance Date	10/5/23 Event	10/5/23 Event Result	Comments
EW-55	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
Tag 69	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-58	7/21/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-52	8/4/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-90	8/11/23	N/A	Failed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-82	9/7/23	30-Day Retest	Passed	Exceedance Resolved
Tag 94	9/15/23	N/A	Passed	Requires 30-Day Retest
EW-67	9/19/23	N/A	Passed	Requires 30-Day Retest
EW-75	9/19/23	N/A	Passed	Requires 30-Day Retest

If you have questions or require additional information, please contact either of the undersigned.

Sincerely,



Wylie Hicklin
Associate Staff Professional
SCS Engineers



Lucas S. Nachman
Senior Project Professional
SCS Engineers

LSN/WRH/cjw

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jonathan Hayes, City of Bristol
Jake Chandler, City of Bristol
Susan "Tracey" Blalock, VDEQ

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 5, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
1	1.4 PPM	OK			Start Serpentine Route
2	4.1 PPM	OK			
3	0.7 PPM	OK			
4	0.9 PPM	OK			
5	0.9 PPM	OK			
6	1.1 PPM	OK			
7	1.8 PPM	OK			
8	1.1 PPM	OK			
9	1.2 PPM	OK			
10	1.2 PPM	OK			
11	3.2 PPM	OK			
12	12.9 PPM	OK			
13	289.0 PPM	OK			
14	7.0 PPM	OK			
15	1.9 PPM	OK			
16	12.5 PPM	OK			
17	22.0 PPM	OK			
18	8.3 PPM	OK			
19	133.0 PPM	OK			
20	1.7 PPM	OK			
21	8.9 PPM	OK			
22	1.5 PPM	OK			
23	56.5 PPM	OK			
24	36.0 PPM	OK			
25	43.8 PPM	OK			
26	92.2 PPM	OK			
27	0.6 PPM	OK			
28	14.4 PPM	OK			
29	4.3 PPM	OK			
30	50.6 PPM	OK			
31	5.3 PPM	OK			
32	15.9 PPM	OK			
33	41.8 PPM	OK			
34	13.0 PPM	OK			
35	22.3 PPM	OK			
36	7.3 PPM	OK			
37	351.0 PPM	OK			
38	39.5 PPM	OK			
39	302.0 PPM	OK			
40	40.8 PPM	OK			
41	4.0 PPM	OK			
42	1.0 PPM	OK			
43	1.8 PPM	OK			
44	9.7 PPM	OK			
45	0.8 PPM	OK			
46	0.0 PPM	OK			
47	0.1 PPM	OK			
48	0.0 PPM	OK			
49	0.0 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 5, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
50	0.0 PPM	OK			
51	0.0 PPM	OK			
52	0.0 PPM	OK			
53	0.1 PPM	OK			
54	0.1 PPM	OK			
55	0.2 PPM	OK			
56	0.4 PPM	OK			
57	3.0 PPM	OK			
58	3.6 PPM	OK			
59	30.2 PPM	OK			
60	0.2 PPM	OK			
61	0.3 PPM	OK			
62	0.2 PPM	OK			
63	0.2 PPM	OK			
64	0.1 PPM	OK			
65	0.1 PPM	OK			
66	209.0 PPM	OK			
67	10.8 PPM	OK			
68	93.2 PPM	OK			
69	6.6 PPM	OK			
70	101.0 PPM	OK			
71	228.0 PPM	OK			
72	11.9 PPM	OK			
73	383.0 PPM	OK			
74	3.9 PPM	OK			
75	105.0 PPM	OK			
76	250.0 PPM	OK			
77	24.5 PPM	OK			
78	172.0 PPM	OK			
79	1.2 PPM	OK			
80	355.0 PPM	OK			
81	62.3 PPM	OK			
82	36.3 PPM	OK			
83	84.1 PPM	OK			
84	8.7 PPM	OK			
85	28.0 PPM	OK			
86	4.0 PPM	OK			
87	7.0 PPM	OK			
88	1.4 PPM	OK			
89	0.2 PPM	OK			
90	0.0 PPM	OK			
91	13.1 PPM	OK			
92	64.9 PPM	OK			
93	230.0 PPM	OK			
94	9.4 PPM	OK			
95	5.3 PPM	OK			
96	79.9 PPM	OK			
97	29.0 PPM	OK			
98	7.5 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 5, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
99	150.0 PPM	OK			
100	21.8 PPM	OK			End Serpentine Route
101	238.0 PPM	OK			EW-35
102	387.0 PPM	OK			EW-52
103	9.1 PPM	OK			TP-4
104	19.5 PPM	OK			EW-60
105	3.8 PPM	OK			EW-48
106	250.0 PPM	OK			TP-6
107	0.3 PPM	OK			EW-61
108	21.5 PPM	OK			EW-34
109	2.0 PPM	OK			EW-50
110	18.0 PPM	OK			EW-67
111	24.4 PPM	OK			EW-47
112	28.8 PPM	OK			EW-54
113	28.6 PPM	OK			EW-55
114	119.0 PPM	OK			EW-92
115	254.0 PPM	OK			EW-91
116	19.5 PPM	OK			EW-96
117	0.4 PPM	OK			TP-2
118	349.0 PPM	OK			EW-66
119	109.0 PPM	OK			EW-58
120	22.1 PPM	OK			EW-57
121	4.1 PPM	OK			TP-1
122	1.3 PPM	OK			EW-59
123	40.5 PPM	OK			EW-56
124	6.0 PPM	OK			EW-97
125	0.9 PPM	OK			EW-41
126	19.8 PPM	OK			EW-53
127	2.3 PPM	OK			EW-40
128	112.0 PPM	OK			TP-3
129	8.5 PPM	OK			EW-51
130	145.0 PPM	OK			EW-39
131	23.8 PPM	OK			TP-5
132	103.0 PPM	OK			EW-68
133	19.6 PPM	OK			EW-87
134	23.3 PPM	OK			EW-38
135	134.0 PPM	OK			TP-7
136	28.2 PPM	OK			EW-49
137	1.8 PPM	OK			EW-83
138	0.0 PPM	OK			EW-31R
139	0.2 PPM	OK			EW-65
140	0.0 PPM	OK			EW-81
141	0.0 PPM	OK			TP-8
142	0.0 PPM	OK			EW-64
143	0.0 PPM	OK			EW-30R
144	0.0 PPM	OK			EW-63
145	0.1 PPM	OK			EW-42
146	30.2 PPM	OK			TP-9

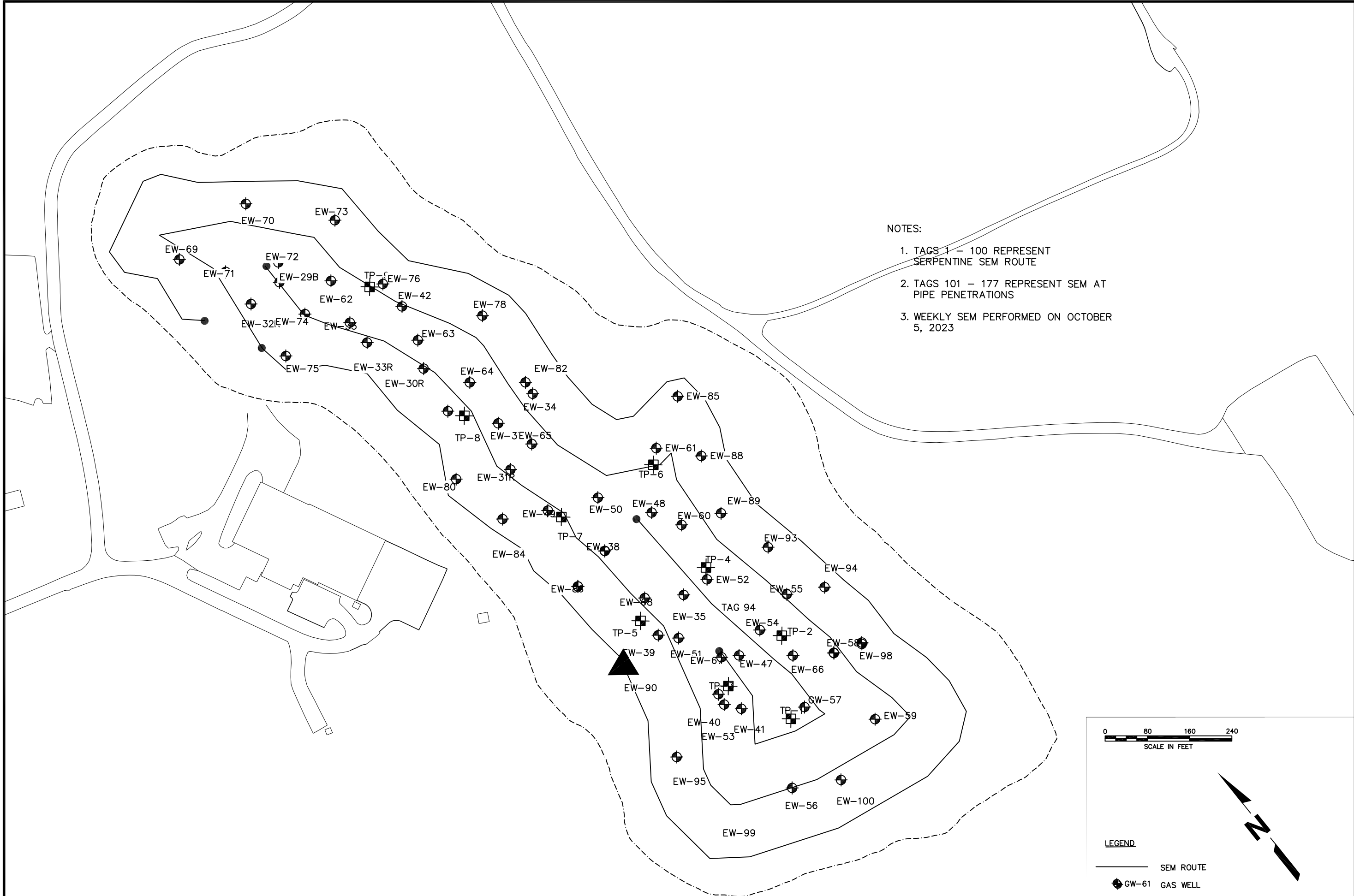
**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 5, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
147	0.0 PPM	OK			EW-33R
148	0.0 PPM	OK			EW-62
149	0.0 PPM	OK			EW-29R
150	0.0 PPM	OK			EW-74
151	14.8 PPM	OK			EW-32R
152	0.1 PPM	OK			EW-69
153	0.0 PPM	OK			EW-71
154	0.0 PPM	OK			EW-72
155	17.1 PPM	OK			EW-70
156	0.1 PPM	OK			EW-73
157	35.2 PPM	OK			EW-76
158	7.6 PPM	OK			EW-78
159	35.6 PPM	OK			EW-82
160	148.0 PPM	OK			EW-36A
161	0.3 PPM	OK			EW-85
162	1.3 PPM	OK			EW-88
163	52.2 PPM	OK			EW-89
164	7.4 PPM	OK			EW-93
165	24.2 PPM	OK			EW-94
166	70.3 PPM	OK			EW-98
167	21.7 PPM	OK			EW-100
168	0.8 PPM	OK			EW-99
169	87.2 PPM	OK			EW-95
170	1704.0 PPM	HIGH_ALARM	36.59886	-82.14824	EW-90
171	13.7 PPM	OK			EW-86
172	0.0 PPM	OK			EW-84
173	1.3 PPM	OK			EW-80
174	0.4 PPM	OK			EW-79
175	0.1 PPM	OK			EW-77
176	0.0 PPM	OK			EW-33B
177	0.3 PPM	OK			EW-75

Number of locations sampled:	177
Number of exceedance locations:	1

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 5, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
NOTES:					
Points 1 through 100 represent serpentine SEM route.					
Points 101 through 177 represent SEM at Pipe Penetrations					
Weather Conditions: Clear 79°F Wind: SW 4 MPH					
<u>Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm</u>					
10/5/2023	10:16	ZERO	0.0		PPM
10/5/2023	10:20	SPAN	501.0		PPM
<u>Background Reading:</u>					
10/5/2023	10:26	Upwind	1.3		PPM
10/5/2023	10:31	Downwind	0.8		PPM



NOTES:
 1. TAGS 1 - 100 REPRESENT SERPENTINE SEM ROUTE
 2. TAGS 101 - 177 REPRESENT SEM AT PIPE PENETRATIONS
 3. WEEKLY SEM PERFORMED ON OCTOBER 5, 2023

0 80 160 240
 SCALE IN FEET

LEGEND

- SEM ROUTE
- ⊕ GW-61 GAS WELL
- ⊕ TP-1 TEMPERATURE PROBE
- ▲ 79 EXCEEDANCE LOCATION
- 75 MONITORING ROUTE ENDPOINT

N

DATE	
REVISION	
NO.	DATE
1	
2	
3	
4	
5	
SHEET TITLE WEEKLY SEM ROUTE	
PROJECT TITLE SURFACE EMISSIONS MONITORING SOLID WASTE PERMIT #588	
CLIENT CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201	
SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 1528 JUDY LANE PH. (804) 378-7440 FAX. (804) 378-7433 PROJ. NO. 02218208.04 DWN. BY: LSN C/A R/W BY: LSN DSK BY: LSN APP. BY: DBK	
FILE: 02218208.04	
DATE: 10/5/23	
SCALE: AS SHOWN	
DRAWING NO.	

October 18, 2023
File No. 02218208.04

Mr. Jonathan Chapman
Enforcement Specialist
Virginia Department of Environmental Quality
SW Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Subject: Weekly Surface Emissions Monitoring Event – October 9, 2023
Bristol Integrated Solid Waste Facility – Bristol, Virginia

Dear Mr. Chapman:

On behalf of the City of Bristol (City), SCS Engineers (SCS), is pleased to submit the results of the Weekly Surface Emissions Monitoring event performed at the Bristol Integrated Solid Waste Facility located in Bristol, Virginia on October 9, 2023. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Appendix A.1.i of the Consent Decree between the Commonwealth of Virginia and the City of Bristol.

The monitoring generally conforms to the requirements of 40 CFR 63.1960(c) and (d), and 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The monitoring route includes the entire waste footprint of the Permit No. 588 Landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint, including at the temperature probes and the newly installed and connected gas extraction wells. The approximate monitoring route and sampling locations are presented in the attached Drawing.

At the time of monitoring, all areas of the Permit No. 588 Landfill footprint are subject to regulatory monitoring based on the regulatory time schedule stipulated in 40 CFR 63.1960(b) and 40 CFR 60.36f(b). The Permit No. 588 Landfill has a surface area of approximately 17.3 acres. Therefore, the minimum number of sampling points to cover the appropriate portion of the landfill footprint, utilizing a 30-meter grid interval, is approximately 82 (4.75 points per acre). A summary of the results of the surface emissions monitoring is provided in Table 1.



Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	177
Number of Points in Serpentine Route	100
Number of Points at Surface Cover Penetrations	77
Number of Exceedances	4
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	4

REMONITORING OF ONGOING EXCEEDANCES

In accordance with 40 CFR 63.1960(c)(4)(ii) and 40 CFR 60.36f(c)(4)(ii), corrective actions and a remonitoring event are to be performed within 10 days of the initial exceedance. In accordance with 40 CFR 63.1960(c)(4)(iii) and 40 CFR 60.36f(c)(4)(iii) additional corrective actions and a second 10-day retest are to be performed if the initial 10-day retest indicates methane values greater than the regulatory threshold. The Facility performs corrective actions, as necessary, including wellhead vacuum adjustments, the installation of well-bore seals, and addition of soil cover prior to weekly monitoring events at locations that previously exhibited elevated methane concentrations.

In accordance with 40 CFR 63.1960(c)(4)(v) and 40 CFR 60.36f(c)(4)(v) a new well or collection device must be installed or an alternate remedy must be submitted within 120-days at locations that continue to exhibit methane concentrations above the regulatory threshold for two consecutive retests.

A summary of ongoing exceedance points is provided in Table 2.

Table 2. Ongoing Weekly SEM Exceedances

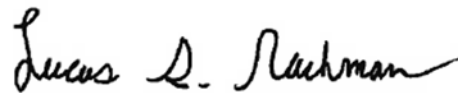
Point ID	Initial Exceedance Date	10/9/23 Event	10/9/23 Event Result	Comments
EW-55	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
Tag 69	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-58	7/21/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-52	8/4/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-90	8/11/23	N/A	Failed	Subject to 40 CFR 63.1960(c)(4)(v)
Tag 94	9/15/23	30-Day Retest	Passed	Exceedance Resolved
EW-67	9/19/23	2 nd 10-Day Retest	Failed	Requires 30-Day Retest
EW-75	9/19/23	N/A	Passed	Requires 30-Day Retest

If you have questions or require additional information, please contact either of the undersigned.

Sincerely,



William J. Fabrie
Staff Professional
SCS Engineers



Lucas S. Nachman
Senior Project Professional
SCS Engineers

LSN/WJF/cjw

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jonathan Hayes, City of Bristol
Jake Chandler, City of Bristol
Susan "Tracey" Blalock, VDEQ

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 9, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
1	1.3 PPM	OK			Start Serpentine Route
2	11.5 PPM	OK			
3	2.2 PPM	OK			
4	1.7 PPM	OK			
5	1.6 PPM	OK			
6	1.7 PPM	OK			
7	3.3 PPM	OK			
8	2.1 PPM	OK			
9	2.5 PPM	OK			
10	10.5 PPM	OK			
11	15.1 PPM	OK			
12	3.3 PPM	OK			
13	7 PPM	OK			
14	12.3 PPM	OK			
15	14.5 PPM	OK			
16	63.5 PPM	OK			
17	14.3 PPM	OK			
18	4.2 PPM	OK			
19	2.8 PPM	OK			
20	15.9 PPM	OK			
21	15.2 PPM	OK			
22	3.5 PPM	OK			
23	39 PPM	OK			
24	1.8 PPM	OK			
25	9.8 PPM	OK			
26	4.5 PPM	OK			
27	37.6 PPM	OK			
28	1.2 PPM	OK			
29	1.4 PPM	OK			
30	124 PPM	OK			
31	7.8 PPM	OK			
32	86.1 PPM	OK			
33	44.8 PPM	OK			
34	149 PPM	OK			
35	40.8 PPM	OK			
36	38.8 PPM	OK			
37	20.8 PPM	OK			
38	14.7 PPM	OK			
39	30.9 PPM	OK			
40	7.2 PPM	OK			
41	4.2 PPM	OK			
42	0.9 PPM	OK			
43	3.1 PPM	OK			
44	1.6 PPM	OK			
45	1.1 PPM	OK			
46	0.7 PPM	OK			
47	2.5 PPM	OK			
48	0.7 PPM	OK			
49	0.6 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 9, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
50	0.6 PPM	OK			
51	0.5 PPM	OK			
52	0.6 PPM	OK			
53	0.7 PPM	OK			
54	0.8 PPM	OK			
55	0.9 PPM	OK			
56	5.5 PPM	OK			
57	6 PPM	OK			
58	0.8 PPM	OK			
59	3.7 PPM	OK			
60	2.6 PPM	OK			
61	1.9 PPM	OK			
62	1.8 PPM	OK			
63	2.5 PPM	OK			
64	5.6 PPM	OK			
65	9.4 PPM	OK			
66	2.8 PPM	OK			
67	22.4 PPM	OK			
68	7.4 PPM	OK			
69	62.4 PPM	OK			
70	7.1 PPM	OK			
71	8.4 PPM	OK			
72	4.9 PPM	OK			
73	6.6 PPM	OK			
74	7 PPM	OK			
75	14.3 PPM	OK			
76	5 PPM	OK			
77	10.8 PPM	OK			
78	49.8 PPM	OK			
79	2.9 PPM	OK			
80	4.6 PPM	OK			
81	6.8 PPM	OK			
82	37.2 PPM	OK			
83	22.4 PPM	OK			
84	39.2 PPM	OK			
85	1.4 PPM	OK			
86	1.2 PPM	OK			
87	12.5 PPM	OK			
88	3.1 PPM	OK			
89	1.6 PPM	OK			
90	1.9 PPM	OK			
91	4.2 PPM	OK			
92	1.7 PPM	OK			
93	18.2 PPM	OK			
94	135 PPM	OK			
95	22.6 PPM	OK			
96	9.8 PPM	OK			
97	5.2 PPM	OK			
98	29.9 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 9, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
99	21.3 PPM	OK			
100	27.1 PPM	OK			End Serpentine Route
101	79 PPM	OK			EW-35
102	65.5 PPM	OK			EW-52
103	106 PPM	OK			TP-4
104	4.8 PPM	OK			EW-60
105	1.6 PPM	OK			EW-48
106	35.5 PPM	OK			TP-6
107	2.7 PPM	OK			EW-61
108	8.6 PPM	OK			EW-34
109	1.1 PPM	OK			EW-50
110	2018 PPM	HIGH_ALRM	36.59890	-82.14778	EW-67
111	20.7 PPM	OK			EW-47
112	41.6 PPM	OK			EW-54
113	34.8 PPM	OK			EW-55
114	1.6 PPM	OK			EW-92
115	50 PPM	OK			EW-91
116	19.3 PPM	OK			EW-96
117	6.3 PPM	OK			TP-2
118	16.2 PPM	OK			EW-66
119	179 PPM	OK			EW-58
120	13.1 PPM	OK			EW-57
121	6 PPM	OK			TP-1
122	5.1 PPM	OK			EW-59
123	72.7 PPM	OK			EW-56
124	1.8 PPM	OK			EW-97
125	1.6 PPM	OK			EW-41
126	6.3 PPM	OK			EW-53
127	2.2 PPM	OK			EW-40
128	3.6 PPM	OK			TP-3
129	14.4 PPM	OK			EW-51
130	42 PPM	OK			EW-39
131	31.4 PPM	OK			TP-5
132	809 PPM	HIGH_ALRM	36.59912	-82.14789	EW-68
133	9.2 PPM	OK			EW-87
134	30.4 PPM	OK			EW-38
135	294 PPM	OK			TP-7
136	2.3 PPM	OK			EW-49
137	1.2 PPM	OK			EW-83
138	0.4 PPM	OK			EW-31R
139	0.1 PPM	OK			EW-65
140	0.1 PPM	OK			EW-81
141	0 PPM	OK			TP-8
142	0.2 PPM	OK			EW-64
143	0.3 PPM	OK			EW-30R
144	0.7 PPM	OK			EW-63
145	6 PPM	OK			EW-42
146	34.1 PPM	OK			TP-9

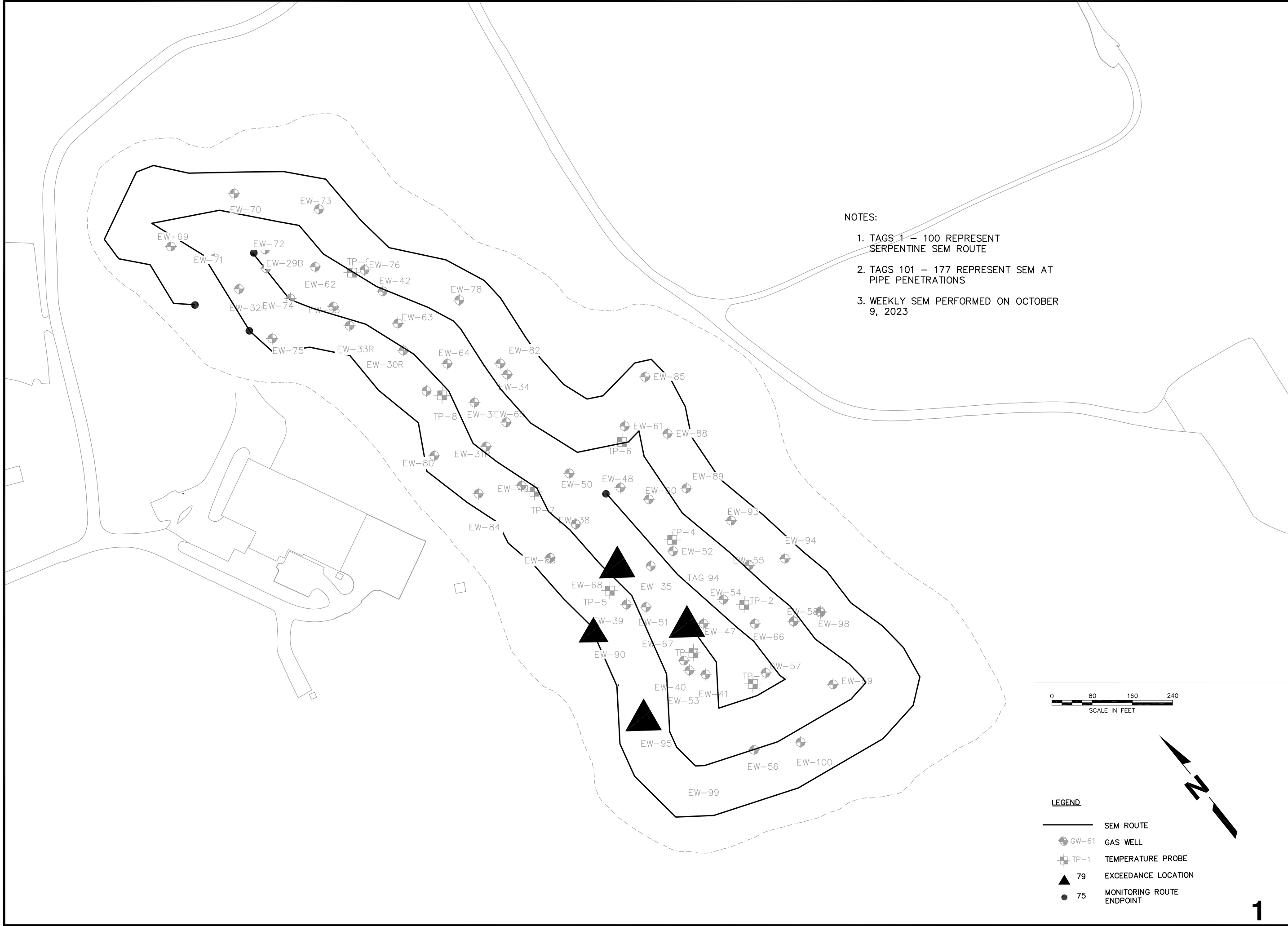
**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 9, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
147	0.8 PPM	OK			EW-33R
148	1.8 PPM	OK			EW-62
149	0.3 PPM	OK			EW-29R
150	0.9 PPM	OK			EW-74
151	43.7 PPM	OK			EW-32R
152	0 PPM	OK			EW-69
153	0 PPM	OK			EW-71
154	0 PPM	OK			EW-72
155	0 PPM	OK			EW-70
156	0.1 PPM	OK			EW-73
157	4.8 PPM	OK			EW-76
158	0.2 PPM	OK			EW-78
159	6.5 PPM	OK			EW-82
160	4.7 PPM	OK			EW-36A
161	28.6 PPM	OK			EW-85
162	0.7 PPM	OK			EW-88
163	12.4 PPM	OK			EW-89
164	2.4 PPM	OK			EW-93
165	44.4 PPM	OK			EW-94
166	31.3 PPM	OK			EW-98
167	216 PPM	OK			EW-100
168	4.2 PPM	OK			EW-99
169	1785 PPM	HIGH_ALARM	36.59828	-82.14833	EW-95
170	3074 PPM	HIGH_ALARM	36.59886	-82.14824	EW-90
171	3.1 PPM	OK			EW-86
172	0.4 PPM	OK			EW-84
173	1.2 PPM	OK			EW-80
174	0.5 PPM	OK			EW-79
175	0.8 PPM	OK			EW-77
176	18.8 PPM	OK			EW-33B
177	0.8 PPM	OK			EW-75

Number of locations sampled:	177
Number of exceedance locations:	4

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 9, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
NOTES:					
Points 1 through 100 represent serpentine SEM route.					
Points 101 through 177 represent SEM at Pipe Penetrations					
Weather Conditions: Partly Cloudy 74°F Wind: NE 3 MPH					
<u>Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm</u>					
10/9/2023	10:34	ZERO	0.0		PPM
10/9/2023	10:36	SPAN	502.0		PPM
<u>Background Reading:</u>					
10/9/2023	10:44	Upwind	1.6		PPM
10/9/2023	10:47	Downwind	1.4		PPM



NOTES:

1. TAGS 1 – 100 REPRESENT SERPENTINE SEM ROUTE
2. TAGS 101 – 177 REPRESENT SEM AT PIPE PENETRATIONS
3. WEEKLY SEM PERFORMED ON OCTOBER 9, 2023



- LEGEND**
- SEM ROUTE
 - ⊕ GW-61 GAS WELL
 - ⊕ TP-1 TEMPERATURE PROBE
 - ▲ 79 EXCEEDANCE LOCATION
 - 75 MONITORING ROUTE ENDPOINT

NO.		REVISION		DATE	
SHEET TITLE			PROJECT TITLE		
WEEKLY SEM ROUTE			SURFACE EMISSIONS MONITORING SOLID WASTE PERMIT #588		
CLIENT					
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201					
CONTRACT NO.					
02218208.04					
DATE					
10/9/23					
SCALE					
AS SHOWN					
DRAWING NO.					

October 25, 2023
File No. 02218208.04

Mr. Jonathan Chapman
Enforcement Specialist
Virginia Department of Environmental Quality
SW Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Subject: Weekly Surface Emissions Monitoring Event – October 18, 2023
Bristol Integrated Solid Waste Facility – Bristol, Virginia

Dear Mr. Chapman:

On behalf of the City of Bristol (City), SCS Engineers (SCS), is pleased to submit the results of the Weekly Surface Emissions Monitoring event performed at the Bristol Integrated Solid Waste Facility located in Bristol, Virginia on October 18, 2023. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Appendix A.1.i of the Consent Decree between the Commonwealth of Virginia and the City of Bristol.

The monitoring generally conforms to the requirements of 40 CFR 63.1960(c) and (d), and 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The monitoring route includes the entire waste footprint of the Permit No. 588 Landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint, including at the temperature probes and the newly installed and connected gas extraction wells. The approximate monitoring route and sampling locations are presented in the attached Drawing.

At the time of monitoring, all areas of the Permit No. 588 Landfill footprint are subject to regulatory monitoring based on the regulatory time schedule stipulated in 40 CFR 63.1960(b) and 40 CFR 60.36f(b). The Permit No. 588 Landfill has a surface area of approximately 17.3 acres. Therefore, the minimum number of sampling points to cover the appropriate portion of the landfill footprint, utilizing a 30-meter grid interval, is approximately 82 (4.75 points per acre). A summary of the results of the surface emissions monitoring is provided in Table 1.



Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	177
Number of Points in Serpentine Route	100
Number of Points at Surface Cover Penetrations	77
Number of Exceedances	0
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	0

REMONITORING OF ONGOING EXCEEDANCES

In accordance with 40 CFR 63.1960(c)(4)(ii) and 40 CFR 60.36f(c)(4)(ii), corrective actions and a remonitoring event are to be performed within 10 days of the initial exceedance. In accordance with 40 CFR 63.1960(c)(4)(iii) and 40 CFR 60.36f(c)(4)(iii) additional corrective actions and a second 10-day retest are to be performed if the initial 10-day retest indicates methane values greater than the regulatory threshold. The Facility performs corrective actions, as necessary, including wellhead vacuum adjustments, the installation of well-bore seals, and addition of soil cover prior to weekly monitoring events at locations that previously exhibited elevated methane concentrations.

In accordance with 40 CFR 63.1960(c)(4)(v) and 40 CFR 60.36f(c)(4)(v) a new well or collection device must be installed or an alternate remedy must be submitted within 120-days at locations that continue to exhibit methane concentrations above the regulatory threshold for two consecutive retests.

A summary of ongoing exceedance points is provided in Table 2.

Table 2. Ongoing Weekly SEM Exceedances

Point ID	Initial Exceedance Date	10/18/23 Event	10/18/23 Event Result	Comments
EW-55	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
Tag 69	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-58	7/21/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-52	8/4/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-90	8/11/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-67	9/19/23	30-Day Retest	Passed	Exceedance Resolved
EW-75	9/19/23	30-Day Retest	Passed	Exceedance Resolved
EW-68	10/9/23	10-Day Retest	Passed	Needs 30-Day Retest
EW-95	10/9/23	10-Day Retest	Passed	Needs 30-Day Retest

If you have questions or require additional information, please contact either of the undersigned.

Sincerely,



Wylie Hicklin
Staff Professional
SCS Engineers



Quinn Bernier, PE
Project Professional
SCS Engineers

WH/QFB/lsn

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jonathan Hayes, City of Bristol
Jake Chandler, City of Bristol
Susan "Tracey" Blalock, VDEQ

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 18, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
1	3.2 PPM	OK			Start Serpentine Route
2	1.6 PPM	OK			
3	5 PPM	OK			
4	1.5 PPM	OK			
5	1.5 PPM	OK			
6	1.7 PPM	OK			
7	1.7 PPM	OK			
8	1.5 PPM	OK			
9	1.6 PPM	OK			
10	2.7 PPM	OK			
11	1.8 PPM	OK			
12	1.5 PPM	OK			
13	1.4 PPM	OK			
14	3.3 PPM	OK			
15	12.4 PPM	OK			
16	2.1 PPM	OK			
17	5.5 PPM	OK			
18	15.5 PPM	OK			
19	29.1 PPM	OK			
20	9.1 PPM	OK			
21	20.9 PPM	OK			
22	5 PPM	OK			
23	4 PPM	OK			
24	144 PPM	OK			
25	30.5 PPM	OK			
26	10.7 PPM	OK			
27	5.8 PPM	OK			
28	61.1 PPM	OK			
29	18.2 PPM	OK			
30	6.6 PPM	OK			
31	21.6 PPM	OK			
32	38.7 PPM	OK			
33	51.1 PPM	OK			
34	443 PPM	OK			
35	47.7 PPM	OK			
36	5 PPM	OK			
37	17.4 PPM	OK			
38	2.6 PPM	OK			
39	193 PPM	OK			
40	3.7 PPM	OK			
41	1.5 PPM	OK			
42	1.4 PPM	OK			
43	1.3 PPM	OK			
44	1.6 PPM	OK			
45	2 PPM	OK			
46	1.3 PPM	OK			
47	1.1 PPM	OK			
48	1.4 PPM	OK			
49	1.4 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 18, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
50	1.6 PPM	OK			
51	2 PPM	OK			
52	3.2 PPM	OK			
53	7.8 PPM	OK			
54	4.7 PPM	OK			
55	1.3 PPM	OK			
56	1.2 PPM	OK			
57	3.7 PPM	OK			
58	3 PPM	OK			
59	1.9 PPM	OK			
60	15.7 PPM	OK			
61	17.1 PPM	OK			
62	13 PPM	OK			
63	45.1 PPM	OK			
64	21.9 PPM	OK			
65	70.3 PPM	OK			
66	393 PPM	OK			
67	121 PPM	OK			
68	9 PPM	OK			
69	14.9 PPM	OK			
70	6.2 PPM	OK			
71	11.8 PPM	OK			
72	136 PPM	OK			
73	81.7 PPM	OK			
74	55.1 PPM	OK			
75	2.1 PPM	OK			
76	123 PPM	OK			
77	30.1 PPM	OK			
78	57 PPM	OK			
79	4.8 PPM	OK			
80	60.1 PPM	OK			
81	33.2 PPM	OK			
82	5.4 PPM	OK			
83	4.3 PPM	OK			
84	4.8 PPM	OK			
85	2.9 PPM	OK			
86	0.5 PPM	OK			
87	0.6 PPM	OK			
88	0.7 PPM	OK			
89	0.9 PPM	OK			
90	0.9 PPM	OK			
91	7.9 PPM	OK			
92	21.3 PPM	OK			
93	33.4 PPM	OK			
94	29.3 PPM	OK			
95	26.9 PPM	OK			
96	1.1 PPM	OK			
97	1.4 PPM	OK			
98	3.6 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 18, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
99	89.2 PPM	OK			
100	42.5 PPM	OK			End Serpentine Route
101	95.9 PPM	OK			EW-35
102	147 PPM	OK			EW-52
103	9.6 PPM	OK			TP-4
104	47.7 PPM	OK			EW-60
105	127 PPM	OK			EW-48
106	10 PPM	OK			TP-6
107	14.2 PPM	OK			EW-61
108	7.2 PPM	OK			EW-34
109	11.8 PPM	OK			EW-50
110	32.6 PPM	OK			EW-67
111	25.6 PPM	OK			EW-47
112	30.9 PPM	OK			EW-54
113	0.8 PPM	OK			EW-55
114	278 PPM	OK			EW-92
115	27 PPM	OK			EW-91
116	20.5 PPM	OK			EW-96
117	4.3 PPM	OK			TP-2
118	12.4 PPM	OK			EW-66
119	37.1 PPM	OK			EW-58
120	48.9 PPM	OK			EW-57
121	59.6 PPM	OK			TP-1
122	4.4 PPM	OK			EW-59
123	50.9 PPM	OK			EW-56
124	8 PPM	OK			EW-97
125	9.3 PPM	OK			EW-41
126	12.1 PPM	OK			EW-53
127	27.3 PPM	OK			EW-40
128	29.4 PPM	OK			TP-3
129	185 PPM	OK			EW-51
130	40.3 PPM	OK			EW-39
131	9.8 PPM	OK			TP-5
132	4.7 PPM	OK			EW-68
133	48.9 PPM	OK			EW-87
134	78.4 PPM	OK			EW-38
135	77.9 PPM	OK			TP-7
136	1.3 PPM	OK			EW-49
137	1 PPM	OK			EW-83
138	2.7 PPM	OK			EW-31R
139	5.6 PPM	OK			EW-65
140	0.8 PPM	OK			EW-81
141	0.7 PPM	OK			TP-8
142	0.4 PPM	OK			EW-64
143	0.4 PPM	OK			EW-30R
144	0.4 PPM	OK			EW-63
145	0.4 PPM	OK			EW-42
146	353 PPM	OK			TP-9

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 18, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
147	0.6 PPM	OK			EW-33R
148	1.8 PPM	OK			EW-62
149	1.6 PPM	OK			EW-29R
150	1.6 PPM	OK			EW-74
151	2.5 PPM	OK			EW-32R
152	0.1 PPM	OK			EW-69
153	0 PPM	OK			EW-71
154	1.1 PPM	OK			EW-72
155	2.7 PPM	OK			EW-70
156	0.4 PPM	OK			EW-73
157	33.4 PPM	OK			EW-76
158	0.3 PPM	OK			EW-78
159	12 PPM	OK			EW-82
160	2.1 PPM	OK			EW-36A
161	0.4 PPM	OK			EW-85
162	491 PPM	OK			EW-88
163	52.9 PPM	OK			EW-89
164	1.9 PPM	OK			EW-93
165	165 PPM	OK			EW-94
166	20 PPM	OK			EW-98
167	29.1 PPM	OK			EW-100
168	5.6 PPM	OK			EW-99
169	380 PPM	OK			EW-95
170	463 PPM	OK			EW-90
171	7.4 PPM	OK			EW-86
172	1.2 PPM	OK			EW-84
173	2.2 PPM	OK			EW-80
174	0.7 PPM	OK			EW-79
175	0.7 PPM	OK			EW-77
176	1.2 PPM	OK			EW-33B
177	2.4 PPM	OK			EW-75

Number of locations sampled:	177
Number of exceedance locations:	0

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 18, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
NOTES:					
Points 1 through 100 represent serpentine SEM route.					
Points 101 through 177 represent SEM at Pipe Penetrations					
Weather Conditions: Partly Cloudy 63°F Wind: NW 7 MPH					
<u>Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm</u>					
10/18/2023	10:11	ZERO	0.0		PPM
10/18/2023	10:15	SPAN	503.0		PPM
<u>Background Reading:</u>					
10/18/2023	10:18	Upwind	2.4		PPM
10/18/2023	10:25	Downwind	3		PPM

November 1, 2023
File No. 02218208.04

Mr. Jonathan Chapman
Enforcement Specialist
Virginia Department of Environmental Quality
SW Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Subject: Weekly Surface Emissions Monitoring Event – October 24, 2023
Bristol Integrated Solid Waste Facility – Bristol, Virginia

Dear Mr. Chapman:

On behalf of the City of Bristol (City), SCS Engineers (SCS), is pleased to submit the results of the Weekly Surface Emissions Monitoring event performed at the Bristol Integrated Solid Waste Facility located in Bristol, Virginia on October 24, 2023. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Appendix A.1.i of the Consent Decree between the Commonwealth of Virginia and the City of Bristol.

The monitoring generally conforms to the requirements of 40 CFR 63.1960(c) and (d), and 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The monitoring route includes the entire waste footprint of the Permit No. 588 Landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint, including at the temperature probes and the newly installed and connected gas extraction wells. The approximate monitoring route and sampling locations are presented in the attached Drawing.

At the time of monitoring, all areas of the Permit No. 588 Landfill footprint are subject to regulatory monitoring based on the regulatory time schedule stipulated in 40 CFR 63.1960(b) and 40 CFR 60.36f(b). The Permit No. 588 Landfill has a surface area of approximately 17.3 acres. Therefore, the minimum number of sampling points to cover the appropriate portion of the landfill footprint, utilizing a 30-meter grid interval, is approximately 82 (4.75 points per acre). A summary of the results of the surface emissions monitoring is provided in Table 1.



Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	177
Number of Points in Serpentine Route	100
Number of Points at Surface Cover Penetrations	77
Number of Exceedances	5
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	5

REMONITORING OF ONGOING EXCEEDANCES

In accordance with 40 CFR 63.1960(c)(4)(ii) and 40 CFR 60.36f(c)(4)(ii), corrective actions and a remonitoring event are to be performed within 10 days of the initial exceedance. In accordance with 40 CFR 63.1960(c)(4)(iii) and 40 CFR 60.36f(c)(4)(iii) additional corrective actions and a second 10-day retest are to be performed if the initial 10-day retest indicates methane values greater than the regulatory threshold. The Facility performs corrective actions, as necessary, including wellhead vacuum adjustments, the installation of well-bore seals, and addition of soil cover prior to weekly monitoring events at locations that previously exhibited elevated methane concentrations.

In accordance with 40 CFR 63.1960(c)(4)(v) and 40 CFR 60.36f(c)(4)(v) a new well or collection device must be installed or an alternate remedy must be submitted within 120-days at locations that continue to exhibit methane concentrations above the regulatory threshold for two consecutive retests.

A summary of ongoing exceedance points is provided in Table 2.

Table 2. Ongoing Weekly SEM Exceedances

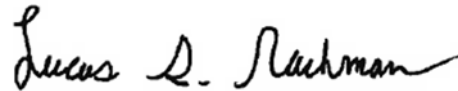
Point ID	Initial Exceedance Date	10/24/23 Event	10/24/23 Event Result	Comments
EW-55	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
Tag 69	7/12/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-58	7/21/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-52	8/4/23	N/A	Passed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-90	8/11/23	N/A	Failed	Subject to 40 CFR 63.1960(c)(4)(v)
EW-68	10/9/23	N/A	Passed	Needs 30-Day Retest
EW-95	10/9/23	N/A	Passed	Needs 30-Day Retest

If you have questions or require additional information, please contact either of the undersigned.

Sincerely,



William J. Fabrie
Staff Professional
SCS Engineers



Lucas S. Nachman
Senior Project Professional
SCS Engineers

LSN/WJF/cjw

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jonathan Hayes, City of Bristol
Jake Chandler, City of Bristol
Susan "Tracey" Blalock, VDEQ

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 24, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
1	2 PPM	OK			Start Serpentine Route
2	28.2 PPM	OK			
3	1.8 PPM	OK			
4	1.8 PPM	OK			
5	1.7 PPM	OK			
6	2.1 PPM	OK			
7	2.3 PPM	OK			
8	2.2 PPM	OK			
9	2.2 PPM	OK			
10	17.4 PPM	OK			
11	4.3 PPM	OK			
12	4.3 PPM	OK			
13	10.3 PPM	OK			
14	9.3 PPM	OK			
15	3 PPM	OK			
16	19 PPM	OK			
17	4 PPM	OK			
18	38.5 PPM	OK			
19	82.1 PPM	OK			
20	18.5 PPM	OK			
21	27.4 PPM	OK			
22	58.5 PPM	OK			
23	72.5 PPM	OK			
24	31.9 PPM	OK			
25	96.5 PPM	OK			
26	289 PPM	OK			
27	278 PPM	OK			
28	44.3 PPM	OK			
29	86.9 PPM	OK			
30	23.4 PPM	OK			
31	151 PPM	OK			
32	14.9 PPM	OK			
33	17 PPM	OK			
34	6.7 PPM	OK			
35	3.8 PPM	OK			
36	14.7 PPM	OK			
37	4.4 PPM	OK			
38	23.3 PPM	OK			
39	12.1 PPM	OK			
40	11.2 PPM	OK			
41	10 PPM	OK			
42	6.6 PPM	OK			
43	6.9 PPM	OK			
44	5.6 PPM	OK			
45	5 PPM	OK			
46	4.4 PPM	OK			
47	3.3 PPM	OK			
48	5.4 PPM	OK			
49	5.1 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 24, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
50	3 PPM	OK			
51	4.3 PPM	OK			
52	5.2 PPM	OK			
53	3.6 PPM	OK			
54	2.6 PPM	OK			
55	9.3 PPM	OK			
56	2.6 PPM	OK			
57	1.5 PPM	OK			
58	2.3 PPM	OK			
59	31.3 PPM	OK			
60	14.4 PPM	OK			
61	15.5 PPM	OK			
62	438 PPM	OK			
63	14.9 PPM	OK			
64	26.1 PPM	OK			
65	25.8 PPM	OK			
66	20.1 PPM	OK			
67	15.7 PPM	OK			
68	12.6 PPM	OK			
69	18.9 PPM	OK			
70	8.8 PPM	OK			
71	6.4 PPM	OK			
72	362 PPM	OK			
73	339 PPM	OK			
74	9.6 PPM	OK			
75	4 PPM	OK			
76	430 PPM	OK			
77	71.2 PPM	OK			
78	222 PPM	OK			
79	15.6 PPM	OK			
80	21.7 PPM	OK			
81	13.4 PPM	OK			
82	1.1 PPM	OK			
83	6.1 PPM	OK			
84	1.5 PPM	OK			
85	2.3 PPM	OK			
86	1 PPM	OK			
87	0.8 PPM	OK			
88	0.8 PPM	OK			
89	0.9 PPM	OK			
90	1.5 PPM	OK			
91	11 PPM	OK			
92	22.7 PPM	OK			
93	31.6 PPM	OK			
94	108 PPM	OK			
95	151 PPM	OK			
96	18.6 PPM	OK			
97	6.5 PPM	OK			
98	28.6 PPM	OK			

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 24, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
99	2.8 PPM	OK			
100	7.6 PPM	OK			End Serpentine Route
101	342 PPM	OK			EW-35
102	320 PPM	OK			EW-52
103	26.3 PPM	OK			TP-4
104	17.5 PPM	OK			EW-60
105	89.8 PPM	OK			EW-48
106	135 PPM	OK			TP-6
107	5.7 PPM	OK			EW-61
108	19.5 PPM	OK			EW-34
109	1.1 PPM	OK			EW-50
110	348 PPM	OK			EW-67
111	128 PPM	OK			EW-47
112	39 PPM	OK			EW-54
113	50.2 PPM	OK			EW-55
114	811 PPM	HIGH_ALARM	36.59882	-82.14733	EW-92
115	1311 PPM	HIGH_ALARM	36.59879	82.14765	EW-91
116	7.5 PPM	OK			EW-96
117	11.5 PPM	OK			TP-2
118	492 PPM	OK			EW-66
119	31.3 PPM	OK			EW-58
120	16.9 PPM	OK			EW-57
121	121 PPM	OK			TP-1
122	3.9 PPM	OK			EW-59
123	36.6 PPM	OK			EW-56
124	2.3 PPM	OK			EW-97
125	2.5 PPM	OK			EW-41
126	90.2 PPM	OK			EW-53
127	28.7 PPM	OK			EW-40
128	7.9 PPM	OK			TP-3
129	367 PPM	OK			EW-51
130	154 PPM	OK			EW-39
131	32.1 PPM	OK			TP-5
132	8.7 PPM	OK			EW-68
133	10.4 PPM	OK			EW-87
134	44.7 PPM	OK			EW-38
135	288 PPM	OK			TP-7
136	1.5 PPM	OK			EW-49
137	24.5 PPM	OK			EW-83
138	1.2 PPM	OK			EW-31R
139	1.2 PPM	OK			EW-65
140	1.1 PPM	OK			EW-81
141	0.2 PPM	OK			TP-8
142	0.1 PPM	OK			EW-64
143	0.1 PPM	OK			EW-30R
144	0.1 PPM	OK			EW-63
145	0.1 PPM	OK			EW-42
146	188 PPM	OK			TP-9

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 24, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
147	0 PPM	OK			EW-33R
148	0 PPM	OK			EW-62
149	0 PPM	OK			EW-29R
150	0 PPM	OK			EW-74
151	0 PPM	OK			EW-32R
152	0 PPM	OK			EW-69
153	0 PPM	OK			EW-71
154	0 PPM	OK			EW-72
155	0 PPM	OK			EW-70
156	0 PPM	OK			EW-73
157	3.3 PPM	OK			EW-76
158	2.2 PPM	OK			EW-78
159	2415 PPM	HIGH_ALRM	36.60039	-82.14767	EW-82
160	17.6 PPM	OK			EW-36A
161	2 PPM	OK			EW-85
162	16.1 PPM	OK			EW-88
163	17.8 PPM	OK			EW-89
164	0.3 PPM	OK			EW-93
165	9.5 PPM	OK			EW-94
166	3509 PPM	HIGH_ALRM	36.59822	-82.14703	EW-98
167	4.4 PPM	OK			EW-100
168	9.2 PPM	OK			EW-99
169	30.2 PPM	OK			EW-95
170	2800 PPM	HIGH_ALRM	36.59877	-82.14825	EW-90
171	4.9 PPM	OK			EW-86
172	0.3 PPM	OK			EW-84
173	0.1 PPM	OK			EW-80
174	0.2 PPM	OK			EW-79
175	0.2 PPM	OK			EW-77
176	0.4 PPM	OK			EW-33B
177	5.5 PPM	OK			EW-75

Number of locations sampled:	177
Number of exceedance locations:	5

**EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 24, 2023
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA**

ID #	Methane Concentration	Compliance	GPS Coordinates		Comments
			Lat.	Long.	
NOTES:					
Points 1 through 100 represent serpentine SEM route.					
Points 101 through 177 represent SEM at Pipe Penetrations					
Weather Conditions: Clear 73°F Wind: SW 4 MPH					
<u>Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm</u>					
10/24/2023	10:39	ZERO	0.1		PPM
10/24/2023	10:43	SPAN	501.0		PPM
<u>Background Reading:</u>					
10/24/2023	10:48	Upwind	2		PPM
10/24/2023	10:51	Downwind	3.2		PPM

Appendix B

In-Waste Temperatures on Select Days in October

Appendix B Figures

Figure B- 1.	Average Temperatures Recorded by TP-1 on October 4, 2023.....	B-3
Figure B- 2.	Average Temperatures Recorded by TP-1 on October 11, 2023.....	B-4
Figure B- 3.	Average Temperatures Recorded by TP-1 on October 18, 2023.....	B-5
Figure B- 4.	Average Temperatures Recorded by TP-1 on October 25, 2023.....	B-6
Figure B- 5.	Average Temperatures Recorded by TP-2 on October 4, 2023.....	B-7
Figure B- 6.	Average Temperatures Recorded by TP-2 on October 11, 2023.....	B-8
Figure B- 7.	Average Temperatures Recorded by TP-2 on October 18, 2023.....	B-9
Figure B- 8.	Average Temperatures Recorded by TP-2 on October 25, 2023.....	B-10
Figure B- 9.	Average Temperatures Recorded by TP-3 on October 4, 2023.....	B-11
Figure B- 10.	Average Temperatures Recorded by TP-3 on October 11, 2023.....	B-12
Figure B- 11.	Average Temperatures Recorded by TP-3 on October 18, 2023.....	B-13
Figure B- 12.	Average Temperatures Recorded by TP-3 on October 25, 2023.....	B-14
Figure B- 13.	Average Temperatures Recorded by TP-4 on October 4, 2023.....	B-15
Figure B- 14.	Average Temperatures Recorded by TP-4 on October 11, 2023.....	B-16
Figure B- 15.	Average Temperatures Recorded by TP-4 on October 18, 2023.....	B-17
Figure B- 16.	Average Temperatures Recorded by TP-4 on October 25, 2023.....	B-18
Figure B- 17.	Average Temperatures Recorded by TP-5 on October 4, 2023.....	B-19
Figure B- 18.	Average Temperatures Recorded by TP-5 on October 11, 2023.....	B-20
Figure B- 19.	Average Temperatures Recorded by TP-5 on October 18, 2023.....	B-21
Figure B- 20.	Average Temperatures Recorded by TP-5 on October 25, 2023.....	B-22
Figure B- 21.	Average Temperatures Recorded by TP-6 on October 4, 2023.....	B-23
Figure B- 22.	Average Temperatures Recorded by TP-6 on October 11, 2023.....	B-24
Figure B- 23.	Average Temperatures Recorded by TP-6 on October 18, 2023.....	B-25
Figure B- 24.	Average Temperatures Recorded by TP-6 on October 25, 2023.....	B-26
Figure B- 25.	Average Temperatures Recorded by TP-7 on October 4, 2023.....	B-27
Figure B- 26.	Average Temperatures Recorded by TP-7 on October 11, 2023.....	B-28
Figure B- 27.	Average Temperatures Recorded by TP-7 on October 18, 2023.....	B-29
Figure B- 28.	Average Temperatures Recorded by TP-7 on October 25, 2023.....	B-30
Figure B- 29.	Average Temperatures Recorded by TP-8 on October 4, 2023.....	B-31
Figure B- 30.	Average Temperatures Recorded by TP-8 on October 11, 2023.....	B-32
Figure B- 31.	Average Temperatures Recorded by TP-8 on October 18, 2023.....	B-33
Figure B- 32.	Average Temperatures Recorded by TP-8 on October 25, 2023.....	B-34
Figure B- 33.	Average Temperatures Recorded by TP-9 on October 4, 2023.....	B-35
Figure B- 34.	Average Temperatures Recorded by TP-9 on October 11, 2023.....	B-36
Figure B- 35.	Average Temperatures Recorded by TP-9 on October 18, 2023.....	B-37
Figure B- 36.	Average Temperatures Recorded by TP-9 on October 25, 2023.....	B-38

Figure B- 1. Average Temperatures Recorded by TP-1 on October 4, 2023

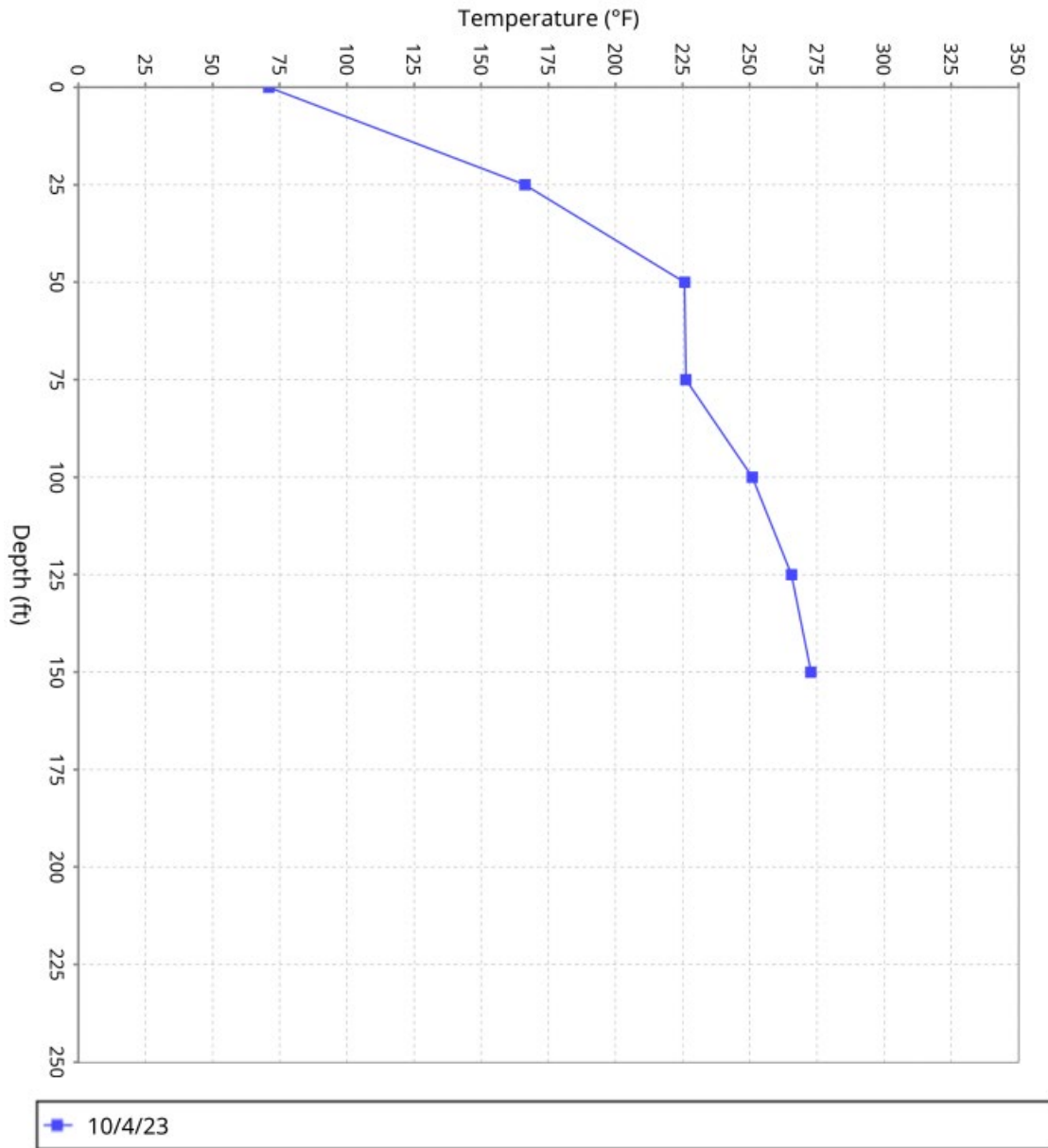


Figure B- 2. Average Temperatures Recorded by TP-1 on October 11, 2023

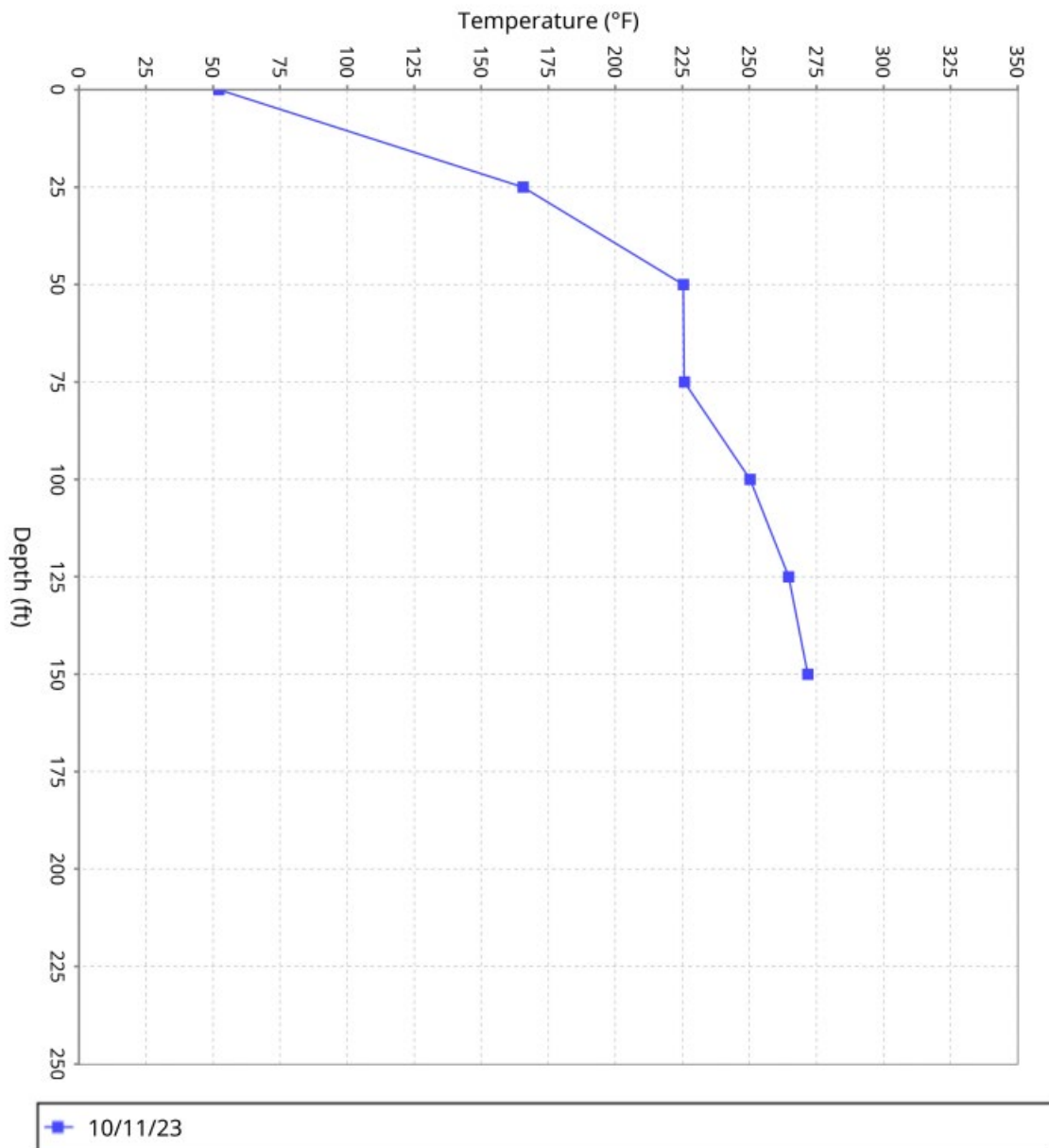


Figure B- 3. Average Temperatures Recorded by TP-1 on October 18, 2023

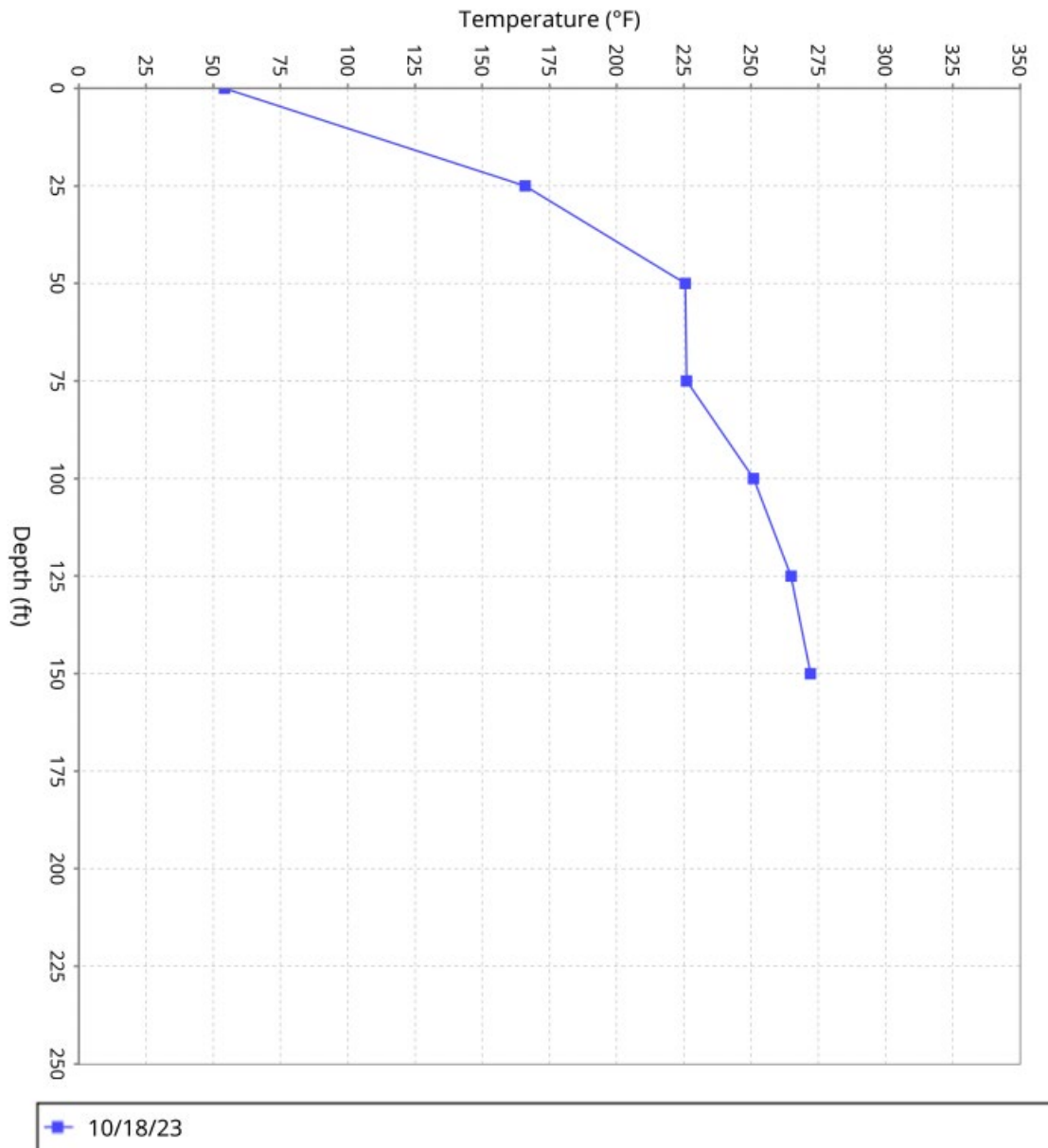


Figure B- 4. Average Temperatures Recorded by TP-1 on October 25, 2023

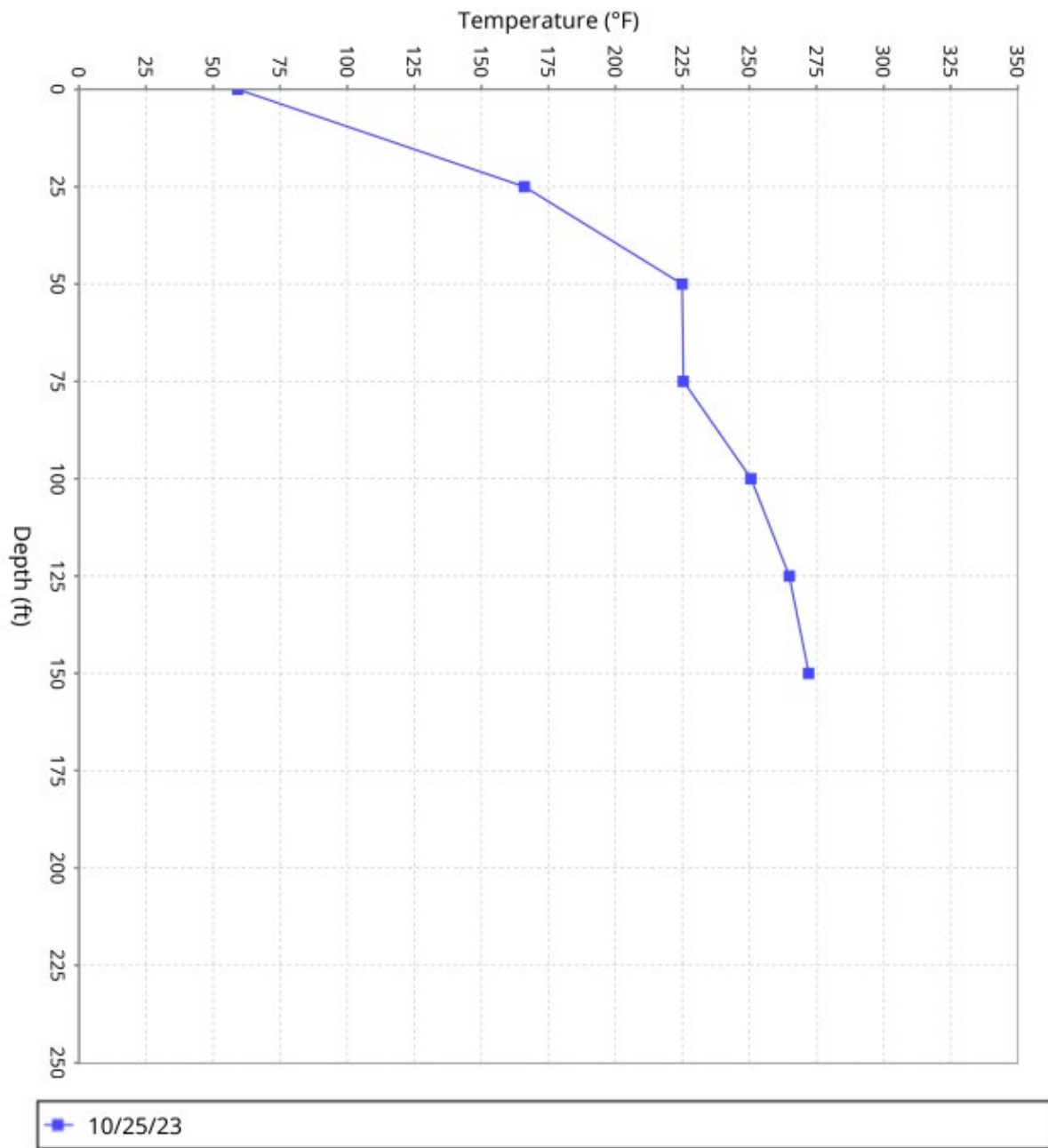


Figure B- 5. Average Temperatures Recorded by TP-2 on October 4, 2023

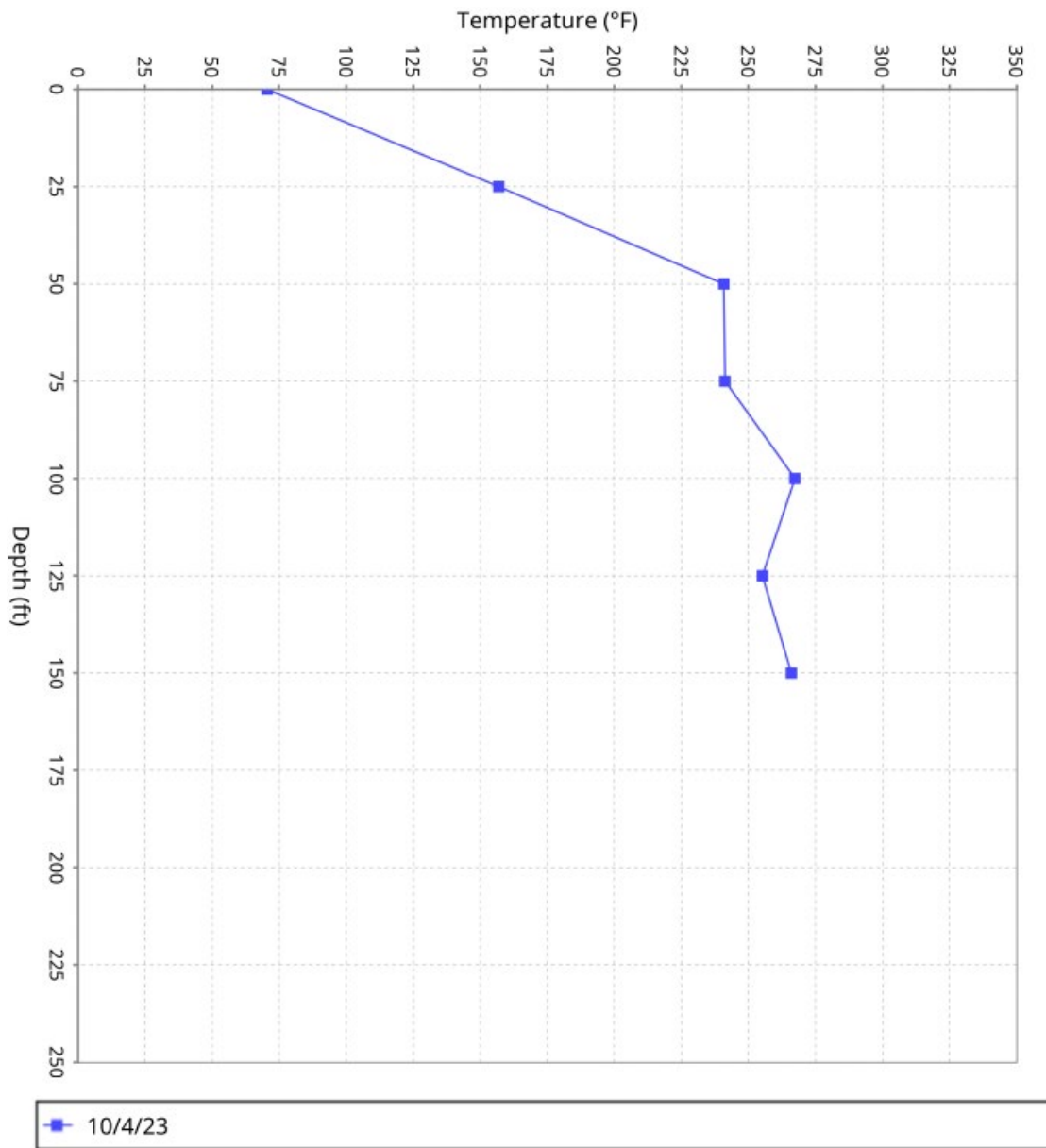


Figure B- 6. Average Temperatures Recorded by TP-2 on October 11, 2023

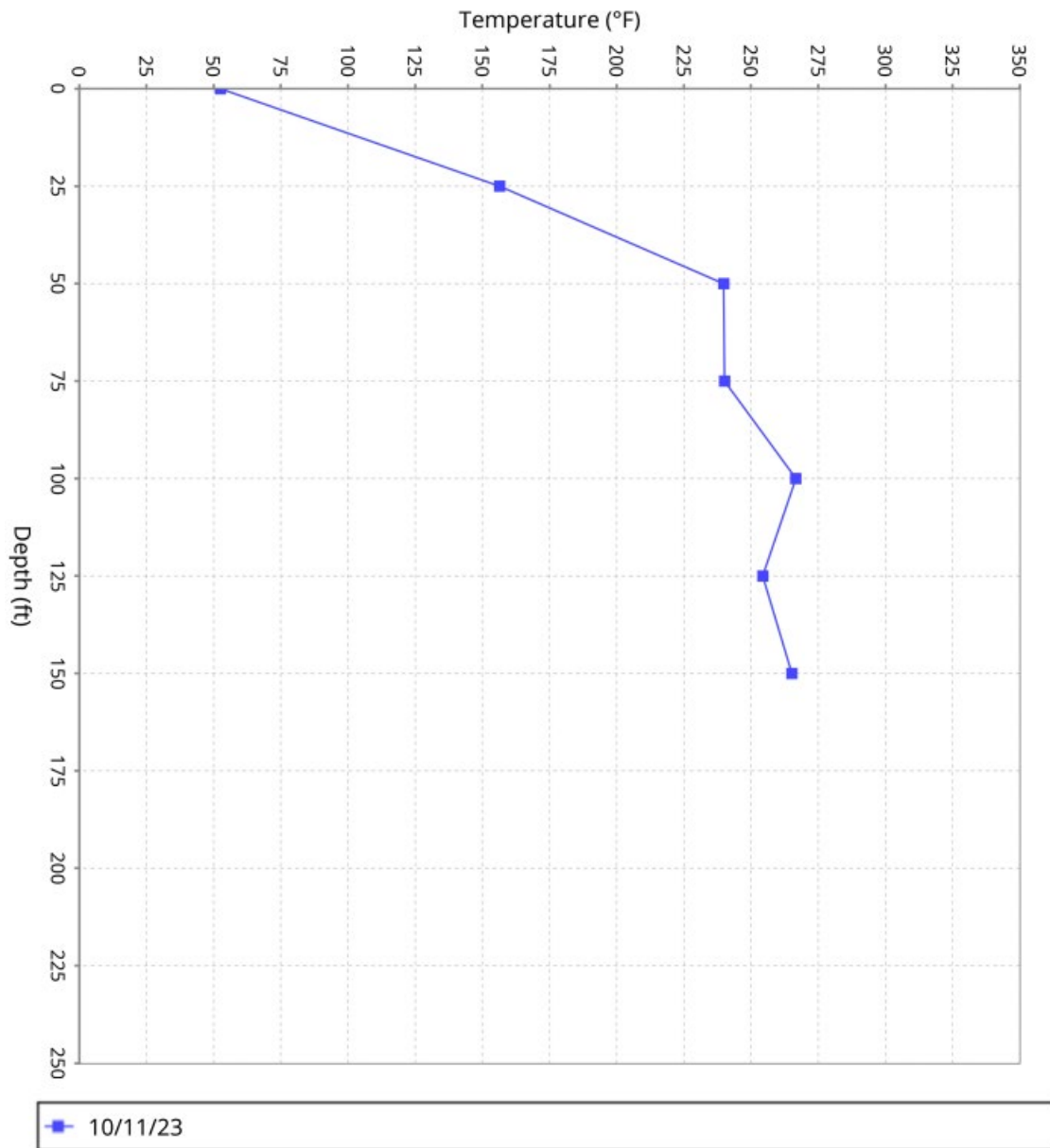


Figure B- 7. Average Temperatures Recorded by TP-2 on October 18, 2023

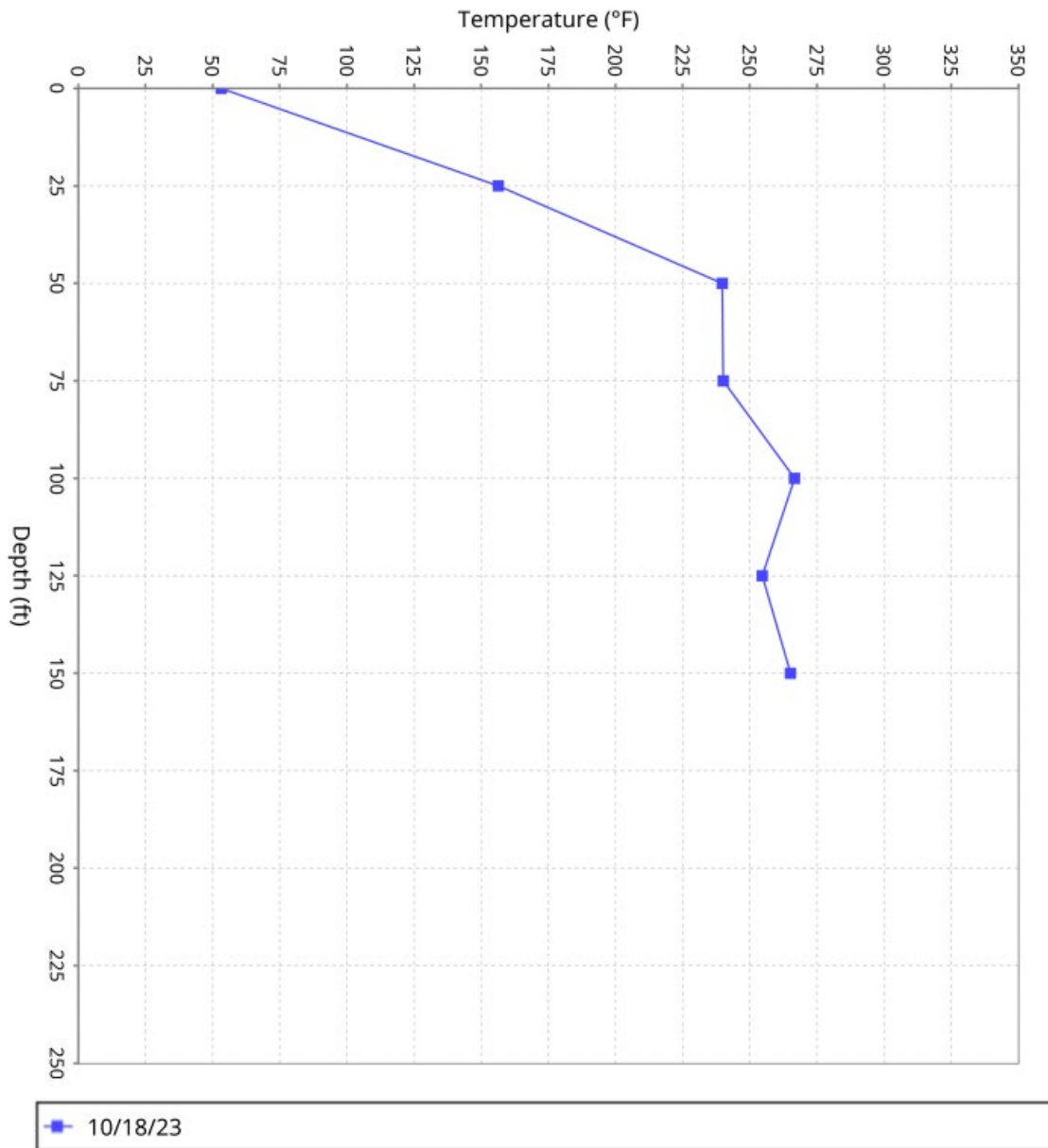


Figure B- 8. Average Temperatures Recorded by TP-2 on October 25, 2023

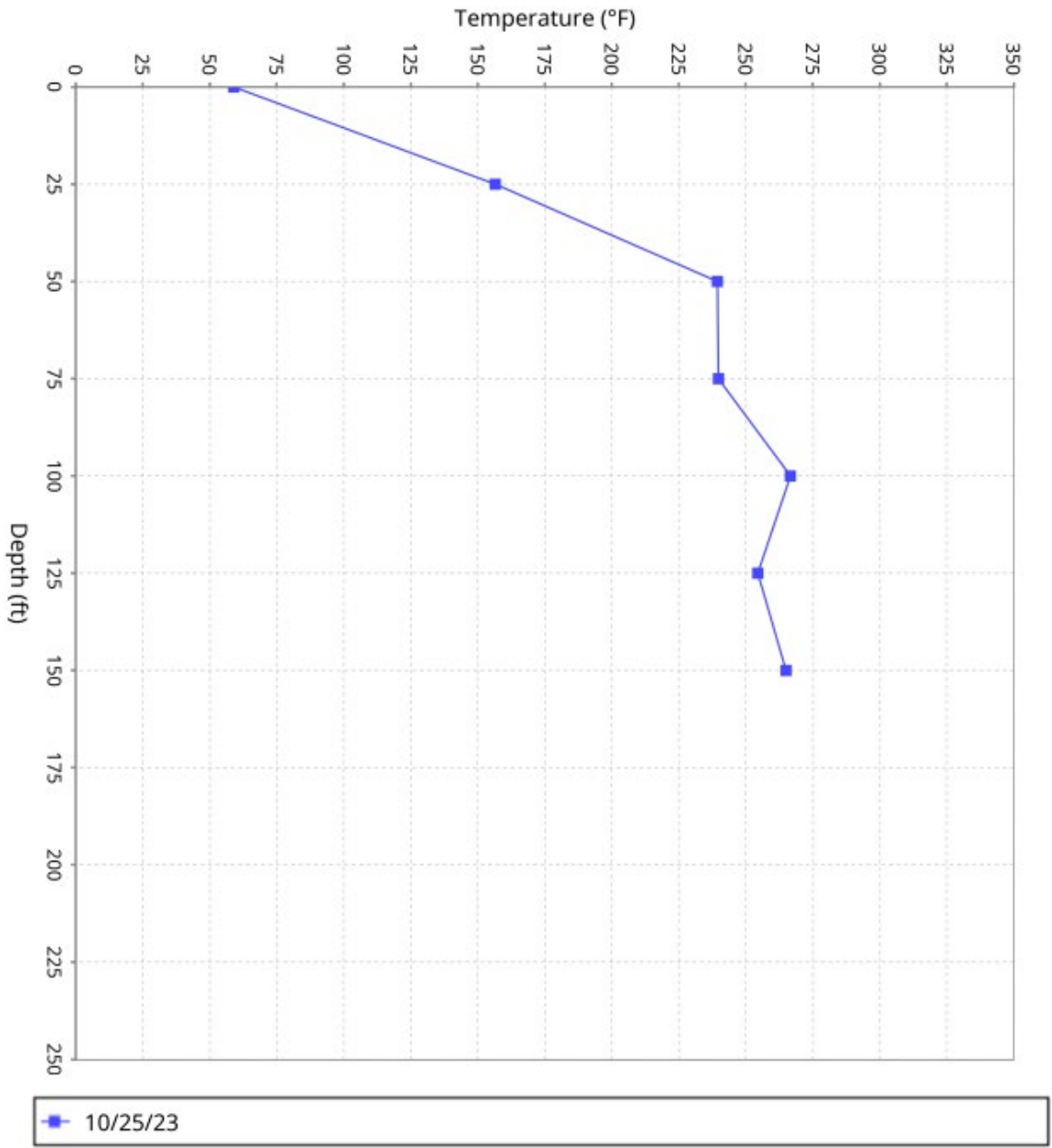


Figure B- 9. Average Temperatures Recorded by TP-3 on October 4, 2023

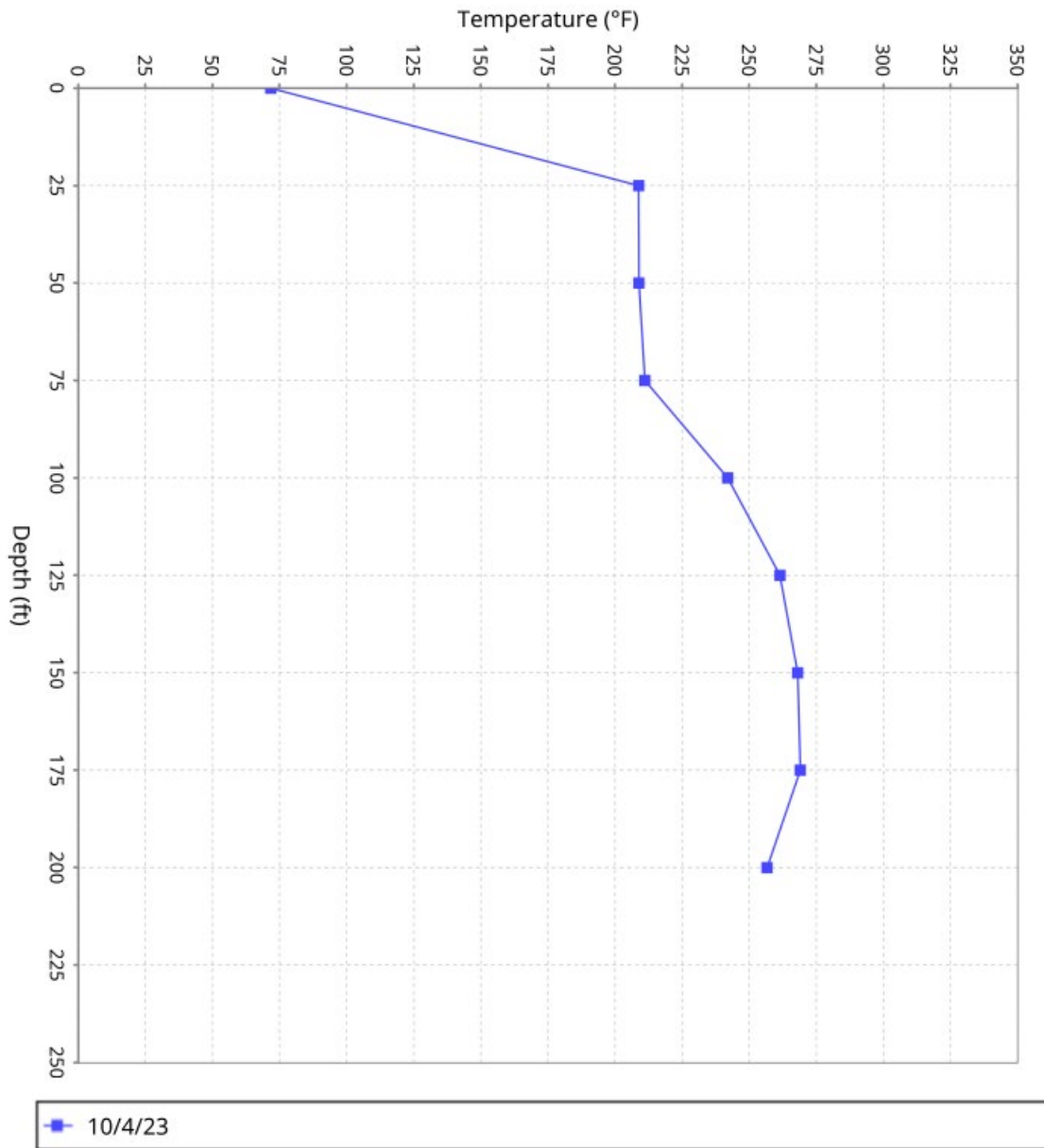


Figure B- 10. Average Temperatures Recorded by TP-3 on October 11, 2023

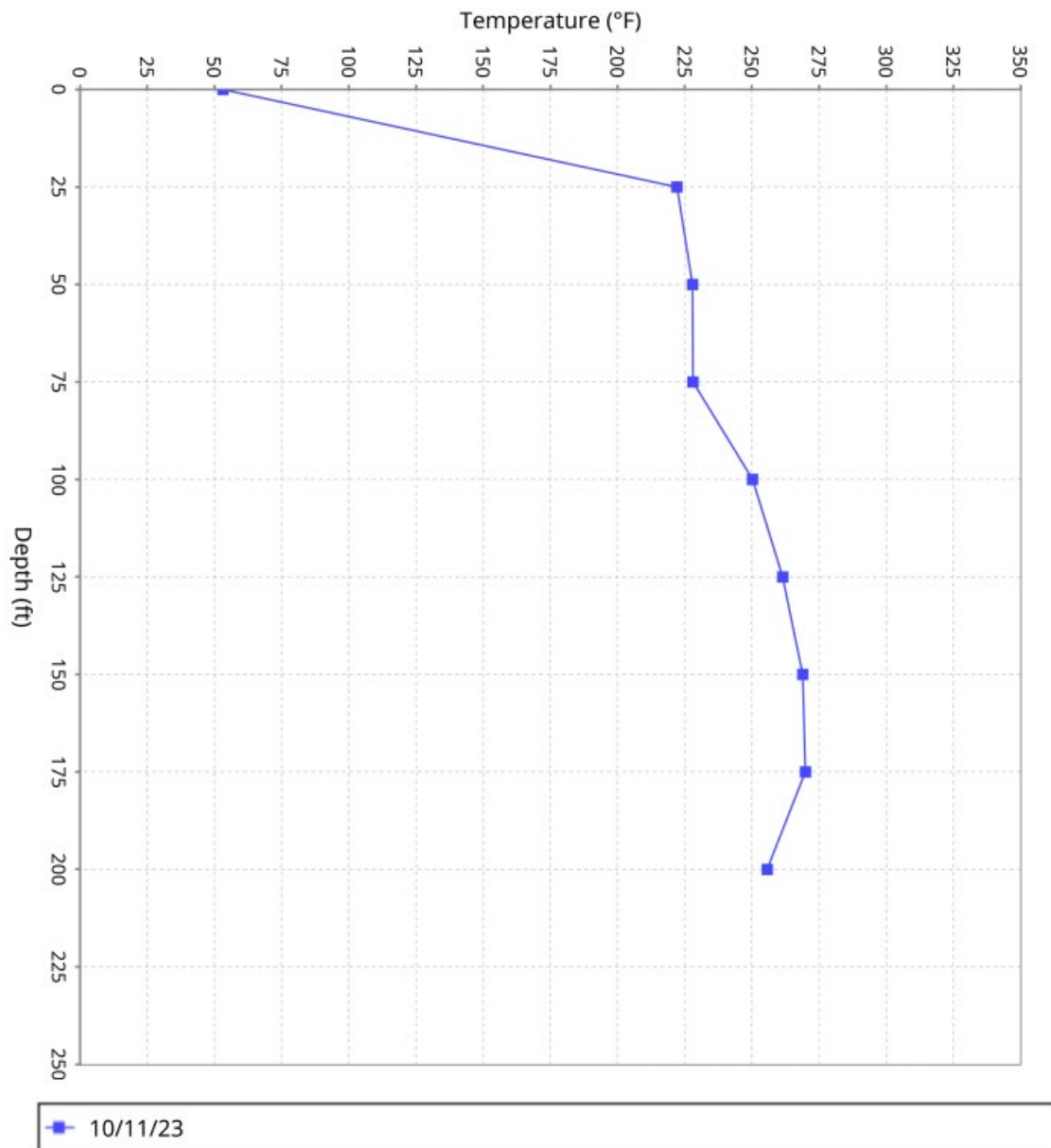


Figure B- 11. Average Temperatures Recorded by TP-3 on October 18, 2023

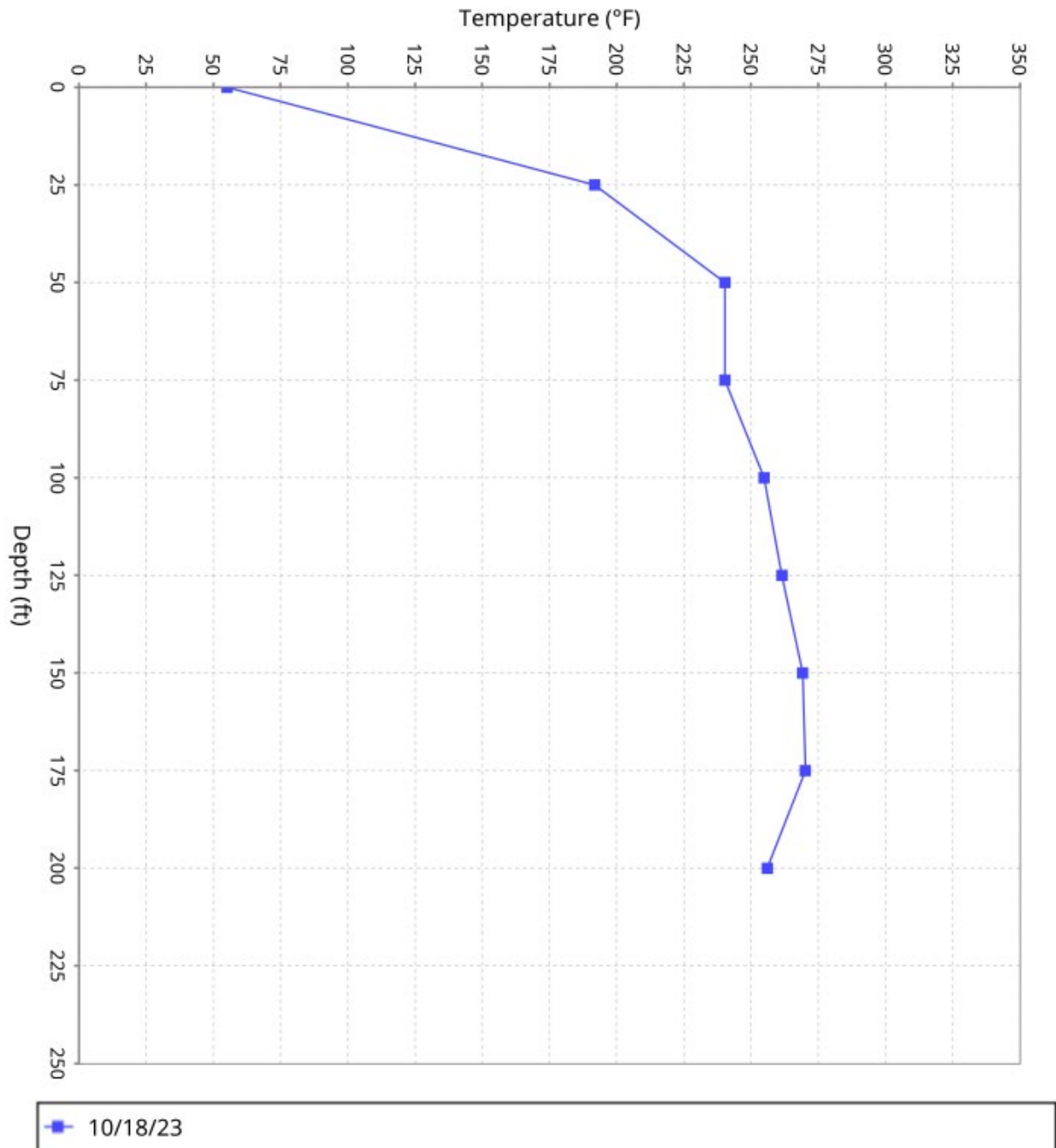


Figure B- 12. Average Temperatures Recorded by TP-3 on October 25, 2023

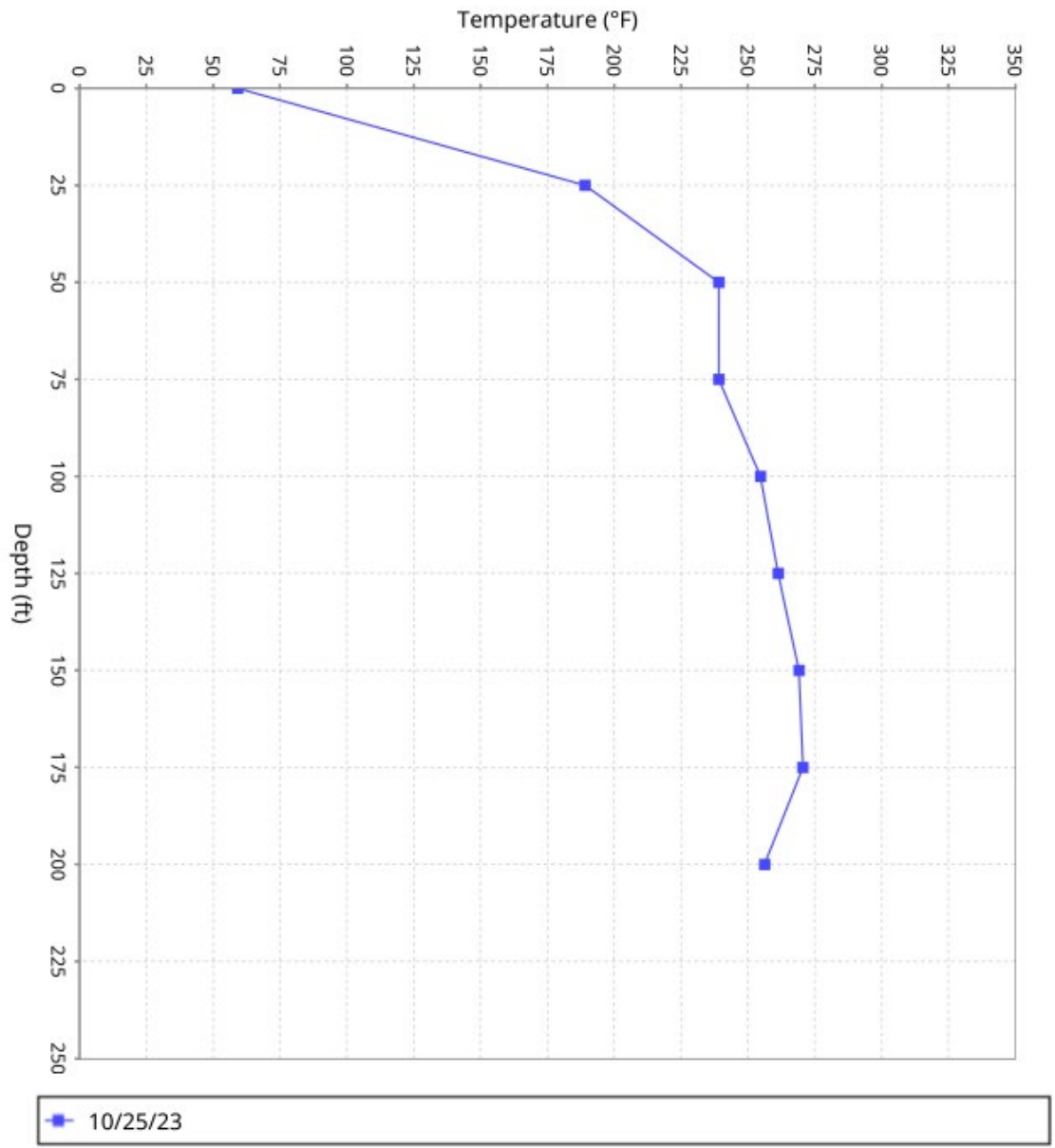


Figure B- 13. Average Temperatures Recorded by TP-4 on October 4, 2023

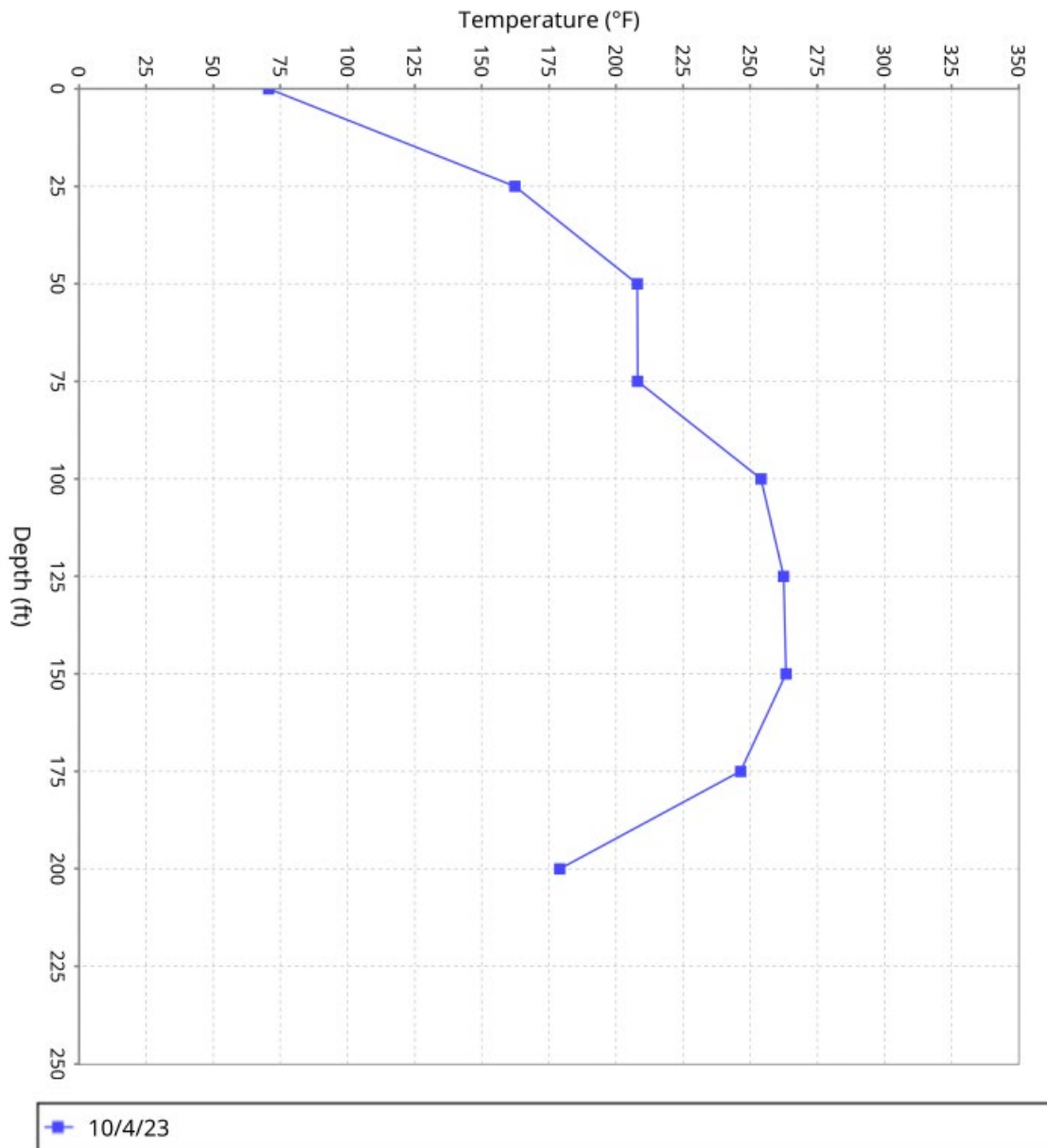


Figure B- 14. Average Temperatures Recorded by TP-4 on October 11, 2023

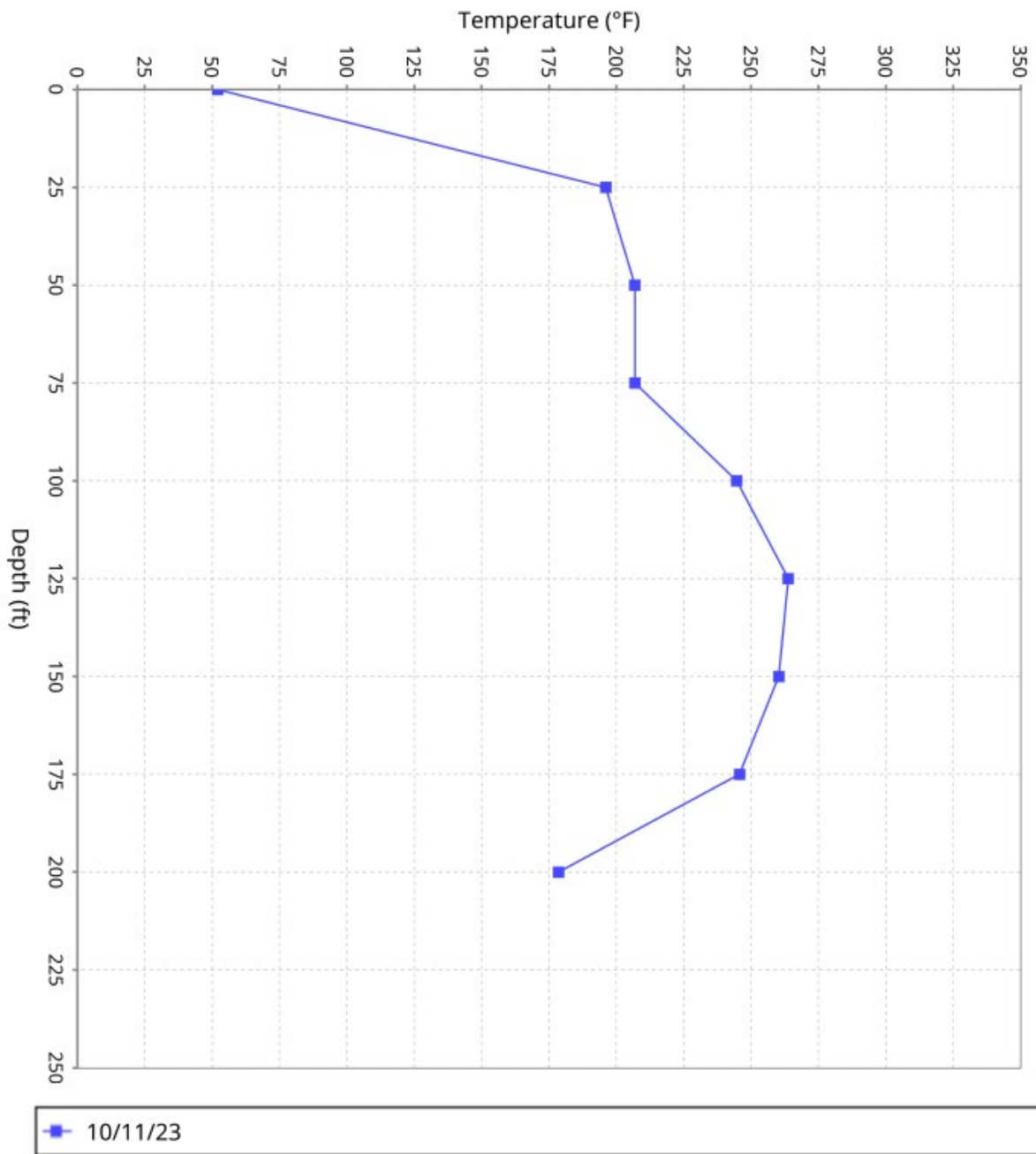


Figure B- 15. Average Temperatures Recorded by TP-4 on October 18, 2023

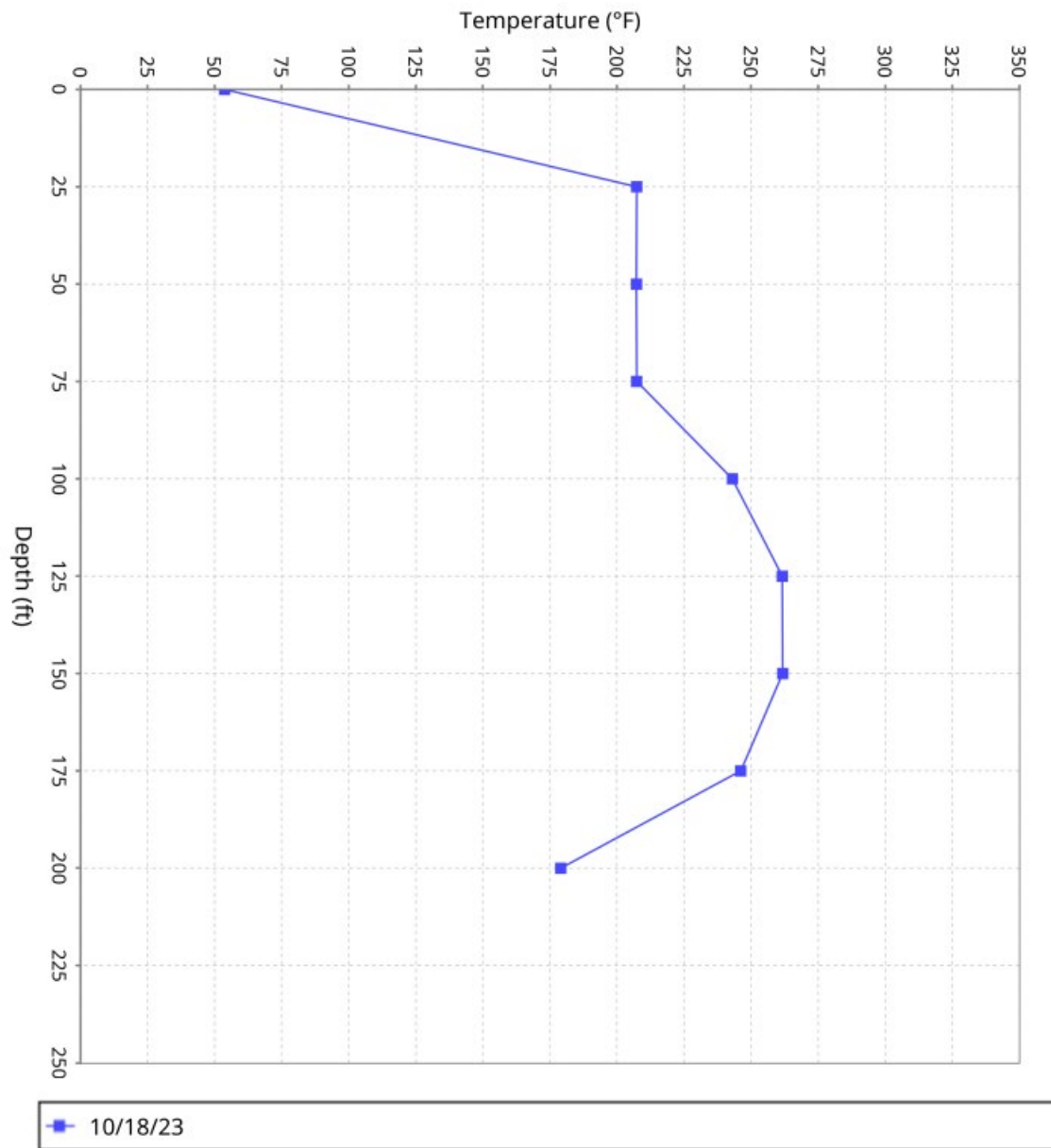


Figure B- 16. Average Temperatures Recorded by TP-4 on October 25, 2023

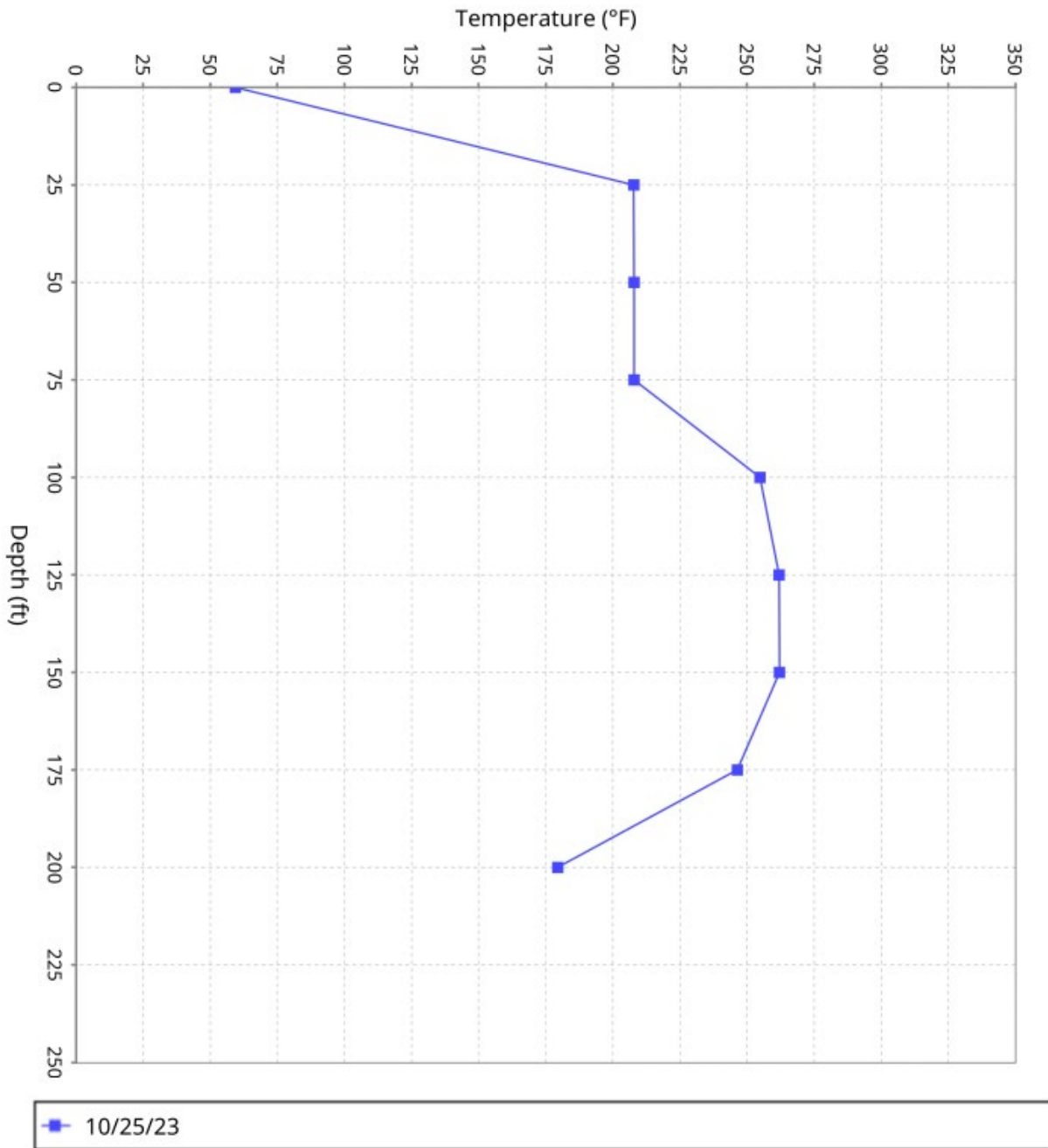


Figure B- 17. Average Temperatures Recorded by TP-5 on October 4, 2023

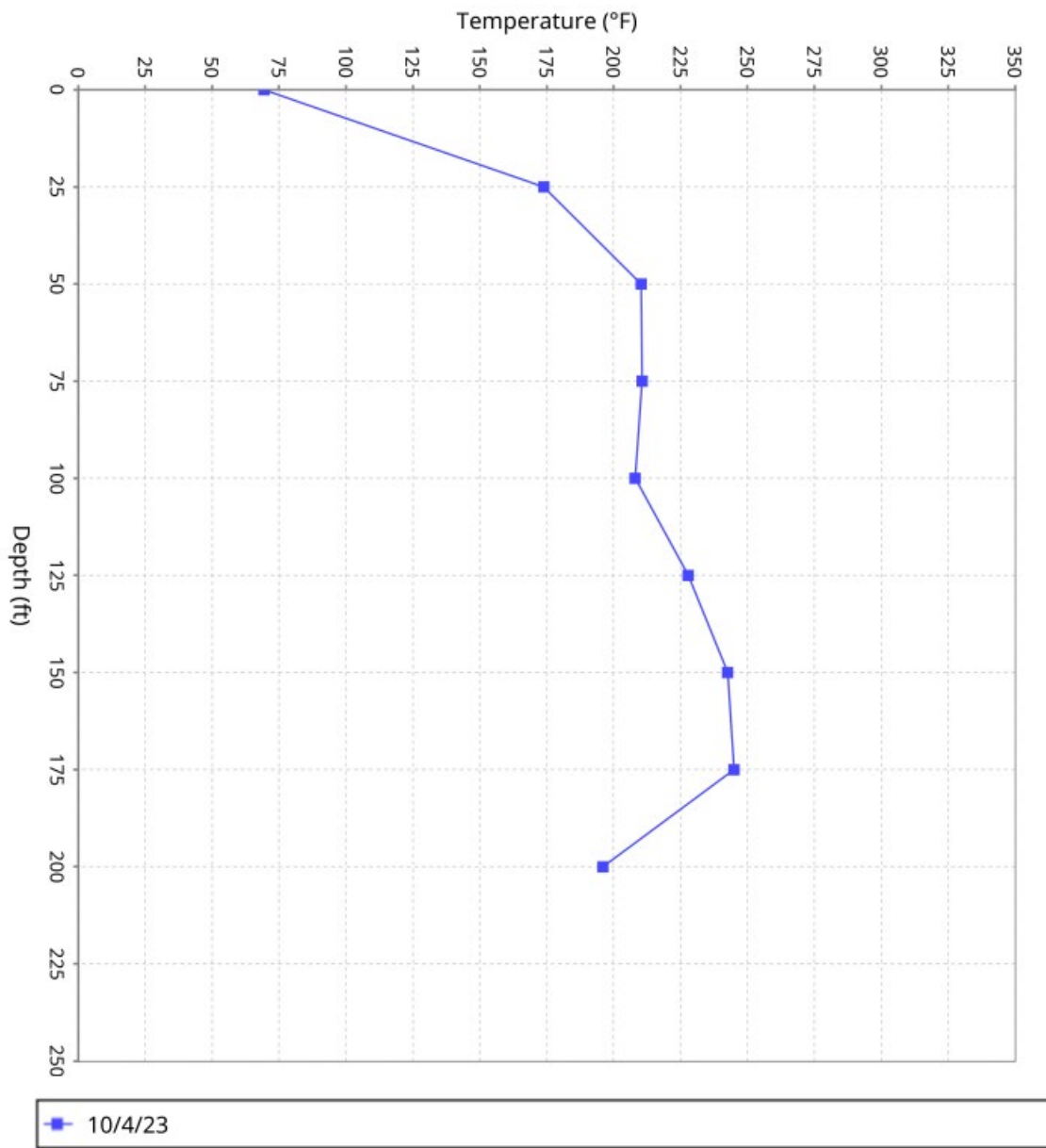


Figure B- 18. Average Temperatures Recorded by TP-5 on October 11, 2023

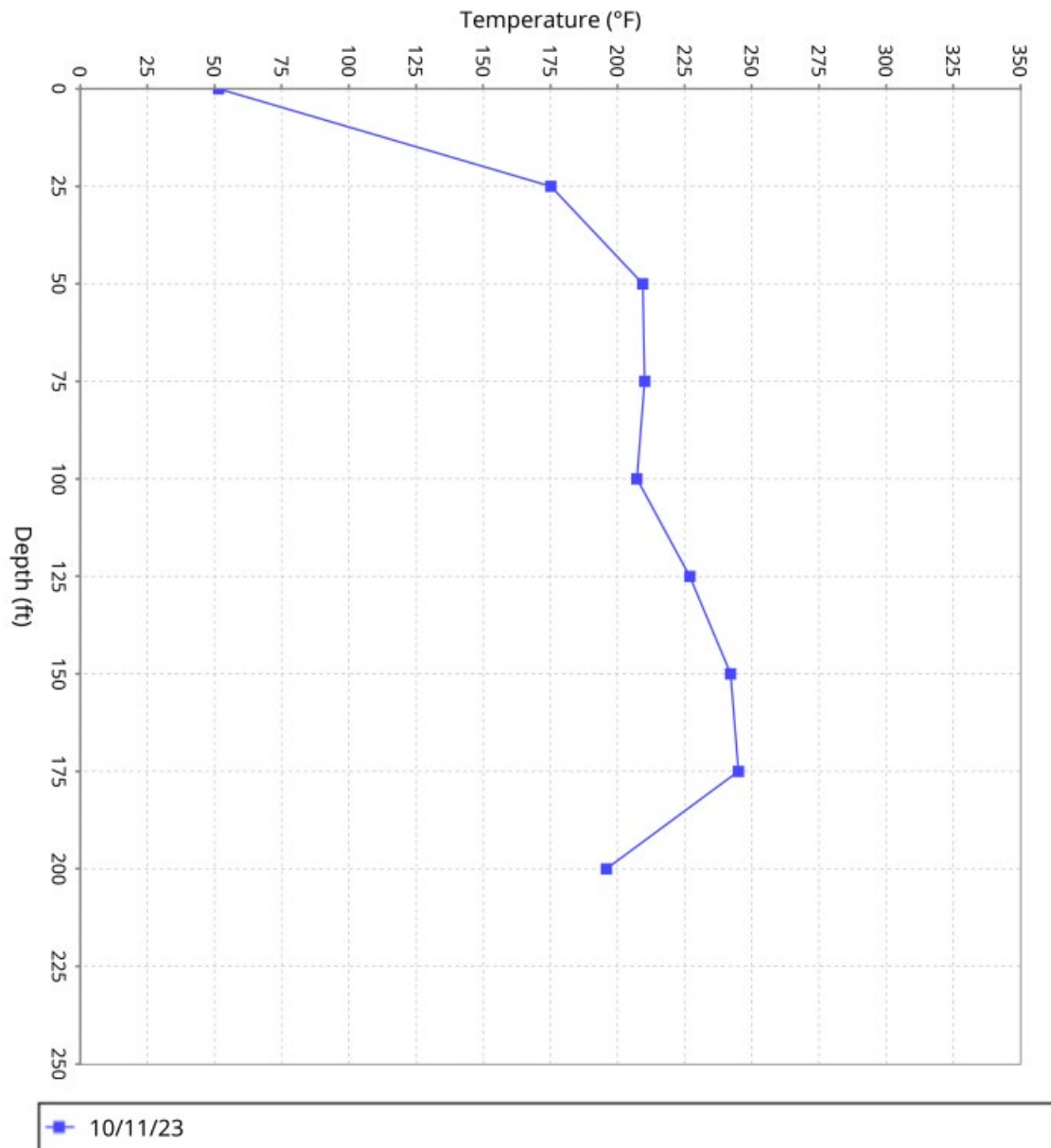


Figure B- 19. Average Temperatures Recorded by TP-5 on October 18, 2023

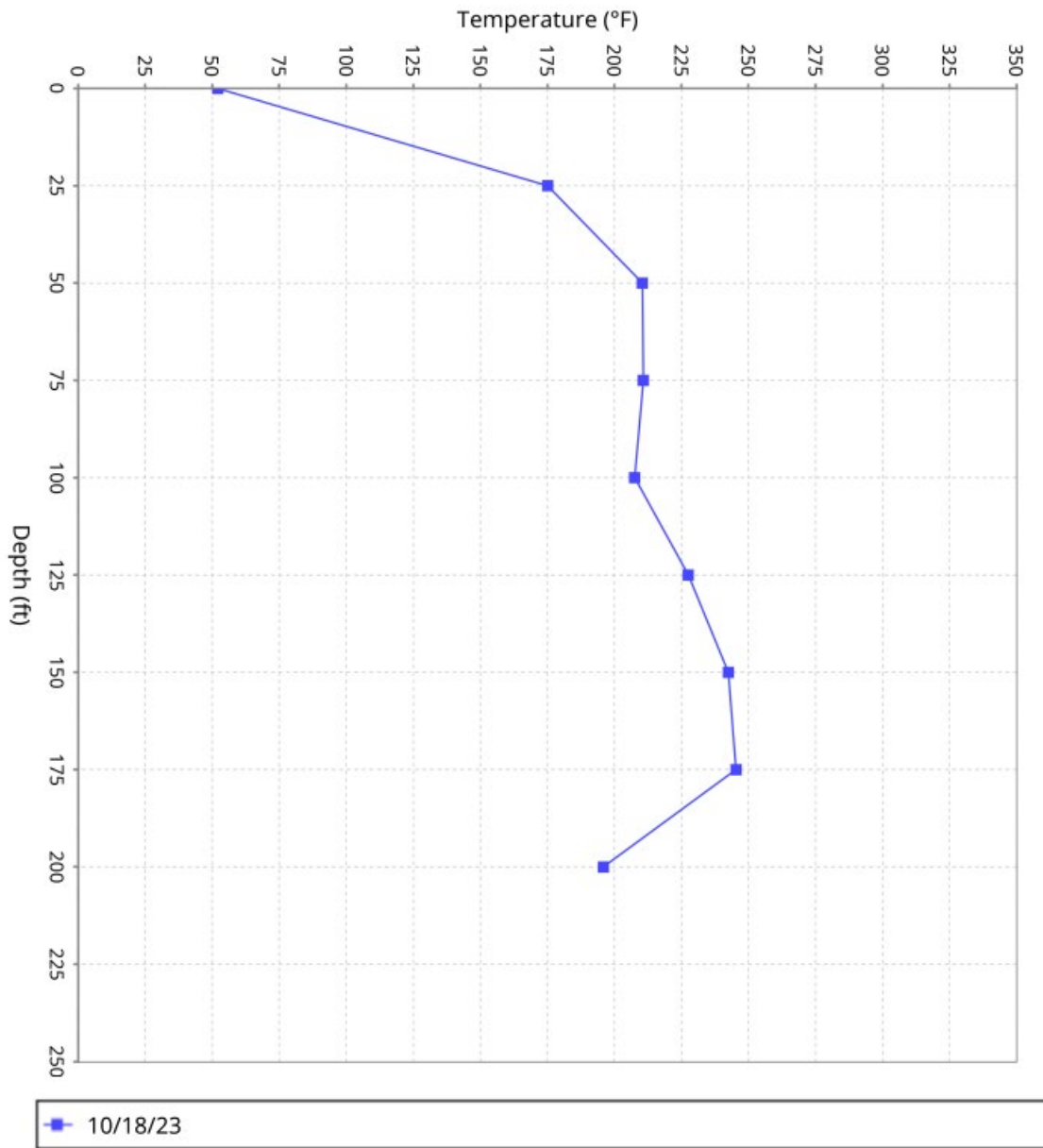
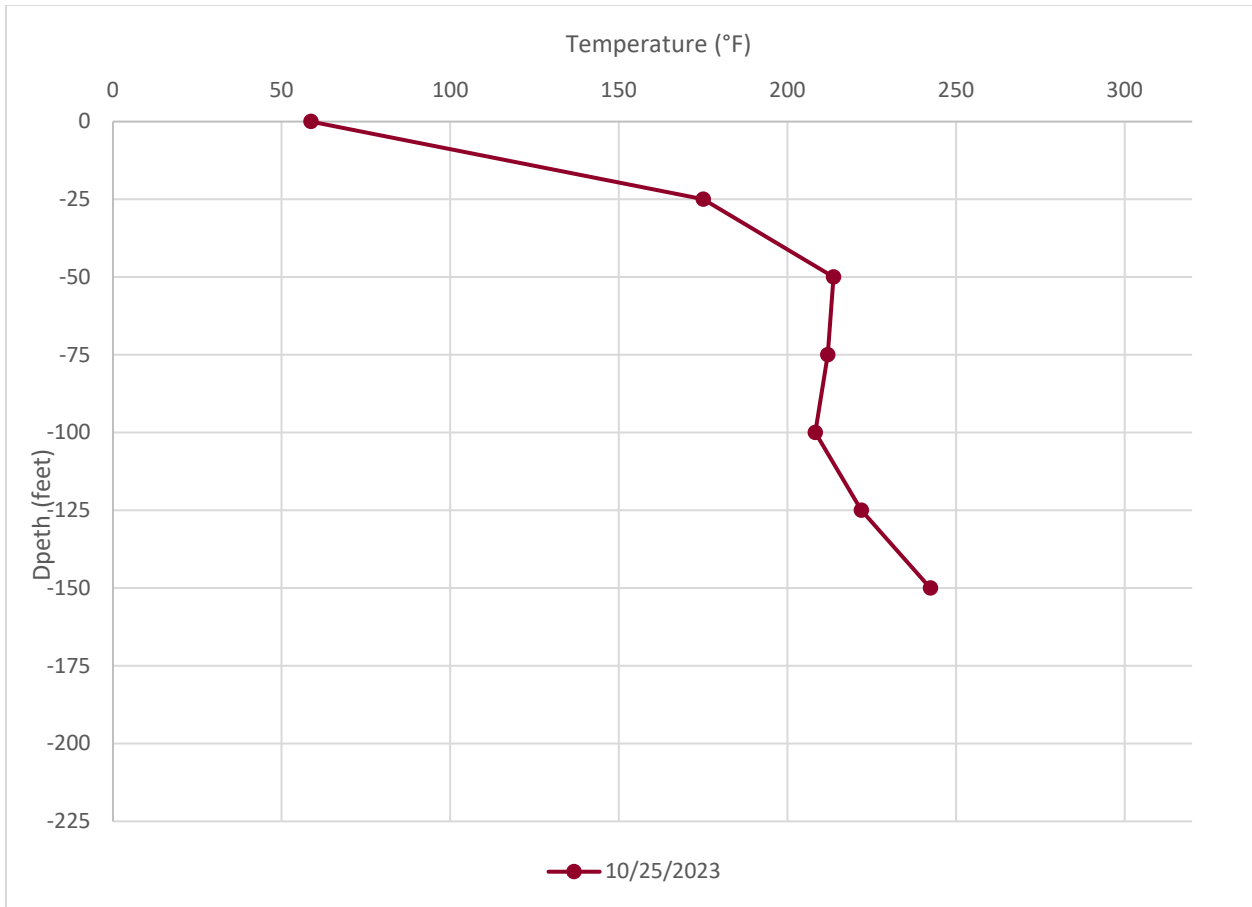


Figure B- 20. Average Temperatures Recorded by TP-5 on October 25, 2023¹⁰



¹⁰ The graph for TP-5 on October 25, 2023 has been generated manually due to errors reading temperatures at the 175-foot and 200-foot depths.

Figure B- 21. Average Temperatures Recorded by TP-6 on October 4, 2023

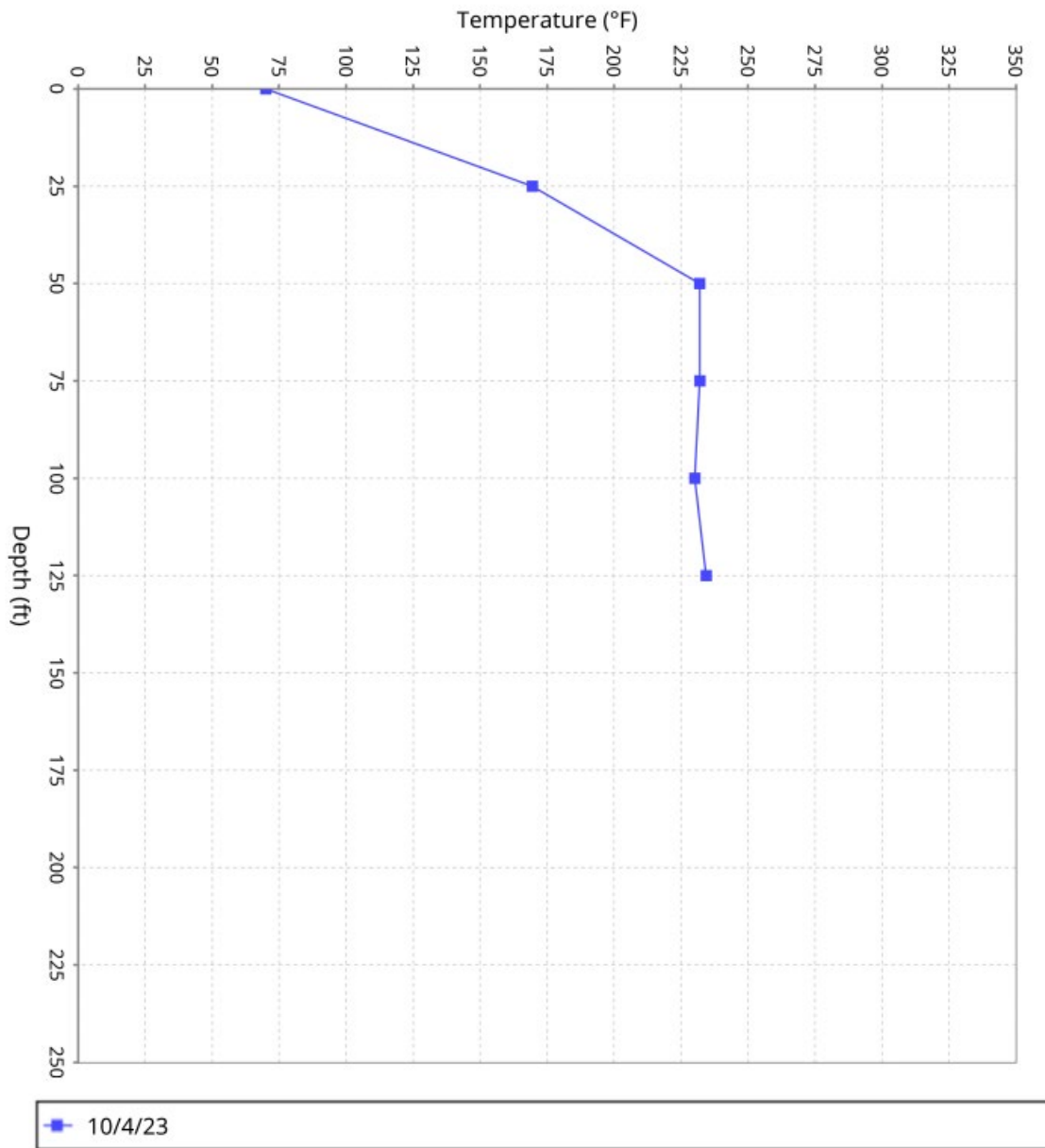


Figure B- 22. Average Temperatures Recorded by TP-6 on October 11, 2023

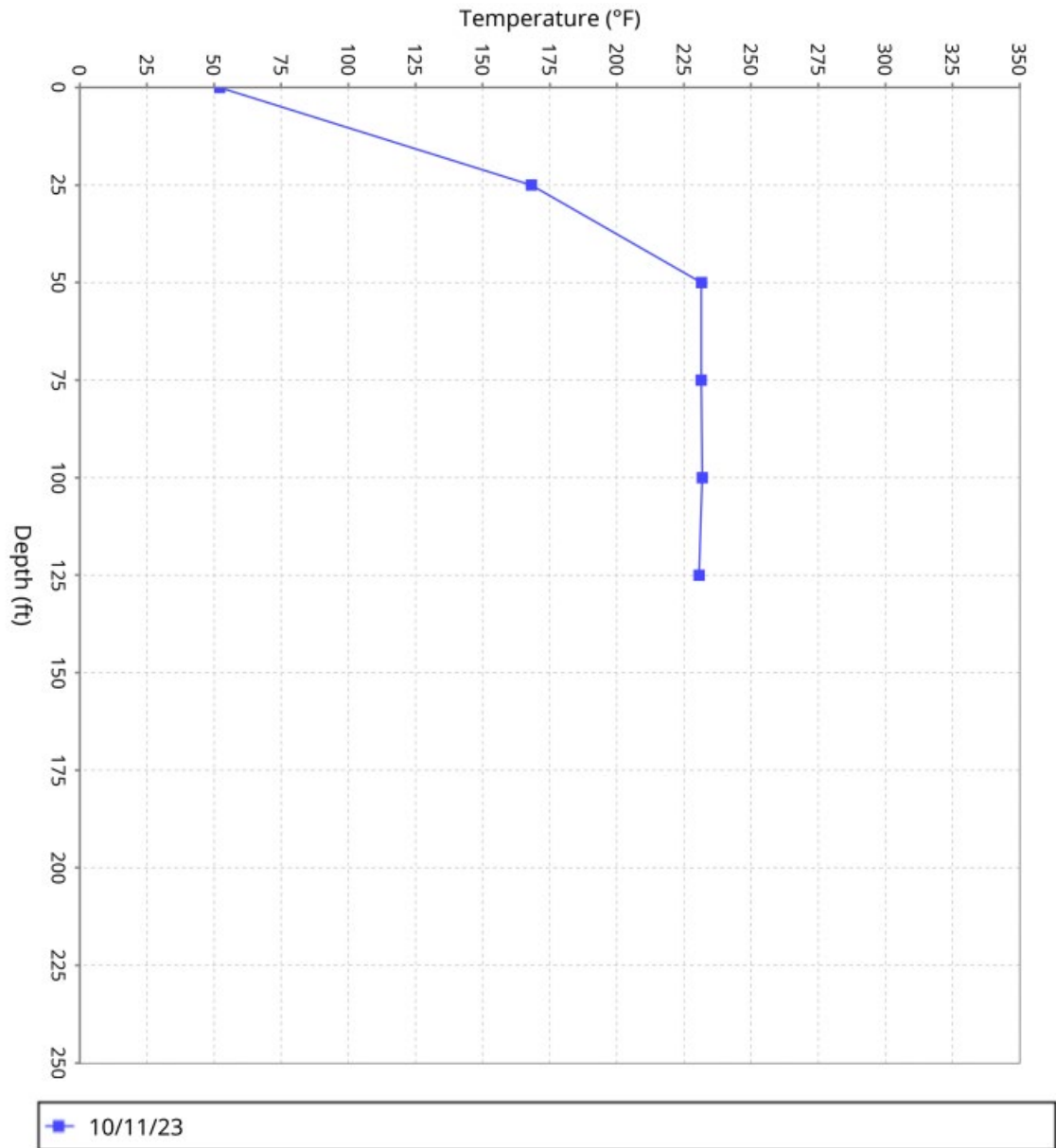


Figure B- 23. Average Temperatures Recorded by TP-6 on October 18, 2023

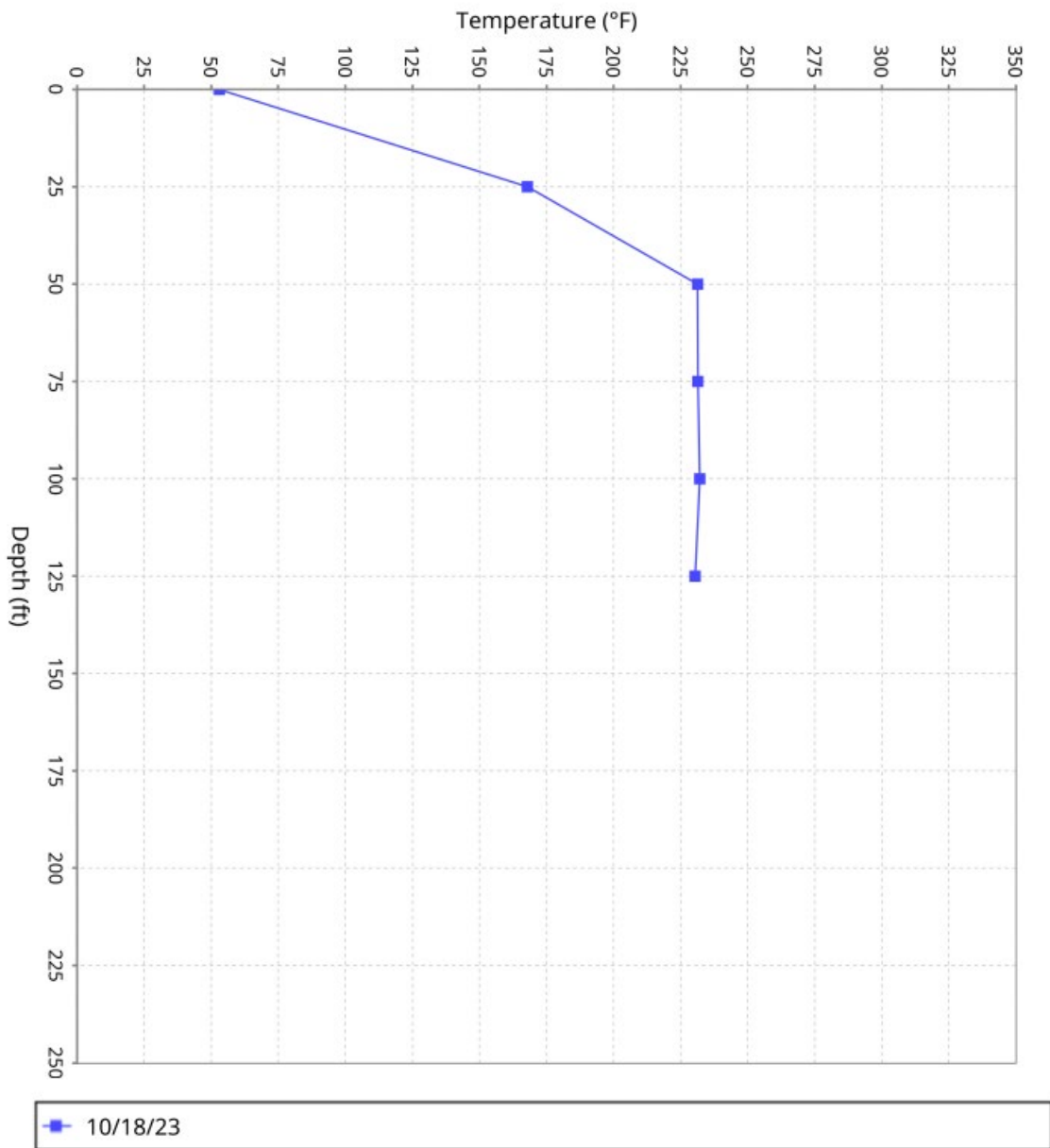


Figure B- 24. Average Temperatures Recorded by TP-6 on October 25, 2023

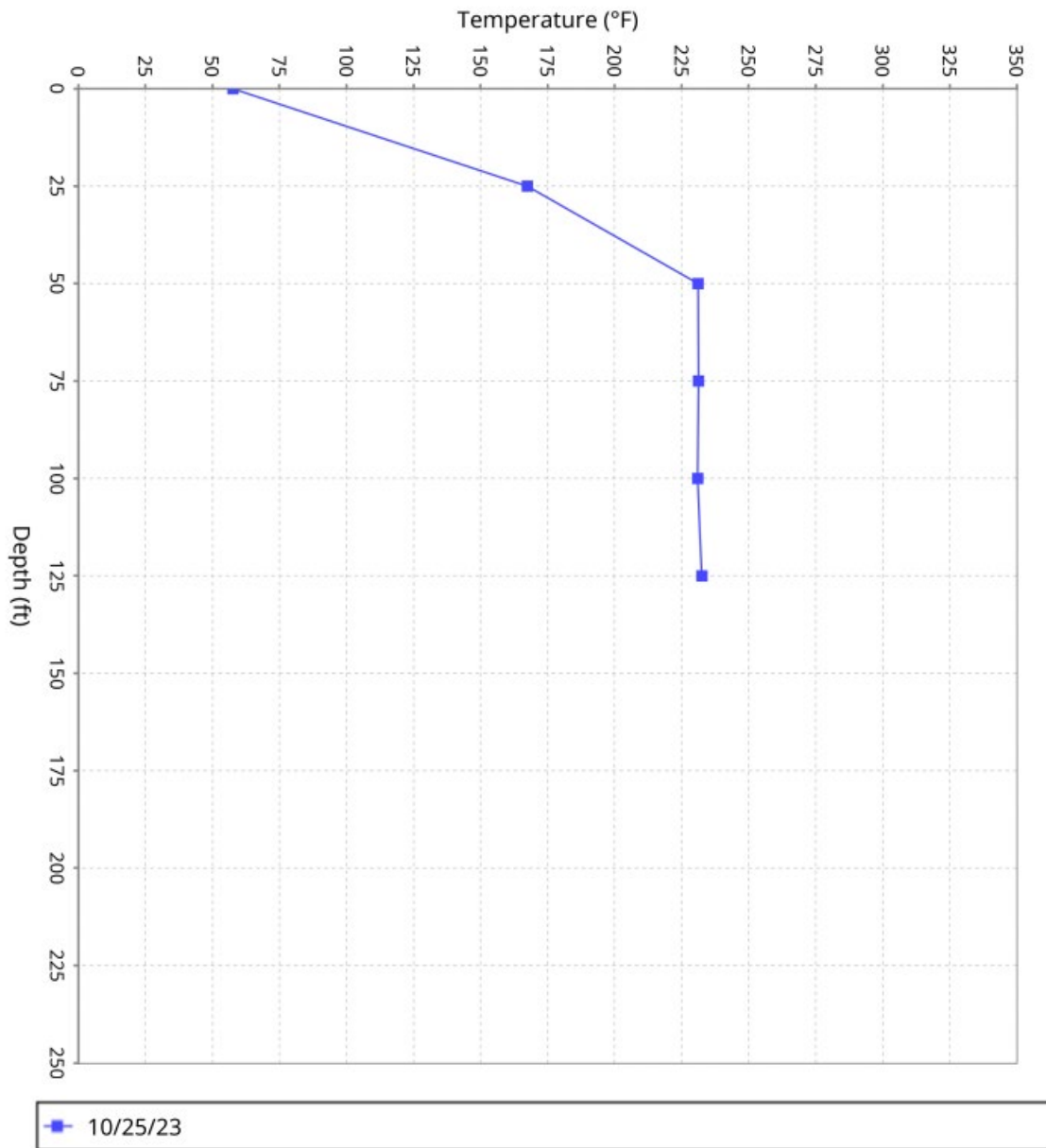


Figure B- 25. Average Temperatures Recorded by TP-7 on October 4, 2023

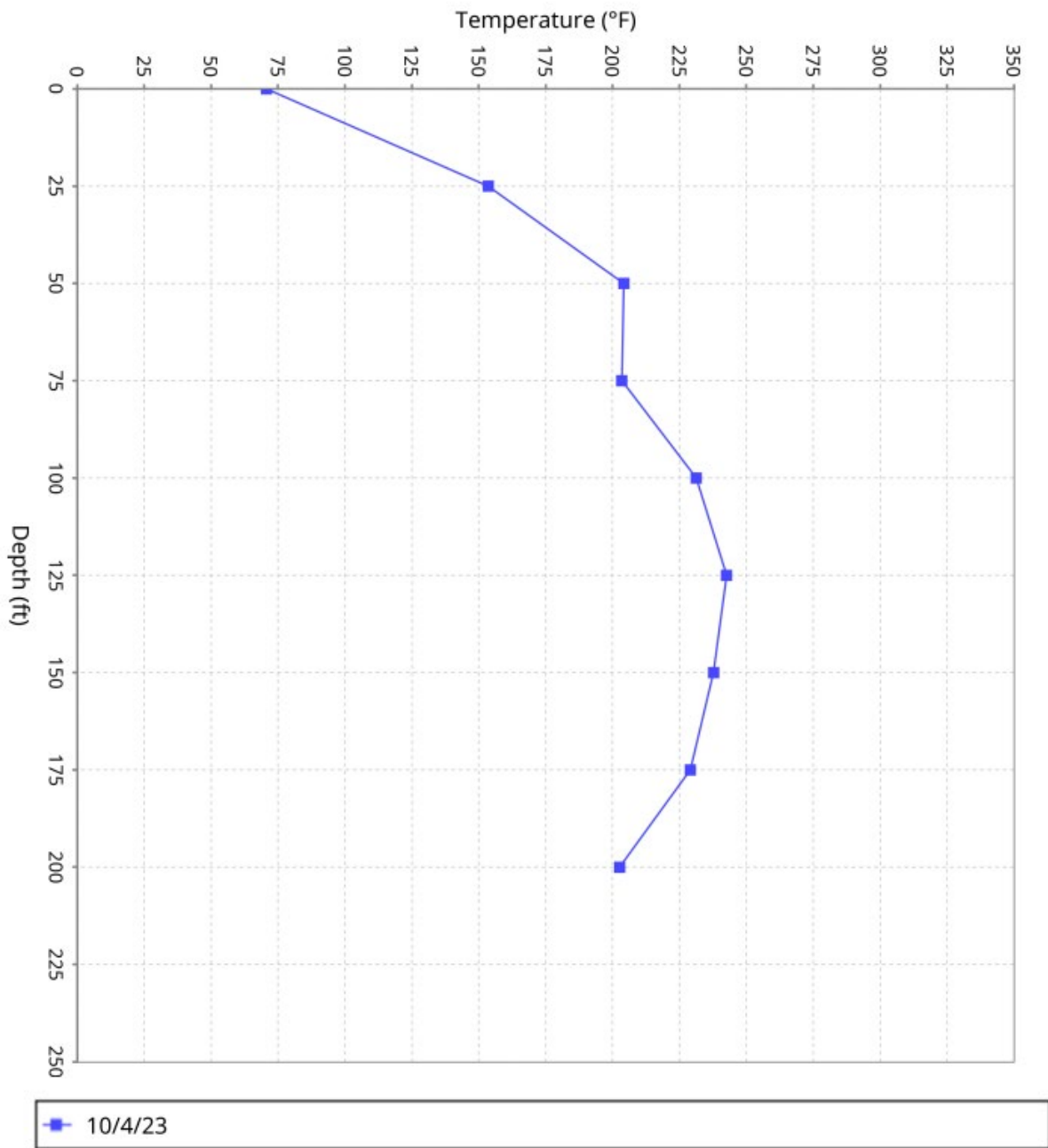


Figure B- 26. Average Temperatures Recorded by TP-7 on October 11, 2023

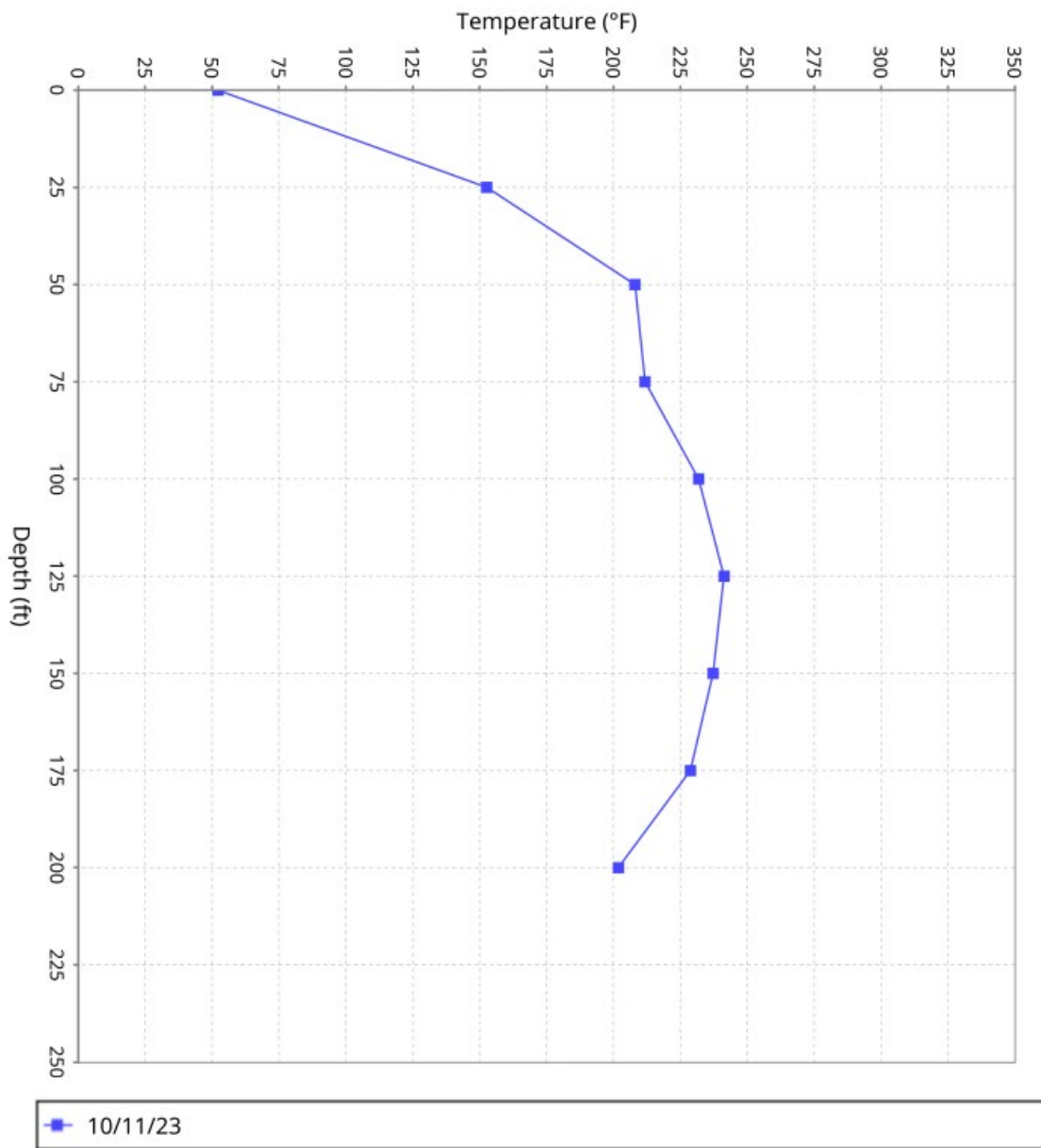


Figure B- 27. Average Temperatures Recorded by TP-7 on October 18, 2023

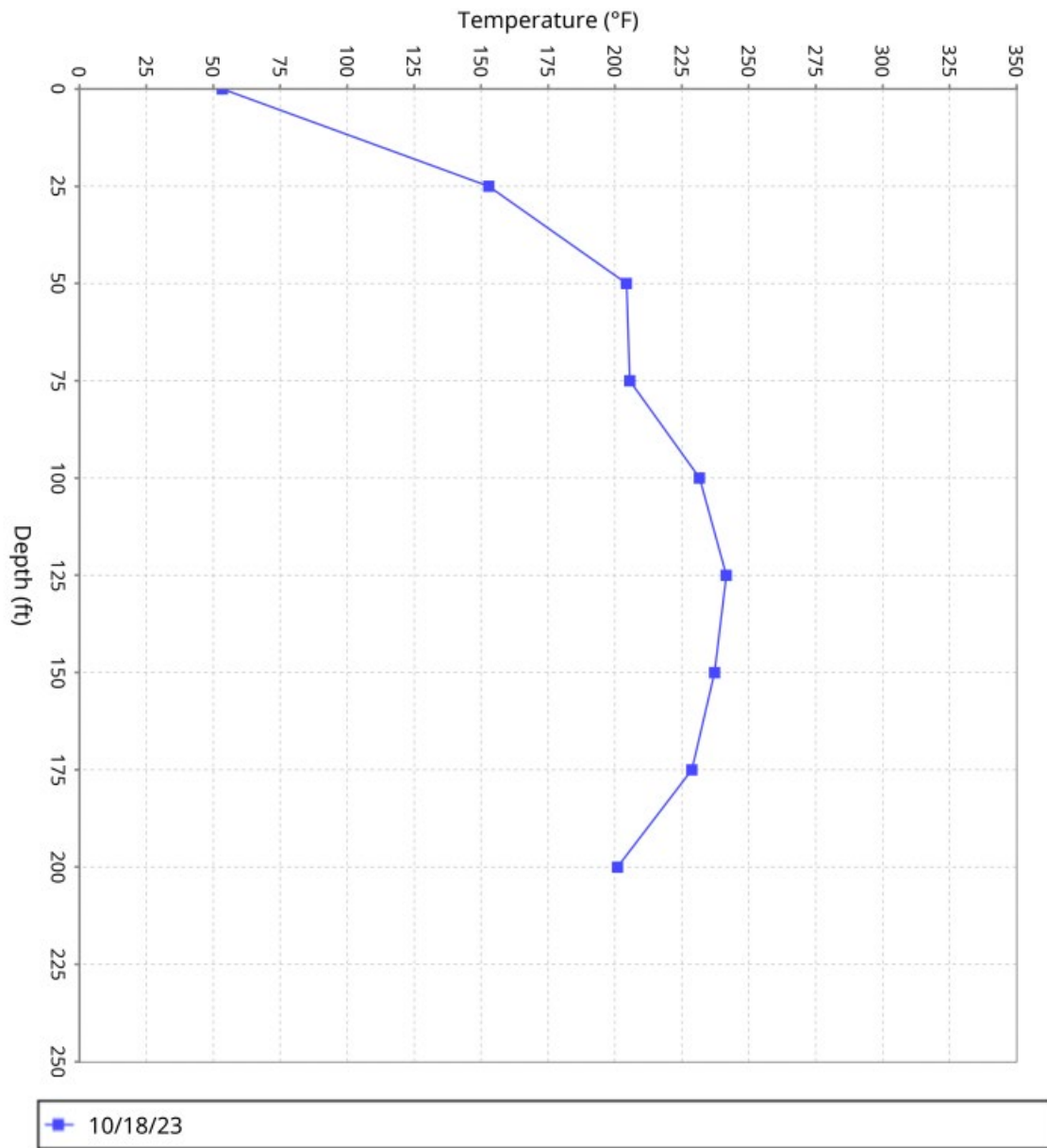


Figure B- 28. Average Temperatures Recorded by TP-7 on October 25, 2023

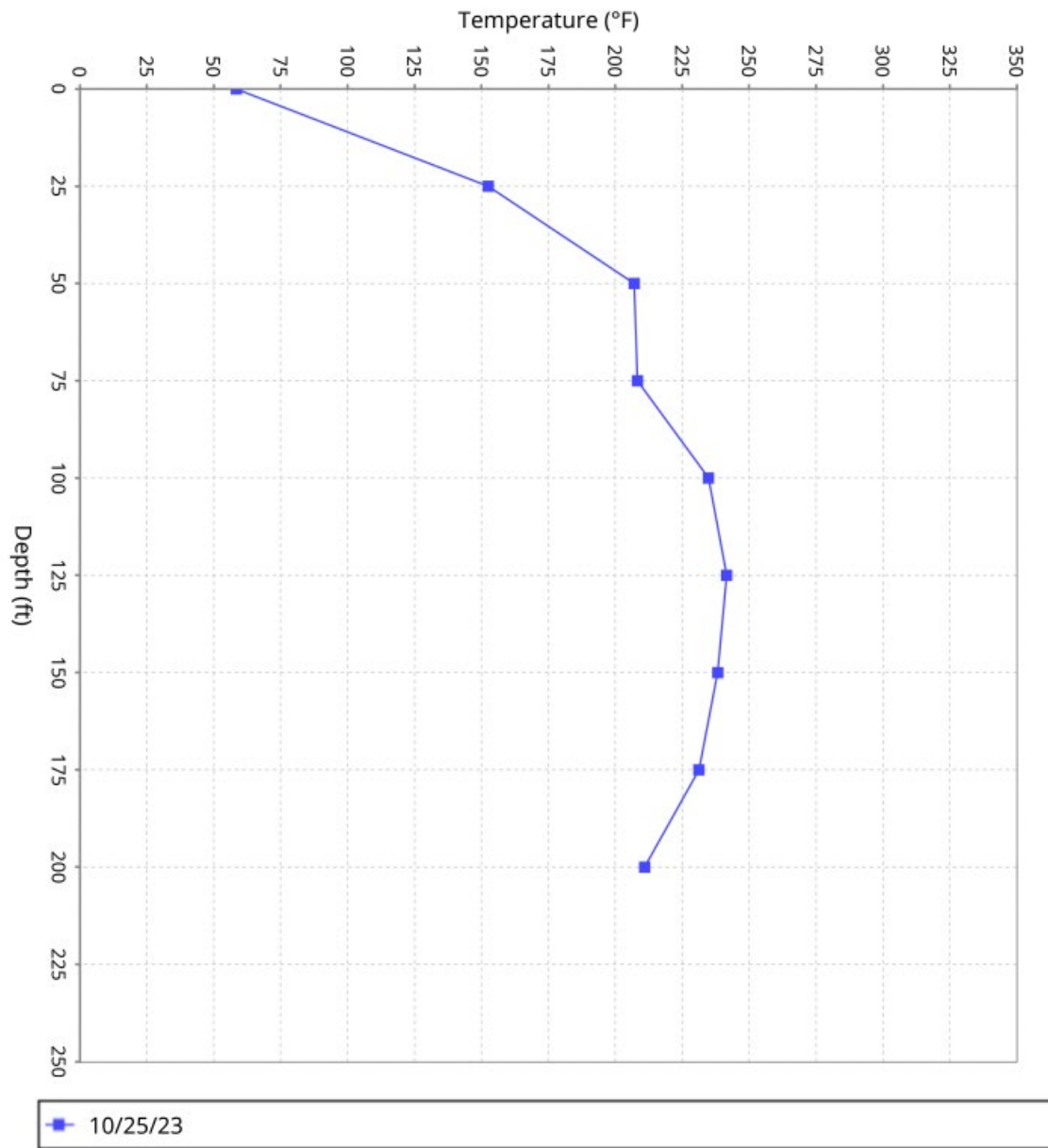


Figure B- 29. Average Temperatures Recorded by TP-8 on October 4, 2023

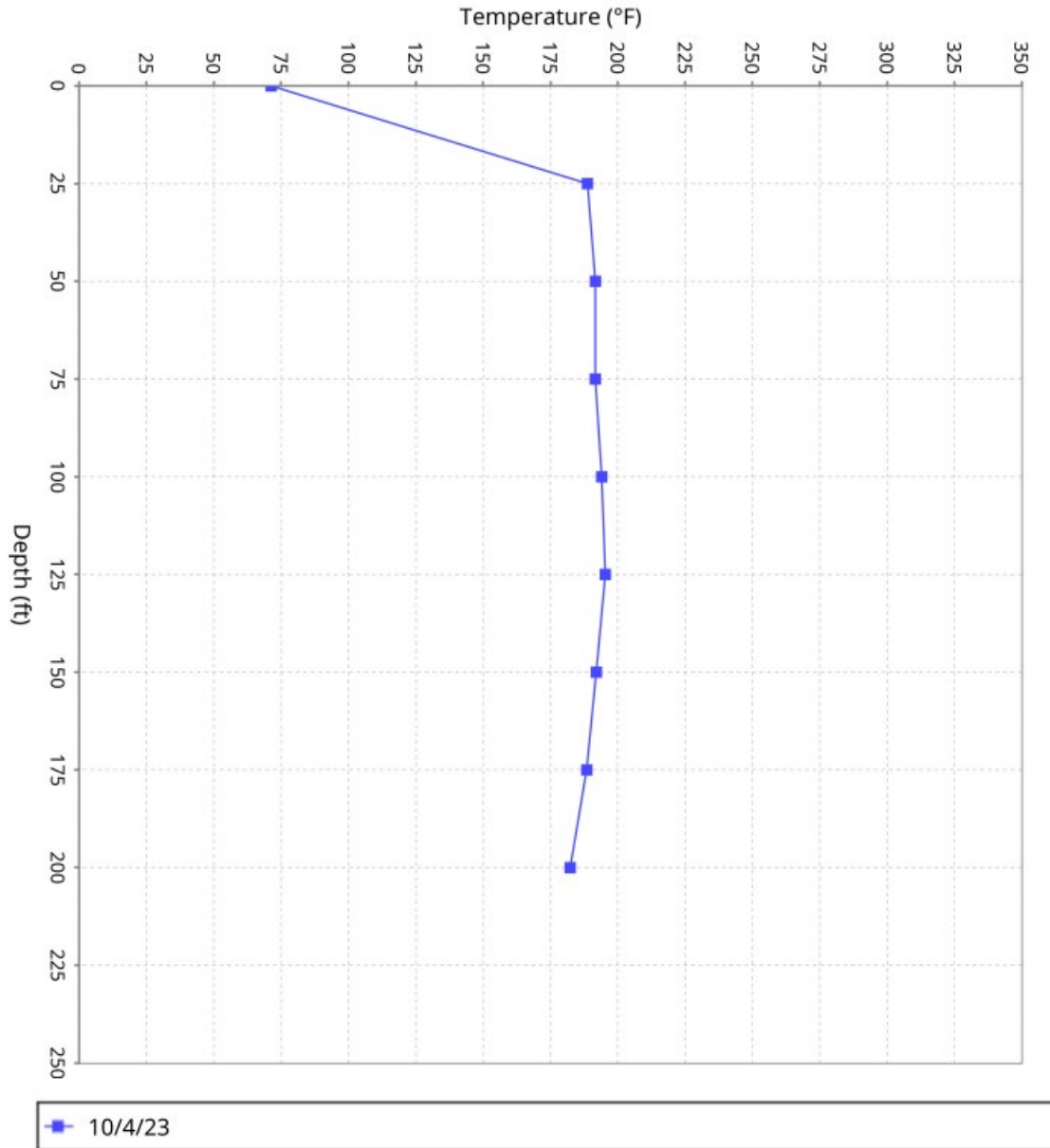


Figure B- 30. Average Temperatures Recorded by TP-8 on October 11, 2023

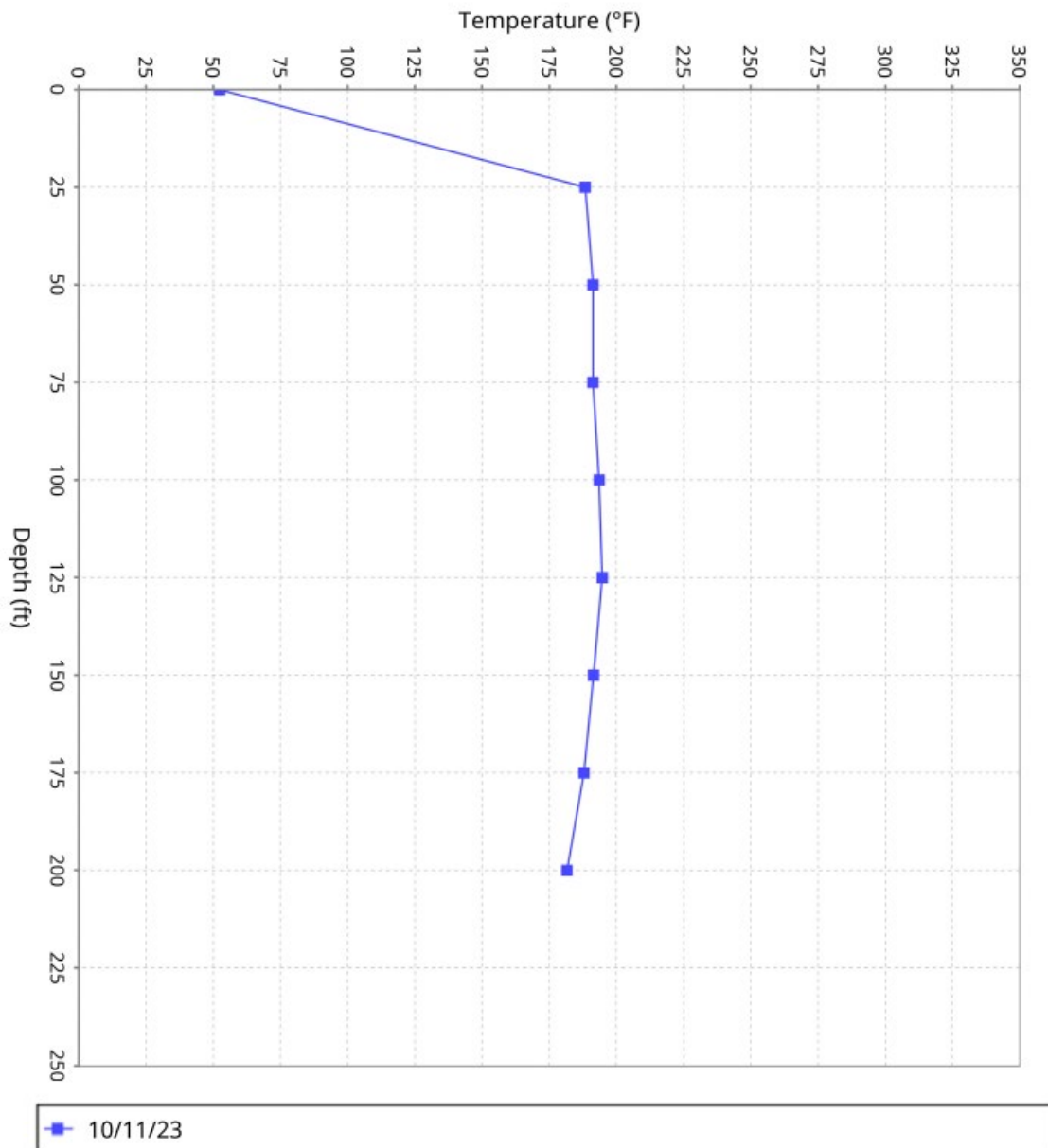


Figure B- 31. Average Temperatures Recorded by TP-8 on October 18, 2023

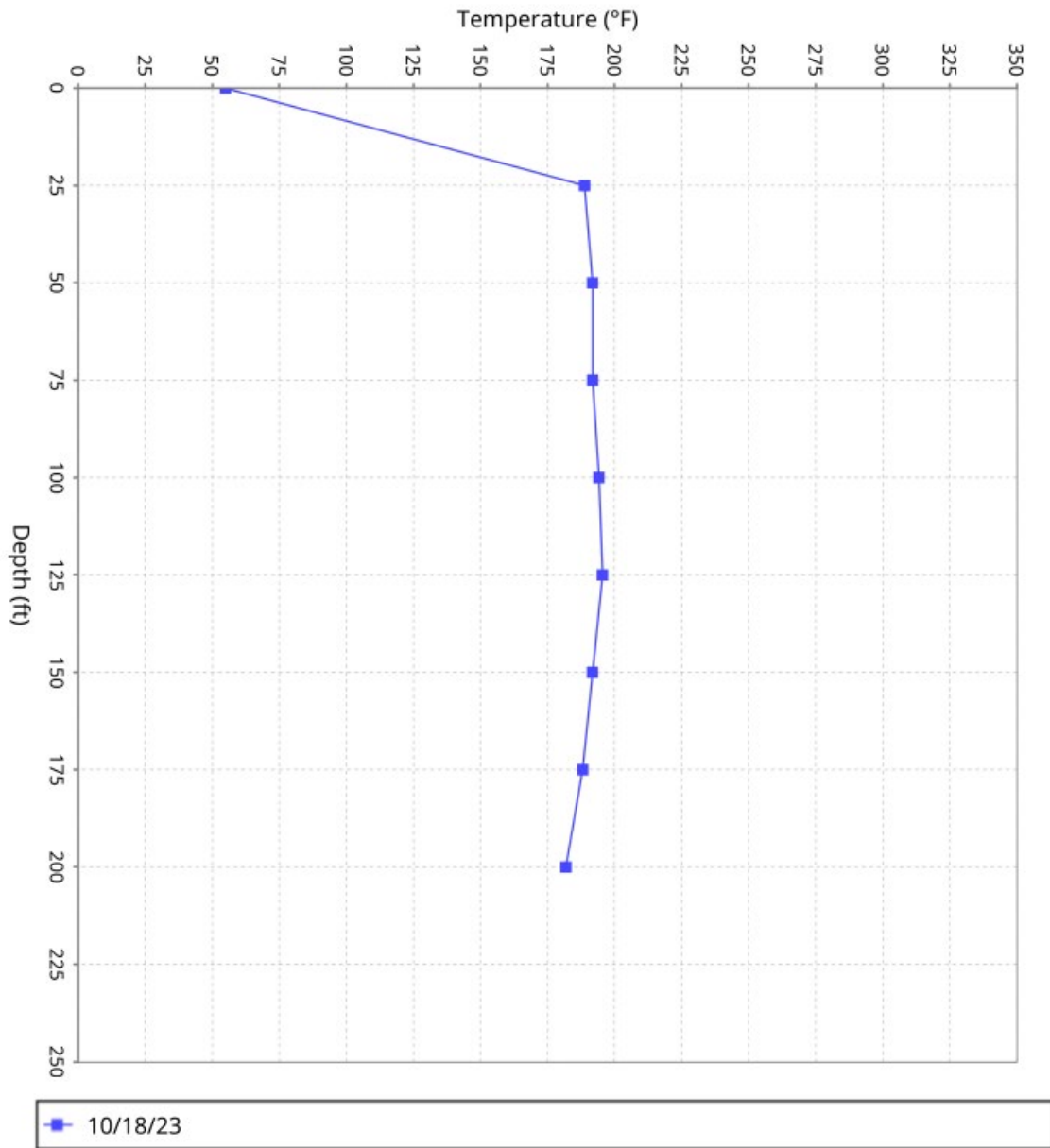


Figure B- 32. Average Temperatures Recorded by TP-8 on October 25, 2023

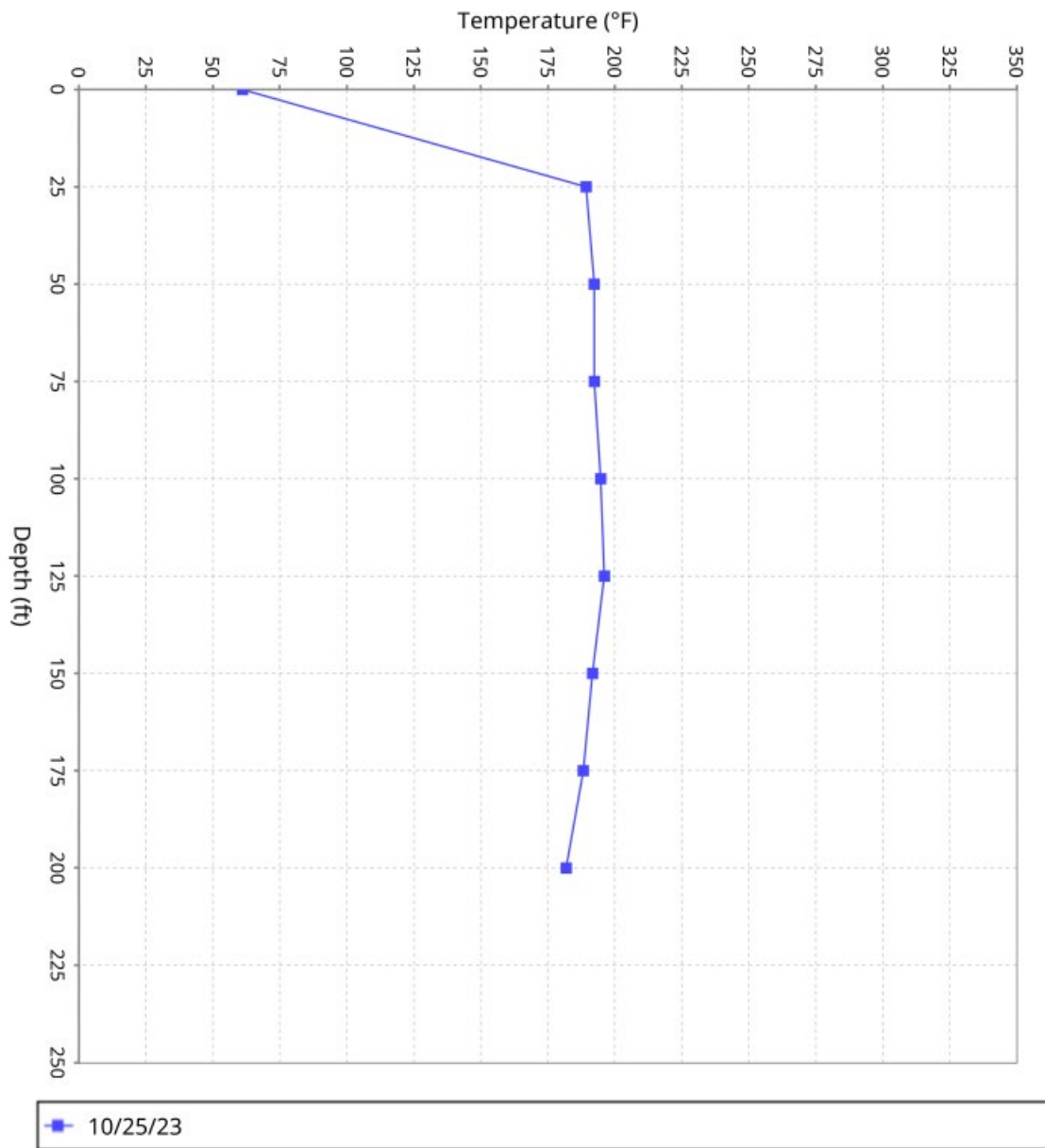


Figure B- 33. Average Temperatures Recorded by TP-9 on October 4, 2023

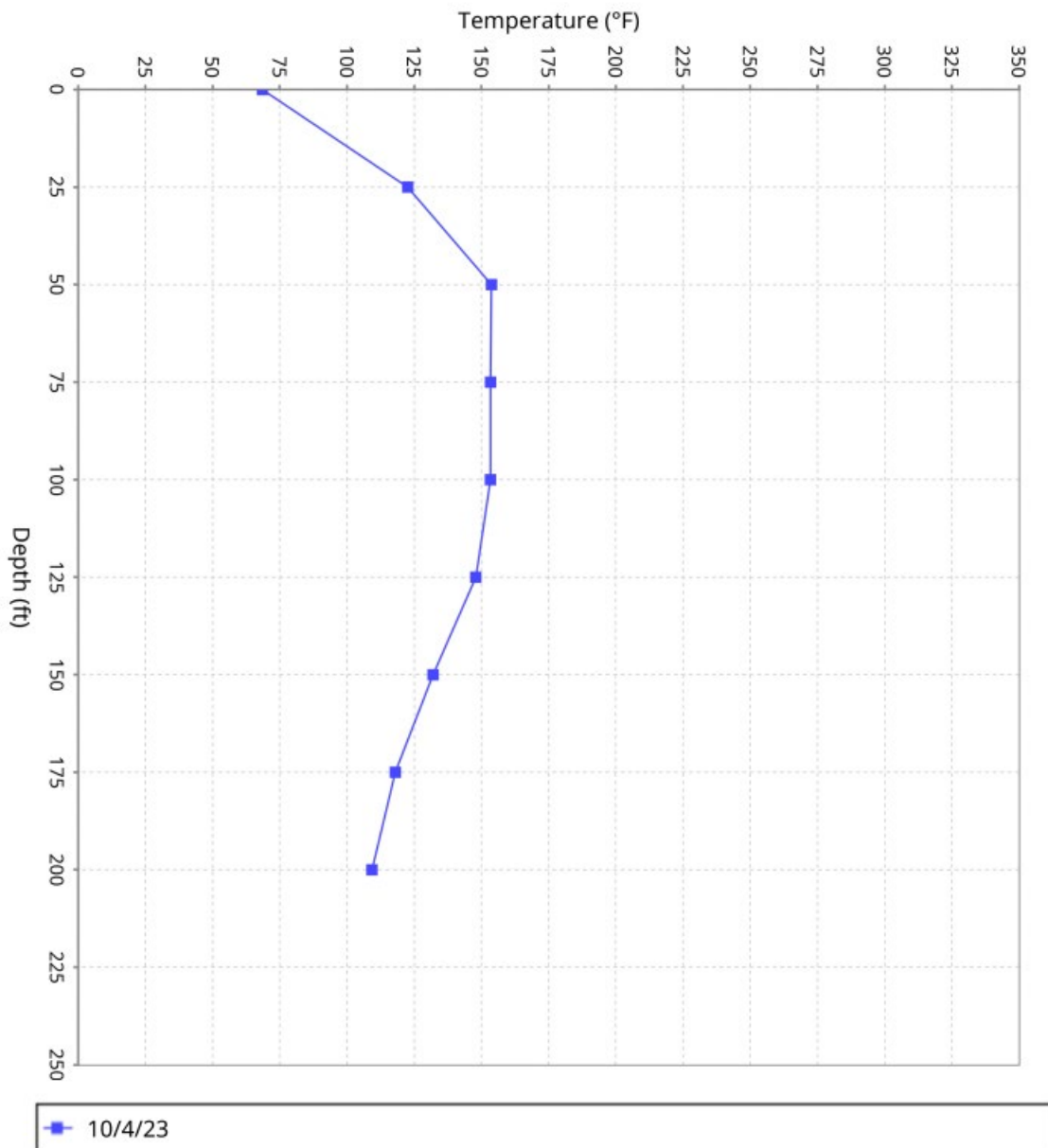


Figure B- 34. Average Temperatures Recorded by TP-9 on October 11, 2023

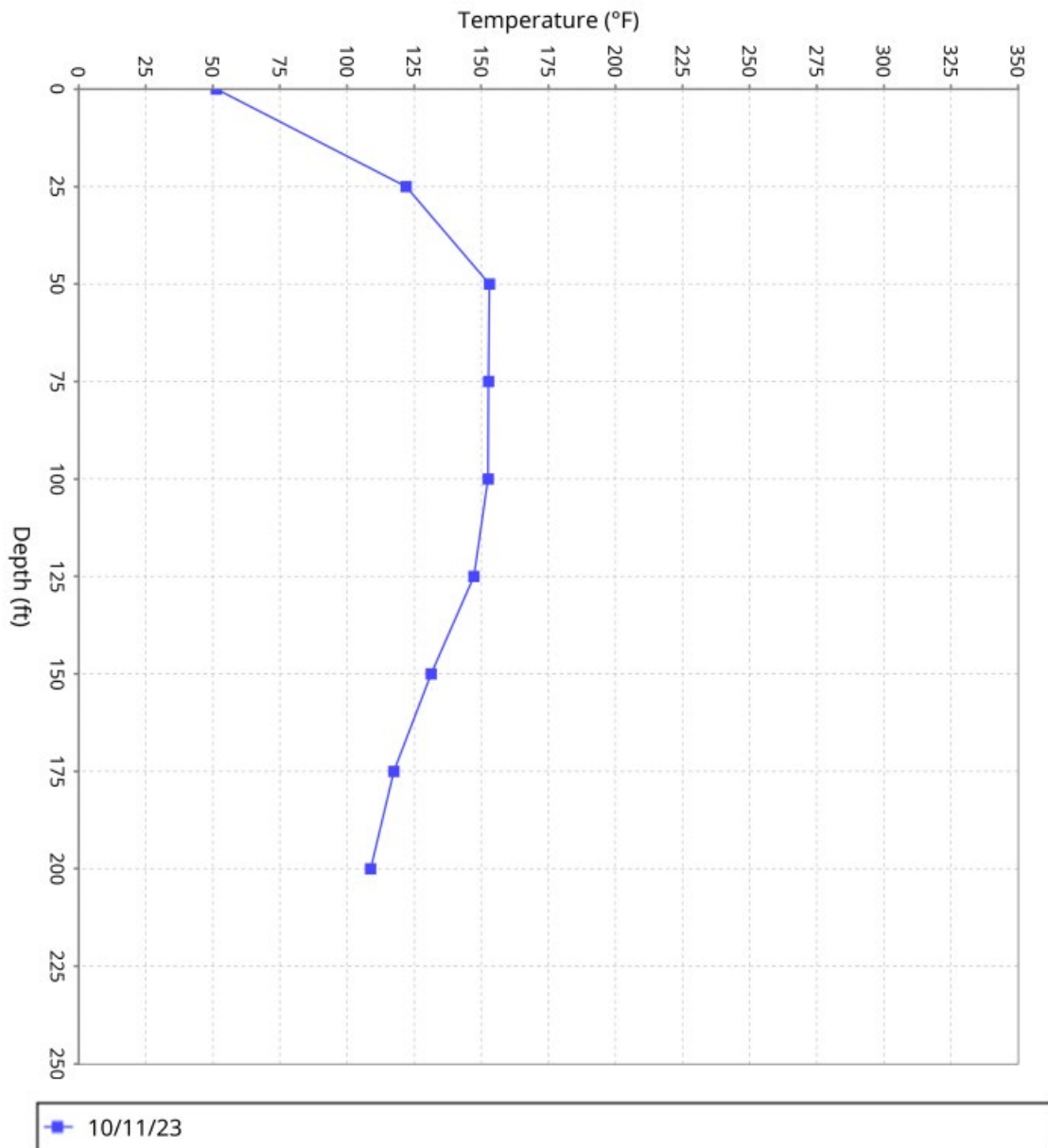


Figure B- 35. Average Temperatures Recorded by TP-9 on October 18, 2023

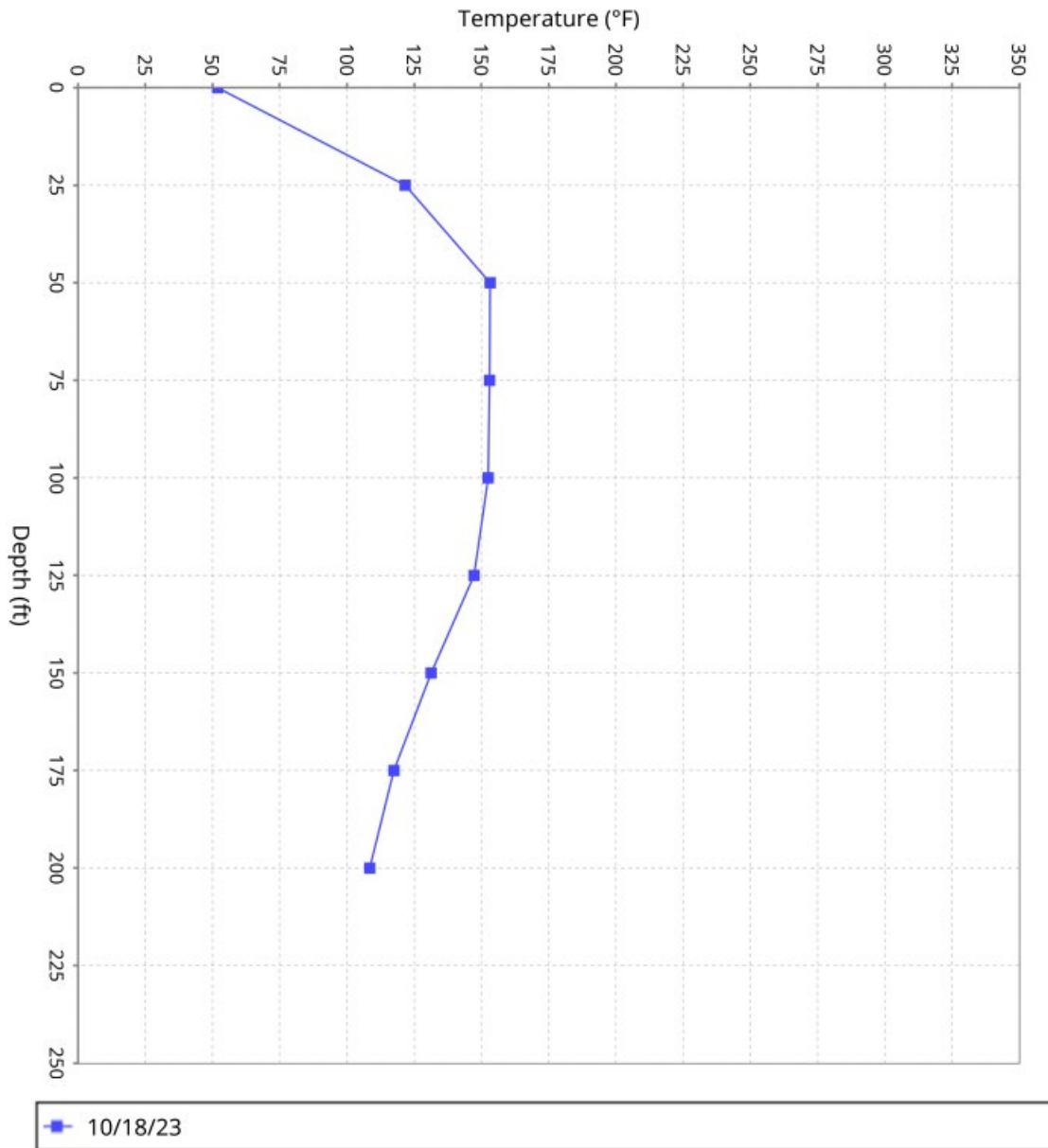
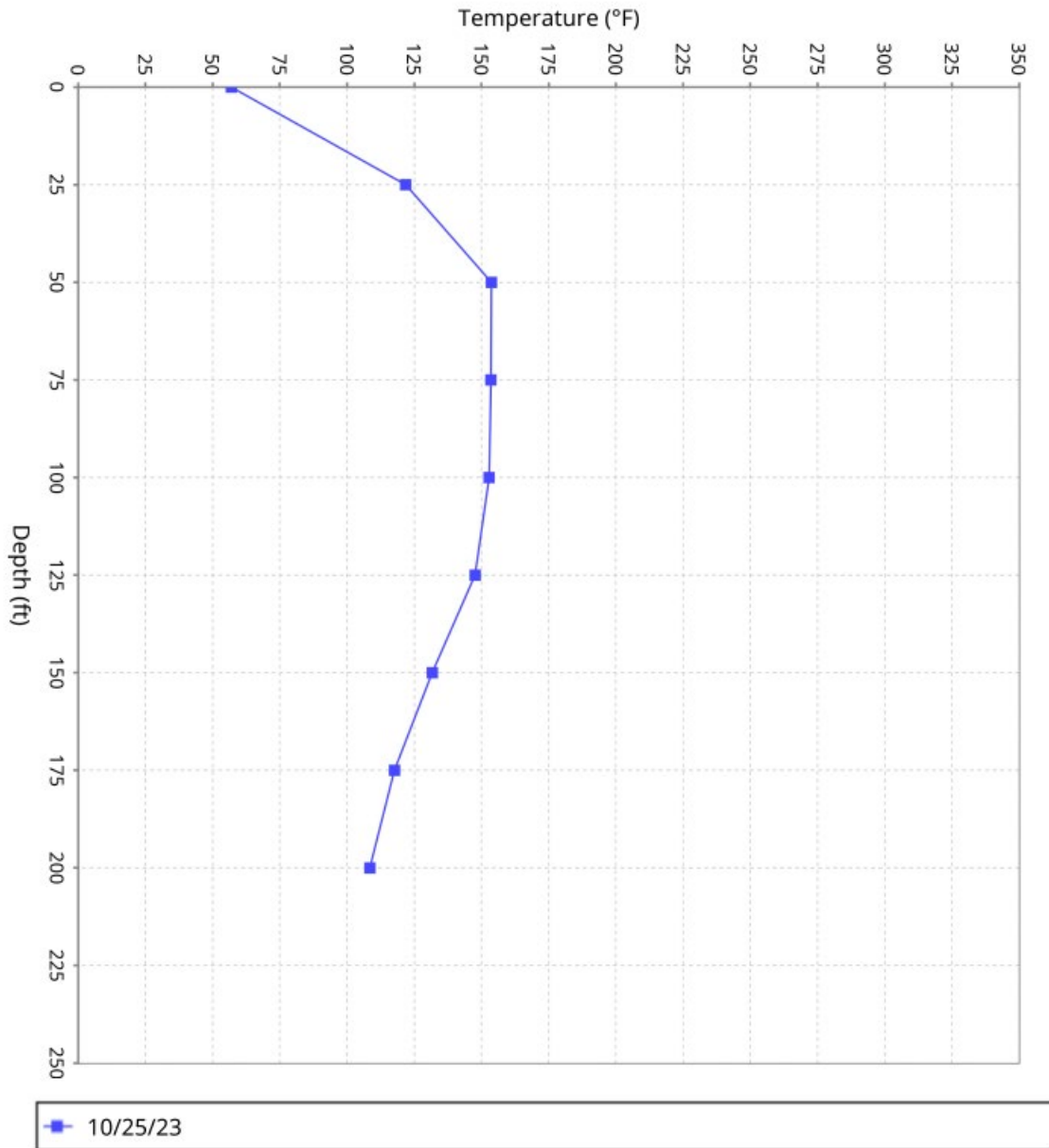



Figure B- 36. Average Temperatures Recorded by TP-9 on October 25, 2023





Appendix C

Daily Wellhead Temperature Averages

Solid Waste Permit 588 Daily Wellhead Temperature Averages

The data provided in this report represent initial readings provided by field instrumentation without Validation, analysis, quality assurance review, or context based on operating conditions. This report is subject to revision following quality assurance review and an analysis of operating conditions. SCS will continue to provide a supplemental report with additional information and further analysis on a monthly basis at a minimum.

SCS ENGINEERS

07222143.00 | November 9, 2023

274 Granite Run Drive
Lancaster, PA 17601
717-550-6330

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 32R

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	97.0	58.1	121.3
Oct 2	108.4	65.6	122.2
Oct 3	114.8	95.6	122.2
Oct 4	108.2	57.2	121.5
Oct 5	113.2	82.8	121.5
Oct 6	107.9	64.0	120.8
Oct 7	116.4	105.5	119.2
Oct 8	83.8	36.7	118.7
Oct 9	78.7	39.0	118.9
Oct 10	81.7	47.0	123.4
Oct 11	96.7	47.7	118.8
Oct 12	104.4	52.4	118.3
Oct 13	105.6	51.8	117.4
Oct 14	91.7	57.7	116.0
Oct 15	70.5	48.1	110.4
Oct 16	90.6	41.0	112.6
Oct 17	86.9	45.5	111.1
Oct 18	91.6	40.3	115.7
Oct 19	106.9	88.3	116.1
Oct 20	86.6	51.3	110.9
Oct 21	57.5	45.2	74.9
Oct 22	56.6	46.3	73.3
Oct 23	89.6	41.2	119.5
Oct 24	92.8	38.7	118.0
Oct 25	101.8	45.2	118.9
Oct 26	103.6	47.0	119.7
Oct 27	96.8	51.7	118.7
Oct 28	103.9	56.1	116.8
Oct 29	82.1	59.5	116.9
Oct 30	101.9	53.3	117.5
Oct 31	70.7	42.3	113.9
Summary	93.5	56.6	116.4

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 34

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	70.2	57.4	90.6
Oct 2	70.3	55.8	93.2
Oct 3	70.6	55.1	94.1
Oct 4	71.1	56.9	90.3
Oct 5	69.7	57.6	86.7
Oct 6	67.1	61.4	83.9
Oct 7	56.6	45.5	68.6
Oct 8	49.2	38.4	62.3
Oct 9	49.3	39.9	64.8
Oct 10	56.4	41.0	76.9
Oct 11	54.3	43.1	68.9
Oct 12	66.3	51.2	88.3
Oct 13	66.6	51.6	87.7
Oct 14	61.7	53.5	72.4
Oct 15	52.6	48.0	60.7
Oct 16	48.2	42.1	55.0
Oct 17	50.0	45.7	56.8
Oct 18	54.5	40.6	74.7
Oct 19	56.0	43.0	74.0
Oct 20	53.9	51.2	62.2
Oct 21	53.3	43.7	69.3
Oct 22	52.1	42.8	71.2
Oct 23	54.5	37.1	83.0
Oct 24	57.5	38.7	85.1
Oct 25	59.6	43.5	84.3
Oct 26	62.0	45.0	85.6
Oct 27	63.4	50.8	81.8
Oct 28	66.1	54.7	83.5
Oct 29	65.6	56.6	77.7
Oct 30	55.3	46.6	70.1
Oct 31	45.8	40.6	53.1
Summary	59.0	45.8	71.1

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 35

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	70.9	56.9	89.1
Oct 2	71.1	54.6	92.0
Oct 3	71.8	56.2	93.8
Oct 4	73.1	58.9	92.0
Oct 5	72.1	59.3	89.3
Oct 6	68.5	62.5	85.0
Oct 7	58.3	44.7	69.6
Oct 8	49.8	37.7	65.0
Oct 9	51.8	39.4	68.0
Oct 10	61.2	49.9	75.1
Oct 11	59.3	51.2	68.0
Oct 12	68.7	58.2	85.5
Oct 13	70.0	57.6	87.5
Oct 14	64.8	58.2	73.0
Oct 15	57.4	53.6	62.0
Oct 16	54.2	50.3	59.3
Oct 17	55.7	52.0	60.3
Oct 18	59.5	49.4	75.7
Oct 19	60.9	51.1	75.1
Oct 20	59.5	56.9	66.6
Oct 21	58.7	51.1	69.5
Oct 22	57.2	50.0	69.2
Oct 23	58.5	45.5	83.0
Oct 24	61.0	45.6	86.0
Oct 25	63.1	49.1	86.4
Oct 26	65.3	51.3	86.3
Oct 27	66.9	56.5	82.6
Oct 28	68.9	59.4	86.4
Oct 29	68.2	61.4	77.1
Oct 30	60.4	52.8	73.3
Oct 31	52.3	46.3	59.9
Summary	62.6	49.8	73.1

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 36A

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	195.2	194.4	196.5
Oct 2	194.6	194.2	195.9
Oct 3	194.4	193.8	196.0
Oct 4	194.3	193.7	196.2
Oct 5	194.3	194.0	195.8
Oct 6	194.0	193.7	195.1
Oct 7	193.5	192.9	193.9
Oct 8	193.8	193.3	194.1
Oct 9	193.7	193.1	194.6
Oct 10	193.3	192.8	193.8
Oct 11	191.3	142.2	194.4
Oct 12	194.4	193.9	194.9
Oct 13	194.8	194.3	195.4
Oct 14	194.3	193.4	195.1
Oct 15	194.1	193.6	195.3
Oct 16	194.2	193.8	194.6
Oct 17	194.4	194.0	195.1
Oct 18	194.6	194.4	196.2
Oct 19	194.6	194.3	195.0
Oct 20	194.0	192.5	194.8
Oct 21	194.3	193.7	194.8
Oct 22	194.5	194.1	194.8
Oct 23	194.6	194.1	195.5
Oct 24	194.7	194.0	196.8
Oct 25	195.0	194.3	196.9
Oct 26	194.9	194.2	196.4
Oct 27	194.6	194.2	195.4
Oct 28	194.6	194.2	195.0
Oct 29	194.3	193.7	195.2
Oct 30	193.8	192.9	195.2
Oct 31	193.1	191.3	194.6
Summary	194.2	191.3	195.2

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 40

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	71.5	57.6	95.0
Oct 2	68.5	26.9	95.9
Oct 3	71.8	54.8	97.7
Oct 4	72.9	57.0	95.7
Oct 5	69.1	26.9	91.8
Oct 6	67.9	61.6	84.9
Oct 7	57.3	43.7	69.6
Oct 8	50.2	38.1	65.2
Oct 9	50.2	39.9	71.0
Oct 10	57.5	41.1	78.9
Oct 11	55.0	42.8	70.0
Oct 12	67.0	51.4	91.5
Oct 13	68.9	51.2	94.3
Oct 14	61.9	53.3	76.6
Oct 15	53.0	47.8	62.2
Oct 16	48.2	41.8	54.5
Oct 17	49.9	46.0	58.0
Oct 18	55.9	41.5	79.2
Oct 19	57.4	42.9	77.7
Oct 20	54.2	50.9	64.4
Oct 21	54.5	42.8	73.2
Oct 22	52.5	42.1	72.4
Oct 23	55.3	36.3	87.4
Oct 24	59.5	38.1	94.4
Oct 25	61.8	43.3	90.0
Oct 26	63.9	44.7	90.4
Oct 27	65.1	50.6	86.8
Oct 28	67.1	54.4	89.7
Oct 29	66.5	56.3	83.0
Oct 30	55.6	46.9	72.8
Oct 31	45.6	38.0	55.1
Summary	59.9	45.6	72.9

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 47

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	70.6	57.0	93.9
Oct 2	70.6	55.9	91.5
Oct 3	71.9	54.1	94.4
Oct 4	73.0	56.7	94.9
Oct 5	71.3	57.9	89.7
Oct 6	68.1	61.2	84.8
Oct 7	56.7	43.3	65.8
Oct 8	48.8	37.2	63.1
Oct 9	49.3	39.3	67.2
Oct 10	57.2	40.9	79.2
Oct 11	54.3	42.0	69.4
Oct 12	67.5	51.8	86.9
Oct 13	67.8	51.0	89.7
Oct 14	59.6	26.6	73.4
Oct 15	51.9	47.5	57.5
Oct 16	47.9	41.7	54.6
Oct 17	49.7	45.5	56.4
Oct 18	54.6	40.7	71.9
Oct 19	56.2	42.3	74.0
Oct 20	53.2	50.5	61.0
Oct 21	53.1	42.1	67.6
Oct 22	51.4	42.2	67.4
Oct 23	54.8	35.9	85.5
Oct 24	58.9	38.0	90.6
Oct 25	61.4	43.0	87.8
Oct 26	63.5	44.4	89.7
Oct 27	64.8	50.6	87.3
Oct 28	66.7	54.5	85.8
Oct 29	66.5	57.4	80.4
Oct 30	55.6	46.9	71.0
Oct 31	45.6	39.2	53.0
Summary	59.4	45.6	73.0

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 49

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	135.6	112.7	140.7
Oct 2	137.7	125.3	141.0
Oct 3	138.3	136.4	140.7
Oct 4	138.0	136.1	140.4
Oct 5	137.7	135.8	139.5
Oct 6	137.1	135.6	138.6
Oct 7	135.0	132.8	136.7
Oct 8	134.3	126.1	136.3
Oct 9	135.6	134.7	137.1
Oct 10	136.0	134.7	137.4
Oct 11	135.7	134.3	137.4
Oct 12	137.8	134.9	140.7
Oct 13	138.1	136.1	140.1
Oct 14	136.3	130.9	138.7
Oct 15	134.4	128.9	137.0
Oct 16	135.3	133.1	136.7
Oct 17	136.3	134.7	137.6
Oct 18	137.1	134.8	139.4
Oct 19	137.2	128.0	139.6
Oct 20	136.1	130.8	138.8
Oct 21	136.8	134.9	138.2
Oct 22	136.2	133.5	137.5
Oct 23	136.6	126.8	140.8
Oct 24	137.6	134.8	141.8
Oct 25	138.0	135.7	141.0
Oct 26	138.0	134.6	141.6
Oct 27	138.1	132.1	140.9
Oct 28	138.7	133.5	140.7
Oct 29	138.7	134.7	140.5
Oct 30	135.8	129.2	139.5
Oct 31	132.6	127.7	137.0
Summary	136.7	132.6	138.7

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 50

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	117.3	99.5	122.0
Oct 2	119.2	110.2	121.7
Oct 3	120.0	118.4	122.4
Oct 4	120.5	118.9	122.9
Oct 5	120.5	119.1	122.2
Oct 6	120.0	119.3	121.3
Oct 7	118.3	117.2	119.5
Oct 8	117.6	110.7	118.6
Oct 9	118.3	115.0	119.5
Oct 10	119.1	118.0	120.6
Oct 11	118.4	117.8	120.0
Oct 12	119.7	118.1	122.2
Oct 13	119.9	117.8	121.7
Oct 14	118.5	115.1	119.9
Oct 15	116.8	112.3	117.8
Oct 16	117.3	116.5	117.5
Oct 17	0.0	118.5	118.5
Oct 18	119.0	119.0	119.0
Oct 19	118.2	117.9	119.0
Oct 20	0.0	118.3	118.3
Oct 21	0.0	118.7	118.7
Oct 22	0.0	119.1	119.1
Oct 23	118.1	115.6	120.4
Oct 24	118.1	113.4	123.1
Oct 25	118.3	115.6	121.3
Oct 26	117.4	108.9	120.9
Oct 27	118.1	111.9	121.7
Oct 28	118.2	116.8	120.3
Oct 29	117.9	115.1	119.1
Oct 30	116.1	111.9	119.8
Oct 31	115.5	113.8	119.0
Summary	103.1	0.0	120.5

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 51

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	70.6	57.1	89.0
Oct 2	70.4	55.6	91.2
Oct 3	68.7	55.7	92.6
Oct 4	71.9	57.9	92.2
Oct 5	69.3	59.0	87.4
Oct 6	67.4	62.0	80.3
Oct 7	56.5	44.5	66.3
Oct 8	49.6	39.1	62.3
Oct 9	50.1	41.2	65.0
Oct 10	56.5	42.2	73.3
Oct 11	54.3	44.0	67.5
Oct 12	65.1	53.0	87.0
Oct 13	67.7	52.8	88.9
Oct 14	61.2	53.4	71.0
Oct 15	52.6	49.4	55.7
Oct 16	49.8	45.1	54.3
Oct 17	51.3	47.7	57.0
Oct 18	56.0	43.6	74.4
Oct 19	58.0	45.7	73.0
Oct 20	55.8	50.7	60.6
Oct 21	54.2	44.8	65.3
Oct 22	53.1	44.5	65.3
Oct 23	55.0	38.8	79.4
Oct 24	54.9	38.6	72.6
Oct 25	60.2	44.4	86.8
Oct 26	62.7	44.7	87.4
Oct 27	64.1	50.8	84.0
Oct 28	66.0	54.2	86.4
Oct 29	65.8	57.4	79.0
Oct 30	55.8	47.4	69.2
Oct 31	0.0	50.0	50.0
Summary	57.9	0.0	71.9

**Solid Waste Permit 588 Daily Wellhead Temperature
Averages for Well 52
Bristol, Virginia**

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	160.1	147.4	179.2
Oct 2	163.9	149.4	179.0
Oct 3	163.9	154.6	175.0
Oct 4	152.9	149.9	155.3
Oct 5	148.4	146.4	150.3
Oct 6	145.8	143.9	147.2
Oct 7	142.7	140.7	144.6
Oct 8	141.4	137.5	142.9
Oct 9	141.8	140.9	143.8
Oct 10	143.7	139.4	164.0
Oct 11	146.1	68.9	175.9
Oct 12	148.7	143.7	152.5
Oct 13	147.0	145.1	149.5
Oct 14	144.1	141.5	145.9
Oct 15	141.7	140.3	143.1
Oct 16	150.1	140.8	174.6
Oct 17	144.5	140.3	146.7
Oct 18	152.5	142.3	177.5
Oct 19	155.2	145.1	177.8
Oct 20	149.2	146.0	154.9
Oct 21	145.4	143.6	146.2
Oct 22	142.9	140.9	144.2
Oct 23	154.8	140.1	178.5
Oct 24	159.9	147.7	180.7
Oct 25	160.2	146.2	181.5
Oct 26	151.3	148.7	153.6
Oct 27	158.8	145.3	179.8
Oct 28	151.2	148.9	153.8
Oct 29	147.7	145.0	148.7
Oct 30	154.6	141.4	178.4
Oct 31	155.5	145.0	179.0
Summary	150.5	141.4	163.9

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 53

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	134.5	124.7	145.2
Oct 2	135.2	125.7	146.2
Oct 3	136.5	128.7	146.9
Oct 4	136.5	128.4	146.2
Oct 5	137.5	127.1	153.0
Oct 6	135.1	126.9	141.2
Oct 7	126.6	119.4	131.7
Oct 8	123.8	117.3	129.0
Oct 9	128.3	120.9	142.3
Oct 10	124.0	93.8	134.5
Oct 11	126.2	120.6	133.0
Oct 12	132.3	124.5	143.4
Oct 13	133.3	124.5	143.4
Oct 14	128.3	120.0	134.9
Oct 15	122.6	117.6	126.4
Oct 16	128.3	118.3	158.4
Oct 17	125.5	120.9	128.3
Oct 18	128.5	120.9	138.1
Oct 19	130.1	118.4	139.7
Oct 20	126.7	120.4	132.0
Oct 21	127.5	121.2	135.6
Oct 22	124.1	117.4	131.2
Oct 23	124.8	113.0	143.8
Oct 24	127.5	115.8	143.9
Oct 25	133.2	118.1	167.3
Oct 26	130.1	120.4	142.1
Oct 27	133.7	123.5	164.2
Oct 28	132.4	126.2	141.1
Oct 29	132.3	127.6	136.9
Oct 30	131.6	120.5	164.5
Oct 31	121.7	114.6	132.0
Summary	129.6	121.7	137.5

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 54

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	74.8	58.3	93.4
Oct 2	74.0	61.2	94.9
Oct 3	73.2	59.9	94.6
Oct 4	72.6	57.2	97.4
Oct 5	71.5	58.5	92.0
Oct 6	67.8	62.0	81.8
Oct 7	57.9	44.3	69.1
Oct 8	49.4	37.6	65.4
Oct 9	49.7	39.9	66.7
Oct 10	59.8	42.0	79.8
Oct 11	57.7	48.9	69.9
Oct 12	68.0	53.9	88.7
Oct 13	69.9	53.0	92.0
Oct 14	62.0	55.2	75.2
Oct 15	53.9	50.9	60.4
Oct 16	50.8	46.3	56.9
Oct 17	51.8	47.3	58.3
Oct 18	58.0	45.8	77.3
Oct 19	58.8	45.9	76.2
Oct 20	54.8	51.9	67.5
Oct 21	55.1	45.8	71.7
Oct 22	53.9	45.6	72.2
Oct 23	58.1	41.9	84.8
Oct 24	61.8	44.7	91.9
Oct 25	63.0	48.0	88.2
Oct 26	63.5	44.7	91.1
Oct 27	64.5	50.5	86.0
Oct 28	66.5	54.3	87.0
Oct 29	66.1	57.3	81.4
Oct 30	55.3	47.0	69.7
Oct 31	45.4	39.3	54.3
Summary	61.0	45.4	74.8

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 55

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	130.2	95.7	143.1
Oct 2	129.2	104.4	141.6
Oct 3	149.9	123.3	197.2
Oct 4	169.1	138.6	199.4
Oct 5	182.9	166.4	199.1
Oct 6	172.1	154.4	199.5
Oct 7	142.4	127.8	162.1
Oct 8	122.7	106.7	133.4
Oct 9	151.1	125.7	197.6
Oct 10	166.8	143.2	199.6
Oct 11	171.8	144.6	199.4
Oct 12	136.6	125.2	143.6
Oct 13	126.3	115.7	138.3
Oct 14	114.4	97.5	123.2
Oct 15	105.1	97.4	113.7
Oct 16	107.0	99.4	113.9
Oct 17	111.6	97.9	118.2
Oct 18	115.0	109.1	120.4
Oct 19	148.7	107.5	196.8
Oct 20	130.2	115.1	142.7
Oct 21	125.3	118.2	131.6
Oct 22	109.1	97.8	118.9
Oct 23	139.8	95.1	197.0
Oct 24	164.4	146.0	198.1
Oct 25	160.6	134.2	197.3
Oct 26	162.9	132.2	196.1
Oct 27	149.2	139.7	160.8
Oct 28	135.7	125.6	142.1
Oct 29	132.1	122.4	136.6
Oct 30	123.2	113.5	132.2
Oct 31	143.9	113.2	196.8
Summary	139.7	105.1	182.9

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 56

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	113.2	96.3	123.4
Oct 2	114.0	100.2	125.4
Oct 3	116.9	109.9	126.8
Oct 4	118.3	113.0	127.2
Oct 5	118.2	112.2	125.9
Oct 6	117.8	114.4	122.4
Oct 7	111.7	107.5	116.7
Oct 8	108.3	104.9	114.8
Oct 9	111.2	104.3	119.2
Oct 10	116.0	110.5	122.0
Oct 11	114.9	112.0	117.2
Oct 12	120.4	118.1	125.5
Oct 13	124.0	120.4	124.9
Oct 14	0.0	123.8	123.8
Oct 15	0.0	122.9	122.9
Oct 16	0.0	122.0	122.0
Oct 17	0.0	121.2	121.2
Oct 18	0.0	120.3	120.3
Oct 19	0.0	119.4	119.4
Oct 20	0.0	118.5	118.5
Oct 21	0.0	117.7	117.7
Oct 22	0.0	116.8	116.8
Oct 23	112.0	105.0	120.7
Oct 24	110.2	103.5	122.2
Oct 25	111.3	104.7	122.6
Oct 26	112.2	104.3	121.6
Oct 27	114.0	109.0	120.7
Oct 28	115.4	111.0	120.6
Oct 29	116.2	113.7	120.6
Oct 30	109.7	100.5	116.9
Oct 31	103.6	99.1	107.6
Summary	81.0	0.0	124.0

Solid Waste Permit 588 Daily Wellhead Temperature
Averages for Well 57
 Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	146.7	139.7	154.0
Oct 2	146.8	139.3	155.2
Oct 3	148.0	141.5	155.4
Oct 4	149.3	143.7	156.0
Oct 5	149.4	143.6	155.6
Oct 6	148.4	145.1	152.2
Oct 7	143.2	138.1	146.2
Oct 8	140.5	134.9	143.5
Oct 9	143.2	139.4	148.3
Oct 10	145.6	140.9	150.7
Oct 11	143.8	140.0	148.7
Oct 12	146.9	143.0	152.3
Oct 13	147.9	142.1	155.0
Oct 14	144.1	136.4	147.8
Oct 15	139.9	136.0	143.1
Oct 16	139.7	137.2	141.5
Oct 17	143.6	78.9	166.7
Oct 18	169.2	166.9	171.8
Oct 19	169.2	164.9	172.0
Oct 20	161.5	143.9	169.3
Oct 21	152.0	142.1	158.2
Oct 22	143.5	135.6	149.0
Oct 23	140.4	130.3	153.8
Oct 24	140.2	130.7	152.8
Oct 25	140.5	132.5	152.0
Oct 26	140.3	130.1	151.2
Oct 27	140.4	133.4	147.7
Oct 28	140.8	133.4	148.6
Oct 29	140.5	134.8	144.8
Oct 30	132.5	120.4	140.4
Oct 31	127.1	120.1	133.3
Summary	145.3	127.1	169.2

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 58

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	94.5	68.2	139.8
Oct 2	97.3	68.3	123.6
Oct 3	108.9	84.2	141.3
Oct 4	139.9	134.1	144.8
Oct 5	121.6	102.4	136.1
Oct 6	105.9	102.5	115.2
Oct 7	106.6	93.4	117.5
Oct 8	105.7	96.1	116.0
Oct 9	100.3	84.0	112.5
Oct 10	96.1	70.8	114.7
Oct 11	72.8	61.1	88.1
Oct 12	81.5	64.0	103.1
Oct 13	75.6	55.4	92.6
Oct 14	67.9	61.6	79.5
Oct 15	69.7	62.8	80.6
Oct 16	81.5	56.2	101.7
Oct 17	82.6	68.3	91.2
Oct 18	82.7	58.9	96.3
Oct 19	80.1	50.9	106.5
Oct 20	61.6	57.4	66.6
Oct 21	61.8	54.0	71.0
Oct 22	74.1	58.2	90.2
Oct 23	99.7	67.9	136.1
Oct 24	102.3	62.5	123.6
Oct 25	105.1	55.0	139.1
Oct 26	102.6	76.2	117.6
Oct 27	82.4	69.7	99.8
Oct 28	85.6	74.9	99.3
Oct 29	86.6	79.6	95.2
Oct 30	77.2	70.8	88.8
Oct 31	72.2	67.6	79.8
Summary	89.8	61.6	139.9

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 59

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	119.3	105.2	122.2
Oct 2	120.5	117.3	121.7
Oct 3	120.4	119.6	121.4
Oct 4	120.6	119.9	121.6
Oct 5	120.8	120.3	121.7
Oct 6	117.0	29.0	121.4
Oct 7	120.5	120.0	120.9
Oct 8	120.3	119.3	120.8
Oct 9	120.5	119.8	121.3
Oct 10	120.7	120.0	121.6
Oct 11	120.6	120.1	121.1
Oct 12	121.4	120.4	122.4
Oct 13	121.6	120.7	122.8
Oct 14	121.0	120.2	121.5
Oct 15	120.5	120.2	120.8
Oct 16	120.4	120.0	120.7
Oct 17	122.4	88.5	129.3
Oct 18	128.3	122.2	131.7
Oct 19	123.4	121.9	131.9
Oct 20	121.7	120.3	122.3
Oct 21	121.5	121.0	122.1
Oct 22	121.2	120.6	122.0
Oct 23	123.8	120.4	127.7
Oct 24	129.6	123.1	132.5
Oct 25	126.9	121.9	131.9
Oct 26	126.5	120.1	132.5
Oct 27	114.3	69.7	132.9
Oct 28	95.9	61.2	123.4
Oct 29	76.0	61.0	124.1
Oct 30	95.8	57.2	126.4
Oct 31	111.8	59.5	132.1
Summary	118.2	76.0	129.6

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 60

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	111.5	87.9	118.0
Oct 2	113.5	95.9	119.5
Oct 3	115.1	111.6	120.1
Oct 4	114.1	107.7	119.8
Oct 5	113.7	103.4	117.6
Oct 6	114.0	112.1	116.7
Oct 7	111.1	108.6	113.2
Oct 8	109.0	102.5	110.7
Oct 9	110.7	108.7	113.5
Oct 10	111.8	108.9	114.6
Oct 11	110.9	109.5	114.3
Oct 12	112.1	105.9	117.2
Oct 13	112.4	103.4	117.7
Oct 14	110.0	106.9	111.8
Oct 15	106.5	98.2	108.2
Oct 16	83.5	47.2	107.2
Oct 17	49.8	45.8	55.7
Oct 18	55.3	40.5	75.9
Oct 19	56.2	42.5	74.4
Oct 20	53.8	50.7	63.4
Oct 21	53.2	43.2	69.7
Oct 22	51.5	42.0	69.9
Oct 23	81.8	36.1	160.5
Oct 24	137.3	126.8	165.7
Oct 25	134.5	122.8	153.2
Oct 26	134.3	113.8	157.8
Oct 27	134.2	124.1	158.3
Oct 28	128.6	122.1	131.8
Oct 29	125.8	119.3	127.5
Oct 30	123.1	115.6	148.0
Oct 31	125.2	116.8	160.1
Summary	103.4	49.8	137.3

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 62

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	104.9	74.6	131.6
Oct 2	114.4	74.5	131.7
Oct 3	122.7	92.4	132.0
Oct 4	119.7	91.7	131.6
Oct 5	121.7	93.7	131.8
Oct 6	119.3	92.1	131.0
Oct 7	125.3	111.8	128.4
Oct 8	96.0	58.2	125.3
Oct 9	99.0	69.4	129.4
Oct 10	104.0	77.2	132.0
Oct 11	119.0	92.9	131.2
Oct 12	123.4	92.4	132.1
Oct 13	123.4	90.7	131.7
Oct 14	110.8	76.4	131.2
Oct 15	87.4	58.9	130.0
Oct 16	115.6	69.5	131.6
Oct 17	110.1	64.1	130.1
Oct 18	116.6	80.5	132.5
Oct 19	127.6	115.5	132.4
Oct 20	107.5	70.0	130.1
Oct 21	64.6	60.1	73.5
Oct 22	59.9	51.1	72.5
Oct 23	102.1	49.1	132.4
Oct 24	114.8	67.7	133.5
Oct 25	120.4	77.4	132.1
Oct 26	121.2	69.7	133.1
Oct 27	115.7	73.6	133.5
Oct 28	120.9	79.0	132.1
Oct 29	96.0	73.2	133.5
Oct 30	120.4	80.7	132.7
Oct 31	88.7	55.2	132.4
Summary	109.5	59.9	127.6

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 63

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	102.2	62.6	134.7
Oct 2	113.4	65.0	136.6
Oct 3	122.8	82.9	137.2
Oct 4	116.9	64.0	136.5
Oct 5	120.9	80.0	135.2
Oct 6	114.6	69.2	134.5
Oct 7	126.4	100.8	131.5
Oct 8	86.4	43.2	130.4
Oct 9	89.9	45.9	131.3
Oct 10	86.5	44.8	134.0
Oct 11	103.2	47.0	133.9
Oct 12	120.3	59.1	137.1
Oct 13	121.6	60.0	136.8
Oct 14	100.8	61.0	134.0
Oct 15	78.7	51.5	130.5
Oct 16	107.5	48.9	131.8
Oct 17	103.1	49.6	133.0
Oct 18	105.3	46.4	134.5
Oct 19	122.5	95.8	135.9
Oct 20	93.8	53.9	130.0
Oct 21	57.1	46.4	72.2
Oct 22	55.5	45.7	71.9
Oct 23	100.8	39.2	136.6
Oct 24	105.5	44.7	137.4
Oct 25	117.4	51.7	137.8
Oct 26	119.1	52.9	137.3
Oct 27	110.0	54.3	138.1
Oct 28	113.3	61.6	135.7
Oct 29	92.4	63.9	135.4
Oct 30	114.1	59.4	135.6
Oct 31	78.3	44.8	132.5
Summary	103.2	55.5	126.4

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 64

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	126.1	107.7	141.7
Oct 2	131.3	107.2	142.2
Oct 3	135.0	120.1	141.5
Oct 4	132.0	106.3	141.1
Oct 5	133.5	114.6	140.7
Oct 6	130.5	108.4	140.1
Oct 7	134.9	126.6	137.9
Oct 8	115.2	93.4	136.5
Oct 9	117.3	95.5	137.9
Oct 10	114.0	92.8	139.7
Oct 11	124.9	98.1	139.5
Oct 12	133.1	102.3	141.1
Oct 13	133.5	104.5	141.2
Oct 14	122.6	101.1	139.4
Oct 15	110.3	95.6	138.4
Oct 16	126.7	98.4	138.4
Oct 17	123.8	95.9	138.7
Oct 18	125.3	97.9	140.7
Oct 19	133.4	123.6	140.1
Oct 20	117.7	95.5	136.3
Oct 21	97.6	90.9	103.0
Oct 22	99.7	96.3	104.3
Oct 23	124.0	94.3	141.7
Oct 24	126.0	96.0	142.1
Oct 25	131.6	97.5	141.4
Oct 26	130.9	92.9	140.9
Oct 27	125.4	95.0	141.6
Oct 28	127.3	99.7	139.3
Oct 29	117.4	101.3	141.2
Oct 30	128.9	100.8	139.6
Oct 31	107.0	86.3	137.4
Summary	123.8	97.6	135.0

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 65

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	121.5	58.0	134.2
Oct 2	129.8	93.0	137.0
Oct 3	134.2	130.5	137.7
Oct 4	137.9	134.1	140.2
Oct 5	139.9	136.5	145.4
Oct 6	137.0	135.4	139.2
Oct 7	132.7	129.6	135.7
Oct 8	128.8	118.9	131.4
Oct 9	129.1	109.7	132.4
Oct 10	133.5	128.6	137.6
Oct 11	112.2	63.4	133.8
Oct 12	68.8	55.0	87.8
Oct 13	68.7	51.8	89.8
Oct 14	61.8	53.2	75.0
Oct 15	51.7	47.5	58.5
Oct 16	48.1	42.5	55.4
Oct 17	50.3	45.7	57.0
Oct 18	55.9	40.6	76.2
Oct 19	57.7	43.2	76.0
Oct 20	53.7	51.2	64.2
Oct 21	53.9	43.4	71.2
Oct 22	52.3	42.9	72.1
Oct 23	55.4	36.4	86.4
Oct 24	70.4	38.3	151.3
Oct 25	102.3	44.1	152.3
Oct 26	143.8	149.0	149.9
Oct 27	140.9	64.3	148.0
Oct 28	147.2	147.1	147.3
Oct 29	0.0	146.9	146.9
Oct 30	0.0	146.6	146.6
Oct 31	0.0	146.3	146.3
Summary	87.7	0.0	147.2

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 66

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	116.2	109.0	126.4
Oct 2	127.3	111.3	147.4
Oct 3	140.3	136.8	143.9
Oct 4	139.8	136.1	143.7
Oct 5	139.5	135.6	143.1
Oct 6	138.3	136.2	140.8
Oct 7	134.4	130.1	137.2
Oct 8	131.0	123.7	134.5
Oct 9	134.3	130.5	138.5
Oct 10	136.3	133.1	141.5
Oct 11	134.6	131.2	139.7
Oct 12	135.7	132.6	141.0
Oct 13	136.6	131.7	141.3
Oct 14	132.9	125.4	136.5
Oct 15	130.4	125.2	134.3
Oct 16	131.7	128.0	134.5
Oct 17	132.6	125.8	134.8
Oct 18	133.2	131.1	135.3
Oct 19	133.4	129.3	140.4
Oct 20	131.1	121.8	136.4
Oct 21	132.0	126.7	134.3
Oct 22	132.0	129.7	134.3
Oct 23	132.2	125.1	140.9
Oct 24	134.1	127.2	141.9
Oct 25	134.4	117.6	145.8
Oct 26	134.6	118.1	142.7
Oct 27	135.8	130.4	142.6
Oct 28	136.5	129.0	141.2
Oct 29	137.1	128.5	140.8
Oct 30	133.3	125.2	139.3
Oct 31	129.9	120.5	133.2
Summary	133.6	116.2	140.3

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 67

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	130.3	114.6	145.5
Oct 2	132.3	118.5	148.8
Oct 3	134.3	121.7	151.4
Oct 4	132.1	118.9	145.3
Oct 5	129.1	111.7	143.5
Oct 6	127.2	119.9	135.8
Oct 7	109.6	94.4	122.1
Oct 8	105.9	95.2	114.9
Oct 9	113.1	105.4	123.7
Oct 10	119.3	103.4	134.4
Oct 11	120.6	109.4	129.9
Oct 12	132.2	118.8	142.6
Oct 13	135.0	124.0	142.9
Oct 14	128.4	108.7	137.2
Oct 15	117.7	104.5	126.7
Oct 16	120.0	113.7	129.8
Oct 17	125.1	117.4	131.6
Oct 18	129.1	119.4	138.5
Oct 19	132.1	116.5	140.7
Oct 20	128.8	117.7	138.8
Oct 21	128.3	120.9	134.7
Oct 22	123.8	114.7	132.6
Oct 23	123.6	106.0	143.8
Oct 24	127.7	110.3	145.4
Oct 25	128.7	119.2	142.7
Oct 26	129.4	116.5	143.5
Oct 27	130.8	123.7	138.4
Oct 28	133.4	127.1	141.1
Oct 29	134.4	130.1	139.8
Oct 30	122.7	105.5	135.2
Oct 31	112.6	101.8	123.0
Summary	125.7	105.9	135.0

Solid Waste Permit 588 Daily Wellhead Temperature

Averages for Well 68

Bristol, Virginia

Date	Average (°F)	Minimum (°F)	Maximum (°F)
Oct 1	120.4	89.6	125.8
Oct 2	123.7	111.7	127.9
Oct 3	125.0	116.4	128.0
Oct 4	125.8	124.5	127.8
Oct 5	125.9	124.2	127.6
Oct 6	124.9	119.6	126.5
Oct 7	123.3	121.5	125.1
Oct 8	122.6	120.7	123.9
Oct 9	123.9	122.1	125.8
Oct 10	124.5	113.9	134.1
Oct 11	113.1	79.4	123.4
Oct 12	73.1	57.9	89.4
Oct 13	95.4	50.9	129.9
Oct 14	126.0	122.9	127.7
Oct 15	124.3	120.3	125.5
Oct 16	123.9	119.6	125.2
Oct 17	124.5	119.9	125.6
Oct 18	125.2	121.9	127.0
Oct 19	126.0	123.4	131.0
Oct 20	124.3	122.6	125.9
Oct 21	124.5	123.6	125.8
Oct 22	125.2	123.9	126.8
Oct 23	125.9	119.4	131.0
Oct 24	126.4	123.9	129.4
Oct 25	126.6	125.1	129.0
Oct 26	126.4	120.9	128.9
Oct 27	126.5	121.8	128.9
Oct 28	126.7	122.6	128.1
Oct 29	126.7	123.9	127.5
Oct 30	125.1	122.5	127.5
Oct 31	124.0	120.4	125.3
Summary	121.9	73.1	126.7

Appendix D

Solid Waste Permit 588 Daily Borehole Temperature Averages

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Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 1

Date	Depth from Surface					
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft
1-Oct	166.3	225.3	225.7	250.5	265.6	272.7
2-Oct	166.3	225.6	226.0	250.7	265.6	272.7
3-Oct	166.4	225.6	226.0	250.8	265.6	272.8
4-Oct	166.3	225.8	226.2	250.9	265.5	272.7
5-Oct	166.3	225.8	226.3	250.9	265.5	272.7
6-Oct	166.1	225.5	226.0	250.7	265.2	272.4
7-Oct	165.8	225.1	225.5	250.3	265.0	272.2
8-Oct	165.4	225.0	225.4	250.0	264.6	271.7
9-Oct	165.4	224.6	225.0	249.7	264.5	271.7
10-Oct	165.8	225.0	225.4	250.1	264.8	272.0
11-Oct	165.6	225.4	225.8	250.3	264.6	271.8
12-Oct	166.2	225.3	225.7	250.5	265.3	272.4
13-Oct	166.3	225.8	226.2	251.0	265.4	272.5
14-Oct	166.0	225.1	225.5	250.3	264.8	271.9
15-Oct	165.6	224.6	225.0	250.0	264.5	271.6
16-Oct	165.4	224.6	225.0	250.0	264.4	271.5
17-Oct	165.5	224.8	225.2	250.4	264.5	271.5
18-Oct	166.0	225.5	226.0	250.9	264.9	272.0
19-Oct	165.8	224.6	225.0	250.0	264.8	271.9
20-Oct	165.7	223.8	224.1	249.5	264.7	271.7
21-Oct	165.8	224.4	224.8	249.9	264.8	271.9
22-Oct	165.7	224.1	224.5	249.7	264.7	271.6
23-Oct	165.9	224.2	224.6	250.1	264.9	271.9
24-Oct	165.9	224.5	224.9	250.4	264.9	272.0
25-Oct	166.0	224.9	225.3	250.5	264.9	272.0
26-Oct	166.0	224.5	224.9	250.2	264.8	272.0
27-Oct	166.0	224.7	225.1	250.5	264.9	272.0
28-Oct	166.2	224.9	225.2	250.7	265.1	272.2
29-Oct	166.1	224.9	225.4	250.7	265.0	272.0
30-Oct	165.7	224.1	224.5	249.9	264.5	271.5
31-Oct	165.4	223.8	224.2	249.7	264.3	271.1
Average	165.9	224.9	225.3	250.3	264.9	272.0

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 2

Date	Depth from Surface					
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft
1-Oct	156.9	241.1	241.4	267.3	255.4	266.1
2-Oct	157.0	241.0	241.4	267.4	255.4	266.2
3-Oct	156.9	240.9	241.3	267.3	255.3	266.1
4-Oct	156.9	240.8	241.2	267.3	255.2	266.0
5-Oct	156.9	240.7	241.1	267.2	255.1	265.9
6-Oct	156.8	240.5	240.9	267.1	255.0	265.8
7-Oct	156.5	240.2	240.6	266.9	254.8	265.5
8-Oct	156.1	239.8	240.2	266.5	254.4	265.2
9-Oct	156.1	239.6	240.0	266.5	254.3	265.0
10-Oct	156.5	239.8	240.3	266.7	254.6	265.4
11-Oct	156.4	239.9	240.2	266.6	254.4	265.2
12-Oct	156.8	240.1	240.6	267.1	254.9	265.7
13-Oct	156.6	240.0	240.4	266.9	254.8	265.6
14-Oct	156.5	239.7	240.1	266.8	254.5	265.3
15-Oct	156.4	239.5	239.9	266.5	254.2	265.1
16-Oct	156.1	239.3	239.7	266.3	253.9	264.8
17-Oct	156.2	239.6	240.0	266.4	254.4	264.9
18-Oct	156.3	239.7	240.1	266.6	254.6	265.1
19-Oct	156.3	239.5	239.9	266.5	254.6	265.0
20-Oct	156.4	239.1	239.5	266.5	254.3	264.9
21-Oct	156.4	239.1	239.5	266.6	254.4	264.9
22-Oct	156.6	239.1	239.6	266.5	254.2	264.9
23-Oct	156.7	239.4	239.9	266.7	254.5	265.1
24-Oct	156.6	239.4	240.0	266.7	254.6	265.1
25-Oct	156.5	239.3	239.8	266.6	254.4	265.0
26-Oct	156.5	239.3	239.8	266.6	254.4	265.0
27-Oct	156.6	239.2	239.7	266.5	254.4	265.0
28-Oct	156.6	239.2	239.6	266.6	254.5	265.1
29-Oct	156.6	239.0	239.4	266.4	254.3	264.8
30-Oct	156.4	238.5	239.0	266.1	253.9	264.5
31-Oct	156.2	238.3	238.7	265.8	253.6	264.2
Average	156.5	239.7	240.1	266.7	254.6	265.2

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 3

Date	Depth from Surface							
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Oct	207.7	208.1	209.7	251.4	262.2	268.6	269.5	256.4
2-Oct	208.4	208.6	210.4	250.7	262.0	268.4	269.3	256.5
3-Oct	208.1	208.4	210.2	250.3	261.8	268.6	269.4	256.6
4-Oct	208.8	208.9	211.1	241.8	261.5	268.0	269.0	256.6
5-Oct	208.0	208.1	209.9	251.3	261.8	268.4	269.3	256.6
6-Oct	209.6	209.7	210.9	244.3	261.9	268.6	269.5	256.3
7-Oct	212.2	212.2	213.3	232.3	261.5	268.5	269.5	256.0
8-Oct	219.3	220.5	220.9	233.7	261.5	268.6	269.9	255.7
9-Oct	223.2	223.2	223.4	235.6	261.4	268.7	270.0	255.7
10-Oct	224.8	226.4	226.5	242.9	261.9	269.2	270.4	256.1
11-Oct	222.1	228.0	228.1	250.3	261.5	269.0	270.0	255.7
12-Oct	221.2	230.5	231.1	254.4	262.1	269.3	270.4	256.6
13-Oct	218.9	233.1	233.6	255.0	261.9	269.2	270.2	256.4
14-Oct	214.5	235.0	235.3	254.8	261.4	268.9	269.7	255.9
15-Oct	210.7	236.8	236.9	252.6	261.2	268.7	269.7	255.6
16-Oct	204.9	238.8	238.7	253.8	261.0	268.6	269.7	255.4
17-Oct	194.8	240.0	240.0	254.7	261.1	268.7	269.7	255.5
18-Oct	191.9	240.3	240.3	254.8	261.5	269.2	270.2	256.1
19-Oct	190.0	240.1	240.1	254.6	261.4	269.0	270.2	256.0
20-Oct	188.9	239.8	239.8	254.2	261.1	268.8	269.9	255.7
21-Oct	188.2	239.8	239.8	254.4	261.2	268.8	270.0	255.9
22-Oct	187.2	239.4	239.5	254.0	260.9	268.6	269.8	255.7
23-Oct	186.7	239.6	239.6	254.4	261.2	268.9	270.2	256.1
24-Oct	186.6	239.3	239.4	254.5	261.2	269.0	270.4	256.1
25-Oct	189.2	239.1	239.1	254.7	261.3	269.1	270.5	256.2
26-Oct	195.8	239.2	239.1	254.7	261.2	269.0	270.4	256.1
27-Oct	202.2	239.5	239.5	254.7	261.2	269.1	270.5	256.2
28-Oct	204.1	238.9	238.9	254.3	261.0	268.9	270.3	256.2
29-Oct	199.0	239.1	239.1	254.1	260.9	268.9	270.3	256.1
30-Oct	197.3	238.5	238.5	253.8	260.5	268.6	269.9	255.6
31-Oct	195.7	238.0	238.0	253.5	260.1	268.3	269.5	255.3
Average	203.9	229.9	230.3	250.7	261.4	268.8	269.9	256.0

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 4

Date	Depth from Surface							
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Oct	162.5	208.1	208.2	253.6	261.6	263.1	246.5	179.0
2-Oct	162.5	208.0	208.1	253.6	261.9	262.9	246.4	179.0
3-Oct	162.4	208.0	208.1	253.9	262.5	263.0	246.4	179.1
4-Oct	162.4	207.9	208.0	254.0	262.4	263.3	246.4	179.1
5-Oct	161.1	207.8	208.0	254.0	262.4	263.5	246.4	179.1
6-Oct	161.0	207.5	207.6	253.8	262.5	263.2	246.2	178.8
7-Oct	160.9	207.2	207.3	253.6	262.3	263.0	246.0	178.8
8-Oct	160.9	206.8	206.9	253.4	261.8	262.7	245.7	178.4
9-Oct	162.0	206.6	206.7	247.3	261.6	262.7	245.5	178.4
10-Oct	172.5	206.9	207.1	233.0	262.1	263.0	246.0	178.9
11-Oct	195.6	206.8	206.9	244.0	263.8	260.3	245.7	178.6
12-Oct	206.9	207.3	207.4	220.7	263.2	261.6	246.5	179.3
13-Oct	207.4	207.4	207.5	239.7	262.7	262.0	246.5	179.2
14-Oct	206.9	206.8	206.8	242.7	262.1	261.7	246.0	178.4
15-Oct	206.6	206.5	206.5	246.5	261.5	261.4	245.7	178.5
16-Oct	206.6	206.5	206.5	250.3	261.2	261.2	245.6	178.3
17-Oct	207.0	206.8	206.9	237.9	261.3	261.2	245.6	178.4
18-Oct	207.4	207.3	207.3	242.7	261.6	261.8	246.1	179.0
19-Oct	207.2	207.1	207.1	254.6	261.5	261.6	246.0	178.9
20-Oct	206.6	206.5	206.5	239.3	261.7	261.5	245.9	178.5
21-Oct	206.7	206.6	206.6	251.4	261.6	261.7	246.0	179.0
22-Oct	207.0	206.9	206.8	235.7	261.3	261.5	245.8	178.9
23-Oct	207.5	207.4	207.4	253.9	261.8	261.5	246.1	179.3
24-Oct	207.8	207.7	207.8	253.4	261.9	261.9	246.3	179.4
25-Oct	207.8	207.9	207.9	254.8	262.0	262.1	246.4	179.5
26-Oct	207.9	207.9	207.9	255.1	261.8	262.2	246.4	179.6
27-Oct	207.8	207.7	207.8	255.2	261.9	261.8	246.3	179.6
28-Oct	207.9	207.8	207.9	255.4	261.9	262.2	246.4	179.8
29-Oct	207.5	207.5	207.5	254.9	261.7	262.0	246.2	179.3
30-Oct	207.0	206.9	206.9	254.5	261.3	261.7	245.7	178.8
31-Oct	206.8	206.7	206.7	235.1	261.2	261.0	245.5	178.6
Average	192.5	207.3	207.3	248.0	261.9	262.1	246.1	179.0

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 5

Date	Depth from Surface							
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Oct	174.1	210.4	210.8	208.1	227.4	242.2	244.7	195.9
2-Oct	174.4	210.7	210.7	208.1	227.3	242.3	244.8	195.9
3-Oct	174.2	209.8	210.7	208.0	227.8	242.3	244.9	195.9
4-Oct	173.9	210.3	210.7	208.0	227.8	242.6	245.0	196.0
5-Oct	174.2	210.3	210.5	208.0	227.6	242.6	245.0	196.0
6-Oct	174.5	209.9	210.3	207.7	227.7	242.8	245.0	196.1
7-Oct	174.2	208.9	210.1	207.4	227.2	242.3	244.7	195.7
8-Oct	174.7	209.3	210.0	207.1	226.9	242.1	244.6	195.6
9-Oct	174.6	208.8	209.9	207.0	226.8	242.0	244.8	195.7
10-Oct	175.4	209.8	210.1	207.1	226.9	242.1	244.9	195.8
11-Oct	175.1	209.4	210.1	207.2	226.9	242.1	245.0	195.8
12-Oct	176.2	209.1	210.4	207.4	227.2	242.5	245.4	196.1
13-Oct	176.5	209.1	210.4	207.5	227.2	242.5	245.4	196.1
14-Oct	176.3	207.5	210.1	207.1	227.2	242.4	245.4	196.1
15-Oct	174.5	207.5	210.0	206.9	226.8	242.2	245.2	195.9
16-Oct	174.3	207.9	210.0	206.9	226.9	242.2	245.2	195.8
17-Oct	174.6	208.9	210.3	207.3	227.3	242.4	245.3	195.9
18-Oct	175.1	210.4	210.7	207.5	227.5	242.5	245.4	195.9
19-Oct	175.7	210.6	210.9	207.4	227.6	242.7	245.5	196.0
20-Oct	175.6	210.1	210.4	206.8	227.2	242.6	245.6	196.0
21-Oct	176.8	210.5	208.3	206.8	224.2	242.4	245.6	195.9
22-Oct	176.6	210.3	206.9	207.0	223.0	242.1	245.6	195.8
23-Oct	176.7	210.9	207.4	207.5	222.5	241.9	245.7	195.9
24-Oct	175.8	210.8	208.2	208.1	222.5	242.3	245.6	195.8
25-Oct	175.0	213.7	212.0	208.2	221.9	242.4	*	*
26-Oct	176.0	213.7	213.1	208.2	221.4	242.5	*	*
27-Oct	176.1	212.6	214.4	208.2	221.2	242.5	*	*
28-Oct	175.8	207.9	215.2	208.2	*	*	*	*
29-Oct	176.1	207.6	212.9	207.8	*	*	*	*
30-Oct	175.7	207.1	213.3	207.3	*	*	*	*
31-Oct	175.6	206.8	211.4	207.1	*	*	*	*
Average	175.3	209.7	210.7	207.5	226.0	242.3	245.2	195.9

* Indicates sensor reading failures

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 6

Date	Depth from Surface				
	25 ft	50 ft	75 ft	100 ft	125 ft
1-Oct	170.0	231.9	232.2	230.4	233.8
2-Oct	169.9	231.9	232.1	230.1	234.3
3-Oct	169.8	231.9	232.1	230.4	234.3
4-Oct	169.5	231.9	232.0	230.2	234.4
5-Oct	169.4	231.9	232.0	230.7	233.8
6-Oct	169.0	231.9	231.8	231.2	232.8
7-Oct	169.0	231.6	231.6	231.3	232.2
8-Oct	168.5	231.2	231.2	231.5	231.1
9-Oct	168.4	231.2	231.1	231.8	231.1
10-Oct	168.3	231.6	231.4	231.9	231.0
11-Oct	168.2	231.5	231.4	231.8	230.7
12-Oct	168.8	232.0	231.9	232.1	231.2
13-Oct	168.4	231.9	231.9	232.2	231.1
14-Oct	168.2	231.7	231.7	232.1	230.6
15-Oct	168.1	231.5	231.5	232.1	230.2
16-Oct	167.8	231.2	231.2	231.8	229.8
17-Oct	167.7	231.2	231.2	231.7	230.1
18-Oct	167.9	231.3	231.4	232.2	230.4
19-Oct	167.8	231.2	231.4	232.2	230.1
20-Oct	167.6	231.2	231.3	232.2	229.8
21-Oct	167.9	231.2	231.3	232.4	230.1
22-Oct	167.3	230.9	231.1	231.1	231.5
23-Oct	167.3	231.0	231.2	230.9	232.4
24-Oct	167.3	231.1	231.2	231.0	232.5
25-Oct	167.4	231.1	231.3	231.0	232.5
26-Oct	167.6	231.2	231.4	231.1	232.6
27-Oct	167.7	231.2	231.3	231.0	232.7
28-Oct	168.0	231.3	231.5	231.2	233.1
29-Oct	168.0	231.1	231.3	230.9	233.0
30-Oct	167.7	230.7	230.8	230.5	232.5
31-Oct	167.4	230.4	230.5	229.8	232.7
Average	168.3	231.4	231.5	231.3	231.9

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 7


Date	Depth from Surface							
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Oct	153.9	206.6	204.9	230.7	242.8	237.8	229.3	202.2
2-Oct	153.6	205.9	204.9	230.8	242.7	237.8	229.2	202.4
3-Oct	153.7	204.2	203.6	230.9	242.6	237.9	229.0	202.4
4-Oct	153.6	204.2	203.5	231.3	242.6	237.8	229.1	202.7
5-Oct	153.7	205.5	204.8	231.5	242.5	237.7	229.1	203.0
6-Oct	153.7	206.5	209.7	231.6	242.3	237.6	229.1	203.0
7-Oct	154.0	207.0	209.7	231.6	241.9	237.4	228.8	202.7
8-Oct	153.0	206.6	207.1	231.5	241.4	237.1	228.3	202.2
9-Oct	152.4	206.1	207.6	231.5	241.4	237.1	228.5	202.0
10-Oct	152.6	206.7	210.1	231.8	241.6	237.4	228.9	202.1
11-Oct	152.6	208.0	211.8	231.8	241.4	237.2	228.8	201.9
12-Oct	153.7	210.7	213.0	232.4	242.0	237.7	229.3	202.1
13-Oct	153.6	212.1	213.4	232.3	241.8	237.5	229.1	201.8
14-Oct	153.4	212.3	213.5	232.3	241.7	237.4	228.9	201.4
15-Oct	153.4	211.2	212.5	232.2	241.5	237.2	228.6	201.0
16-Oct	152.5	205.1	206.5	231.3	241.2	236.9	228.4	200.8
17-Oct	152.2	204.8	206.0	231.4	241.3	237.0	228.5	200.8
18-Oct	152.9	204.3	205.6	231.6	241.6	237.2	228.7	201.0
19-Oct	152.9	204.3	205.6	231.2	241.4	237.1	228.7	200.9
20-Oct	152.5	203.6	205.3	231.3	241.4	237.2	228.9	201.2
21-Oct	152.4	202.8	204.4	231.2	241.4	237.2	228.9	201.4
22-Oct	152.5	202.4	204.0	231.3	241.2	237.0	228.9	201.4
23-Oct	152.9	202.1	203.5	231.3	241.7	236.9	229.4	201.8
24-Oct	152.3	203.1	204.8	231.8	241.7	237.4	230.1	204.1
25-Oct	152.6	207.1	208.3	234.8	241.6	238.3	231.2	210.9
26-Oct	152.2	207.8	208.5	235.1	241.5	238.5	231.5	210.9
27-Oct	152.8	207.9	208.6	235.3	241.9	239.0	232.0	209.7
28-Oct	152.9	207.8	208.6	235.4	242.0	239.2	232.1	209.8
29-Oct	152.6	207.5	208.2	235.5	241.6	239.1	231.8	209.6
30-Oct	152.0	206.9	207.7	235.2	241.2	239.1	231.5	209.9
31-Oct	151.6	206.7	207.5	235.4	241.1	238.5	231.5	209.8
Average	152.9	206.4	207.5	232.4	241.7	237.7	229.5	203.8

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 8

Date	Depth from Surface							
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Oct	188.4	191.6	191.5	193.9	195.2	191.9	188.4	182.2
2-Oct	188.7	191.6	191.6	194.0	195.3	192.0	188.4	182.2
3-Oct	188.8	191.7	191.7	194.0	195.4	192.0	188.5	182.3
4-Oct	188.7	191.7	191.7	194.0	195.3	192.1	188.5	182.3
5-Oct	188.7	191.7	191.7	194.0	195.3	192.0	188.4	182.2
6-Oct	188.6	191.5	191.5	193.8	195.0	191.8	188.2	182.0
7-Oct	188.6	191.4	191.4	193.7	195.0	191.8	188.2	182.0
8-Oct	188.3	191.2	191.2	193.5	194.7	191.5	187.9	181.6
9-Oct	188.1	191.1	191.1	193.3	194.5	191.5	187.9	181.6
10-Oct	188.4	191.5	191.5	193.7	195.0	191.9	188.3	182.1
11-Oct	188.4	191.3	191.3	193.6	194.7	191.5	187.9	181.6
12-Oct	188.9	191.7	191.7	194.0	195.2	192.0	188.5	182.2
13-Oct	188.9	191.7	191.7	194.0	195.2	191.9	188.4	182.2
14-Oct	188.6	191.6	191.6	193.7	194.9	191.8	188.1	181.9
15-Oct	188.3	191.3	191.4	193.6	194.8	191.6	188.0	181.7
16-Oct	188.3	191.2	191.2	193.4	194.7	191.3	187.7	181.4
17-Oct	188.5	191.4	191.4	193.7	194.9	191.3	187.7	181.4
18-Oct	188.8	191.8	191.8	194.1	195.5	191.8	188.1	181.9
19-Oct	188.9	191.7	191.8	194.1	195.4	191.7	188.0	181.7
20-Oct	188.5	191.5	191.6	193.9	195.0	191.6	188.0	181.6
21-Oct	188.5	191.6	191.7	193.9	195.2	191.7	188.1	181.7
22-Oct	188.7	191.6	191.7	194.0	195.3	191.4	188.0	181.6
23-Oct	189.1	192.0	192.0	194.4	195.8	191.6	188.2	181.8
24-Oct	189.1	192.1	192.2	194.6	196.0	191.6	188.2	181.8
25-Oct	189.3	192.3	192.4	194.7	196.1	191.7	188.2	181.9
26-Oct	189.4	192.3	192.4	194.8	196.1	191.9	188.3	181.9
27-Oct	189.3	192.3	192.4	194.7	196.0	191.8	188.2	181.8
28-Oct	189.5	192.4	192.5	194.8	196.0	191.9	188.2	181.8
29-Oct	189.3	192.3	192.4	194.7	195.8	191.7	188.1	181.6
30-Oct	189.1	191.9	192.0	194.6	195.4	191.5	187.8	181.3
31-Oct	188.7	191.7	191.8	194.1	195.3	191.2	187.6	181.0
Average	188.8	191.7	191.7	194.0	195.3	191.7	188.1	181.8

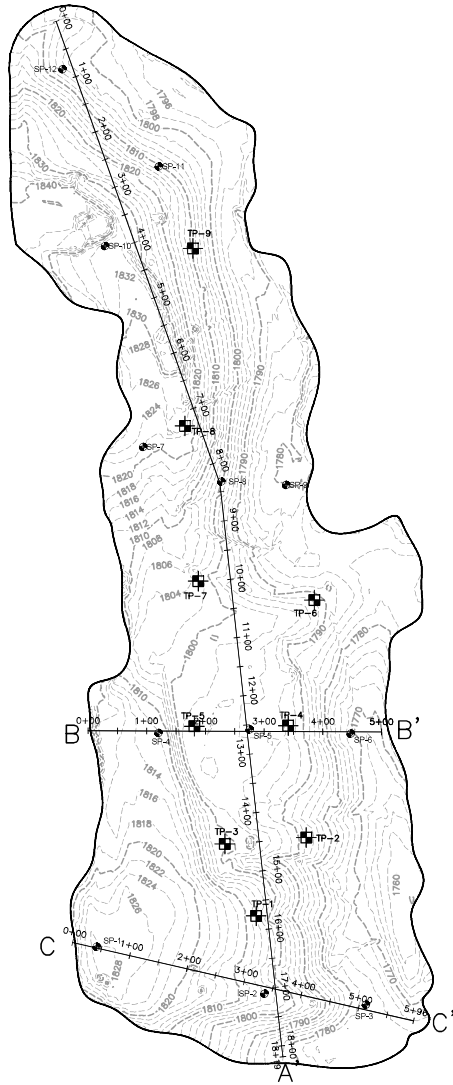
Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 9

Date	Depth from Surface							
	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Oct	122.6	153.8	153.4	153.3	148.0	132.0	117.9	109.2
2-Oct	122.7	153.8	153.3	153.3	147.9	131.9	117.8	109.1
3-Oct	122.7	153.7	153.4	153.3	147.8	132.0	117.9	109.2
4-Oct	122.6	153.8	153.4	153.3	147.9	132.0	118.0	109.3
5-Oct	122.5	153.6	153.3	153.3	147.8	131.9	118.0	109.3
6-Oct	122.3	153.5	153.1	153.2	147.8	132.0	118.0	109.3
7-Oct	122.2	153.3	152.9	152.8	147.4	131.5	117.6	108.8
8-Oct	121.6	152.8	152.4	152.5	147.1	131.2	117.2	108.5
9-Oct	121.4	152.7	152.3	152.5	147.1	131.2	117.3	108.5
10-Oct	122.2	153.1	152.8	152.7	147.4	131.3	117.4	108.7
11-Oct	122.0	153.1	152.8	152.6	147.3	131.4	117.5	108.8
12-Oct	122.4	153.6	153.2	153.1	147.8	131.8	117.9	109.2
13-Oct	122.3	153.6	153.2	153.1	147.9	131.8	118.0	109.2
14-Oct	121.9	153.3	152.9	152.9	147.6	131.6	117.8	109.1
15-Oct	121.5	152.9	152.6	152.6	147.2	131.3	117.5	108.7
16-Oct	121.3	152.8	152.5	152.4	146.9	131.1	117.3	108.5
17-Oct	121.4	152.9	152.7	152.4	147.0	131.2	117.5	108.6
18-Oct	121.6	153.2	153.0	152.5	147.3	131.3	117.5	108.5
19-Oct	121.7	153.3	153.0	152.7	147.3	131.6	117.5	108.5
20-Oct	121.1	153.1	152.8	152.7	147.4	131.5	117.6	108.6
21-Oct	121.8	153.2	153.0	152.6	147.2	131.4	117.5	108.4
22-Oct	121.9	153.2	153.1	152.5	147.1	131.3	117.4	108.3
23-Oct	122.1	153.4	153.3	152.6	147.6	131.5	117.4	108.3
24-Oct	121.7	153.6	153.4	152.7	147.6	131.6	117.5	108.4
25-Oct	121.8	153.7	153.5	152.8	147.6	131.7	117.7	108.5
26-Oct	121.8	153.8	153.6	152.9	147.7	131.8	117.8	108.6
27-Oct	121.7	153.8	153.6	153.0	147.9	131.9	117.9	108.7
28-Oct	121.8	153.9	153.7	153.1	148.0	132.1	118.0	108.8
29-Oct	121.5	153.8	153.5	153.0	148.0	132.0	118.0	108.7
30-Oct	121.1	153.4	153.1	152.7	147.6	131.6	117.6	108.3
31-Oct	120.6	153.0	152.8	152.2	147.1	131.2	117.3	107.9
Average	121.9	153.4	153.1	152.8	147.5	131.6	117.6	108.7



Appendix E

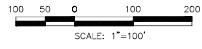
Monthly Topography Analysis



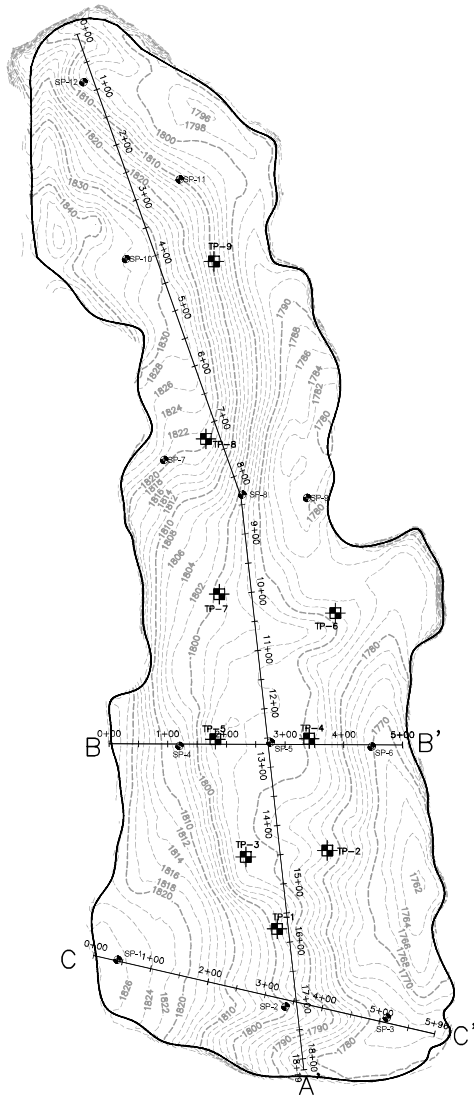
- LEGEND**
- MAJOR CONTOURS (EVERY 10')
 - MINOR CONTOURS (EVERY 2')
 - APPROXIMATE SIDEWALL LOCATION
 - SP-# SETTLEMENT PLATE
 - TP-# TEMPERATURE MONITORING PROBE

NOTES:

1. GRADES SHOWN AS CONTOUR LINES ONLY WITHIN THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY CAPTURED ON OCTOBER 7, 2022 BY NV5 GEOSPATIAL.
2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FLOOD PLAIN DETERMINATION.
3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011).
4. THE VERTICAL DATUM IS BASED UPON NGS MEAN SEA LEVEL.



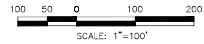
<p>SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT 1521 MILITARY TRAIL, WILCOXVILLE, VA 23113 PH: (804) 378-7448 FAX: (804) 378-7433 WWW.SCS-VA.COM</p>	<p>CLIENT CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VIRGINIA 24201</p>	<p>SHEET TITLE OCTOBER 2022 LANDFILL TOPOGRAPHY</p>	<p>PROJECT TITLE MONTHLY TOPOGRAPHY ANALYSIS SOLID WASTE PERMIT #588</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 5%;">NO.</th> <th style="width: 5%;">REVISION</th> <th style="width: 10%;">DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	REVISION	DATE												
	NO.	REVISION	DATE																
<p>CADD FILE: SURV: COMP</p> <p>DATE: 11/6/2023</p> <p>SCALE: DRAWING NO. 1 of 8</p>																			



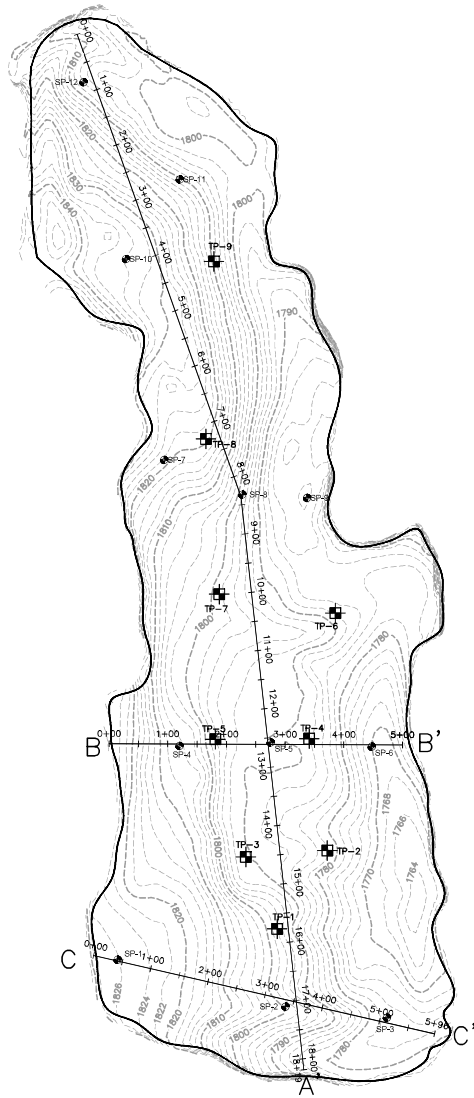
- LEGEND**
- MAJOR CONTOURS (EVERY 10')
 - MINOR CONTOURS (EVERY 2')
 - APPROXIMATE SIDEWALL LOCATION
 - SP-# SETTLEMENT PLATE
 - ⊕ TP-# TEMPERATURE MONITORING PROBE

NOTES:

1. GRADES SHOWN AS CONTOUR LINES ONLY WITHIN THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY CAPTURED ON JULY 12, 2023 BY SCS ENGINEERS.
2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FLOOD PLAIN DETERMINATION.
3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011).
4. THE VERTICAL DATUM IS BASED UPON NAVD-88.



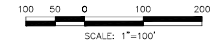
<p>SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT 1521 MILFORD AVENUE, SUITE 100 BRISTOL, VIRGINIA 24201 PH: (804) 378-7448 FAX: (804) 378-7433 WWW.SCS-VA.COM</p>	<p>CLIENT</p> <p>CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VIRGINIA 24201</p>	<p>SHEET TITLE</p> <p>JULY 2023 LANDFILL TOPOGRAPHY</p>	<p>PROJECT TITLE</p> <p>MONTHLY TOPOGRAPHY ANALYSIS SOLID WASTE PERMIT #588</p>	<p>NO.</p> <p>REVISION</p>	<p>DATE</p>
	<p>CADD FILE:</p> <p>SUR: COMP</p>	<p>DATE:</p> <p>11/6/2023</p>	<p>DRAWING NO.</p> <p>2 of 8</p>		



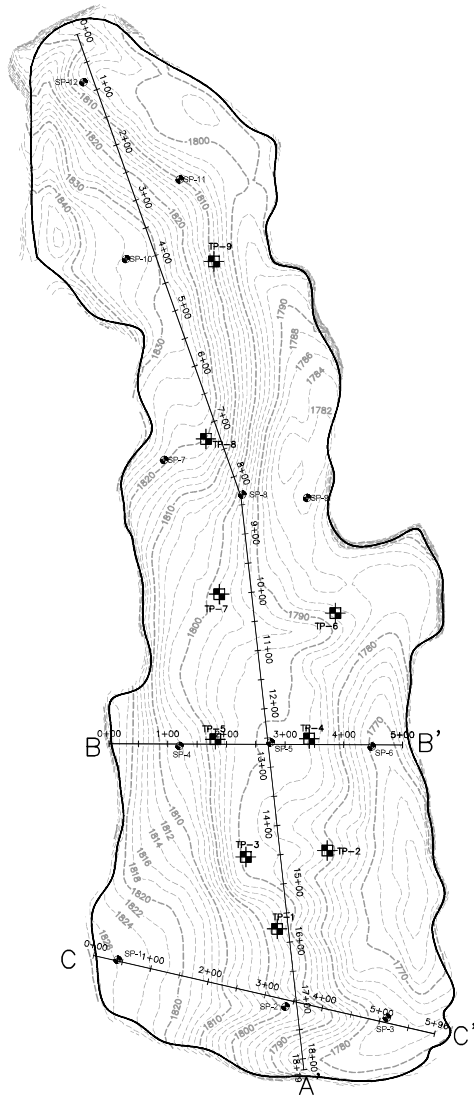
- LEGEND**
- MAJOR CONTOURS (EVERY 10')
 - MINOR CONTOURS (EVERY 2')
 - APPROXIMATE SIDEWALL LOCATION
 - SP-# SETTLEMENT PLATE
 - ⊕ TP-# TEMPERATURE MONITORING PROBE

NOTES:

1. GRADES SHOWN AS CONTOUR LINES ONLY WITHIN THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY CAPTURED ON SEPTEMBER 15, 2023 BY SCS ENGINEERS.
2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FLOOD PLAIN DETERMINATION.
3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011).
4. THE VERTICAL DATUM IS BASED UPON NAVD-86.



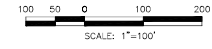
<p>SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT 1521 MILITARY TRAIL, FIFTH FLOOR FALLS CHURCH, VA 22034 PH: (703) 271-4400 FAX: (703) 271-4333 WWW.SCS-VA.COM</p>	<p>CLIENT CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VIRGINIA 24201</p>	<p>SHEET TITLE SEPTEMBER 2023 LANDFILL TOPOGRAPHY</p>	<p>PROJECT TITLE MONTHLY TOPOGRAPHY ANALYSIS SOLID WASTE PERMIT #586</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 5%;">NO.</th> <th style="width: 5%;">REVISION</th> <th style="width: 5%;">DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	REVISION	DATE												
	NO.	REVISION	DATE																
<p>CADD FILE: SUR: COMP</p> <p>DATE: 11/6/2023</p> <p>SCALE:</p>	<p>DRAWING NO. 3 of 8</p>																		



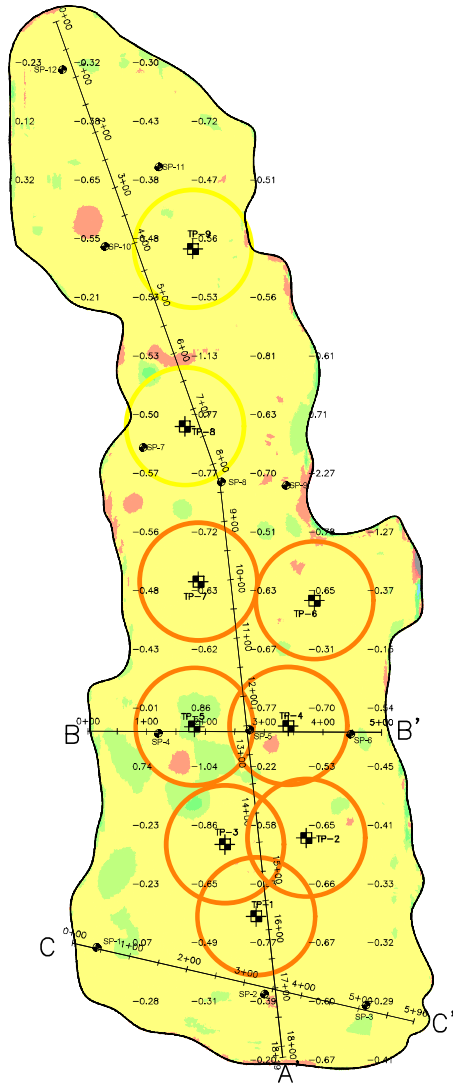
- LEGEND
- MAJOR CONTOURS (EVERY 10')
 - MINOR CONTOURS (EVERY 2')
 - APPROXIMATE SIDEWALL LOCATION
 - SP-# SETTLEMENT PLATE
 - ⊕ TP-# TEMPERATURE MONITORING PROBE

NOTES:

1. GRADES SHOWN AS CONTOUR LINES ONLY WITHIN THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY CAPTURED ON OCTOBER 12, 2023 BY SCS ENGINEERS.
2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FLOOD PLAIN DETERMINATION.
3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011).
4. THE VERTICAL DATUM IS BASED UPON NAVD-88.



SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT SURF COMP 1521 MIDLOTHIAN TRAIL, MIDLOTHIAN, VA 23115 PH: (804) 292-4444 FAX: (804) 292-4432 WWW.SCS-VA.COM	CLIENT CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VIRGINIA 24201	SHEET TITLE OCTOBER 2023 LANDFILL TOPOGRAPHY	NO.	REVISION	DATE	
	PROJECT TITLE MONTHLY TOPOGRAPHY ANALYSIS SOLID WASTE PERMIT #588	NO.	REVISION	DATE	NO.	REVISION
CADD FILE: SURF COMP	DATE: 11/6/2023	SCALE: DRAWING NO.	4 of 8			



LEGEND

- MAJOR CONTOURS (EVERY 10')
- MINOR CONTOURS (EVERY 2')
- APPROXIMATE WASTE BOUNDARY
- SP-9 SETTLEMENT PLATE
- -0.39 SPOT ELEVATION ON 100' GRID
- TP-6 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH LESS THAN 200 F
- TP-1 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH BETWEEN 200 F AND 250 F
- TP-2 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH BETWEEN 250 F AND 300 F

Volume

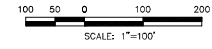
Base Surface TOPO - SEPTEMBER 15, 2023		
Comparison Surface TOPO - OCTOBER 12, 2023		
Cut Volume	14,415	Cu. Yd.
Fill Volume	865	Cu. Yd.
Net Cut	13,790	Cu. Yd.

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-12.000	-5.000	Red
2	-5.000	-1.000	Orange
3	-1.000	0.000	Yellow
4	0.000	1.000	Light Green
5	1.000	5.000	Green
6	5.000	10.000	Blue

NOTES:

1. THE ELEVATION CHANGES ARE CALCULATED BETWEEN THE AERIAL TOPOGRAPHY DATA CAPTURED ON SEPTEMBER 15, 2023 AND OCTOBER 12, 2023 BY SCS ENGINEERS. POSITIVE VALUES (+) INDICATE AREAS OF FILL AND NEGATIVE VALUES (-) INDICATE AREAS OF CUT (SETTLEMENT). VALUES ARE ROUNDED TO THE NEAREST FOOT.
2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FOR FLOOD PLAIN DETERMINATION.
3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011)
4. THE VERTICAL DATUM IS BASED UPON NAVD-88.



NO.	REVISION	DATE

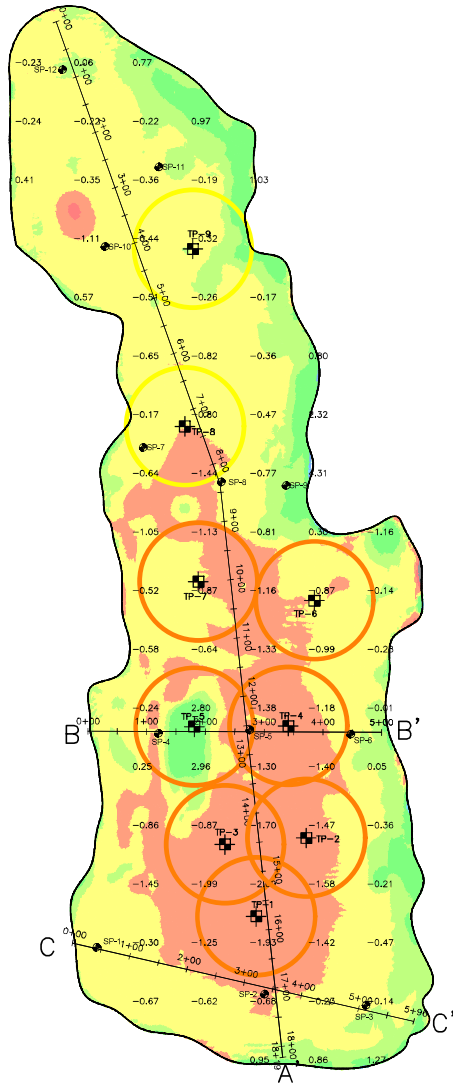
SHEET TITLE	OCTOBER VOLUME CHANGE
PROJECT TITLE	SEPTEMBER 2023 TO OCTOBER 2023
MONTHLY TOPOGRAPHY ANALYSIS	
SOLID WASTE PERMIT #588	

CLIENT
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
 2655 VALLEY DRIVE
 BRISTOL, VIRGINIA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 1521 MIDLANTIC PARK - MIDDLETON, VA 23115
 P.E. (VA) 296-1442/PALE (VA) 296-4332
 02212303.05
 DATE: 11/16/2023
 DRAWN BY: JWH
 CHECKED BY: JWH
 DATE: 11/16/2023

CADD FILE:
 SURF COMP
 DATE: 11/16/2023
 SCALE:

DRAWING NO.
5 of 8



LEGEND

- MAJOR CONTOURS (EVERY 10')
- MINOR CONTOURS (EVERY 2')
- APPROXIMATE WASTE BOUNDARY
- SP-9 SETTLEMENT PLATE
- 0.39 SPOT ELEVATION ON 100' GRID

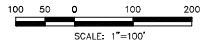
- TP-6 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH LESS THAN 200 F
- TP-1 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH BETWEEN 200 F AND 250 F
- TP-2 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH BETWEEN 250 F AND 300 F

Volume
 Base Surface TOPO - JULY 12, 2023
 Comparison Surface TOPO - OCTOBER 12, 2023
 Cut Volume 18,992 Cu. Yd.
 Fill Volume 4,452 Cu. Yd.
 Net Cut 14,540 Cu. Yd.

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-11.000	-5.000	Red
2	-5.000	-1.000	Orange
3	-1.000	0.000	Yellow
4	0.000	1.000	Light Green
5	1.000	5.000	Green
6	5.000	10.000	Blue

NOTES:

1. THE ELEVATION CHANGES ARE CALCULATED BETWEEN THE AERIAL TOPOGRAPHY DATA CAPTURED ON JULY 12, 2023 AND OCTOBER 12, 2023 BY SCS ENGINEERS. POSITIVE VALUES (+) INDICATE AREAS OF FILL AND NEGATIVE VALUES (-) INDICATE AREAS OF CUT (SETTLEMENT). VALUES ARE ROUNDED TO THE NEAREST FOOT
2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FOR FLOOD PLAIN DETERMINATION.
3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011)
4. THE VERTICAL DATUM IS BASED UPON NAVD-88.



NO.	REVISION	DATE

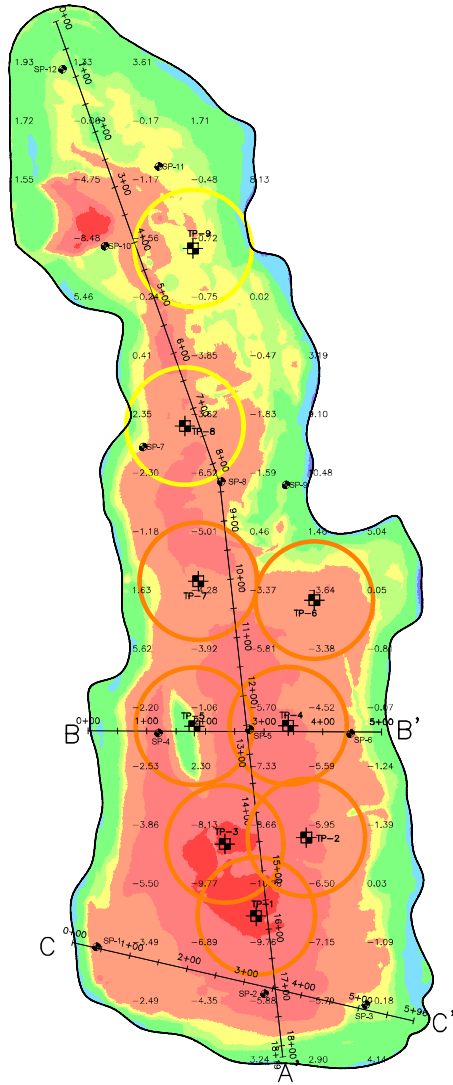
SHEET TITLE: OCTOBER VOLUME CHANGE
 JULY 2023 TO OCTOBER 2023
 PROJECT TITLE: MONTHLY TOPOGRAPHY ANALYSIS
 SOLID WASTE PERMIT #588

CLIENT: CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
 2665 VALLEY DRIVE
 BRISTOL, VIRGINIA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 1521 MIDLANTIC PARK - WELLSFORD, VA 22118
 PH: (541) 378-1442 FAX: (541) 378-4332
 02/18/2008.05
 DATE: 11/16/2023
 TIME: 10:52 AM
 USER: WPC/CM
 PLOT: WPC/CM

CADD FILE: SURF_COMP
 DATE: 11/16/2023
 SCALE:

DRAWING NO. 6 of 8



- LEGEND**
- MAJOR CONTOURS (EVERY 10')
 - MINOR CONTOURS (EVERY 2')
 - APPROXIMATE WASTE BOUNDARY
 - SP-9 SETTLEMENT PLATE
 - 0.39 SPOT ELEVATION ON 100' GRID
 - TP-6 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH LESS THAN 200' F
 - TP-1 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH BETWEEN 200' F AND 250' F
 - TP-2 TEMPERATURE MONITORING PROBE WITH AVERAGE TEMPERATURES AT DEPTH BETWEEN 250' F AND 300' F

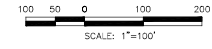
Volume
 Base Surface TOPO - OCTOBER 7, 2022
 Comparison Surface TOPO - OCTOBER 12, 2023

Cut Volume	75,200	Cu. Yd.
Fill Volume	22,400	Cu. Yd.
Net Cut	52,800	Cu. Yd.

Elevations Table

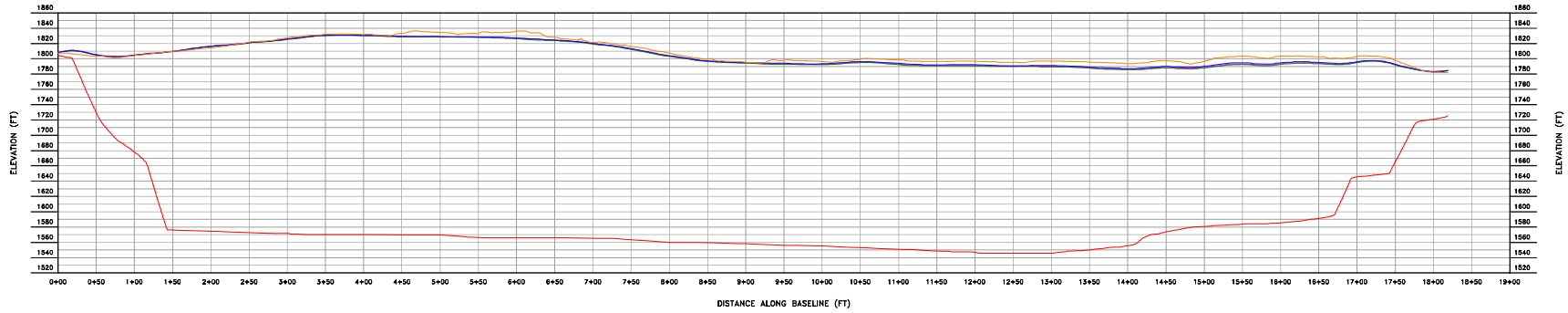
Number	Minimum Elevation	Maximum Elevation	Color
1	-19.000	-5.000	Red
2	-10.000	-5.000	Red
3	-5.000	-1.000	Orange
4	-1.000	0.000	Yellow
5	0.000	1.000	Light Green
6	1.000	5.000	Green
7	5.000	10.000	Blue

- NOTES:**
1. THE ELEVATION CHANGES ARE CALCULATED BETWEEN THE AERIAL TOPOGRAPHY DATA CAPTURED ON OCTOBER 7, 2023 AND OCTOBER 12, 2023 BY SCS ENGINEERS. POSITIVE VALUES (+) INDICATE AREAS OF FILL AND NEGATIVE VALUES (-) INDICATE AREAS OF CUT (SETTLEMENT). VALUES ARE ROUNDED TO THE NEAREST FOOT
 2. ANY DETERMINATION OF TOPOGRAPHY OR CONTOURS, OR ANY DEPICTION OF PHYSICAL IMPROVEMENTS, PROPERTY LINES, OR BOUNDARIES IS FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR DESIGN, MODIFICATION, OR CONSTRUCTION OF IMPROVEMENTS TO REAL PROPERTY OR FOR FLOOD PLAIN DETERMINATION.
 3. THE HORIZONTAL DATUM IS STATE PLANE VIRGINIA SOUTH ZONE NAD-83 (2011)
 4. THE VERTICAL DATUM(S) IS BASED UPON NGS MEAN SEA LEVEL (OCT. 2022), AND NAVD-88 (OCT. 2023).

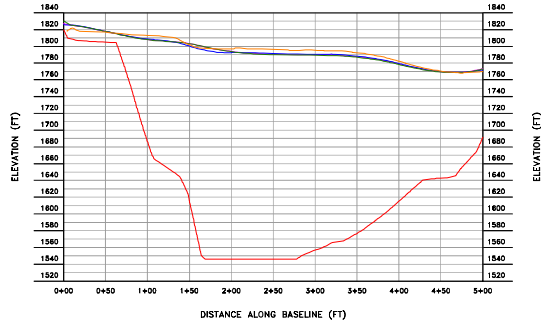


SHEET TITLE OCTOBER VOLUME CHANGE OCTOBER 2022 TO OCTOBER 2023	DATE
	REVISION
NO.	DATE
PROJECT TITLE	NO.
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VIRGINIA 24201	MONTHLY TOPOGRAPHY ANALYSIS SOLID WASTE PERMIT #588
SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT 1521 MIDLANTIC TRAIL - CHARLOTTE, VA 28115 PH: (404) 292-7444 FAX: (404) 292-7432 WWW.SCS-VA.COM	DATE: 11/6/2023 SCALE: DRAWING NO.
CADD FILE: SURF COMP	7 of 8

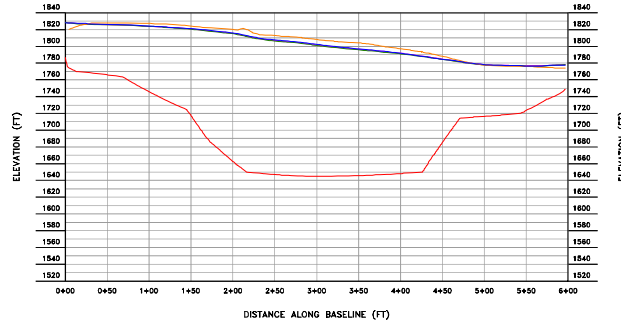
LONGITUDINAL PROFILE A ALIGN



LONGITUDINAL PROFILE B ALIGN



LONGITUDINAL PROFILE C ALIGN



- LEGEND**
- BOTTOM LINER ELEVATION
 - OCTOBER 2022 TOPO
 - JULY 2023 TOPO
 - SEPTEMBER 2023 TOPO
 - OCTOBER 2023 TOPO

NO.	REVISION	DATE
1		
2		
3		
4		
5		

PROFILES
 SHEET TITLE
 PROJECT TITLE
MONTHLY TOPOGRAPHY ANALYSIS
SOLID WASTE PERMIT #588

CLIENT
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
 2655 VALLEY DRIVE
 BRISTOL, VIRGINIA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 1521 MIDLANTIC TRAIL - WELLSFORD, VA 22118
 PH: (540) 378-7444 FAX: (540) 378-4332
 02212023.05
 DATE: 11/6/2023
 TIME: 11:50 AM
 USER: WPC/JW
 PLOT: WPC/JW

CADD FILE:
 SURF: COMP
 DATE: 11/6/2023
 SCALE:

DRAWING NO.
08 of 8

Appendix F
Field Logs
Lab Report
Historical LFG-EW Leachate Monitoring Results Summary

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Liquid Level Measurement Log

Date	October 9-11, 2023											
Personnel	L. Nelson, W. Fabrie											
Location ID	Date	Scheduled Borehole Depth (ft)	Measured Well Casing Depth		Should Have Pump	Pump Depth (ft)	Cycle Count	Depth to Liquid (ft)	Casing Stickup (ft)	Liquid Column Thickness (ft)	Pump Running (Yes/No)	Comments
			(ft)	(Date)								
EW-33B	10/11/2023	180			x		17	145.93	3.76	---	No	
EW-36A	10/11/2023	184	---				800829	124.51	3.32	---	yes	No discharge
EW-49	10/10/2023		96.15	12/20-21/2022	x	90	777887	---	7.02	---	no	Unable to measure - too tall
EW-50	10/10/2023		77.70	12/20-21/2022	x	83	273166	47.11	5.25	30.59		
EW-51	10/10/2023		92.80	12/20-21/2022	x	95	1005496	31.67		61.13	no	no discharge
EW-52	10/10/2023		98.70	12/20-21/2022	x	93	279528	46.47	3.21	52.23		
EW-53	10/10/2023		100.70	12/20-21/2022	x		2326465	dry	4.75	---		
EW-54	10/10/2023		82.70	12/20-21/2022	x	75	597284	37.73	5.32	44.97	no	
EW-55	10/10/2023		90.40	12/20-21/2022	x	90	616789	44.27	4.44	46.13	yes	
EW-56	10/9/2023		58.50	12/20-21/2022	x	58	---	47.72	4.96	10.78		No pump
EW-57	10/9/2023		107.40	12/20-21/2022	x	71	671215	15.3	5.00	92.10	no	
EW-58	10/9/2023		84.50	12/20-21/2022	x	82	2481603	dry	5.50	---	no	pump strocking - counter not changing
EW-59	10/9/2023		73.40	12/20-21/2022	x	64	2400517	36.41	3.90	36.99	no	
EW-60	10/10/2023		81.80	12/20-21/2022	x	70	484835	---	3.13	---	no	heavy black sludge - blockage at 39.22
EW-61	10/11/2023		87.80	12/20-21/2022	x	66	---	55.98	4.56	31.82	no	no stroke counter
EW-62	10/11/2023		110.60	12/20-21/2022	x	80	197730	92.37		18.23	no	
EW-63	10/11/2023		62.10	12/20-21/2022		64	---	62.45	4.53	-0.35		no pump
EW-64	10/11/2023		109.00	12/20-21/2022	x	113	177591	82.64	3.62	26.36	no	
EW-65	10/11/2023		88.40	12/20-21/2022	x	50	4807	57.32	6.18	31.08		
EW-67	10/10/2023		107.75	12/20-21/2022	x	62.5	436123	42.68	6.20	65.07	no (BH)	obstruction at 39" - no discharge
EW-68	10/10/2023		73.57	12/20-21/2022	x	68	2217058	42.99	1.60	30.58	yes	
EW-69	10/11/2023	93	98.00	5/3/2023			9	96.52	4.21	1.48	no	no sample port
EW-70	10/11/2023	66	71.00	5/3/2023	x		12	68.4	1.74	2.60	no	
EW-71	10/11/2023	180	185.80	7/18/2023	x		---	171.71	4.18	14.09		no pump
EW-72	10/11/2023	180	141.21	8/17/2023	x		---	dry	4.11	---		no pump
EW-73	10/11/2023	111	116.00	5/3/2023	x		23	110.01	3.42	5.99	no	
EW-74	10/11/2023	180	184.15	7/18/2023	x		17	dry	5.60	---		no sample port
EW-75	10/11/2023	179	124.58	8/17/2023	x		11	110.67	4.93	13.91		lost bottle in well
EW-76	10/11/2023	122	127.00	5/3/2023	x		23	107.73	4.21	19.27	no	
EW-77	10/11/2023	180	185.22	8/17/2023		N/A	---	139.76	4.36	45.46		no pump
EW-78	10/11/2023	52	57.00	5/3/2023	x		59992	47.17	3.56	9.83	yes	
EW-79	10/11/2023	180	185.64	8/17/2023		N/A	---	158.74	4.70	26.90		no pump
EW-80	10/11/2023	144	149.00	5/3/2023		N/A	---	dry	3.84	---		no pump
EW-81	10/10/2023	180	151.56	8/17/2023		N/A	831067	dry	5.42	---	no (BH)	
EW-82	10/11/2023	180	163.26	8/17/2023		N/A	679291	dry	4.95	---	no (BH)	
EW-83	10/10/2023	180	167.04	8/17/2023		N/A	714124	dry	3.45	---	no (BH)	
EW-84	10/10/2023	137	130.56	8/17/2023		N/A	---	dry		---		no pump
EW-85	10/11/2023	86	91.00	5/3/2023			45456	53.68	3.43	37.32	no	
EW-86	10/10/2023	148	153.00	5/3/2023		N/A	---	82.25	3.83	70.75		no pump
EW-87	10/10/2023	180	149.57	8/16/2023		N/A	907676	57.86	3.81	91.71	yes (BH)	
EW-88	10/11/2023	95	100.00	5/3/2023	x		216240	39.76	3.05	60.24	no	no sample port
EW-89	10/10/2023	121	84.57	8/16/2023			---	39.93	3.36	44.64	no	
EW-90	10/10/2023	109	114.00	5/3/2023			170669	89.88	3.50	24.12	no	No discharge
EW-91	10/10/2023	180	137.70	8/16/2023			16964	47.12	4.27	90.58	yes (BH)	No discharge
EW-92	10/10/2023	140	112.99	8/16/2023			967886	53.07	5.00	59.92	yes (BH)	No discharge
EW-93	10/10/2023	106	111.00	5/3/2023			---	33.34	3.31	77.66		Pump disconnected

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Liquid Level Measurement Log

Date		October 9-11, 2023										
Personnel		L. Nelson, W. Fabrie										
Location ID	Date	Scheduled Borehole Depth (ft)	Measured Well Casing Depth		Should Have Pump	Pump Depth (ft)	Cycle Count	Depth to Liquid (ft)	Casing Stickup (ft)	Liquid Column Thickness (ft)	Pump Running (Yes/No)	Comments
			(ft)	(Date)								
EW-94	10/10/2023	45	50.00	5/3/2023	x		252249	25.3	4.00	24.70	yes (BH)	
EW-95	10/10/2023	63	68.00	5/3/2023			10	dry	3.43	---	no	no discharge
EW-96	10/10/2023	180	164.35	7/18/2023			703074	46.92	5.82	117.43	yes (BH)	No discharge
EW-97	10/9/2023	180	67.95	8/16/2023			---	83.52	4.48	---	no	Pump disconnected
EW-98	10/10/2023	51	51.00	5/3/2023	x		1318797	28.73	3.73	22.27	no	
EW-99	10/9/2023	60	65.00	5/3/2023			12	43.92	3.20	21.08	no	
EW-100	10/10/2023	130	108.50	5/3/2023			244743	65.98	3.63	42.52	no	Pump disconnected
Log Checked By:		J. Robb										

--- = not applicable/available

BH=Black Hawk

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Sample Collection Log

Location ID	Sample Date	Sample Time	Temperature (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Observations
EW-55	10/11/2023	3/10/1902	74	5.6	34.8	0.15	-77.4	34.06	Black
EW-78	10/11/2023	0:00	45.3	7.93	19.37	0.53	-59.7	27.3	Black
EW-87	10/11/2023	0:00	70.1	5.58	38	0.43	-38	7.47	Black

Sampler: L. Nelson, W. Fabrie

Samples Shipped By: Courier

Log Checked By: J. Robb

Laboratory: Enthalpy Analytical



1941 Reymet Road • Richmond, Virginia 23237 • Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 23J0632

Client Name: SCS Engineers-Winchester
296 Victory Road
Winchester, VA 22602

Date Received: October 12, 2023 8:00
Date Issued: October 26, 2023 17:13
Project Number: 02218208.15 Task 1
Purchase Order:

Submitted To: Logan Howard

Client Site I.D.: 2023 City of Bristol Landfill Leachate

Enclosed are the results of analyses for samples received by the laboratory on 10/12/2023 08:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Mandy Mishra
Laboratory Director

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Enthalpy Analytical.

Analysis Detects Report

Client Name: SCS Engineers-Winchester
 Client Site ID: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Laboratory Sample ID: 23J0632-01

Client Sample ID: EW-87

Parameter	Samp ID	Reference Method	Sample Results	Qual	LOD	LOQ	Dil. Factor	Units
Arsenic	01	SW6020B	310		0.50	1.0	1	ug/L
Barium	01RE1	SW6020B	1930		5.00	25.0	5	ug/L
Chromium	01	SW6020B	194		0.400	1.00	1	ug/L
Copper	01	SW6020B	0.609	J	0.300	1.00	1	ug/L
Lead	01	SW6020B	3.4		1.0	1.0	1	ug/L
Mercury	01	SW6020B	0.550		0.400	0.400	2	ug/L
Nickel	01	SW6020B	92.06		1.000	1.000	1	ug/L
Selenium	01	SW6020B	4.40		0.850	1.00	1	ug/L
Zinc	01RE1	SW6020B	633		5.00	10.0	2	ug/L
2-Butanone (MEK)	01RE1	SW8260D	33400		1500	5000	500	ug/L
Acetone	01RE1	SW8260D	92900		3500	5000	500	ug/L
Benzene	01	SW8260D	3100		20.0	50.0	50	ug/L
Ethylbenzene	01	SW8260D	247		20.0	50.0	50	ug/L
Tetrahydrofuran	01	SW8260D	9140		500	500	50	ug/L
Toluene	01	SW8260D	235		25.0	50.0	50	ug/L
Xylenes, Total	01	SW8260D	328		50.0	150	50	ug/L
Ammonia as N	01	EPA350.1 R2.0	2890		146	200	2000	mg/L
BOD	01	SM5210B-2016	37000		0.2	2.0	1	mg/L
COD	01	SM5220D-2011	63600		10000	10000	1000	mg/L
Cyanide	01	SW9012B	0.26	CI	0.10	0.10	10	mg/L
TKN as N	01	EPA351.2 R2.0	1320		40.0	100	200	mg/L
Total Recoverable Phenolics	01	SW9065	38.7		0.600	1.00	20	mg/L

Analysis Detects Report

 Client Name: SCS Engineers-Winchester
 Client Site ID: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Laboratory Sample ID: 23J0632-02 Client Sample ID: EW-55

Parameter	Samp ID	Reference Method	Sample Results	Qual	LOD	LOQ	Dil. Factor	Units
Arsenic	02	SW6020B	360		1.0	2.0	2	ug/L
Barium	02RE1	SW6020B	2560		5.00	25.0	5	ug/L
Chromium	02	SW6020B	273		0.800	2.00	2	ug/L
Copper	02	SW6020B	8.06		0.600	2.00	2	ug/L
Lead	02	SW6020B	7.7		2.0	2.0	2	ug/L
Mercury	02	SW6020B	1.65		0.400	0.400	2	ug/L
Nickel	02	SW6020B	104.0		2.000	2.000	2	ug/L
Selenium	02	SW6020B	3.32		1.70	2.00	2	ug/L
Zinc	02	SW6020B	203		5.00	10.0	2	ug/L
2-Butanone (MEK)	02RE1	SW8260D	17800		1500	5000	500	ug/L
Acetone	02RE1	SW8260D	66900		3500	5000	500	ug/L
Benzene	02	SW8260D	576		20.0	50.0	50	ug/L
Ethylbenzene	02	SW8260D	42.5	J	20.0	50.0	50	ug/L
Tetrahydrofuran	02	SW8260D	4870		500	500	50	ug/L
Toluene	02	SW8260D	37.0	J	25.0	50.0	50	ug/L
Xylenes, Total	02	SW8260D	134	J	50.0	150	50	ug/L
Ammonia as N	02	EPA350.1 R2.0	1980		146	200	2000	mg/L
BOD	02	SM5210B-2016	34600		0.2	2.0	1	mg/L
COD	02	SM5220D-2011	51000		5000	5000	500	mg/L
Cyanide	02	SW9012B	0.20	CI	0.10	0.10	10	mg/L
TKN as N	02	EPA351.2 R2.0	1050		40.0	100	200	mg/L
Total Recoverable Phenolics	02	SW9065	37.0		0.600	1.00	20	mg/L

Note that this report is not the "Certificate of Analysis". This report only lists the target analytes that displayed concentrations that exceeded the detection limit specified for that analyte. For a complete listing of all analytes requested and the results of the analysis see the "Certificate of Analysis".

Certificate of Analysis

Client Name: SCS Engineers-Winchester
Client Site I.D.: 2023 City of Bristol Landfill Leachate
Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EW-87	23J0632-01	Ground Water	10/11/2023 08:30	10/12/2023 08:00
EW-55	23J0632-02	Ground Water	10/11/2023 08:00	10/12/2023 08:00
Trip Blank	23J0632-03	Waste Water	09/20/2023 13:35	10/12/2023 08:00

Due to severe matrix interferences, high dilutions were performed for all methods.

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: EW-87

Laboratory Sample ID: 23J0632-01

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Metals (Total) by EPA 6000/7000 Series Methods												
Silver	01	7440-22-4	SW6020B	10/16/2023 11:25	10/17/2023 10:51	BLOD		0.0600	1.00	1	ug/L	AB
Arsenic	01	7440-38-2	SW6020B	10/16/2023 11:25	10/17/2023 10:51	310		0.50	1.0	1	ug/L	AB
Barium	01RE1	7440-39-3	SW6020B	10/16/2023 11:25	10/17/2023 10:29	1930		5.00	25.0	5	ug/L	AB
Cadmium	01	7440-43-9	SW6020B	10/16/2023 11:25	10/17/2023 10:51	BLOD		0.100	1.00	1	ug/L	AB
Chromium	01	7440-47-3	SW6020B	10/16/2023 11:25	10/17/2023 10:51	194		0.400	1.00	1	ug/L	AB
Copper	01	7440-50-8	SW6020B	10/16/2023 11:25	10/17/2023 10:51	0.609	J	0.300	1.00	1	ug/L	AB
Mercury	01	7439-97-6	SW6020B	10/16/2023 11:25	10/17/2023 10:42	0.550		0.400	0.400	2	ug/L	AB
Nickel	01	7440-02-0	SW6020B	10/16/2023 11:25	10/17/2023 10:51	92.06		1.000	1.000	1	ug/L	AB
Lead	01	7439-92-1	SW6020B	10/16/2023 11:25	10/17/2023 10:51	3.4		1.0	1.0	1	ug/L	AB
Selenium	01	7782-49-2	SW6020B	10/16/2023 11:25	10/17/2023 10:51	4.40		0.850	1.00	1	ug/L	AB
Zinc	01RE1	7440-66-6	SW6020B	10/16/2023 11:25	10/17/2023 10:42	633		5.00	10.0	2	ug/L	AB
Volatile Organic Compounds by GCMS												
2-Butanone (MEK)	01RE1	78-93-3	SW8260D	10/13/2023 17:06	10/13/2023 17:06	33400		1500	5000	500	ug/L	RJB
Acetone	01RE1	67-64-1	SW8260D	10/13/2023 17:06	10/13/2023 17:06	92900		3500	5000	500	ug/L	RJB
Benzene	01	71-43-2	SW8260D	10/12/2023 21:16	10/12/2023 21:16	3100		20.0	50.0	50	ug/L	RJB
Ethylbenzene	01	100-41-4	SW8260D	10/12/2023 21:16	10/12/2023 21:16	247		20.0	50.0	50	ug/L	RJB
Toluene	01	108-88-3	SW8260D	10/12/2023 21:16	10/12/2023 21:16	235		25.0	50.0	50	ug/L	RJB
Xylenes, Total	01	1330-20-7	SW8260D	10/12/2023 21:16	10/12/2023 21:16	328		50.0	150	50	ug/L	RJB
Tetrahydrofuran	01	109-99-9	SW8260D	10/12/2023 21:16	10/12/2023 21:16	9140		500	500	50	ug/L	RJB
Surr: 1,2-Dichloroethane-d4 (Surr)	01	112 %	70-120	10/12/2023 21:16	10/12/2023 21:16							
Surr: 4-Bromofluorobenzene (Surr)	01	105 %	75-120	10/12/2023 21:16	10/12/2023 21:16							
Surr: Dibromofluoromethane (Surr)	01	105 %	70-130	10/12/2023 21:16	10/12/2023 21:16							
Surr: Toluene-d8 (Surr)	01	103 %	70-130	10/12/2023 21:16	10/12/2023 21:16							
Surr: 1,2-Dichloroethane-d4 (Surr)	01RE1	105 %	70-120	10/13/2023 17:06	10/13/2023 17:06							
Surr: 4-Bromofluorobenzene (Surr)	01RE1	105 %	75-120	10/13/2023 17:06	10/13/2023 17:06							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: EW-87

Laboratory Sample ID: 23J0632-01

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Volatile Organic Compounds by GCMS												
Surr: Dibromofluoromethane (Surr)	01RE1	102 %	70-130	10/13/2023 17:06	10/13/2023 17:06							
Surr: Toluene-d8 (Surr)	01RE1	103 %	70-130	10/13/2023 17:06	10/13/2023 17:06							
Semivolatile Organic Compounds by GCMS												
Anthracene	01	120-12-7	SW8270E	10/13/2023 09:00	10/13/2023 16:01	BLOD		40.0	80.0	4	ug/L	BMS
Surr: 2,4,6-Tribromophenol (Surr)	01	%	5-136	10/13/2023 09:00	10/13/2023 16:01							DS
Surr: 2-Fluorobiphenyl (Surr)	01	5.68 %	9-117	10/13/2023 09:00	10/13/2023 16:01							DS
Surr: 2-Fluorophenol (Surr)	01	3.92 %	5-60	10/13/2023 09:00	10/13/2023 16:01							DS
Surr: Nitrobenzene-d5 (Surr)	01	51.8 %	5-151	10/13/2023 09:00	10/13/2023 16:01							
Surr: Phenol-d5 (Surr)	01	17.4 %	5-60	10/13/2023 09:00	10/13/2023 16:01							
Surr: p-Terphenyl-d14 (Surr)	01	2.32 %	5-141	10/13/2023 09:00	10/13/2023 16:01							DS

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: EW-87

Laboratory Sample ID: 23J0632-01

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Wet Chemistry Analysis												
Ammonia as N	01	7664-41-7	EPA350.1 R2.0	10/25/2023 12:05	10/25/2023 12:05	2890		146	200	2000	mg/L	MGC
BOD	01	E1640606	SM5210B-20 16	10/12/2023 12:06	10/12/2023 12:06	37000		0.2	2.0	1	mg/L	SPH
Cyanide	01	57-12-5	SW9012B	10/18/2023 12:42	10/18/2023 12:42	0.26	CI	0.10	0.10	10	mg/L	AAL
COD	01	NA	SM5220D-20 11	10/26/2023 10:00	10/26/2023 10:00	63600		10000	10000	1000	mg/L	MJRL
Nitrate as N	01	14797-55-8	Calc.	10/24/2023 10:00	10/24/2023 10:00	BLOD		1.50	3.50	50	mg/L	TEG
Nitrate+Nitrite as N	01RE1	E701177	SM4500-NO 3F-2016	10/24/2023 10:00	10/24/2023 10:00	BLOD		1.00	1.00	10	mg/L	TEG
Nitrite as N	01	14797-65-0	SM4500-NO 2B-2011	10/12/2023 12:20	10/12/2023 12:20	BLOD		0.50	2.50	50	mg/L	AJM
Total Recoverable Phenolics	01	NA	SW9065	10/25/2023 17:06	10/25/2023 17:06	38.7		0.600	1.00	20	mg/L	AAL
TKN as N	01	E17148461	EPA351.2 R2.0	10/25/2023 10:51	10/25/2023 10:51	1320		40.0	100	200	mg/L	AAL

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: EW-55

Laboratory Sample ID: 23J0632-02

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Metals (Total) by EPA 6000/7000 Series Methods												
Silver	02	7440-22-4	SW6020B	10/16/2023 11:25	10/17/2023 10:45	BLOD		0.120	2.00	2	ug/L	AB
Arsenic	02	7440-38-2	SW6020B	10/16/2023 11:25	10/17/2023 10:45	360		1.0	2.0	2	ug/L	AB
Barium	02RE1	7440-39-3	SW6020B	10/16/2023 11:25	10/17/2023 10:32	2560		5.00	25.0	5	ug/L	AB
Cadmium	02	7440-43-9	SW6020B	10/16/2023 11:25	10/17/2023 10:45	BLOD		0.200	2.00	2	ug/L	AB
Chromium	02	7440-47-3	SW6020B	10/16/2023 11:25	10/17/2023 10:45	273		0.800	2.00	2	ug/L	AB
Copper	02	7440-50-8	SW6020B	10/16/2023 11:25	10/17/2023 10:45	8.06		0.600	2.00	2	ug/L	AB
Mercury	02	7439-97-6	SW6020B	10/16/2023 11:25	10/17/2023 10:45	1.65		0.400	0.400	2	ug/L	AB
Nickel	02	7440-02-0	SW6020B	10/16/2023 11:25	10/17/2023 10:45	104.0		2.000	2.000	2	ug/L	AB
Lead	02	7439-92-1	SW6020B	10/16/2023 11:25	10/17/2023 10:45	7.7		2.0	2.0	2	ug/L	AB
Selenium	02	7782-49-2	SW6020B	10/16/2023 11:25	10/17/2023 10:45	3.32		1.70	2.00	2	ug/L	AB
Zinc	02	7440-66-6	SW6020B	10/16/2023 11:25	10/17/2023 10:45	203		5.00	10.0	2	ug/L	AB
Volatile Organic Compounds by GCMS												
2-Butanone (MEK)	02RE1	78-93-3	SW8260D	10/13/2023 17:29	10/13/2023 17:29	17800		1500	5000	500	ug/L	RJB
Acetone	02RE1	67-64-1	SW8260D	10/13/2023 17:29	10/13/2023 17:29	66900		3500	5000	500	ug/L	RJB
Benzene	02	71-43-2	SW8260D	10/12/2023 21:39	10/12/2023 21:39	576		20.0	50.0	50	ug/L	RJB
Ethylbenzene	02	100-41-4	SW8260D	10/12/2023 21:39	10/12/2023 21:39	42.5	J	20.0	50.0	50	ug/L	RJB
Toluene	02	108-88-3	SW8260D	10/12/2023 21:39	10/12/2023 21:39	37.0	J	25.0	50.0	50	ug/L	RJB
Xylenes, Total	02	1330-20-7	SW8260D	10/12/2023 21:39	10/12/2023 21:39	134	J	50.0	150	50	ug/L	RJB
Tetrahydrofuran	02	109-99-9	SW8260D	10/12/2023 21:39	10/12/2023 21:39	4870		500	500	50	ug/L	RJB
Surr: 1,2-Dichloroethane-d4 (Surr)	02	111 %	70-120	10/12/2023 21:39	10/12/2023 21:39							
Surr: 4-Bromofluorobenzene (Surr)	02	104 %	75-120	10/12/2023 21:39	10/12/2023 21:39							
Surr: Dibromofluoromethane (Surr)	02	106 %	70-130	10/12/2023 21:39	10/12/2023 21:39							
Surr: Toluene-d8 (Surr)	02	103 %	70-130	10/12/2023 21:39	10/12/2023 21:39							
Surr: 1,2-Dichloroethane-d4 (Surr)	02RE1	110 %	70-120	10/13/2023 17:29	10/13/2023 17:29							
Surr: 4-Bromofluorobenzene (Surr)	02RE1	105 %	75-120	10/13/2023 17:29	10/13/2023 17:29							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: EW-55

Laboratory Sample ID: 23J0632-02

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Volatile Organic Compounds by GCMS												
Surr: Dibromofluoromethane (Surr)	02RE1	102 %	70-130	10/13/2023 17:29	10/13/2023 17:29							
Surr: Toluene-d8 (Surr)	02RE1	104 %	70-130	10/13/2023 17:29	10/13/2023 17:29							
Semivolatile Organic Compounds by GCMS												
Anthracene	02	120-12-7	SW8270E	10/13/2023 09:00	10/13/2023 20:38	BLOD		500	1000	50	ug/L	BMS
Surr: 2,4,6-Tribromophenol (Surr)	02	%	5-136	10/13/2023 09:00	10/13/2023 20:38							DS
Surr: 2-Fluorobiphenyl (Surr)	02	29.0 %	9-117	10/13/2023 09:00	10/13/2023 20:38							
Surr: 2-Fluorophenol (Surr)	02	24.0 %	5-60	10/13/2023 09:00	10/13/2023 20:38							
Surr: Nitrobenzene-d5 (Surr)	02	48.0 %	5-151	10/13/2023 09:00	10/13/2023 20:38							
Surr: Phenol-d5 (Surr)	02	23.0 %	5-60	10/13/2023 09:00	10/13/2023 20:38							
Surr: p-Terphenyl-d14 (Surr)	02	11.0 %	5-141	10/13/2023 09:00	10/13/2023 20:38							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: EW-55

Laboratory Sample ID: 23J0632-02

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Wet Chemistry Analysis												
Ammonia as N	02	7664-41-7	EPA350.1 R2.0	10/25/2023 12:05	10/25/2023 12:05	1980		146	200	2000	mg/L	MGC
BOD	02	E1640606	SM5210B-20 16	10/12/2023 12:11	10/12/2023 12:11	34600		0.2	2.0	1	mg/L	SPH
Cyanide	02	57-12-5	SW9012B	10/18/2023 12:42	10/18/2023 12:42	0.20	CI	0.10	0.10	10	mg/L	AAL
COD	02	NA	SM5220D-20 11	10/26/2023 10:00	10/26/2023 10:00	51000		5000	5000	500	mg/L	MJRL
Nitrate as N	02	14797-55-8	Calc.	10/24/2023 10:00	10/24/2023 10:00	BLOD		1.00	3.00	50	mg/L	TEG
Nitrate+Nitrite as N	02RE1	E701177	SM4500-NO 3F-2016	10/24/2023 10:00	10/24/2023 10:00	BLOD		0.50	0.50	5	mg/L	TEG
Nitrite as N	02	14797-65-0	SM4500-NO 2B-2011	10/12/2023 12:20	10/12/2023 12:20	BLOD		0.50	2.50	50	mg/L	AJM
Total Recoverable Phenolics	02	NA	SW9065	10/25/2023 17:06	10/25/2023 17:06	37.0		0.600	1.00	20	mg/L	AAL
TKN as N	02	E17148461	EPA351.2 R2.0	10/25/2023 10:52	10/25/2023 10:52	1050		40.0	100	200	mg/L	AAL

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Client Sample ID: Trip Blank

Laboratory Sample ID: 23J0632-03

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Volatile Organic Compounds by GCMS												
2-Butanone (MEK)	03	78-93-3	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		3.00	10.0	1	ug/L	RJB
Acetone	03	67-64-1	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		7.00	10.0	1	ug/L	RJB
Benzene	03	71-43-2	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		0.40	1.00	1	ug/L	RJB
Ethylbenzene	03	100-41-4	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		0.40	1.00	1	ug/L	RJB
Toluene	03	108-88-3	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		0.50	1.00	1	ug/L	RJB
Xylenes, Total	03	1330-20-7	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		1.00	3.00	1	ug/L	RJB
Tetrahydrofuran	03	109-99-9	SW8260D	10/12/2023 16:12	10/12/2023 16:12	BLOD		10.0	10.0	1	ug/L	RJB
Surr: 1,2-Dichloroethane-d4 (Surr)	03	107 %	70-120	10/12/2023 16:12	10/12/2023 16:12							
Surr: 4-Bromofluorobenzene (Surr)	03	103 %	75-120	10/12/2023 16:12	10/12/2023 16:12							
Surr: Dibromofluoromethane (Surr)	03	104 %	70-130	10/12/2023 16:12	10/12/2023 16:12							
Surr: Toluene-d8 (Surr)	03	104 %	70-130	10/12/2023 16:12	10/12/2023 16:12							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0615 - EPA200.8 R5.4

Blank (BGJ0615-BLK1)

Prepared: 10/16/2023 Analyzed: 10/17/2023

Mercury	ND	0.200	ug/L							
Arsenic	ND	1.0	ug/L							
Barium	ND	5.00	ug/L							
Cadmium	ND	1.00	ug/L							
Chromium	ND	1.00	ug/L							
Copper	ND	1.00	ug/L							
Lead	ND	1.0	ug/L							
Nickel	ND	1.000	ug/L							
Selenium	ND	1.00	ug/L							
Silver	ND	1.00	ug/L							
Zinc	ND	5.00	ug/L							

LCS (BGJ0615-BS1)

Prepared: 10/16/2023 Analyzed: 10/17/2023

Mercury	0.987	0.200	ug/L	1.00		98.7	80-120
Arsenic	50	1.0	ug/L	50.0		101	80-120
Barium	49.7	5.00	ug/L	50.0		99.3	80-120
Cadmium	51.0	1.00	ug/L	50.0		102	80-120
Chromium	46.9	1.00	ug/L	50.0		93.8	80-120
Copper	50.1	1.00	ug/L	50.0		100	80-120
Lead	51	1.0	ug/L	50.0		102	80-120
Nickel	49.12	1.000	ug/L	50.0		98.2	80-120
Selenium	49.8	1.00	ug/L	50.0		99.6	80-120
Silver	10.0	1.00	ug/L	10.0		100	80-120
Zinc	52.1	5.00	ug/L	50.0		104	80-120

Matrix Spike (BGJ0615-MS1)

Source: 23J0679-01

Prepared: 10/16/2023 Analyzed: 10/17/2023

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0615 - EPA200.8 R5.4

Matrix Spike (BGJ0615-MS1)		Source: 23J0679-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
Mercury	1.00	0.200	ug/L	1.00	BLOD	100	70-130			
Arsenic	50	1.0	ug/L	50.0	0.57	98.1	75-125			
Barium	89.9	5.00	ug/L	50.0	41.7	96.5	75-125			
Cadmium	47.4	1.00	ug/L	50.0	BLOD	94.8	75-125			
Chromium	46.5	1.00	ug/L	50.0	BLOD	92.9	75-125			
Copper	49.8	1.00	ug/L	50.0	2.86	93.9	75-125			
Lead	48	1.0	ug/L	50.0	BLOD	96.7	75-125			
Nickel	50.17	1.000	ug/L	50.0	3.985	92.4	75-125			
Selenium	44.6	1.00	ug/L	50.0	BLOD	89.2	75-125			
Silver	9.50	1.00	ug/L	10.0	BLOD	95.0	75-125			
Zinc	54.9	5.00	ug/L	50.0	10.6	88.6	75-125			
Matrix Spike (BGJ0615-MS2)		Source: 23J0728-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
Mercury	1.02	0.200	ug/L	1.00	BLOD	102	70-130			
Arsenic	51	1.0	ug/L	50.0	BLOD	101	75-125			
Barium	99.9	5.00	ug/L	50.0	49.1	102	75-125			
Cadmium	50.4	1.00	ug/L	50.0	BLOD	101	75-125			
Chromium	52.3	1.00	ug/L	50.0	0.939	103	75-125			
Copper	54.1	1.00	ug/L	50.0	3.60	101	75-125			
Lead	51	1.0	ug/L	50.0	BLOD	102	75-125			
Nickel	52.48	1.000	ug/L	50.0	3.408	98.2	75-125			
Selenium	48.2	1.00	ug/L	50.0	BLOD	96.3	75-125			
Silver	10.2	1.00	ug/L	10.0	BLOD	102	75-125			
Zinc	69.1	5.00	ug/L	50.0	19.6	99.0	75-125			

Matrix Spike Dup (BGJ0615-MSD1)		Source: 23J0679-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
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Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0615 - EPA200.8 R5.4

Matrix Spike Dup (BGJ0615-MSD1)		Source: 23J0679-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
Mercury	1.01	0.200	ug/L	1.00	BLOD	101	70-130	0.517	20	
Arsenic	48	1.0	ug/L	50.0	0.57	95.3	75-125	2.85	20	
Barium	87.3	5.00	ug/L	50.0	41.7	91.1	75-125	3.03	20	
Cadmium	45.5	1.00	ug/L	50.0	BLOD	91.0	75-125	4.12	20	
Chromium	43.1	1.00	ug/L	50.0	BLOD	86.2	75-125	7.52	20	
Copper	47.8	1.00	ug/L	50.0	2.86	89.8	75-125	4.24	20	
Lead	45	1.0	ug/L	50.0	BLOD	90.3	75-125	6.80	20	
Nickel	48.44	1.000	ug/L	50.0	3.985	88.9	75-125	3.51	20	
Selenium	43.9	1.00	ug/L	50.0	BLOD	87.8	75-125	1.65	20	
Silver	9.09	1.00	ug/L	10.0	BLOD	90.9	75-125	4.39	20	
Zinc	52.5	5.00	ug/L	50.0	10.6	83.8	75-125	4.40	20	

Matrix Spike Dup (BGJ0615-MSD2)		Source: 23J0728-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
Mercury	1.05	0.200	ug/L	1.00	BLOD	105	70-130	2.29	20	
Arsenic	51	1.0	ug/L	50.0	BLOD	102	75-125	0.970	20	
Barium	99.0	5.00	ug/L	50.0	49.1	99.7	75-125	0.956	20	
Cadmium	50.9	1.00	ug/L	50.0	BLOD	102	75-125	0.869	20	
Chromium	51.8	1.00	ug/L	50.0	0.939	102	75-125	0.927	20	
Copper	54.0	1.00	ug/L	50.0	3.60	101	75-125	0.176	20	
Lead	51	1.0	ug/L	50.0	BLOD	103	75-125	0.764	20	
Nickel	52.82	1.000	ug/L	50.0	3.408	98.8	75-125	0.630	20	
Selenium	48.2	1.00	ug/L	50.0	BLOD	96.4	75-125	0.0419	20	
Silver	10.4	1.00	ug/L	10.0	BLOD	104	75-125	1.26	20	
Zinc	68.8	5.00	ug/L	50.0	19.6	98.5	75-125	0.368	20	

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0533 - SW5030B-MS

Blank (BGJ0533-BLK1)

Prepared & Analyzed: 10/12/2023

2-Butanone (MEK)	ND	10.0	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.00	ug/L							
Ethylbenzene	ND	1.00	ug/L							
Toluene	ND	1.00	ug/L							
Xylenes, Total	ND	3.00	ug/L							
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	52.8		ug/L	50.0		106	70-120			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	51.7		ug/L	50.0		103	75-120			
<i>Surr: Dibromofluoromethane (Surr)</i>	51.6		ug/L	50.0		103	70-130			
<i>Surr: Toluene-d8 (Surr)</i>	51.5		ug/L	50.0		103	70-130			

LCS (BGJ0533-BS1)

Prepared & Analyzed: 10/12/2023

1,1,1,2-Tetrachloroethane	48.0	0.4	ug/L	50.0		95.9	80-130			
1,1,1-Trichloroethane	46.0	1	ug/L	50.0		91.9	65-130			
1,1,2,2-Tetrachloroethane	51.6	0.4	ug/L	50.0		103	65-130			
1,1,2-Trichloroethane	54.3	1	ug/L	50.0		109	75-125			
1,1-Dichloroethane	48.2	1	ug/L	50.0		96.4	70-135			
1,1-Dichloroethylene	37.8	1	ug/L	50.0		75.6	70-130			
1,1-Dichloropropene	47.6	1	ug/L	50.0		95.3	75-135			
1,2,3-Trichlorobenzene	42.1	1	ug/L	50.0		84.2	55-140			
1,2,3-Trichloropropane	49.2	1	ug/L	50.0		98.5	75-125			
1,2,4-Trichlorobenzene	40.9	1	ug/L	50.0		81.8	65-135			
1,2,4-Trimethylbenzene	48.1	1	ug/L	50.0		96.2	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	38.5	1	ug/L	50.0		76.9	50-130			
1,2-Dibromoethane (EDB)	49.2	1	ug/L	50.0		98.5	80-120			

Certificate of Analysis

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0533 - SW5030B-MS

LCS (BGJ0533-BS1)

Prepared & Analyzed: 10/12/2023

1,2-Dichlorobenzene	46.8	0.5	ug/L	50.0		93.6	70-120			
1,2-Dichloroethane	44.8	1	ug/L	50.0		89.6	70-130			
1,2-Dichloropropane	51.1	0.5	ug/L	50.0		102	75-125			
1,3,5-Trimethylbenzene	44.8	1	ug/L	50.0		89.5	75-125			
1,3-Dichlorobenzene	46.6	1	ug/L	50.0		93.2	75-125			
1,3-Dichloropropane	52.1	1	ug/L	50.0		104	75-125			
1,4-Dichlorobenzene	45.9	1	ug/L	50.0		91.7	75-125			
2,2-Dichloropropane	43.7	1	ug/L	50.0		87.4	70-135			
2-Butanone (MEK)	43.6	10	ug/L	50.0		87.3	30-150			
2-Chlorotoluene	45.2	1	ug/L	50.0		90.3	75-125			
2-Hexanone (MBK)	49.2	5	ug/L	50.0		98.3	55-130			
4-Chlorotoluene	45.7	1	ug/L	50.0		91.3	75-130			
4-Isopropyltoluene	46.2	1	ug/L	50.0		92.4	75-130			
4-Methyl-2-pentanone (MIBK)	50.8	5	ug/L	50.0		102	60-135			
Acetone	39.3	10	ug/L	50.0		78.5	40-140			
Benzene	48.4	1	ug/L	50.0		96.8	80-120			
Bromobenzene	49.6	1	ug/L	50.0		99.1	75-125			
Bromochloromethane	47.7	1	ug/L	50.0		95.4	65-130			
Bromodichloromethane	50.5	0.5	ug/L	50.0		101	75-120			
Bromoform	47.4	1	ug/L	50.0		94.9	70-130			
Bromomethane	31.0	1	ug/L	50.0		62.1	30-145			
Carbon disulfide	36.8	10	ug/L	50.0		73.6	35-160			
Carbon tetrachloride	46.5	1	ug/L	50.0		93.1	65-140			
Chlorobenzene	46.3	1	ug/L	50.0		92.6	80-120			
Chloroethane	37.8	1	ug/L	50.0		75.5	60-135			

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0533 - SW5030B-MS

LCS (BGJ0533-BS1)

Prepared & Analyzed: 10/12/2023

Chloroform	45.3	0.5	ug/L	50.0		90.5	65-135			
Chloromethane	34.2	1	ug/L	50.0		68.5	40-125			
cis-1,2-Dichloroethylene	47.6	1	ug/L	50.0		95.2	70-125			
cis-1,3-Dichloropropene	54.0	1	ug/L	50.0		108	70-130			
Dibromochloromethane	52.4	0.5	ug/L	50.0		105	60-135			
Dibromomethane	50.2	1	ug/L	50.0		100	75-125			
Dichlorodifluoromethane	28.2	1	ug/L	50.0		56.3	30-155			
Ethylbenzene	46.2	1	ug/L	50.0		92.3	75-125			
Hexachlorobutadiene	37.3	0.8	ug/L	50.0		74.6	50-140			
Isopropylbenzene	45.2	1	ug/L	50.0		90.5	75-125			
m+p-Xylenes	92.1	2	ug/L	100		92.1	75-130			
Methylene chloride	47.0	4	ug/L	50.0		94.0	55-140			
Methyl-t-butyl ether (MTBE)	51.6	1	ug/L	50.0		103	65-125			
Naphthalene	43.0	1	ug/L	50.0		86.0	55-140			
n-Butylbenzene	43.9	1	ug/L	50.0		87.8	70-135			
n-Propylbenzene	44.4	1	ug/L	50.0		88.7	70-130			
o-Xylene	48.5	1	ug/L	50.0		97.0	80-120			
sec-Butylbenzene	47.4	1	ug/L	50.0		94.7	70-125			
Styrene	48.9	1	ug/L	50.0		97.8	65-135			
tert-Butylbenzene	45.4	1	ug/L	50.0		90.8	70-130			
Tetrachloroethylene (PCE)	43.9	1	ug/L	50.0		87.8	45-150			
Toluene	47.6	1	ug/L	50.0		95.3	75-120			
trans-1,2-Dichloroethylene	44.3	1	ug/L	50.0		88.6	60-140			
trans-1,3-Dichloropropene	58.5	1	ug/L	50.0		117	55-140			
Trichloroethylene	47.6	1	ug/L	50.0		95.1	70-125			

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Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0533 - SW5030B-MS

LCS (BGJ0533-BS1)

Prepared & Analyzed: 10/12/2023

Trichlorofluoromethane	38.2	1	ug/L	50.0		76.5	60-145			
Vinyl chloride	37.6	0.5	ug/L	50.0		75.2	50-145			
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	<i>50.7</i>		ug/L	<i>50.0</i>		<i>101</i>	<i>70-120</i>			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	<i>52.8</i>		ug/L	<i>50.0</i>		<i>106</i>	<i>75-120</i>			
<i>Surr: Dibromofluoromethane (Surr)</i>	<i>49.7</i>		ug/L	<i>50.0</i>		<i>99.4</i>	<i>70-130</i>			
<i>Surr: Toluene-d8 (Surr)</i>	<i>49.6</i>		ug/L	<i>50.0</i>		<i>99.2</i>	<i>70-130</i>			

Matrix Spike (BGJ0533-MS1)

Source: 23J0555-01

Prepared & Analyzed: 10/12/2023

1,1,1,2-Tetrachloroethane	52.6	0.4	ug/L	50.0	BLOD	105	80-130			
1,1,1-Trichloroethane	50.1	1	ug/L	50.0	BLOD	100	65-130			
1,1,2,2-Tetrachloroethane	55.3	0.4	ug/L	50.0	BLOD	111	65-130			
1,1,2-Trichloroethane	60.0	1	ug/L	50.0	BLOD	120	75-125			
1,1-Dichloroethane	52.2	1	ug/L	50.0	BLOD	104	70-135			
1,1-Dichloroethylene	40.5	1	ug/L	50.0	BLOD	81.1	50-145			
1,1-Dichloropropene	52.0	1	ug/L	50.0	BLOD	104	75-135			
1,2,3-Trichlorobenzene	47.7	1	ug/L	50.0	BLOD	95.3	55-140			
1,2,3-Trichloropropane	52.3	1	ug/L	50.0	BLOD	105	75-125			
1,2,4-Trichlorobenzene	46.6	1	ug/L	50.0	BLOD	93.1	65-135			
1,2,4-Trimethylbenzene	55.9	1	ug/L	50.0	3.95	104	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	41.5	1	ug/L	50.0	BLOD	82.9	50-130			
1,2-Dibromoethane (EDB)	53.2	1	ug/L	50.0	BLOD	106	80-120			
1,2-Dichlorobenzene	50.7	0.5	ug/L	50.0	BLOD	101	70-120			
1,2-Dichloroethane	48.1	1	ug/L	50.0	BLOD	95.1	70-130			
1,2-Dichloropropane	54.7	0.5	ug/L	50.0	BLOD	109	75-125			
1,3,5-Trimethylbenzene	50.4	1	ug/L	50.0	0.94	99.0	75-124			

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Volatile Organic Compounds by GCMS - Quality Control

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Batch BGJ0533 - SW5030B-MS

Matrix Spike (BGJ0533-MS1)

Source: 23J0555-01

Prepared & Analyzed: 10/12/2023

1,3-Dichlorobenzene	51.2	1	ug/L	50.0	BLOD	102	75-125			
1,3-Dichloropropane	57.2	1	ug/L	50.0	BLOD	114	75-125			
1,4-Dichlorobenzene	53.0	1	ug/L	50.0	2.44	101	75-125			
2,2-Dichloropropane	47.5	1	ug/L	50.0	BLOD	95.0	70-135			
2-Butanone (MEK)	84.4	10	ug/L	50.0	46.7	75.4	30-150			
2-Chlorotoluene	52.5	1	ug/L	50.0	BLOD	105	75-125			
2-Hexanone (MBK)	52.4	5	ug/L	50.0	BLOD	105	55-130			
4-Chlorotoluene	51.5	1	ug/L	50.0	BLOD	103	75-130			
4-Isopropyltoluene	50.9	1	ug/L	50.0	1.09	99.6	75-130			
4-Methyl-2-pentanone (MIBK)	60.7	5	ug/L	50.0	BLOD	121	60-135			
Acetone	151	10	ug/L	50.0	147	6.32	40-140			M
Benzene	234	1	ug/L	50.0	201	64.3	80-120			M
Bromobenzene	53.3	1	ug/L	50.0	BLOD	107	75-125			
Bromochloromethane	52.9	1	ug/L	50.0	BLOD	106	65-130			
Bromodichloromethane	54.6	0.5	ug/L	50.0	BLOD	109	75-136			
Bromoform	51.8	1	ug/L	50.0	BLOD	104	70-130			
Bromomethane	33.7	1	ug/L	50.0	BLOD	67.5	30-145			
Carbon disulfide	39.2	10	ug/L	50.0	BLOD	78.5	35-160			
Carbon tetrachloride	50.6	1	ug/L	50.0	BLOD	101	65-140			
Chlorobenzene	50.6	1	ug/L	50.0	0.73	99.8	80-120			
Chloroethane	40.6	1	ug/L	50.0	BLOD	81.2	60-135			
Chloroform	50.7	0.5	ug/L	50.0	2.29	96.8	65-135			
Chloromethane	36.4	1	ug/L	50.0	BLOD	72.8	40-125			
cis-1,2-Dichloroethylene	51.8	1	ug/L	50.0	BLOD	104	70-125			
cis-1,3-Dichloropropene	59.7	1	ug/L	50.0	BLOD	119	47-136			

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

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Batch BGJ0533 - SW5030B-MS

Matrix Spike (BGJ0533-MS1)	Source: 23J0555-01			Prepared & Analyzed: 10/12/2023						
Dibromochloromethane	57.1	0.5	ug/L	50.0	BLOD	114	60-135			
Dibromomethane	54.5	1	ug/L	50.0	BLOD	109	75-125			
Dichlorodifluoromethane	29.7	1	ug/L	50.0	BLOD	59.3	30-155			
Ethylbenzene	64.9	1	ug/L	50.0	15.6	98.5	75-125			
Hexachlorobutadiene	41.5	0.8	ug/L	50.0	BLOD	83.1	50-140			
Isopropylbenzene	49.9	1	ug/L	50.0	1.60	96.5	75-125			
m+p-Xylenes	106	2	ug/L	100	6.67	99.5	75-130			
Methylene chloride	51.4	4	ug/L	50.0	BLOD	103	55-140			
Methyl-t-butyl ether (MTBE)	58.4	1	ug/L	50.0	1.14	114	65-125			
Naphthalene	53.4	1	ug/L	50.0	3.78	99.2	55-140			
n-Butylbenzene	48.0	1	ug/L	50.0	BLOD	95.9	70-135			
n-Propylbenzene	50.7	1	ug/L	50.0	0.47	101	70-130			
o-Xylene	55.4	1	ug/L	50.0	3.62	104	80-120			
sec-Butylbenzene	52.4	1	ug/L	50.0	BLOD	105	70-125			
Styrene	53.0	1	ug/L	50.0	BLOD	106	65-135			
tert-Butylbenzene	50.3	1	ug/L	50.0	BLOD	101	70-130			
Tetrachloroethylene (PCE)	45.3	1	ug/L	50.0	BLOD	90.7	51-231			
Toluene	55.2	1	ug/L	50.0	3.79	103	75-120			
trans-1,2-Dichloroethylene	49.2	1	ug/L	50.0	BLOD	98.3	60-140			
trans-1,3-Dichloropropene	64.3	1	ug/L	50.0	BLOD	129	55-140			
Trichloroethylene	51.7	1	ug/L	50.0	BLOD	103	70-125			
Trichlorofluoromethane	41.5	1	ug/L	50.0	BLOD	82.9	60-145			
Vinyl chloride	34.1	0.5	ug/L	50.0	BLOD	68.2	50-145			
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Surr: 1,2-Dichloroethane-d4 (Surr)	50.3		ug/L	50.0		101	70-120			
Surr: 4-Bromofluorobenzene (Surr)	51.5		ug/L	50.0		103	75-120			

Certificate of Analysis

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

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Batch BGJ0533 - SW5030B-MS

Matrix Spike (BGJ0533-MS1)

Source: 23J0555-01

Prepared & Analyzed: 10/12/2023

<i>Surr: Dibromofluoromethane (Surr)</i>	49.7		ug/L	50.0		99.4	70-130		
<i>Surr: Toluene-d8 (Surr)</i>	49.0		ug/L	50.0		98.0	70-130		

Matrix Spike Dup (BGJ0533-MSD1)

Source: 23J0555-01

Prepared & Analyzed: 10/12/2023

1,1,1,2-Tetrachloroethane	53.6	0.4	ug/L	50.0	BLOD	107	80-130	2.05	30
1,1,1-Trichloroethane	50.6	1	ug/L	50.0	BLOD	101	65-130	1.07	30
1,1,2,2-Tetrachloroethane	57.0	0.4	ug/L	50.0	BLOD	114	65-130	2.92	30
1,1,2-Trichloroethane	61.4	1	ug/L	50.0	BLOD	123	75-125	2.27	30
1,1-Dichloroethane	52.4	1	ug/L	50.0	BLOD	105	70-135	0.268	30
1,1-Dichloroethylene	40.0	1	ug/L	50.0	BLOD	80.1	50-145	1.19	30
1,1-Dichloropropene	51.6	1	ug/L	50.0	BLOD	103	75-135	0.791	30
1,2,3-Trichlorobenzene	48.7	1	ug/L	50.0	BLOD	97.4	55-140	2.12	30
1,2,3-Trichloropropane	54.1	1	ug/L	50.0	BLOD	108	75-125	3.40	30
1,2,4-Trichlorobenzene	47.3	1	ug/L	50.0	BLOD	94.6	65-135	1.58	30
1,2,4-Trimethylbenzene	57.3	1	ug/L	50.0	3.95	107	75-130	2.54	30
1,2-Dibromo-3-chloropropane (DBCP)	43.0	1	ug/L	50.0	BLOD	86.1	50-130	3.72	30
1,2-Dibromoethane (EDB)	55.0	1	ug/L	50.0	BLOD	110	80-120	3.27	30
1,2-Dichlorobenzene	51.6	0.5	ug/L	50.0	BLOD	103	70-120	1.70	30
1,2-Dichloroethane	48.6	1	ug/L	50.0	BLOD	96.1	70-130	1.06	30
1,2-Dichloropropane	55.9	0.5	ug/L	50.0	BLOD	112	75-125	2.10	30
1,3,5-Trimethylbenzene	50.9	1	ug/L	50.0	0.94	99.9	75-124	0.947	30
1,3-Dichlorobenzene	52.1	1	ug/L	50.0	BLOD	104	75-125	1.72	30
1,3-Dichloropropane	57.8	1	ug/L	50.0	BLOD	116	75-125	0.974	30
1,4-Dichlorobenzene	53.2	1	ug/L	50.0	2.44	101	75-125	0.358	30
2,2-Dichloropropane	47.2	1	ug/L	50.0	BLOD	94.3	70-135	0.655	30

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Batch BGJ0533 - SW5030B-MS

Matrix Spike Dup (BGJ0533-MSD1)	Source: 23J0555-01			Prepared & Analyzed: 10/12/2023						
2-Butanone (MEK)	86.0	10	ug/L	50.0	46.7	78.5	30-150	1.84	30	
2-Chlorotoluene	52.5	1	ug/L	50.0	BLOD	105	75-125	0.00	30	
2-Hexanone (MBK)	50.1	5	ug/L	50.0	BLOD	100	55-130	4.41	30	
4-Chlorotoluene	52.3	1	ug/L	50.0	BLOD	105	75-130	1.54	30	
4-Isopropyltoluene	51.1	1	ug/L	50.0	1.09	100	75-130	0.333	30	
4-Methyl-2-pentanone (MIBK)	56.5	5	ug/L	50.0	BLOD	113	60-135	7.29	30	
Acetone	145	10	ug/L	50.0	147	-4.20	40-140	3.56	30	M
Benzene	234	1	ug/L	50.0	201	65.6	80-120	0.291	30	M
Bromobenzene	55.4	1	ug/L	50.0	BLOD	111	75-125	3.94	30	
Bromochloromethane	52.8	1	ug/L	50.0	BLOD	106	65-130	0.189	30	
Bromodichloromethane	55.5	0.5	ug/L	50.0	BLOD	111	75-136	1.62	30	
Bromoform	53.8	1	ug/L	50.0	BLOD	108	70-130	3.69	30	
Bromomethane	31.4	1	ug/L	50.0	BLOD	62.8	30-145	7.12	30	
Carbon disulfide	37.0	10	ug/L	50.0	BLOD	74.1	35-160	5.77	30	
Carbon tetrachloride	51.6	1	ug/L	50.0	BLOD	103	65-140	1.94	30	
Chlorobenzene	52.1	1	ug/L	50.0	0.73	103	80-120	2.86	30	
Chloroethane	38.7	1	ug/L	50.0	BLOD	77.4	60-135	4.72	30	
Chloroform	51.1	0.5	ug/L	50.0	2.29	97.6	65-135	0.747	30	
Chloromethane	34.4	1	ug/L	50.0	BLOD	68.8	40-125	5.65	30	
cis-1,2-Dichloroethylene	52.0	1	ug/L	50.0	BLOD	104	70-125	0.231	30	
cis-1,3-Dichloropropene	60.0	1	ug/L	50.0	BLOD	120	47-136	0.535	30	
Dibromochloromethane	58.9	0.5	ug/L	50.0	BLOD	118	60-135	3.10	30	
Dibromomethane	55.6	1	ug/L	50.0	BLOD	111	75-125	1.96	30	
Dichlorodifluoromethane	29.6	1	ug/L	50.0	BLOD	59.2	30-155	0.169	30	
Ethylbenzene	66.3	1	ug/L	50.0	15.6	101	75-125	2.09	30	

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0533 - SW5030B-MS

Matrix Spike Dup (BGJ0533-MSD1)	Source: 23J0555-01			Prepared & Analyzed: 10/12/2023						
Hexachlorobutadiene	42.3	0.8	ug/L	50.0	BLOD	84.7	50-140	1.91	30	
Isopropylbenzene	50.9	1	ug/L	50.0	1.60	98.6	75-125	2.00	30	
m+p-Xylenes	108	2	ug/L	100	6.67	101	75-130	1.47	30	
Methylene chloride	51.2	4	ug/L	50.0	BLOD	102	55-140	0.370	30	
Methyl-t-butyl ether (MTBE)	58.2	1	ug/L	50.0	1.14	114	65-125	0.223	30	
Naphthalene	55.0	1	ug/L	50.0	3.78	102	55-140	2.97	30	
n-Butylbenzene	47.9	1	ug/L	50.0	BLOD	95.8	70-135	0.104	30	
n-Propylbenzene	51.9	1	ug/L	50.0	0.47	103	70-130	2.20	30	
o-Xylene	57.1	1	ug/L	50.0	3.62	107	80-120	2.92	30	
sec-Butylbenzene	52.6	1	ug/L	50.0	BLOD	105	70-125	0.438	30	
Styrene	54.0	1	ug/L	50.0	BLOD	108	65-135	1.87	30	
tert-Butylbenzene	50.9	1	ug/L	50.0	BLOD	102	70-130	1.32	30	
Tetrachloroethylene (PCE)	46.8	1	ug/L	50.0	BLOD	93.6	51-231	3.15	30	
Toluene	56.7	1	ug/L	50.0	3.79	106	75-120	2.73	30	
trans-1,2-Dichloroethylene	48.8	1	ug/L	50.0	BLOD	97.6	60-140	0.735	30	
trans-1,3-Dichloropropene	65.8	1	ug/L	50.0	BLOD	132	55-140	2.17	30	
Trichloroethylene	52.4	1	ug/L	50.0	BLOD	105	70-125	1.40	30	
Trichlorofluoromethane	40.1	1	ug/L	50.0	BLOD	80.1	60-145	3.43	30	
Vinyl chloride	38.3	0.5	ug/L	50.0	BLOD	76.5	50-145	11.6	30	
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Surr: 1,2-Dichloroethane-d4 (Surr)	49.8		ug/L	50.0		99.5	70-120			
Surr: 4-Bromofluorobenzene (Surr)	51.8		ug/L	50.0		104	75-120			
Surr: Dibromofluoromethane (Surr)	49.2		ug/L	50.0		98.4	70-130			
Surr: Toluene-d8 (Surr)	49.3		ug/L	50.0		98.7	70-130			

Batch BGJ0587 - SW5030B-MS

Certificate of Analysis

Client Name: SCS Engineers-Winchester
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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0587 - SW5030B-MS										
Blank (BGJ0587-BLK1)				Prepared & Analyzed: 10/13/2023						
2-Butanone (MEK)	ND	10.0	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.00	ug/L							
Ethylbenzene	ND	1.00	ug/L							
Toluene	ND	1.00	ug/L							
Xylenes, Total	ND	3.00	ug/L							
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	51.4		ug/L	50.0		103	70-120			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	52.2		ug/L	50.0		104	75-120			
<i>Surr: Dibromofluoromethane (Surr)</i>	49.2		ug/L	50.0		98.4	70-130			
<i>Surr: Toluene-d8 (Surr)</i>	51.1		ug/L	50.0		102	70-130			
LCS (BGJ0587-BS1)				Prepared & Analyzed: 10/13/2023						
1,1,1,2-Tetrachloroethane	49.4	0.4	ug/L	50.0		98.8	80-130			
1,1,1-Trichloroethane	51.1	1	ug/L	50.0		102	65-130			
1,1,2,2-Tetrachloroethane	55.5	0.4	ug/L	50.0		111	65-130			
1,1,2-Trichloroethane	58.8	1	ug/L	50.0		118	75-125			
1,1-Dichloroethane	54.7	1	ug/L	50.0		109	70-135			
1,1-Dichloroethylene	43.5	1	ug/L	50.0		87.1	70-130			
1,1-Dichloropropene	54.4	1	ug/L	50.0		109	75-135			
1,2,3-Trichlorobenzene	42.5	1	ug/L	50.0		85.1	55-140			
1,2,3-Trichloropropane	53.2	1	ug/L	50.0		106	75-125			
1,2,4-Trichlorobenzene	41.2	1	ug/L	50.0		82.5	65-135			
1,2,4-Trimethylbenzene	50.2	1	ug/L	50.0		100	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	40.2	1	ug/L	50.0		80.5	50-130			
1,2-Dibromoethane (EDB)	51.7	1	ug/L	50.0		103	80-120			

Certificate of Analysis

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

LCS (BGJ0587-BS1)

Prepared & Analyzed: 10/13/2023

1,2-Dichlorobenzene	49.0	0.5	ug/L	50.0		97.9	70-120			
1,2-Dichloroethane	51.8	1	ug/L	50.0		104	70-130			
1,2-Dichloropropane	56.1	0.5	ug/L	50.0		112	75-125			
1,3,5-Trimethylbenzene	47.0	1	ug/L	50.0		93.9	75-125			
1,3-Dichlorobenzene	49.0	1	ug/L	50.0		98.0	75-125			
1,3-Dichloropropane	56.8	1	ug/L	50.0		114	75-125			
1,4-Dichlorobenzene	48.7	1	ug/L	50.0		97.4	75-125			
2,2-Dichloropropane	49.4	1	ug/L	50.0		98.8	70-135			
2-Butanone (MEK)	44.8	10	ug/L	50.0		89.5	30-150			
2-Chlorotoluene	49.2	1	ug/L	50.0		98.4	75-125			
2-Hexanone (MBK)	50.6	5	ug/L	50.0		101	55-130			
4-Chlorotoluene	48.4	1	ug/L	50.0		96.8	75-130			
4-Isopropyltoluene	49.0	1	ug/L	50.0		98.1	75-130			
4-Methyl-2-pentanone (MIBK)	53.6	5	ug/L	50.0		107	60-135			
Acetone	46.9	10	ug/L	50.0		93.7	40-140			
Benzene	53.0	1	ug/L	50.0		106	80-120			
Bromobenzene	52.6	1	ug/L	50.0		105	75-125			
Bromochloromethane	52.2	1	ug/L	50.0		104	65-130			
Bromodichloromethane	54.3	0.5	ug/L	50.0		109	75-120			
Bromoform	47.7	1	ug/L	50.0		95.5	70-130			
Bromomethane	36.3	1	ug/L	50.0		72.5	30-145			
Carbon disulfide	39.1	10	ug/L	50.0		78.1	35-160			
Carbon tetrachloride	49.3	1	ug/L	50.0		98.7	65-140			
Chlorobenzene	48.6	1	ug/L	50.0		97.3	80-120			
Chloroethane	44.2	1	ug/L	50.0		88.5	60-135			

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Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

LCS (BGJ0587-BS1)

Prepared & Analyzed: 10/13/2023

Chloroform	50.9	0.5	ug/L	50.0		102	65-135			
Chloromethane	41.1	1	ug/L	50.0		82.2	40-125			
cis-1,2-Dichloroethylene	53.4	1	ug/L	50.0		107	70-125			
cis-1,3-Dichloropropene	58.3	1	ug/L	50.0		117	70-130			
Dibromochloromethane	55.0	0.5	ug/L	50.0		110	60-135			
Dibromomethane	54.4	1	ug/L	50.0		109	75-125			
Dichlorodifluoromethane	31.8	1	ug/L	50.0		63.7	30-155			
Ethylbenzene	49.7	1	ug/L	50.0		99.4	75-125			
Hexachlorobutadiene	38.4	0.8	ug/L	50.0		76.8	50-140			
Isopropylbenzene	48.9	1	ug/L	50.0		97.8	75-125			
m+p-Xylenes	99.0	2	ug/L	100		99.0	75-130			
Methylene chloride	52.2	4	ug/L	50.0		104	55-140			
Methyl-t-butyl ether (MTBE)	57.3	1	ug/L	50.0		115	65-125			
Naphthalene	44.5	1	ug/L	50.0		89.1	55-140			
n-Butylbenzene	47.7	1	ug/L	50.0		95.4	70-135			
n-Propylbenzene	46.7	1	ug/L	50.0		93.4	70-130			
o-Xylene	52.2	1	ug/L	50.0		104	80-120			
sec-Butylbenzene	51.0	1	ug/L	50.0		102	70-125			
Styrene	52.4	1	ug/L	50.0		105	65-135			
tert-Butylbenzene	47.8	1	ug/L	50.0		95.5	70-130			
Tetrachloroethylene (PCE)	45.8	1	ug/L	50.0		91.7	45-150			
Toluene	51.9	1	ug/L	50.0		104	75-120			
trans-1,2-Dichloroethylene	48.8	1	ug/L	50.0		97.6	60-140			
trans-1,3-Dichloropropene	63.1	1	ug/L	50.0		126	55-140			
Trichloroethylene	51.0	1	ug/L	50.0		102	70-125			

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

LCS (BGJ0587-BS1)

Prepared & Analyzed: 10/13/2023

Trichlorofluoromethane	43.8	1	ug/L	50.0		87.5	60-145			
Vinyl chloride	42.6	0.5	ug/L	50.0		85.3	50-145			
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	53.5		ug/L	50.0		107	70-120			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	53.8		ug/L	50.0		108	75-120			
<i>Surr: Dibromofluoromethane (Surr)</i>	51.8		ug/L	50.0		104	70-130			
<i>Surr: Toluene-d8 (Surr)</i>	51.2		ug/L	50.0		102	70-130			

Matrix Spike (BGJ0587-MS1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

1,1,1,2-Tetrachloroethane	50.1	0.4	ug/L	50.0	BLOD	100	80-130			
1,1,1-Trichloroethane	50.8	1	ug/L	50.0	BLOD	102	65-130			
1,1,2,2-Tetrachloroethane	49.0	0.4	ug/L	50.0	BLOD	97.9	65-130			
1,1,2-Trichloroethane	58.6	1	ug/L	50.0	BLOD	117	75-125			
1,1-Dichloroethane	54.1	1	ug/L	50.0	BLOD	108	70-135			
1,1-Dichloroethylene	40.5	1	ug/L	50.0	BLOD	81.0	50-145			
1,1-Dichloropropene	53.6	1	ug/L	50.0	BLOD	107	75-135			
1,2,3-Trichlorobenzene	52.6	1	ug/L	50.0	BLOD	105	55-140			
1,2,3-Trichloropropane	47.9	1	ug/L	50.0	BLOD	95.7	75-125			
1,2,4-Trichlorobenzene	51.5	1	ug/L	50.0	BLOD	103	65-135			
1,2,4-Trimethylbenzene	52.2	1	ug/L	50.0	BLOD	104	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	41.2	1	ug/L	50.0	BLOD	82.3	50-130			
1,2-Dibromoethane (EDB)	51.5	1	ug/L	50.0	BLOD	103	80-120			
1,2-Dichlorobenzene	45.2	0.5	ug/L	50.0	BLOD	90.5	70-120			
1,2-Dichloroethane	49.6	1	ug/L	50.0	BLOD	99.3	70-130			
1,2-Dichloropropane	54.9	0.5	ug/L	50.0	BLOD	110	75-125			
1,3,5-Trimethylbenzene	48.3	1	ug/L	50.0	BLOD	96.6	75-124			

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Enthalpy Analytical

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Batch BGJ0587 - SW5030B-MS

Matrix Spike (BGJ0587-MS1)	Source: 23J0725-02			Prepared & Analyzed: 10/13/2023						
1,3-Dichlorobenzene	47.1	1	ug/L	50.0	BLOD	94.1	75-125			
1,3-Dichloropropane	56.6	1	ug/L	50.0	BLOD	113	75-125			
1,4-Dichlorobenzene	56.8	1	ug/L	50.0	BLOD	114	75-125			
2,2-Dichloropropane	49.6	1	ug/L	50.0	BLOD	99.1	70-135			
2-Butanone (MEK)	6400	10	ug/L	50.0	BLOD	12800	30-150			M
2-Chlorotoluene	50.7	1	ug/L	50.0	BLOD	101	75-125			
2-Hexanone (MBK)	77.6	5	ug/L	50.0	BLOD	155	55-130			M
4-Chlorotoluene	50.6	1	ug/L	50.0	BLOD	101	75-130			
4-Isopropyltoluene	49.7	1	ug/L	50.0	BLOD	99.3	75-130			
4-Methyl-2-pentanone (MIBK)	160	5	ug/L	50.0	BLOD	321	60-135			M
Acetone	11800	10	ug/L	50.0	BLOD	23700	40-140			M
Benzene	55.0	1	ug/L	50.0	BLOD	110	80-120			
Bromobenzene	49.7	1	ug/L	50.0	BLOD	99.3	75-125			
Bromochloromethane	52.2	1	ug/L	50.0	BLOD	104	65-130			
Bromodichloromethane	54.2	0.5	ug/L	50.0	BLOD	108	75-136			
Bromoform	46.8	1	ug/L	50.0	BLOD	93.6	70-130			
Bromomethane	33.9	1	ug/L	50.0	BLOD	67.8	30-145			
Carbon disulfide	38.3	10	ug/L	50.0	BLOD	76.6	35-160			
Carbon tetrachloride	50.7	1	ug/L	50.0	BLOD	101	65-140			
Chlorobenzene	49.5	1	ug/L	50.0	BLOD	99.1	80-120			
Chloroethane	42.5	1	ug/L	50.0	BLOD	85.1	60-135			
Chloroform	50.2	0.5	ug/L	50.0	BLOD	100	65-135			
Chloromethane	38.8	1	ug/L	50.0	BLOD	77.6	40-125			
cis-1,2-Dichloroethylene	52.5	1	ug/L	50.0	BLOD	105	70-125			
cis-1,3-Dichloropropene	58.7	1	ug/L	50.0	BLOD	117	47-136			

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Enthalpy Analytical

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Batch BGJ0587 - SW5030B-MS

Matrix Spike (BGJ0587-MS1)	Source: 23J0725-02			Prepared & Analyzed: 10/13/2023						
Dibromochloromethane	55.7	0.5	ug/L	50.0	BLOD	111	60-135			
Dibromomethane	54.2	1	ug/L	50.0	BLOD	108	75-125			
Dichlorodifluoromethane	30.2	1	ug/L	50.0	BLOD	60.3	30-155			
Ethylbenzene	49.9	1	ug/L	50.0	BLOD	99.8	75-125			
Hexachlorobutadiene	44.6	0.8	ug/L	50.0	BLOD	89.3	50-140			
Isopropylbenzene	46.5	1	ug/L	50.0	BLOD	93.0	75-125			
m+p-Xylenes	96.0	2	ug/L	100	BLOD	96.0	75-130			
Methylene chloride	50.8	4	ug/L	50.0	BLOD	102	55-140			
Methyl-t-butyl ether (MTBE)	57.7	1	ug/L	50.0	BLOD	115	65-125			
Naphthalene	68.2	1	ug/L	50.0	BLOD	136	55-140			
n-Butylbenzene	45.4	1	ug/L	50.0	BLOD	90.9	70-135			
n-Propylbenzene	50.6	1	ug/L	50.0	BLOD	101	70-130			
o-Xylene	50.1	1	ug/L	50.0	BLOD	100	80-120			
sec-Butylbenzene	49.5	1	ug/L	50.0	BLOD	99.0	70-125			
Styrene	50.7	1	ug/L	50.0	BLOD	101	65-135			
tert-Butylbenzene	48.4	1	ug/L	50.0	BLOD	96.7	70-130			
Tetrachloroethylene (PCE)	42.7	1	ug/L	50.0	BLOD	85.4	51-231			
Toluene	52.3	1	ug/L	50.0	BLOD	105	75-120			
trans-1,2-Dichloroethylene	49.6	1	ug/L	50.0	BLOD	99.1	60-140			
trans-1,3-Dichloropropene	64.3	1	ug/L	50.0	BLOD	129	55-140			
Trichloroethylene	51.8	1	ug/L	50.0	BLOD	104	70-125			
Trichlorofluoromethane	42.1	1	ug/L	50.0	BLOD	84.1	60-145			
Vinyl chloride	37.6	0.5	ug/L	50.0	BLOD	75.2	50-145			
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Surr: 1,2-Dichloroethane-d4 (Surr)	51.4		ug/L	50.0		103	70-120			
Surr: 4-Bromofluorobenzene (Surr)	49.6		ug/L	50.0		99.2	75-120			

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike (BGJ0587-MS1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

<i>Surr: Dibromofluoromethane (Surr)</i>	51.3		ug/L	50.0		103	70-130		
<i>Surr: Toluene-d8 (Surr)</i>	50.1		ug/L	50.0		100	70-130		

Matrix Spike Dup (BGJ0587-MSD1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

1,1,1,2-Tetrachloroethane	51.8	0.4	ug/L	50.0	BLOD	104	80-130	3.46	30
1,1,1-Trichloroethane	47.6	1	ug/L	50.0	BLOD	95.3	65-130	6.50	30
1,1,2,2-Tetrachloroethane	48.7	0.4	ug/L	50.0	BLOD	97.4	65-130	0.512	30
1,1,2-Trichloroethane	56.8	1	ug/L	50.0	BLOD	114	75-125	3.10	30
1,1-Dichloroethane	48.2	1	ug/L	50.0	BLOD	96.4	70-135	11.6	30
1,1-Dichloroethylene	36.0	1	ug/L	50.0	BLOD	72.1	50-145	11.6	30
1,1-Dichloropropene	49.2	1	ug/L	50.0	BLOD	98.4	75-135	8.64	30
1,2,3-Trichlorobenzene	51.0	1	ug/L	50.0	BLOD	102	55-140	2.99	30
1,2,3-Trichloropropane	47.5	1	ug/L	50.0	BLOD	94.9	75-125	0.839	30
1,2,4-Trichlorobenzene	48.4	1	ug/L	50.0	BLOD	96.8	65-135	6.18	30
1,2,4-Trimethylbenzene	51.7	1	ug/L	50.0	BLOD	103	75-130	0.925	30
1,2-Dibromo-3-chloropropane (DBCP)	40.8	1	ug/L	50.0	BLOD	81.5	50-130	0.976	30
1,2-Dibromoethane (EDB)	51.3	1	ug/L	50.0	BLOD	103	80-120	0.486	30
1,2-Dichlorobenzene	44.5	0.5	ug/L	50.0	BLOD	89.0	70-120	1.67	30
1,2-Dichloroethane	44.7	1	ug/L	50.0	BLOD	89.4	70-130	10.4	30
1,2-Dichloropropane	52.5	0.5	ug/L	50.0	BLOD	105	75-125	4.45	30
1,3,5-Trimethylbenzene	48.0	1	ug/L	50.0	BLOD	96.0	75-124	0.644	30
1,3-Dichlorobenzene	46.8	1	ug/L	50.0	BLOD	93.6	75-125	0.511	30
1,3-Dichloropropane	54.3	1	ug/L	50.0	BLOD	109	75-125	4.11	30
1,4-Dichlorobenzene	55.0	1	ug/L	50.0	BLOD	110	75-125	3.29	30
2,2-Dichloropropane	45.1	1	ug/L	50.0	BLOD	90.2	70-135	9.42	30

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike Dup (BGJ0587-MSD1)	Source: 23J0725-02			Prepared & Analyzed: 10/13/2023						
2-Butanone (MEK)	5550	10	ug/L	50.0	BLOD	11100	30-150	14.3	30	M
2-Chlorotoluene	51.4	1	ug/L	50.0	BLOD	103	75-125	1.27	30	
2-Hexanone (MBK)	76.6	5	ug/L	50.0	BLOD	153	55-130	1.18	30	M
4-Chlorotoluene	50.5	1	ug/L	50.0	BLOD	101	75-130	0.178	30	
4-Isopropyltoluene	48.1	1	ug/L	50.0	BLOD	96.2	75-130	3.23	30	
4-Methyl-2-pentanone (MIBK)	152	5	ug/L	50.0	BLOD	305	60-135	5.15	30	M
Acetone	10100	10	ug/L	50.0	BLOD	20100	40-140	16.1	30	M
Benzene	52.9	1	ug/L	50.0	BLOD	106	80-120	3.84	30	
Bromobenzene	51.0	1	ug/L	50.0	BLOD	102	75-125	2.66	30	
Bromochloromethane	48.9	1	ug/L	50.0	BLOD	97.8	65-130	6.60	30	
Bromodichloromethane	52.8	0.5	ug/L	50.0	BLOD	106	75-136	2.71	30	
Bromoform	49.4	1	ug/L	50.0	BLOD	98.7	70-130	5.35	30	
Bromomethane	27.4	1	ug/L	50.0	BLOD	54.9	30-145	21.1	30	
Carbon disulfide	35.5	10	ug/L	50.0	BLOD	71.0	35-160	7.61	30	
Carbon tetrachloride	49.7	1	ug/L	50.0	BLOD	99.3	65-140	1.99	30	
Chlorobenzene	50.0	1	ug/L	50.0	BLOD	99.9	80-120	0.844	30	
Chloroethane	35.9	1	ug/L	50.0	BLOD	71.9	60-135	16.8	30	
Chloroform	45.5	0.5	ug/L	50.0	BLOD	91.0	65-135	9.81	30	
Chloromethane	31.9	1	ug/L	50.0	BLOD	63.8	40-125	19.5	30	
cis-1,2-Dichloroethylene	48.0	1	ug/L	50.0	BLOD	95.9	70-125	9.02	30	
cis-1,3-Dichloropropene	57.3	1	ug/L	50.0	BLOD	115	47-136	2.50	30	
Dibromochloromethane	55.6	0.5	ug/L	50.0	BLOD	111	60-135	0.324	30	
Dibromomethane	52.1	1	ug/L	50.0	BLOD	104	75-125	4.01	30	
Dichlorodifluoromethane	27.2	1	ug/L	50.0	BLOD	54.5	30-155	10.1	30	
Ethylbenzene	49.4	1	ug/L	50.0	BLOD	98.7	75-125	1.07	30	

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike Dup (BGJ0587-MSD1)	Source: 23J0725-02			Prepared & Analyzed: 10/13/2023						
Hexachlorobutadiene	42.4	0.8	ug/L	50.0	BLOD	84.8	50-140	5.12	30	
Isopropylbenzene	46.2	1	ug/L	50.0	BLOD	92.4	75-125	0.604	30	
m+p-Xylenes	95.9	2	ug/L	100	BLOD	95.9	75-130	0.104	30	
Methylene chloride	45.6	4	ug/L	50.0	BLOD	91.1	55-140	10.9	30	
Methyl-t-butyl ether (MTBE)	52.2	1	ug/L	50.0	BLOD	104	65-125	10.0	30	
Naphthalene	64.8	1	ug/L	50.0	BLOD	130	55-140	5.19	30	
n-Butylbenzene	43.7	1	ug/L	50.0	BLOD	87.5	70-135	3.81	30	
n-Propylbenzene	51.1	1	ug/L	50.0	BLOD	102	70-130	1.02	30	
o-Xylene	49.5	1	ug/L	50.0	BLOD	99.1	80-120	1.18	30	
sec-Butylbenzene	48.2	1	ug/L	50.0	BLOD	96.5	70-125	2.60	30	
Styrene	50.4	1	ug/L	50.0	BLOD	101	65-135	0.534	30	
tert-Butylbenzene	47.8	1	ug/L	50.0	BLOD	95.6	70-130	1.21	30	
Tetrachloroethylene (PCE)	45.6	1	ug/L	50.0	BLOD	91.1	51-231	6.48	30	
Toluene	50.8	1	ug/L	50.0	BLOD	102	75-120	2.95	30	
trans-1,2-Dichloroethylene	46.6	1	ug/L	50.0	BLOD	93.1	60-140	6.24	30	
trans-1,3-Dichloropropene	63.3	1	ug/L	50.0	BLOD	127	55-140	1.63	30	
Trichloroethylene	50.6	1	ug/L	50.0	BLOD	101	70-125	2.48	30	
Trichlorofluoromethane	36.8	1	ug/L	50.0	BLOD	73.7	60-145	13.3	30	
Vinyl chloride	34.7	0.5	ug/L	50.0	BLOD	69.4	50-145	8.05	30	
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	<i>47.7</i>		<i>ug/L</i>	<i>50.0</i>		<i>95.4</i>	<i>70-120</i>			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	<i>49.2</i>		<i>ug/L</i>	<i>50.0</i>		<i>98.5</i>	<i>75-120</i>			
<i>Surr: Dibromofluoromethane (Surr)</i>	<i>47.3</i>		<i>ug/L</i>	<i>50.0</i>		<i>94.7</i>	<i>70-130</i>			
<i>Surr: Toluene-d8 (Surr)</i>	<i>49.1</i>		<i>ug/L</i>	<i>50.0</i>		<i>98.2</i>	<i>70-130</i>			

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Blank (BGJ0528-BLK1)

Prepared & Analyzed: 10/12/2023

Anthracene	ND	10.0	ug/L							
<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	79.3		ug/L	100		79.3	5-136			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	36.4		ug/L	50.0		72.9	9-117			
<i>Surr: 2-Fluorophenol (Surr)</i>	40.7		ug/L	100		40.7	5-60			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	36.5		ug/L	50.0		73.0	5-151			
<i>Surr: Phenol-d5 (Surr)</i>	28.6		ug/L	100		28.6	5-60			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	34.1		ug/L	50.0		68.3	5-141			

LCS (BGJ0528-BS1)

Prepared & Analyzed: 10/12/2023

1,2,4-Trichlorobenzene	31.4	10.0	ug/L	50.0		62.8	57-130			
1,2-Dichlorobenzene	34.2	10.0	ug/L	50.0		68.5	22-115			
1,3-Dichlorobenzene	32.3	10.0	ug/L	50.0		64.6	22-112			
1,4-Dichlorobenzene	36.0	10.0	ug/L	50.0		72.0	13-112			
2,4,6-Trichlorophenol	37.2	10.0	ug/L	50.0		74.4	52-129			
2,4-Dichlorophenol	35.2	10.0	ug/L	50.0		70.5	53-122			
2,4-Dimethylphenol	38.7	5.00	ug/L	50.0		77.4	42-120			
2,4-Dinitrophenol	41.9	50.0	ug/L	50.0		83.8	48-127			
2,4-Dinitrotoluene	41.9	10.0	ug/L	50.0		83.7	10-173			
2,6-Dinitrotoluene	41.9	10.0	ug/L	50.0		83.7	68-137			
2-Chloronaphthalene	34.1	10.0	ug/L	50.0		68.3	65-120			
2-Chlorophenol	31.8	10.0	ug/L	50.0		63.6	36-120			
2-Nitrophenol	41.2	10.0	ug/L	50.0		82.5	45-167			
3,3'-Dichlorobenzidine	31.3	10.0	ug/L	50.0		62.6	10-213			
4,6-Dinitro-2-methylphenol	49.6	50.0	ug/L	50.0		99.3	53-130			
4-Bromophenyl phenyl ether	34.4	10.0	ug/L	50.0		68.8	65-120			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

LCS (BGJ0528-BS1)

Prepared & Analyzed: 10/12/2023

4-Chlorophenyl phenyl ether	33.2	10.0	ug/L	50.0		66.4	38-145			
4-Nitrophenol	16.2	50.0	ug/L	50.0		32.3	13-129			
Acenaphthene	38.4	10.0	ug/L	50.0		76.8	60-132			
Acenaphthylene	42.9	10.0	ug/L	50.0		85.8	54-126			
Acetophenone	35.3	20.0	ug/L	50.0		70.5	0-200			
Anthracene	38.4	10.0	ug/L	50.0		76.8	43-120			
Benzo (a) anthracene	36.1	10.0	ug/L	50.0		72.3	42-133			
Benzo (a) pyrene	34.3	10.0	ug/L	50.0		68.6	32-148			
Benzo (b) fluoranthene	34.2	10.0	ug/L	50.0		68.3	42-140			
Benzo (g,h,i) perylene	41.8	10.0	ug/L	50.0		83.5	10-195			
Benzo (k) fluoranthene	29.2	10.0	ug/L	50.0		58.3	25-146			
bis (2-Chloroethoxy) methane	43.9	10.0	ug/L	50.0		87.8	49-165			
bis (2-Chloroethyl) ether	36.8	10.0	ug/L	50.0		73.5	43-126			
2,2'-Oxybis (1-chloropropane)	37.3	10.0	ug/L	50.0		74.7	63-139			
bis (2-Ethylhexyl) phthalate	38.9	10.0	ug/L	50.0		77.8	29-137			
Butyl benzyl phthalate	48.9	10.0	ug/L	50.0		97.8	10-140			
Chrysene	37.4	10.0	ug/L	50.0		74.8	44-140			
Dibenz (a,h) anthracene	41.4	10.0	ug/L	50.0		82.7	10-200			
Diethyl phthalate	40.6	10.0	ug/L	50.0		81.3	10-120			
Dimethyl phthalate	38.4	10.0	ug/L	50.0		76.8	10-120			
Di-n-butyl phthalate	46.6	10.0	ug/L	50.0		93.1	10-120			
Di-n-octyl phthalate	34.3	10.0	ug/L	50.0		68.6	19-132			
Fluoranthene	41.1	10.0	ug/L	50.0		82.2	43-121			
Fluorene	50.9	10.0	ug/L	50.0		102	70-120			
Hexachlorobenzene	24.4	1.00	ug/L	50.0		48.7	10-142			

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Batch BGJ0528 - SW3510C/EPA600-MS

LCS (BGJ0528-BS1)

Prepared & Analyzed: 10/12/2023

Hexachlorobutadiene	32.9	10.0	ug/L	50.0		65.9	38-120			
Hexachlorocyclopentadiene	24.0	10.0	ug/L	50.0		47.9	10-76			
Hexachloroethane	34.5	10.0	ug/L	50.0		68.9	55-120			
Indeno (1,2,3-cd) pyrene	38.3	10.0	ug/L	50.0		76.6	10-151			
Isophorone	28.5	10.0	ug/L	50.0		56.9	47-180			
Naphthalene	34.0	5.00	ug/L	50.0		68.0	36-120			
Nitrobenzene	38.0	10.0	ug/L	50.0		76.0	54-158			
n-Nitrosodimethylamine	26.6	10.0	ug/L	50.0		53.3	10-85			
n-Nitrosodi-n-propylamine	37.8	10.0	ug/L	50.0		75.6	14-198			
n-Nitrosodiphenylamine	31.9	10.0	ug/L	50.0		63.9	12-97			
p-Chloro-m-cresol	37.2	10.0	ug/L	50.0		74.3	10-142			
Pentachlorophenol	44.2	20.0	ug/L	50.0		88.3	38-152			
Phenanthrene	54.5	10.0	ug/L	50.0		109	65-120			
Phenol	18.3	10.0	ug/L	50.5		36.3	17-120			
Pyrene	47.5	10.0	ug/L	50.0		95.0	70-120			
Pyridine	33.6	10.0	ug/L	50.0		67.2	10-103			
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<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	<i>94.8</i>		ug/L	<i>100</i>		<i>94.8</i>	<i>5-136</i>			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	<i>36.7</i>		ug/L	<i>50.0</i>		<i>73.3</i>	<i>9-117</i>			
<i>Surr: 2-Fluorophenol (Surr)</i>	<i>47.3</i>		ug/L	<i>100</i>		<i>47.3</i>	<i>5-60</i>			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	<i>40.0</i>		ug/L	<i>50.0</i>		<i>79.9</i>	<i>5-151</i>			
<i>Surr: Phenol-d5 (Surr)</i>	<i>34.4</i>		ug/L	<i>100</i>		<i>34.4</i>	<i>5-60</i>			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	<i>39.7</i>		ug/L	<i>50.0</i>		<i>79.4</i>	<i>5-141</i>			

Matrix Spike (BGJ0528-MS1)

Source: 23J0431-03

Prepared & Analyzed: 10/12/2023

1,2,4-Trichlorobenzene	47.3	10.0	ug/L	100	BLOD	47.3	44-142			
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike (BGJ0528-MS1)

Source: 23J0431-03

Prepared & Analyzed: 10/12/2023

1,2-Dichlorobenzene	54.1	10.0	ug/L	100	BLOD	54.1	22-115			
1,3-Dichlorobenzene	49.8	10.0	ug/L	100	BLOD	49.8	22-112			
1,4-Dichlorobenzene	55.1	10.0	ug/L	100	BLOD	55.1	13-112			
2,4,6-Trichlorophenol	62.0	10.0	ug/L	100	BLOD	62.0	37-144			
2,4-Dichlorophenol	56.3	10.0	ug/L	100	BLOD	56.3	39-135			
2,4-Dimethylphenol	56.3	5.00	ug/L	100	BLOD	56.3	32-120			
2,4-Dinitrophenol	108	50.0	ug/L	100	BLOD	108	39-139			
2,4-Dinitrotoluene	71.8	10.0	ug/L	100	BLOD	71.8	10-191			
2,6-Dinitrotoluene	71.8	10.0	ug/L	100	BLOD	71.8	50-158			
2-Chloronaphthalene	54.0	10.0	ug/L	100	BLOD	54.0	60-120			M
2-Chlorophenol	48.8	10.0	ug/L	100	BLOD	48.8	23-134			
2-Nitrophenol	63.7	10.0	ug/L	100	BLOD	63.7	29-182			
3,3'-Dichlorobenzidine	48.4	10.0	ug/L	100	BLOD	48.4	10-262			
4,6-Dinitro-2-methylphenol	112	50.0	ug/L	100	BLOD	112	10-181			
4-Bromophenyl phenyl ether	65.5	10.0	ug/L	100	BLOD	65.5	53-127			
4-Chlorophenyl phenyl ether	56.2	10.0	ug/L	100	BLOD	56.2	25-158			
4-Nitrophenol	57.1	50.0	ug/L	100	BLOD	57.1	10-132			
Acenaphthene	62.9	10.0	ug/L	100	BLOD	62.9	47-145			
Acenaphthylene	69.4	10.0	ug/L	100	BLOD	69.4	33-145			
Acetophenone	50.1	20.0	ug/L	100	BLOD	50.1	0-200			
Anthracene	64.0	10.0	ug/L	100	BLOD	64.0	27-133			
Benzo (a) anthracene	83.2	10.0	ug/L	100	BLOD	83.2	33-143			
Benzo (a) pyrene	96.4	10.0	ug/L	100	BLOD	96.4	17-163			
Benzo (b) fluoranthene	90.7	10.0	ug/L	100	BLOD	90.7	24-159			
Benzo (g,h,i) perylene	86.6	10.0	ug/L	100	BLOD	86.6	10-219			

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike (BGJ0528-MS1)	Source: 23J0431-03			Prepared & Analyzed: 10/12/2023						
Benzo (k) fluoranthene	86.2	10.0	ug/L	100	BLOD	86.2	11-162			
bis (2-Chloroethoxy) methane	67.5	10.0	ug/L	100	BLOD	67.5	33-184			
bis (2-Chloroethyl) ether	55.8	10.0	ug/L	100	BLOD	55.8	12-158			
2,2'-Oxybis (1-chloropropane)	61.2	10.0	ug/L	100	BLOD	61.2	36-166			
bis (2-Ethylhexyl) phthalate	79.8	10.0	ug/L	100	BLOD	79.8	10-158			
Butyl benzyl phthalate	88.3	10.0	ug/L	100	BLOD	88.3	10-152			
Chrysene	85.2	10.0	ug/L	100	BLOD	85.2	17-169			
Dibenz (a,h) anthracene	97.2	10.0	ug/L	100	BLOD	97.2	10-227			
Diethyl phthalate	64.6	10.0	ug/L	100	BLOD	64.6	10-120			
Dimethyl phthalate	63.8	10.0	ug/L	100	BLOD	63.8	10-120			
Di-n-butyl phthalate	80.2	10.0	ug/L	100	BLOD	80.2	10-120			
Di-n-octyl phthalate	91.6	10.0	ug/L	100	BLOD	91.6	10-146			
Fluoranthene	67.6	10.0	ug/L	100	BLOD	67.6	26-137			
Fluorene	86.0	10.0	ug/L	100	BLOD	86.0	59-121			
Hexachlorobenzene	55.3	1.00	ug/L	100	BLOD	55.3	10-152			
Hexachlorobutadiene	52.3	10.0	ug/L	100	BLOD	52.3	24-120			
Hexachlorocyclopentadiene	46.0	10.0	ug/L	100	BLOD	46.0	10-90			
Hexachloroethane	53.5	10.0	ug/L	100	BLOD	53.5	40-120			
Indeno (1,2,3-cd) pyrene	88.6	10.0	ug/L	100	BLOD	88.6	10-171			
Isophorone	44.4	10.0	ug/L	100	BLOD	44.4	21-196			
Naphthalene	46.5	5.00	ug/L	100	BLOD	46.5	21-133			
Nitrobenzene	60.8	10.0	ug/L	100	BLOD	60.8	35-180			
n-Nitrosodimethylamine	51.3	10.0	ug/L	100	BLOD	51.3	10-85			
n-Nitrosodi-n-propylamine	55.8	10.0	ug/L	100	BLOD	55.8	10-230			
n-Nitrosodiphenylamine	50.8	10.0	ug/L	100	BLOD	50.8	12-111			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike (BGJ0528-MS1)	Source: 23J0431-03			Prepared & Analyzed: 10/12/2023						
p-Chloro-m-cresol	59.3	10.0	ug/L	100	BLOD	59.3	10-127			
Pentachlorophenol	108	20.0	ug/L	100	BLOD	108	14-176			
Phenanthrene	90.8	10.0	ug/L	100	BLOD	90.8	54-120			
Phenol	35.5	10.0	ug/L	101	BLOD	35.2	10-120			
Pyrene	85.1	10.0	ug/L	100	BLOD	85.1	52-120			
Pyridine	58.8	10.0	ug/L	100	BLOD	58.8	10-110			
<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	<i>207</i>		ug/L	<i>200</i>		<i>104</i>	<i>5-136</i>			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	<i>57.6</i>		ug/L	<i>100</i>		<i>57.6</i>	<i>9-117</i>			
<i>Surr: 2-Fluorophenol (Surr)</i>	<i>81.6</i>		ug/L	<i>200</i>		<i>40.8</i>	<i>5-60</i>			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	<i>65.2</i>		ug/L	<i>100</i>		<i>65.2</i>	<i>5-151</i>			
<i>Surr: Phenol-d5 (Surr)</i>	<i>70.6</i>		ug/L	<i>200</i>		<i>35.3</i>	<i>5-60</i>			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	<i>84.9</i>		ug/L	<i>100</i>		<i>84.9</i>	<i>5-141</i>			
Matrix Spike (BGJ0528-MS2)	Source: 23J0636-01			Prepared & Analyzed: 10/13/2023						
1,2,4-Trichlorobenzene	28.4	10.0	ug/L	93.5	BLOD	30.4	44-142			M
1,2-Dichlorobenzene	31.7	10.0	ug/L	93.5	BLOD	33.9	22-115			
1,3-Dichlorobenzene	29.2	10.0	ug/L	93.5	BLOD	31.2	22-112			
1,4-Dichlorobenzene	32.3	10.0	ug/L	93.5	BLOD	34.6	13-112			
2,4,6-Trichlorophenol	36.3	10.0	ug/L	93.5	BLOD	38.8	37-144			
2,4-Dichlorophenol	33.7	10.0	ug/L	93.5	BLOD	36.0	39-135			M
2,4-Dimethylphenol	37.0	5.00	ug/L	93.5	BLOD	39.6	32-120			
2,4-Dinitrophenol	49.9	50.0	ug/L	93.5	BLOD	53.4	39-139			
2,4-Dinitrotoluene	40.3	10.0	ug/L	93.5	BLOD	43.1	10-191			
2,6-Dinitrotoluene	40.3	10.0	ug/L	93.5	BLOD	43.1	50-158			M
2-Chloronaphthalene	32.1	10.0	ug/L	93.5	BLOD	34.4	60-120			M

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike (BGJ0528-MS2)	Source: 23J0636-01			Prepared & Analyzed: 10/13/2023						
2-Chlorophenol	30.1	10.0	ug/L	93.5	BLOD	32.2	23-134			
2-Nitrophenol	38.7	10.0	ug/L	93.5	BLOD	41.4	29-182			
3,3'-Dichlorobenzidine	ND	10.0	ug/L	93.5	BLOD		10-262			M
4,6-Dinitro-2-methylphenol	50.9	50.0	ug/L	93.5	BLOD	54.5	10-181			
4-Bromophenyl phenyl ether	28.2	10.0	ug/L	93.5	BLOD	30.1	53-127			M
4-Chlorophenyl phenyl ether	28.8	10.0	ug/L	93.5	BLOD	30.8	25-158			
4-Nitrophenol	18.6	50.0	ug/L	93.5	BLOD	19.9	10-132			
Acenaphthene	35.8	10.0	ug/L	93.5	BLOD	38.3	47-145			M
Acenaphthylene	40.0	10.0	ug/L	93.5	BLOD	42.8	33-145			
Acetophenone	32.8	20.0	ug/L	93.5	BLOD	35.1	0-200			
Anthracene	34.4	10.0	ug/L	93.5	BLOD	36.8	27-133			
Benzo (a) anthracene	18.8	10.0	ug/L	93.5	BLOD	20.1	33-143			M
Benzo (a) pyrene	17.6	10.0	ug/L	93.5	BLOD	18.8	17-163			
Benzo (b) fluoranthene	18.8	10.0	ug/L	93.5	BLOD	20.1	24-159			M
Benzo (g,h,i) perylene	12.3	10.0	ug/L	93.5	BLOD	13.2	10-219			
Benzo (k) fluoranthene	17.0	10.0	ug/L	93.5	BLOD	18.2	11-162			
bis (2-Chloroethoxy) methane	41.5	10.0	ug/L	93.5	BLOD	44.4	33-184			
bis (2-Chloroethyl) ether	33.0	10.0	ug/L	93.5	BLOD	35.3	12-158			
2,2'-Oxybis (1-chloropropane)	34.3	10.0	ug/L	93.5	BLOD	36.7	36-166			
bis (2-Ethylhexyl) phthalate	21.0	10.0	ug/L	93.5	BLOD	22.5	10-158			
Butyl benzyl phthalate	34.0	10.0	ug/L	93.5	BLOD	36.4	10-152			
Chrysene	19.1	10.0	ug/L	93.5	BLOD	20.4	17-169			
Dibenz (a,h) anthracene	13.2	10.0	ug/L	93.5	BLOD	14.1	10-227			
Diethyl phthalate	36.9	10.0	ug/L	93.5	BLOD	39.4	10-120			
Dimethyl phthalate	36.7	10.0	ug/L	93.5	BLOD	39.2	10-120			

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike (BGJ0528-MS2)	Source: 23J0636-01			Prepared & Analyzed: 10/13/2023						
Di-n-butyl phthalate	36.9	10.0	ug/L	93.5	BLOD	39.5	10-120			
Di-n-octyl phthalate	26.4	10.0	ug/L	93.5	BLOD	28.3	10-146			
Fluoranthene	28.8	10.0	ug/L	93.5	BLOD	30.8	26-137			
Fluorene	47.9	10.0	ug/L	93.5	BLOD	51.2	59-121			M
Hexachlorobenzene	13.8	1.00	ug/L	93.5	BLOD	14.7	10-152			
Hexachlorobutadiene	28.3	10.0	ug/L	93.5	BLOD	30.3	24-120			
Hexachlorocyclopentadiene	20.0	10.0	ug/L	93.5	BLOD	21.4	10-90			
Hexachloroethane	31.5	10.0	ug/L	93.5	BLOD	33.7	40-120			M
Indeno (1,2,3-cd) pyrene	12.4	10.0	ug/L	93.5	BLOD	13.2	10-171			
Isophorone	26.1	10.0	ug/L	93.5	BLOD	28.0	21-196			
Naphthalene	31.4	5.00	ug/L	93.5	BLOD	33.6	21-133			
Nitrobenzene	35.0	10.0	ug/L	93.5	BLOD	37.5	35-180			
n-Nitrosodimethylamine	22.6	10.0	ug/L	93.5	BLOD	24.1	10-85			
n-Nitrosodi-n-propylamine	35.1	10.0	ug/L	93.5	BLOD	37.6	10-230			
n-Nitrosodiphenylamine	31.4	10.0	ug/L	93.5	BLOD	33.6	12-111			
p-Chloro-m-cresol	36.1	10.0	ug/L	93.5	BLOD	38.6	10-127			
Pentachlorophenol	50.6	20.0	ug/L	93.5	BLOD	54.2	14-176			
Phenanthrene	55.3	10.0	ug/L	93.5	8.04	50.6	54-120			M
Phenol	19.0	10.0	ug/L	94.4	4.06	15.8	10-120			
Pyrene	28.4	10.0	ug/L	93.5	BLOD	30.4	52-120			M
Pyridine	30.2	10.0	ug/L	93.5	BLOD	32.3	10-110			
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<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	96.2		ug/L	93.5		103	5-136			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	32.4		ug/L	46.7		69.2	9-117			
<i>Surr: 2-Fluorophenol (Surr)</i>	39.2		ug/L	93.5		42.0	5-60			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	37.9		ug/L	46.7		81.1	5-151			

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0528 - SW3510C/EPA600-MS										
Matrix Spike (BGJ0528-MS2)		Source: 23J0636-01			Prepared & Analyzed: 10/13/2023					
<i>Surr: Phenol-d5 (Surr)</i>	28.3		ug/L	93.5		30.3	5-60			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	14.8		ug/L	46.7		31.7	5-141			
Matrix Spike Dup (BGJ0528-MSD1)		Source: 23J0431-03			Prepared & Analyzed: 10/12/2023					
1,2,4-Trichlorobenzene	36.9	10.0	ug/L	100	BLOD	36.9	44-142	24.6	20	M, P
1,2-Dichlorobenzene	38.3	10.0	ug/L	100	BLOD	38.3	22-115	34.3	20	P
1,3-Dichlorobenzene	34.8	10.0	ug/L	100	BLOD	34.8	22-112	35.5	20	P
1,4-Dichlorobenzene	38.7	10.0	ug/L	100	BLOD	38.7	13-112	34.8	20	P
2,4,6-Trichlorophenol	55.9	10.0	ug/L	100	BLOD	55.9	37-144	10.4	20	
2,4-Dichlorophenol	51.2	10.0	ug/L	100	BLOD	51.2	39-135	9.53	20	
2,4-Dimethylphenol	50.3	5.00	ug/L	100	BLOD	50.3	32-120	11.2	20	
2,4-Dinitrophenol	93.7	50.0	ug/L	100	BLOD	93.7	39-139	14.5	20	
2,4-Dinitrotoluene	65.2	10.0	ug/L	100	BLOD	65.2	10-191	9.55	20	
2,6-Dinitrotoluene	65.2	10.0	ug/L	100	BLOD	65.2	50-158	9.55	20	
2-Chloronaphthalene	50.3	10.0	ug/L	100	BLOD	50.3	60-120	7.08	20	M
2-Chlorophenol	45.2	10.0	ug/L	100	BLOD	45.2	23-134	7.64	20	
2-Nitrophenol	57.7	10.0	ug/L	100	BLOD	57.7	29-182	9.85	20	
3,3'-Dichlorobenzidine	45.4	10.0	ug/L	100	BLOD	45.4	10-262	6.25	20	
4,6-Dinitro-2-methylphenol	98.2	50.0	ug/L	100	BLOD	98.2	10-181	13.3	20	
4-Bromophenyl phenyl ether	60.2	10.0	ug/L	100	BLOD	60.2	53-127	8.49	20	
4-Chlorophenyl phenyl ether	52.0	10.0	ug/L	100	BLOD	52.0	25-158	7.82	20	
4-Nitrophenol	52.0	50.0	ug/L	100	BLOD	52.0	10-132	9.31	20	
Acenaphthene	58.1	10.0	ug/L	100	BLOD	58.1	47-145	7.85	20	
Acenaphthylene	64.6	10.0	ug/L	100	BLOD	64.6	33-145	7.07	20	
Acetophenone	47.4	20.0	ug/L	100	BLOD	47.4	0-200	5.39	20	

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Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0528-MSD1)	Source: 23J0431-03			Prepared & Analyzed: 10/12/2023						
Anthracene	61.6	10.0	ug/L	100	BLOD	61.6	27-133	3.86	20	
Benzo (a) anthracene	77.9	10.0	ug/L	100	BLOD	77.9	33-143	6.63	20	
Benzo (a) pyrene	92.3	10.0	ug/L	100	BLOD	92.3	17-163	4.36	20	
Benzo (b) fluoranthene	89.9	10.0	ug/L	100	BLOD	89.9	24-159	0.864	20	
Benzo (g,h,i) perylene	66.3	10.0	ug/L	100	BLOD	66.3	10-219	26.6	20	P
Benzo (k) fluoranthene	78.8	10.0	ug/L	100	BLOD	78.8	11-162	8.93	20	
bis (2-Chloroethoxy) methane	60.7	10.0	ug/L	100	BLOD	60.7	33-184	10.6	20	
bis (2-Chloroethyl) ether	48.7	10.0	ug/L	100	BLOD	48.7	12-158	13.6	20	
2,2'-Oxybis (1-chloropropane)	51.3	10.0	ug/L	100	BLOD	51.3	36-166	17.5	20	
bis (2-Ethylhexyl) phthalate	75.4	10.0	ug/L	100	BLOD	75.4	10-158	5.63	20	
Butyl benzyl phthalate	84.0	10.0	ug/L	100	BLOD	84.0	10-152	4.98	20	
Chrysene	79.6	10.0	ug/L	100	BLOD	79.6	17-169	6.82	20	
Dibenz (a,h) anthracene	80.4	10.0	ug/L	100	BLOD	80.4	10-227	18.9	20	
Diethyl phthalate	59.1	10.0	ug/L	100	BLOD	59.1	10-120	8.78	20	
Dimethyl phthalate	57.1	10.0	ug/L	100	BLOD	57.1	10-120	11.0	20	
Di-n-butyl phthalate	79.6	10.0	ug/L	100	BLOD	79.6	10-120	0.776	20	
Di-n-octyl phthalate	87.0	10.0	ug/L	100	BLOD	87.0	10-146	5.18	20	
Fluoranthene	68.7	10.0	ug/L	100	BLOD	68.7	26-137	1.54	20	
Fluorene	79.2	10.0	ug/L	100	BLOD	79.2	59-121	8.19	20	
Hexachlorobenzene	50.6	1.00	ug/L	100	BLOD	50.6	10-152	8.88	20	
Hexachlorobutadiene	37.4	10.0	ug/L	100	BLOD	37.4	24-120	33.2	20	P
Hexachlorocyclopentadiene	40.5	10.0	ug/L	100	BLOD	40.5	10-90	12.9	20	
Hexachloroethane	36.3	10.0	ug/L	100	BLOD	36.3	40-120	38.4	20	M, P
Indeno (1,2,3-cd) pyrene	71.9	10.0	ug/L	100	BLOD	71.9	10-171	20.9	20	P
Isophorone	40.5	10.0	ug/L	100	BLOD	40.5	21-196	9.19	20	

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Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0528-MSD1)		Source: 23J0431-03		Prepared & Analyzed: 10/12/2023						
Naphthalene	40.3	5.00	ug/L	100	BLOD	40.3	21-133	14.5	20	
Nitrobenzene	52.4	10.0	ug/L	100	BLOD	52.4	35-180	14.8	20	
n-Nitrosodimethylamine	43.8	10.0	ug/L	100	BLOD	43.8	10-85	15.8	20	
n-Nitrosodi-n-propylamine	51.8	10.0	ug/L	100	BLOD	51.8	10-230	7.32	20	
n-Nitrosodiphenylamine	45.4	10.0	ug/L	100	BLOD	45.4	12-111	11.1	20	
p-Chloro-m-cresol	54.6	10.0	ug/L	100	BLOD	54.6	10-127	8.36	20	
Pentachlorophenol	94.9	20.0	ug/L	100	BLOD	94.9	14-176	12.6	20	
Phenanthrene	87.9	10.0	ug/L	100	BLOD	87.9	54-120	3.23	20	
Phenol	33.2	10.0	ug/L	101	BLOD	32.9	10-120	6.66	20	
Pyrene	75.1	10.0	ug/L	100	BLOD	75.1	52-120	12.5	20	
Pyridine	48.4	10.0	ug/L	100	BLOD	48.4	10-110	19.5	20	
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<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	<i>179</i>		<i>ug/L</i>	<i>200</i>		<i>89.7</i>	<i>5-136</i>			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	<i>54.0</i>		<i>ug/L</i>	<i>100</i>		<i>54.0</i>	<i>9-117</i>			
<i>Surr: 2-Fluorophenol (Surr)</i>	<i>72.7</i>		<i>ug/L</i>	<i>200</i>		<i>36.4</i>	<i>5-60</i>			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	<i>56.6</i>		<i>ug/L</i>	<i>100</i>		<i>56.6</i>	<i>5-151</i>			
<i>Surr: Phenol-d5 (Surr)</i>	<i>64.9</i>		<i>ug/L</i>	<i>200</i>		<i>32.4</i>	<i>5-60</i>			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	<i>74.6</i>		<i>ug/L</i>	<i>100</i>		<i>74.6</i>	<i>5-141</i>			
<hr/>										
Matrix Spike Dup (BGJ0528-MSD2)		Source: 23J0636-01		Prepared & Analyzed: 10/13/2023						
1,2,4-Trichlorobenzene	30.6	10.0	ug/L	93.5	BLOD	32.7	44-142	7.32	20	M
1,2-Dichlorobenzene	33.3	10.0	ug/L	93.5	BLOD	35.6	22-115	4.92	20	
1,3-Dichlorobenzene	32.2	10.0	ug/L	93.5	BLOD	34.4	22-112	9.81	20	
1,4-Dichlorobenzene	34.3	10.0	ug/L	93.5	BLOD	36.6	13-112	5.90	20	
2,4,6-Trichlorophenol	38.6	10.0	ug/L	93.5	BLOD	41.3	37-144	6.16	20	
2,4-Dichlorophenol	35.4	10.0	ug/L	93.5	BLOD	37.8	39-135	4.96	20	M

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0528-MSD2)	Source: 23J0636-01			Prepared & Analyzed: 10/13/2023						
2,4-Dimethylphenol	38.2	5.00	ug/L	93.5	BLOD	40.9	32-120	3.26	20	
2,4-Dinitrophenol	48.1	50.0	ug/L	93.5	BLOD	51.4	39-139	3.81	20	
2,4-Dinitrotoluene	43.5	10.0	ug/L	93.5	BLOD	46.5	10-191	7.66	20	
2,6-Dinitrotoluene	43.5	10.0	ug/L	93.5	BLOD	46.5	50-158	7.66	20	M
2-Chloronaphthalene	34.4	10.0	ug/L	93.5	BLOD	36.8	60-120	6.77	20	M
2-Chlorophenol	32.3	10.0	ug/L	93.5	BLOD	34.5	23-134	6.89	20	
2-Nitrophenol	41.5	10.0	ug/L	93.5	BLOD	44.4	29-182	7.04	20	
3,3'-Dichlorobenzidine	ND	10.0	ug/L	93.5	BLOD		10-262		20	M
4,6-Dinitro-2-methylphenol	53.9	50.0	ug/L	93.5	BLOD	57.7	10-181	5.81	20	
4-Bromophenyl phenyl ether	29.5	10.0	ug/L	93.5	BLOD	31.6	53-127	4.60	20	M
4-Chlorophenyl phenyl ether	30.9	10.0	ug/L	93.5	BLOD	33.1	25-158	7.24	20	
4-Nitrophenol	18.9	50.0	ug/L	93.5	BLOD	20.2	10-132	1.44	20	
Acenaphthene	38.1	10.0	ug/L	93.5	BLOD	40.8	47-145	6.30	20	M
Acenaphthylene	43.4	10.0	ug/L	93.5	BLOD	46.5	33-145	8.09	20	
Acetophenone	34.6	20.0	ug/L	93.5	BLOD	37.0	0-200	5.36	20	
Anthracene	34.9	10.0	ug/L	93.5	BLOD	37.4	27-133	1.51	20	
Benzo (a) anthracene	19.8	10.0	ug/L	93.5	BLOD	21.2	33-143	5.62	20	M
Benzo (a) pyrene	19.3	10.0	ug/L	93.5	BLOD	20.6	17-163	9.22	20	
Benzo (b) fluoranthene	20.1	10.0	ug/L	93.5	BLOD	21.5	24-159	6.54	20	M
Benzo (g,h,i) perylene	14.5	10.0	ug/L	93.5	BLOD	15.5	10-219	16.5	20	
Benzo (k) fluoranthene	18.5	10.0	ug/L	93.5	BLOD	19.8	11-162	8.32	20	
bis (2-Chloroethoxy) methane	44.3	10.0	ug/L	93.5	BLOD	47.5	33-184	6.66	20	
bis (2-Chloroethyl) ether	35.7	10.0	ug/L	93.5	BLOD	38.2	12-158	7.73	20	
2,2'-Oxybis (1-chloropropane)	36.8	10.0	ug/L	93.5	BLOD	39.3	36-166	7.00	20	
bis (2-Ethylhexyl) phthalate	22.1	10.0	ug/L	93.5	BLOD	23.7	10-158	5.20	20	

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0528-MSD2)	Source: 23J0636-01			Prepared & Analyzed: 10/13/2023						
Butyl benzyl phthalate	35.3	10.0	ug/L	93.5	BLOD	37.8	10-152	3.83	20	
Chrysene	19.7	10.0	ug/L	93.5	BLOD	21.1	17-169	3.37	20	
Dibenz (a,h) anthracene	14.6	10.0	ug/L	93.5	BLOD	15.6	10-227	10.6	20	
Diethyl phthalate	40.0	10.0	ug/L	93.5	BLOD	42.8	10-120	8.08	20	
Dimethyl phthalate	39.3	10.0	ug/L	93.5	BLOD	42.0	10-120	6.79	20	
Di-n-butyl phthalate	36.8	10.0	ug/L	93.5	BLOD	39.4	10-120	0.203	20	
Di-n-octyl phthalate	27.6	10.0	ug/L	93.5	BLOD	29.5	10-146	4.26	20	
Fluoranthene	27.7	10.0	ug/L	93.5	BLOD	29.7	26-137	3.70	20	
Fluorene	51.9	10.0	ug/L	93.5	BLOD	55.5	59-121	8.00	20	M
Hexachlorobenzene	14.4	1.00	ug/L	93.5	BLOD	15.4	10-152	4.32	20	
Hexachlorobutadiene	30.3	10.0	ug/L	93.5	BLOD	32.4	24-120	6.51	20	
Hexachlorocyclopentadiene	20.7	10.0	ug/L	93.5	BLOD	22.2	10-90	3.63	20	
Hexachloroethane	33.7	10.0	ug/L	93.5	BLOD	36.1	40-120	6.82	20	M
Indeno (1,2,3-cd) pyrene	14.3	10.0	ug/L	93.5	BLOD	15.3	10-171	14.7	20	
Isophorone	28.9	10.0	ug/L	93.5	BLOD	30.9	21-196	9.98	20	
Naphthalene	32.7	5.00	ug/L	93.5	BLOD	35.0	21-133	4.17	20	
Nitrobenzene	36.8	10.0	ug/L	93.5	BLOD	39.4	35-180	5.07	20	
n-Nitrosodimethylamine	24.6	10.0	ug/L	93.5	BLOD	26.4	10-85	8.80	20	
n-Nitrosodi-n-propylamine	37.2	10.0	ug/L	93.5	BLOD	39.8	10-230	5.71	20	
n-Nitrosodiphenylamine	33.0	10.0	ug/L	93.5	BLOD	35.3	12-111	4.84	20	
p-Chloro-m-cresol	37.8	10.0	ug/L	93.5	BLOD	40.4	10-127	4.55	20	
Pentachlorophenol	51.4	20.0	ug/L	93.5	BLOD	55.0	14-176	1.58	20	
Phenanthrene	57.7	10.0	ug/L	93.5	8.04	53.1	54-120	4.20	20	M
Phenol	17.0	10.0	ug/L	94.4	4.06	13.7	10-120	11.1	20	
Pyrene	29.7	10.0	ug/L	93.5	BLOD	31.8	52-120	4.54	20	M

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0528 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0528-MSD2)	Source: 23J0636-01			Prepared & Analyzed: 10/13/2023						
Pyridine	31.5	10.0	ug/L	93.5	BLOD	33.7	10-110	4.33	20	
<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	<i>102</i>		ug/L	<i>93.5</i>		<i>109</i>	<i>5-136</i>			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	<i>34.6</i>		ug/L	<i>46.7</i>		<i>74.1</i>	<i>9-117</i>			
<i>Surr: 2-Fluorophenol (Surr)</i>	<i>42.7</i>		ug/L	<i>93.5</i>		<i>45.7</i>	<i>5-60</i>			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	<i>39.1</i>		ug/L	<i>46.7</i>		<i>83.8</i>	<i>5-151</i>			
<i>Surr: Phenol-d5 (Surr)</i>	<i>30.3</i>		ug/L	<i>93.5</i>		<i>32.4</i>	<i>5-60</i>			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	<i>15.2</i>		ug/L	<i>46.7</i>		<i>32.6</i>	<i>5-141</i>			

Certificate of Analysis

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0517 - No Prep Wet Chem										
Blank (BGJ0517-BLK1)				Prepared & Analyzed: 10/12/2023						
Nitrite as N	ND	0.05	mg/L							
LCS (BGJ0517-BS1)				Prepared & Analyzed: 10/12/2023						
Nitrite as N	0.10	0.05	mg/L	0.100		97.0	80-120			
Matrix Spike (BGJ0517-MS1)				Source: 23J0552-05 Prepared & Analyzed: 10/12/2023						
Nitrite as N	0.09	0.05	mg/L	0.100	BLOD	92.0	80-120			
Matrix Spike (BGJ0517-MS2)				Source: 23J0633-05 Prepared & Analyzed: 10/12/2023						
Nitrite as N	0.10	0.05	mg/L	0.100	BLOD	98.0	80-120			
Matrix Spike Dup (BGJ0517-MSD1)				Source: 23J0552-05 Prepared & Analyzed: 10/12/2023						
Nitrite as N	0.09	0.05	mg/L	0.100	BLOD	94.0	80-120	2.15	20	
Matrix Spike Dup (BGJ0517-MSD2)				Source: 23J0633-05 Prepared & Analyzed: 10/12/2023						
Nitrite as N	0.10	0.05	mg/L	0.100	BLOD	97.0	80-120	1.03	20	
Batch BGJ0524 - No Prep Wet Chem										
Blank (BGJ0524-BLK1)				Prepared & Analyzed: 10/12/2023						
BOD	ND	2.0	mg/L							
LCS (BGJ0524-BS1)				Prepared & Analyzed: 10/12/2023						
BOD	202	2	mg/L	198		102	84.6-115.4			
Duplicate (BGJ0524-DUP1)				Source: 23J0566-05 Prepared & Analyzed: 10/12/2023						
BOD	2.5	2.0	mg/L		2.8			12.5	20	

Certificate of Analysis

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0755 - No Prep Wet Chem										
Blank (BGJ0755-BLK1)				Prepared & Analyzed: 10/18/2023						
Cyanide	ND	0.01	mg/L							
LCS (BGJ0755-BS1)				Prepared & Analyzed: 10/18/2023						
Cyanide	0.23	0.01	mg/L	0.250		90.2	80-120			
Matrix Spike (BGJ0755-MS1)				Source: 23J0399-07 Prepared & Analyzed: 10/18/2023						
Cyanide	0.24	0.01	mg/L	0.250	BLOD	95.5	80-120			
Matrix Spike (BGJ0755-MS2)				Source: 23J0399-02 Prepared & Analyzed: 10/18/2023						
Cyanide	0.25	0.01	mg/L	0.250	0.01	94.9	80-120			
Matrix Spike Dup (BGJ0755-MSD1)				Source: 23J0399-07 Prepared & Analyzed: 10/18/2023						
Cyanide	0.25	0.01	mg/L	0.250	BLOD	98.6	80-120	3.17	20	
Matrix Spike Dup (BGJ0755-MSD2)				Source: 23J0399-02 Prepared & Analyzed: 10/18/2023						
Cyanide	0.25	0.01	mg/L	0.250	0.01	94.2	80-120	0.687	20	
Batch BGJ0978 - No Prep Wet Chem										
Blank (BGJ0978-BLK1)				Prepared & Analyzed: 10/25/2023						
TKN as N	ND	0.50	mg/L							
LCS (BGJ0978-BS1)				Prepared & Analyzed: 10/25/2023						
TKN as N	4.95	0.50	mg/L	5.00		99.0	90-110			
Matrix Spike (BGJ0978-MS1)				Source: 23J1034-01 Prepared & Analyzed: 10/25/2023						
TKN as N	13.5	0.50	mg/L	5.00	8.63	96.7	90-110			

Certificate of Analysis

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0978 - No Prep Wet Chem										
Matrix Spike (BGJ0978-MS2)		Source: 23J0760-01			Prepared & Analyzed: 10/25/2023					
TKN as N	6.14	0.50	mg/L	5.00	1.19	99.1	90-110			
Matrix Spike Dup (BGJ0978-MSD1)		Source: 23J1034-01			Prepared & Analyzed: 10/25/2023					
TKN as N	13.4	0.50	mg/L	5.00	8.63	95.0	90-110	0.633	20	
Matrix Spike Dup (BGJ0978-MSD2)		Source: 23J0760-01			Prepared & Analyzed: 10/25/2023					
TKN as N	6.10	0.50	mg/L	5.00	1.19	98.3	90-110	0.604	20	
Batch BGJ0992 - No Prep Wet Chem										
Blank (BGJ0992-BLK1)					Prepared & Analyzed: 10/24/2023					
Nitrate+Nitrite as N	ND	0.10	mg/L							
LCS (BGJ0992-BS1)					Prepared & Analyzed: 10/24/2023					
Nitrate+Nitrite as N	1.05	0.1	mg/L	1.00		105	90-110			
Matrix Spike (BGJ0992-MS1)		Source: 23J0633-05			Prepared & Analyzed: 10/24/2023					
Nitrate+Nitrite as N	1.67	0.1	mg/L	1.00	0.59	108	90-120			
Matrix Spike Dup (BGJ0992-MSD1)		Source: 23J0633-05			Prepared & Analyzed: 10/24/2023					
Nitrate+Nitrite as N	1.61	0.1	mg/L	1.00	0.59	102	90-120	3.78	20	
Batch BGJ1020 - No Prep Wet Chem										
Blank (BGJ1020-BLK1)					Prepared & Analyzed: 10/25/2023					
Ammonia as N	ND	0.10	mg/L							

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ1020 - No Prep Wet Chem										
LCS (BGJ1020-BS1)				Prepared & Analyzed: 10/25/2023						
Ammonia as N	1.08	0.1	mg/L	1.00		108	90-110			
Matrix Spike (BGJ1020-MS1)				Source: 23J0552-16 Prepared & Analyzed: 10/25/2023						
Ammonia as N	1.02	0.1	mg/L	1.00	BLOD	102	89.3-131			
Matrix Spike (BGJ1020-MS2)				Source: 23J0943-03 Prepared & Analyzed: 10/25/2023						
Ammonia as N	1.15	0.1	mg/L	1.00	BLOD	109	89.3-131			
Matrix Spike Dup (BGJ1020-MSD1)				Source: 23J0552-16 Prepared & Analyzed: 10/25/2023						
Ammonia as N	1.07	0.1	mg/L	1.00	BLOD	107	89.3-131	4.11	20	
Matrix Spike Dup (BGJ1020-MSD2)				Source: 23J0943-03 Prepared & Analyzed: 10/25/2023						
Ammonia as N	1.18	0.1	mg/L	1.00	BLOD	111	89.3-131	2.14	20	
Batch BGJ1045 - No Prep Wet Chem										
Blank (BGJ1045-BLK1)				Prepared & Analyzed: 10/25/2023						
Total Recoverable Phenolics	ND	0.050	mg/L							
LCS (BGJ1045-BS1)				Prepared & Analyzed: 10/25/2023						
Total Recoverable Phenolics	0.41	0.050	mg/L	0.505		81.6	80-120			
Matrix Spike (BGJ1045-MS1)				Source: 23J1008-09 Prepared & Analyzed: 10/25/2023						
Total Recoverable Phenolics	0.46	0.050	mg/L	0.500	0.04	83.6	70-130			
Matrix Spike Dup (BGJ1045-MSD1)				Source: 23J1008-09 Prepared & Analyzed: 10/25/2023						
Total Recoverable Phenolics	0.45	0.050	mg/L	0.500	0.04	82.4	70-130	1.32	20	

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ1078 - No Prep Wet Chem										
Blank (BGJ1078-BLK1)				Prepared & Analyzed: 10/26/2023						
COD	ND	10.0	mg/L							
LCS (BGJ1078-BS1)				Prepared & Analyzed: 10/26/2023						
COD	49.7	10.0	mg/L	50.0		99.4	88-119			
Matrix Spike (BGJ1078-MS1)				Source: 23J0633-05 Prepared & Analyzed: 10/26/2023						
COD	48.1	10.0	mg/L	50.0	BLOD	96.2	72.4-130			
Matrix Spike Dup (BGJ1078-MSD1)				Source: 23J0633-05 Prepared & Analyzed: 10/26/2023						
COD	48.7	10.0	mg/L	50.0	BLOD	97.5	72.4-130	1.34	20	

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Analytical Summary

23J0632-01 Subcontract
 23J0632-02 Subcontract

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods			Preparation Method: EPA200.8 R5.4		
23J0632-01	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
23J0632-01RE1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
23J0632-02	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
23J0632-02RE1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method: No Prep Wet Chem		
23J0632-01	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
23J0632-02	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
23J0632-01	300 mL / 300 mL	SM5210B-2016	BGJ0524	SGJ0672	
23J0632-02	300 mL / 300 mL	SM5210B-2016	BGJ0524	SGJ0672	
23J0632-01	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
23J0632-02	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
23J0632-01	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
23J0632-02	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
23J0632-01	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
23J0632-01RE1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
23J0632-02	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
23J0632-02RE1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
23J0632-01	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
23J0632-02	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
23J0632-01	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352

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Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method: No Prep Wet Chem		
23J0632-02	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
23J0632-01	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
23J0632-02	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Organic Compounds by GCMS			Preparation Method: SW3510C/EPA600-MS		
23J0632-01	500 mL / 1.00 mL	SW8270E	BGJ0528	SGJ0593	AJ30247
23J0632-02	500 mL / 1.00 mL	SW8270E	BGJ0528	SGJ0593	AJ30247
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GCMS			Preparation Method: SW5030B-MS		
23J0632-01	5.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
23J0632-02	5.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
23J0632-03	5.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
23J0632-01RE1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
23J0632-02RE1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

QC Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods			Preparation Method:	EPA200.8 R5.4	
BGJ0615-BLK1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-BS1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MS1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MS2	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MSD1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MSD2	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method:	No Prep Wet Chem	
BGJ0517-BLK1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0517-BS1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0517-MRL1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0517-MS1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0517-MS2	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0517-MSD1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0517-MSD2	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0517	SGJ0496	AJ20128
BGJ0524-BLK1	300 mL / 300 mL	SM5210B-2016	BGJ0524	SGJ0672	
BGJ0524-BS1	300 mL / 300 mL	SM5210B-2016	BGJ0524	SGJ0672	
BGJ0524-DUP1	300 mL / 300 mL	SM5210B-2016	BGJ0524	SGJ0672	
BGJ0755-BLK1	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
BGJ0755-BS1	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
BGJ0755-MRL1	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
BGJ0755-MS1	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method:	No Prep Wet Chem	
BGJ0755-MS2	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
BGJ0755-MSD1	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
BGJ0755-MSD2	6.00 mL / 6.00 mL	SW9012B	BGJ0755	SGJ0749	AJ30310
BGJ0978-BLK1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0978-BS1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0978-MRL1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0978-MS1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0978-MS2	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0978-MSD1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0978-MSD2	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0978	SGJ0976	AJ30347
BGJ0992-BLK1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
BGJ0992-BS1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
BGJ0992-MS1	5.00 mL / 25.0 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
BGJ0992-MSD1	5.00 mL / 25.0 mL	SM4500-NO3F-2016	BGJ0992	SGJ0960	AJ30345
BGJ1020-BLK1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1020-BS1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1020-MRL1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1020-MS1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1020-MS2	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1020-MSD1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1020-MSD2	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1020	SGJ0982	AJ30349
BGJ1045-BLK1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-BS1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-MRL1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-MS1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-MSD1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1078-BLK1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-BS1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-MRL1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method:	No Prep Wet Chem	
BGJ1078-MS1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-MSD1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatiles Organic Compounds by GCMS			Preparation Method:	SW3510C/EPA600-MS	
BGJ0528-BLK1	1000 mL / 1.00 mL	SW8270E	BGJ0528	SGJ0563	AJ30247
BGJ0528-BS1	1000 mL / 1.00 mL	SW8270E	BGJ0528	SGJ0563	AJ30247
BGJ0528-MS1	500 mL / 0.500 mL	SW8270E	BGJ0528	SGJ0563	AJ30247
BGJ0528-MS2	1070 mL / 1.00 mL	SW8270E	BGJ0528	SGJ0593	AJ30247
BGJ0528-MSD1	500 mL / 0.500 mL	SW8270E	BGJ0528	SGJ0563	AJ30247
BGJ0528-MSD2	1070 mL / 1.00 mL	SW8270E	BGJ0528	SGJ0593	AJ30247

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GCMS			Preparation Method:	SW5030B-MS	
BGJ0533-BLK1	5.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
BGJ0533-BS1	5.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
BGJ0533-MS1	1.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
BGJ0533-MSD1	1.00 mL / 5.00 mL	SW8260D	BGJ0533	SGJ0527	AI30208
BGJ0587-BLK1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0587-BS1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0587-MS1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0587-MSD1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208

Certificate of Analysis

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Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA350.1 R2.0 in Non-Potable Water</i>	
Ammonia as N	VELAP,NCDEQ,PADEP,WVDEP
<i>EPA351.2 R2.0 in Non-Potable Water</i>	
TKN as N	VELAP,NCDEQ,WVDEP
<i>SM4500-NO2B-2011 in Non-Potable Water</i>	
Nitrite as N	VELAP,WVDEP,NCDEQ
<i>SM4500-NO3F-2016 in Non-Potable Water</i>	
Nitrate+Nitrite as N	VELAP,WVDEP
<i>SM5210B-2016 in Non-Potable Water</i>	
BOD	VELAP,NCDEQ,WVDEP
<i>SM5220D-2011 in Non-Potable Water</i>	
COD	VELAP,NCDEQ,PADEP,WVDEP
<i>SW6020B in Non-Potable Water</i>	
Mercury	VELAP
Arsenic	VELAP,WVDEP
Barium	VELAP,WVDEP
Cadmium	VELAP,WVDEP
Chromium	VELAP,WVDEP
Copper	VELAP,WVDEP
Lead	VELAP,WVDEP
Nickel	VELAP,WVDEP
Selenium	VELAP,WVDEP
Silver	VELAP,WVDEP
Zinc	VELAP,WVDEP
<i>SW8260D in Non-Potable Water</i>	

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Certified Analyses included in this Report

<u>Analyte</u>	<u>Certifications</u>
2-Butanone (MEK)	VELAP,NCDEQ,PADEP,WVDEP
Acetone	VELAP,NCDEQ,PADEP,WVDEP
Benzene	VELAP,NCDEQ,PADEP,WVDEP
Ethylbenzene	VELAP,NCDEQ,PADEP,WVDEP
Toluene	VELAP,NCDEQ,PADEP,WVDEP
Xylenes, Total	VELAP,NCDEQ,PADEP,WVDEP
Tetrahydrofuran	VELAP,PADEP
<i>SW8270E in Non-Potable Water</i>	
Anthracene	VELAP,PADEP,NCDEQ,WVDEP
<i>SW9012B in Non-Potable Water</i>	
Cyanide	VELAP,WVDEP
<i>SW9065 in Non-Potable Water</i>	
Total Recoverable Phenolics	VELAP,WVDEP

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2023
NC	North Carolina DENR	495	12/31/2023
NCDEQ	North Carolina DEQ	495	12/31/2023
NCDOH	North Carolina Department of Health	51714	07/31/2024
NYDOH	New York DOH Drinking Water	12069	04/01/2024
PADEP	NELAP-Pennsylvania Certificate #008	68-03503	10/31/2023
SCDHEC	South Carolina Dept of Health and Environmental Control Certificate 93016001	93016	06/14/2024
TXCEQ	Texas Comm on Environmental Quality #T104704576-23-1	T104704576	05/31/2024
VELAP	NELAP-Virginia Certificate #12617	460021	06/14/2024
WVDEP	West Virginia DEP	350	11/30/2023

Certificate of Analysis

Client Name: SCS Engineers-Winchester
Client Site I.D.: 2023 City of Bristol Landfill Leachate
Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Qualifiers and Definitions

CI	Residual Chlorine or other oxidizing agent was detected in the container used to analyze this sample.
DS	Surrogate concentration reflects a dilution factor.
J	The reported result is an estimated value.
M	Matrix spike recovery is outside established acceptance limits
P	Duplicate analysis does not meet the acceptance criteria for precision
RPD	Relative Percent Difference
Qual	Qualifiers
-RE	Denotes sample was re-analyzed
LOD	Limit of Detection
BLOD	Below Limit of Detection
LOQ	Limit of Quantitation
DF	Dilution Factor
TIC	Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library. A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
PCBs, Total	Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.



1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

COMPANY NAME: SCS Engineers	INVOICE TO: SAME	PROJECT NAME/Quote #:
CONTACT: Jennifer Robb	INVOICE CONTACT:	SITE NAME: 2023 City of Bristol Landfill Leachate
ADDRESS: 11260 Roger Bacon Drive, Ste. 300, Reston VA 20190	INVOICE ADDRESS:	PROJECT NUMBER: 02218208.15 Task 1
PHONE #: 703-471-6150	EMAIL: jrobb@scsengineers.com	Pretreatment Program:
Is sample for compliance reporting? YES NO	Regulatory State: V A	Is sample from a chlorinated supply? YES NO
SAMPLER NAME (PRINT): Logan Nelson/Will Fabric		SAMPLER SIGNATURE: <i>[Signature]</i>
		Turn Around Time: 10 Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)											COMMENTS	
											Ammonia - EPA 350.1	BOD - SM22 5210B-201	COD - SM22 5220D-2011	Cyanide - EPA 335.2	Nitrate SM22 450-NO3F-2011 (report separately from Nitrite)	Nitrite SM22 450-NO3F-2011	SVOC (Anthracene) 8270	Total Metals (As, Ba, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn) 6020	TKN - EPA 351.2 R2.0	Mercury - 6020	Total Recoverable Phenolics - 9065		V. Fatty Acids (See List) 8015
1) EW-87	X					10/11/23	830		GW	12	X	X	X	X	X	X	X	X	X	X	X	X	<p>Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol</p> <p>Note VOC 8260 no HCl</p> <p>PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)</p>
2) EW-55	X					10/11/23	800		GW	12	X	X	X	X	X	X	X	X	X	X	X	X	
3)									GW														
4)									GW														
5)									GW														
6)									GW														
7)									GW														
8)									GW														
9)									GW														
10) Trip Blank						9/20/23	1335		DI	2												X	

RELINQUISHED: <i>[Signature]</i>	DATE / TIME: 10/11/23/1200	RECEIVED: LCRV	DATE / TIME:	QC Data Package	LAB USE ONLY Therm ID: 338	COOLER TEMP 2.8 °C
RELINQUISHED: LCRV	DATE / TIME:	RECEIVED: <i>[Signature]</i>	DATE / TIME: 10/12/23 0800	Level III <input type="checkbox"/>	Customer Seals used and intact? (N)	Received on ice? (N)
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:	Level IV <input type="checkbox"/>	SCS-W 23J0632	
				2023 City of Bristol Landfill Leach:		
				Recd: 10/12/2023 Due: 10/26/2023		



Sample Preservation Log

Order ID 23 J0632

Date Performed: 10/12/23

Analyst Performing Check: JH

Sample ID	Container ID	Metals		Cyanide		Sulfide		Ammonia		TKN		Phos, Tot		NO3+NO2		DRO		Pesticide (8081/609/508) PCB DW only			SVOC (525/6270/625)			CrVI * **		Pest/PCB (508) / SVOC(525)		Phenolics		COD						
		pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH	Received Res. Cl	final or -	Received Res. Cl	final or -	Received pH	Final pH	pH as Received	Final pH	pH as Received	Final pH	pH as Received	Final pH							
		<2	Other	>12	Other	>9	Other	<2	Other	<2	Other	<2	Other	<2	Other	<2	Other							<2	Other	<2	Other	<2	Other							
1	A	7	<2																																	
1	C			7	<2																															
1	E																																			
1	F																																			
1	G							7	<2	7	<2			7	<2																					
2	A	7	<2																																	
2	C			7	<2																															
2	E																																			
2	F																																			
2	G							7	<2	7	<2			7	<2																					

NaOH ID: 2H00468

HNO3 ID: 3I64133

CrVI preserved date/time: _____
 * pH must be adjusted between 9.3 - 9.7

Analyst Initials: _____

H2SO4 ID: 3I63139

Na2S2O3 ID: _____

Ammonia Buffer Sol'n ID: _____

HCL ID: _____

Na2SO3 ID: _____

5N NaOH ID: _____

Metals were received with pH = 7
 HNO3 was added on 12 October 2023 at
 1140 by JNH in the Log-In room to bring
 pH = <2.

Certificate of Analysis

Client Name: SCS Engineers-Winchester
Client Site I.D.: 2023 City of Bristol Landfill Leachate
Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Logan Howard

Date Issued: 10/26/2023 5:13:09PM

Laboratory Order ID: 23J0632

Sample Conditions Checklist

Samples Received at:	2.80°C
How were samples received?	Logistics Courier
Were Custody Seals used? If so, were they received intact?	Yes
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits or received on ice, and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	No
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	Yes
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis. In addition, field parameters are always received outside holding time and will be marked accordingly.	No

Work Order Comments

Jennifer Robb notified via email for samples being received with trip blanks that were not indicated on the chain of custody, as well as P250 mL and GA250mL preserved with H2SO4 containers being received at a pH of 7, and VOAC40 mL containers being recieved with headspace. KRC 10/12/23 1326

Certificate of Analysis

Client Name: SCS Engineers-Winchester

Date Issued: 10/26/2023 5:13:09PM

Client Site I.D.: 2023 City of Bristol Landfill Leachate

Submitted To: Logan Howard

Jennifer Robb confirmed via email to proceed with analysis despite headspace deviation. KRC 10/12/23 1336

Work Orders: 3J13042

Project: 23J0632

Attn: Enthalpy VA

Client: Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Report Date: 10/23/2023

Received Date: 10/13/2023

Turnaround Time: 5 workdays

Phones: (804) 358-8295

Fax:

P.O. #: PO-053980

Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • LACSD #10143

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Enthalpy VA,

Enclosed are the results of analyses for samples received 10/13/23 with the Chain-of-Custody document. The samples were received in good condition, at 2.6 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:



Ryan J. Gasio
Project Manager



Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Project Number: 23J0632

Project Manager: Enthalpy VA

Reported:
10/23/2023 12:14

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
23J0632-01: EW-87	Client	3J13042-01	Water	10/11/23 08:30	
23J0632-02: EW-55	Client	3J13042-02	Water	10/11/23 08:00	

Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Project Number: 23J0632
Project Manager: Enthalpy VA

Reported:
10/23/2023 12:14

Sample Results

Sample: 23J0632-01: EW-87
3J13042-01 (Water) Sampled: 10/11/23 8:30 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Alcohols by GC/FID						
Method: EPA 8015M		Instr: GC09				
Batch ID: W3J1540		Preparation: _NONE (SVOC)		Prepared: 10/19/23 17:00		Analyst: alf
Acetic acid	4100	500	mg/l	50	10/20/23	M-05
Butyric acid	2000	500	mg/l	50	10/20/23	M-05
Heptanoic acid	ND	500	mg/l	50	10/20/23	M-05
Hexanoic acid	ND	500	mg/l	50	10/20/23	M-05
Isobutyric acid	ND	500	mg/l	50	10/20/23	M-05
Isocaproic acid	ND	500	mg/l	50	10/20/23	M-05
Isovaleric acid	ND	500	mg/l	50	10/20/23	M-05
Propionic acid	2000	500	mg/l	50	10/20/23	M-05
Valeric acid	ND	500	mg/l	50	10/20/23	M-05

Sample Results

Sample: 23J0632-02: EW-55
3J13042-02 (Water) Sampled: 10/11/23 8:00 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Alcohols by GC/FID						
Method: EPA 8015M		Instr: GC09				
Batch ID: W3J1540		Preparation: _NONE (SVOC)		Prepared: 10/19/23 17:00		Analyst: alf
Acetic acid	3200	500	mg/l	50	10/20/23	M-05
Butyric acid	1200	500	mg/l	50	10/20/23	M-05
Heptanoic acid	ND	500	mg/l	50	10/20/23	M-05
Hexanoic acid	ND	500	mg/l	50	10/20/23	M-05
Isobutyric acid	ND	500	mg/l	50	10/20/23	M-05
Isocaproic acid	ND	500	mg/l	50	10/20/23	M-05
Isovaleric acid	ND	500	mg/l	50	10/20/23	M-05
Propionic acid	1300	500	mg/l	50	10/20/23	M-05
Valeric acid	ND	500	mg/l	50	10/20/23	M-05

Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Project Number: 23J0632

Reported:
10/23/2023 12:14

Project Manager: Enthalpy VA

Quality Control Results

Alcohols by GC/FID

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit	Qualifier
Batch: W3J1540 - EPA 8015M										
Blank (W3J1540-BLK1)										
				Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	ND	10	mg/l							
Butyric acid	ND	10	mg/l							
Heptanoic acid	ND	10	mg/l							
Hexanoic acid	ND	10	mg/l							
Isobutyric acid	ND	10	mg/l							
Isocaproic acid	ND	10	mg/l							
Isovaleric acid	ND	10	mg/l							
Propionic acid	ND	10	mg/l							
Valeric acid	ND	10	mg/l							
LCS (W3J1540-BS1)										
				Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	57.1	10	mg/l	50.0		114	50-150			
Butyric acid	49.8	10	mg/l	50.0		100	50-150			
Heptanoic acid	57.3	10	mg/l	50.0		115	50-150			
Hexanoic acid	53.7	10	mg/l	50.0		107	50-150			
Isobutyric acid	57.2	10	mg/l	50.0		114	50-150			
Isocaproic acid	47.7	10	mg/l	50.0		95	50-150			
Isovaleric acid	40.0	10	mg/l	50.0		80	50-150			
Propionic acid	50.1	10	mg/l	50.0		100	50-150			
Valeric acid	45.8	10	mg/l	50.0		92	50-150			
Matrix Spike (W3J1540-MS1)										
		Source: 3129078-01		Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	2780	500	mg/l	2500	ND	111	50-150			
Butyric acid	2490	500	mg/l	2500	ND	100	50-150			
Heptanoic acid	2740	500	mg/l	2500	ND	110	50-150			
Hexanoic acid	2720	500	mg/l	2500	ND	109	50-150			
Isobutyric acid	2830	500	mg/l	2500	ND	113	50-150			
Isocaproic acid	2470	500	mg/l	2500	ND	99	50-150			
Isovaleric acid	2010	500	mg/l	2500	ND	80	50-150			
Propionic acid	2490	500	mg/l	2500	ND	100	50-150			
Valeric acid	2320	500	mg/l	2500	ND	93	50-150			
Matrix Spike Dup (W3J1540-MSD1)										
		Source: 3129078-01		Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	2790	500	mg/l	2500	ND	112	50-150	0.4	25	
Butyric acid	2490	500	mg/l	2500	ND	99	50-150	0.2	25	
Heptanoic acid	2800	500	mg/l	2500	ND	112	50-150	2	25	
Hexanoic acid	2690	500	mg/l	2500	ND	108	50-150	1	25	
Isobutyric acid	2820	500	mg/l	2500	ND	113	50-150	0.06	25	
Isocaproic acid	2410	500	mg/l	2500	ND	97	50-150	2	25	
Isovaleric acid	1990	500	mg/l	2500	ND	80	50-150	0.9	25	
Propionic acid	2520	500	mg/l	2500	ND	101	50-150	1	25	
Valeric acid	2300	500	mg/l	2500	ND	92	50-150	0.8	25	

Enthalpy Analytical - Richmond VA
 1941 Reymet Road
 Richmond, VA 23237

Project Number: 23J0632

Project Manager: Enthalpy VA

Reported:
 10/23/2023 12:14

Quality Control Results

(Continued)

Alcohols by GC/FID (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Batch: W3J1540 - EPA 8015M (Continued)

Matrix Spike Dup (W3J1540-MSD1)

Source: 3129078-01

Prepared: 10/19/23 Analyzed: 10/20/23

Enthalpy Analytical - Richmond VA
 1941 Reymet Road
 Richmond, VA 23237

Project Number: 23J0632

Project Manager: Enthalpy VA

Reported:
 10/23/2023 12:14

Notes and Definitions

Item	Definition
M-05	Due to the nature of matrix interferences, sample was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.



1941 Reymet Road • Richmond, Virginia 23237 • Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 23J0725

Client Name: SCS Engineers-Winchester
296 Victory Road
Winchester, VA 22602

Date Received: October 13, 2023 8:00
Date Issued: November 1, 2023 15:39
Project Number: 02218208.15 Task 1
Purchase Order:

Submitted To: Jennifer Robb

Client Site I.D.: 2023 City of Bristol Landfill Leachate

Enclosed are the results of analyses for samples received by the laboratory on 10/13/2023 08:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars
Technical Director

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Enthalpy Analytical.

Analysis Detects Report

Client Name: SCS Engineers-Winchester
 Client Site ID: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Laboratory Sample ID: 23J0725-01 Client Sample ID: EW-78

Parameter	Samp ID	Reference Method	Sample Results	Qual	LOD	LOQ	Dil. Factor	Units
Arsenic	01	SW6020B	240		0.50	1.0	1	ug/L
Barium	01RE1	SW6020B	664		2.00	10.0	2	ug/L
Cadmium	01	SW6020B	0.171	J	0.100	1.00	1	ug/L
Chromium	01	SW6020B	144		0.400	1.00	1	ug/L
Copper	01	SW6020B	3.61		0.300	1.00	1	ug/L
Lead	01	SW6020B	3.6		1.0	1.0	1	ug/L
Nickel	01	SW6020B	201.9		1.000	1.000	1	ug/L
Selenium	01	SW6020B	1.86		0.850	1.00	1	ug/L
Zinc	01	SW6020B	62.2		2.50	5.00	1	ug/L
2-Butanone (MEK)	01RE1	SW8260D	211		15.0	50.0	5	ug/L
Acetone	01RE1	SW8260D	79.0		35.0	50.0	5	ug/L
Benzene	01RE1	SW8260D	399		2.00	5.00	5	ug/L
Ethylbenzene	01RE1	SW8260D	34.8		2.00	5.00	5	ug/L
Tetrahydrofuran	01RE1	SW8260D	606		50.0	50.0	5	ug/L
Toluene	01RE1	SW8260D	59.2		2.50	5.00	5	ug/L
Xylenes, Total	01RE1	SW8260D	30.6		5.00	15.0	5	ug/L
Ammonia as N	01	EPA350.1 R2.0	1730		146	200	2000	mg/L
BOD	01	SM5210B-2016	690		0.2	2.0	1	mg/L
COD	01	SM5220D-2011	5320		500	500	50	mg/L
Cyanide	01RE1	SW9012B	0.68		0.10	0.10	10	mg/L
Nitrate+Nitrite as N	01	SM4500-NO3F-2016	1.10		0.10	0.10	1	mg/L
TKN as N	01	EPA351.2 R2.0	4630		100	250	500	mg/L
Total Recoverable Phenolics	01	SW9065	4.13		0.150	0.250	1	mg/L

Note that this report is not the "Certificate of Analysis". This report only lists the target analytes that displayed concentrations that exceeded the detection limit specified for that analyte. For a complete listing of all analytes requested and the results of the analysis see the "Certificate of Analysis".

Certificate of Analysis

Client Name: SCS Engineers-Winchester
Client Site I.D.: 2023 City of Bristol Landfill Leachate
Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EW-78	23J0725-01	Ground Water	10/11/2023 14:15	10/13/2023 08:00
Trip Blank	23J0725-02	Ground Water	10/04/2023 10:25	10/13/2023 08:00

In order to resolve heavy matrix interference, dilutions were performed on several analyses.
Analysis for Volatile Fatty Acids was subcontracted to Weck. The subcontracted results are attached at the end of this Certificate of Analysis.

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Client Sample ID: EW-78

Laboratory Sample ID: 23J0725-01

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Metals (Total) by EPA 6000/7000 Series Methods												
Silver	01	7440-22-4	SW6020B	10/16/2023 11:25	10/17/2023 10:56	BLOD		0.0600	1.00	1	ug/L	AB
Arsenic	01	7440-38-2	SW6020B	10/16/2023 11:25	10/17/2023 10:56	240		0.50	1.0	1	ug/L	AB
Barium	01RE1	7440-39-3	SW6020B	10/16/2023 11:25	10/17/2023 10:48	664		2.00	10.0	2	ug/L	AB
Cadmium	01	7440-43-9	SW6020B	10/16/2023 11:25	10/17/2023 10:56	0.171	J	0.100	1.00	1	ug/L	AB
Chromium	01	7440-47-3	SW6020B	10/16/2023 11:25	10/17/2023 10:56	144		0.400	1.00	1	ug/L	AB
Copper	01	7440-50-8	SW6020B	10/16/2023 11:25	10/17/2023 10:56	3.61		0.300	1.00	1	ug/L	AB
Mercury	01	7439-97-6	SW6020B	10/16/2023 11:25	10/17/2023 10:48	BLOD		0.400	0.400	2	ug/L	AB
Nickel	01	7440-02-0	SW6020B	10/16/2023 11:25	10/17/2023 10:56	201.9		1.000	1.000	1	ug/L	AB
Lead	01	7439-92-1	SW6020B	10/16/2023 11:25	10/17/2023 10:56	3.6		1.0	1.0	1	ug/L	AB
Selenium	01	7782-49-2	SW6020B	10/16/2023 11:25	10/17/2023 10:56	1.86		0.850	1.00	1	ug/L	AB
Zinc	01	7440-66-6	SW6020B	10/16/2023 11:25	10/17/2023 10:56	62.2		2.50	5.00	1	ug/L	AB
Volatile Organic Compounds by GCMS												
2-Butanone (MEK)	01RE1	78-93-3	SW8260D	10/16/2023 12:01	10/16/2023 12:01	211		15.0	50.0	5	ug/L	TLH
Acetone	01RE1	67-64-1	SW8260D	10/16/2023 12:01	10/16/2023 12:01	79.0		35.0	50.0	5	ug/L	TLH
Benzene	01RE1	71-43-2	SW8260D	10/16/2023 12:01	10/16/2023 12:01	399		2.00	5.00	5	ug/L	TLH
Ethylbenzene	01RE1	100-41-4	SW8260D	10/16/2023 12:01	10/16/2023 12:01	34.8		2.00	5.00	5	ug/L	TLH
Toluene	01RE1	108-88-3	SW8260D	10/16/2023 12:01	10/16/2023 12:01	59.2		2.50	5.00	5	ug/L	TLH
Xylenes, Total	01RE1	1330-20-7	SW8260D	10/16/2023 12:01	10/16/2023 12:01	30.6		5.00	15.0	5	ug/L	TLH
Tetrahydrofuran	01RE1	109-99-9	SW8260D	10/16/2023 12:01	10/16/2023 12:01	606		50.0	50.0	5	ug/L	TLH
Surr: 1,2-Dichloroethane-d4 (Surr)	01	96.9 %	70-120	10/13/2023 20:12	10/13/2023 20:12							
Surr: 4-Bromofluorobenzene (Surr)	01	104 %	75-120	10/13/2023 20:12	10/13/2023 20:12							
Surr: Dibromofluoromethane (Surr)	01	94.1 %	70-130	10/13/2023 20:12	10/13/2023 20:12							
Surr: Toluene-d8 (Surr)	01	99.0 %	70-130	10/13/2023 20:12	10/13/2023 20:12							
Surr: 1,2-Dichloroethane-d4 (Surr)	01RE1	104 %	70-120	10/16/2023 12:01	10/16/2023 12:01							
Surr: 4-Bromofluorobenzene (Surr)	01RE1	104 %	75-120	10/16/2023 12:01	10/16/2023 12:01							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Client Sample ID: EW-78

Laboratory Sample ID: 23J0725-01

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Volatile Organic Compounds by GCMS												
Surr: Dibromofluoromethane (Surr)	01RE1	100 %	70-130	10/16/2023 12:01	10/16/2023 12:01							
Surr: Toluene-d8 (Surr)	01RE1	101 %	70-130	10/16/2023 12:01	10/16/2023 12:01							
Semivolatile Organic Compounds by GCMS												
Anthracene	01	120-12-7	SW8270E	10/17/2023 09:30	10/17/2023 19:54	BLOD		50.0	100	10	ug/L	BMS
Surr: 2,4,6-Tribromophenol (Surr)	01	45.6 %	5-136	10/17/2023 09:30	10/17/2023 19:54							
Surr: 2-Fluorobiphenyl (Surr)	01	25.1 %	9-117	10/17/2023 09:30	10/17/2023 19:54							
Surr: 2-Fluorophenol (Surr)	01	21.0 %	5-60	10/17/2023 09:30	10/17/2023 19:54							
Surr: Nitrobenzene-d5 (Surr)	01	37.3 %	5-151	10/17/2023 09:30	10/17/2023 19:54							
Surr: Phenol-d5 (Surr)	01	14.2 %	5-60	10/17/2023 09:30	10/17/2023 19:54							
Surr: p-Terphenyl-d14 (Surr)	01	6.10 %	5-141	10/17/2023 09:30	10/17/2023 19:54							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Client Sample ID: EW-78

Laboratory Sample ID: 23J0725-01

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Wet Chemistry Analysis												
Ammonia as N	01	7664-41-7	EPA350.1 R2.0	10/26/2023 13:29	10/26/2023 13:29	1730		146	200	2000	mg/L	MGC
BOD	01	E1640606	SM5210B-20 16	10/13/2023 11:25	10/13/2023 11:25	690		0.2	2.0	1	mg/L	MJRL
Cyanide	01RE1	57-12-5	SW9012B	10/24/2023 13:06	10/24/2023 13:06	0.68		0.10	0.10	10	mg/L	MGC
COD	01	NA	SM5220D-20 11	10/26/2023 10:00	10/26/2023 10:00	5320		500	500	50	mg/L	MJRL
Nitrate as N	01	14797-55-8	Calc.	10/25/2023 13:00	10/25/2023 13:00	BLOD		0.350	1.35	1	mg/L	AJM
Nitrate+Nitrite as N	01	E701177	SM4500-NO 3F-2016	10/25/2023 13:00	10/25/2023 13:00	1.10		0.10	0.10	1	mg/L	TEG
Nitrite as N	01	14797-65-0	SM4500-NO 2B-2011	10/13/2023 10:00	10/13/2023 10:00	BLOD		0.25	1.25	1	mg/L	AJM
Total Recoverable Phenolics	01	NA	SW9065	10/25/2023 17:06	10/25/2023 17:06	4.13		0.150	0.250	1	mg/L	AAL
TKN as N	01	E17148461	EPA351.2 R2.0	10/25/2023 11:20	10/25/2023 11:20	4630		100	250	500	mg/L	AAL

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Client Sample ID: Trip Blank

Laboratory Sample ID: 23J0725-02

Parameter	Samp ID	CAS	Reference Method	Sample Prep Date/Time	Analyzed Date/Time	Sample Results	Qual	LOD	LOQ	DF	Units	Analyst
Volatile Organic Compounds by GCMS												
2-Butanone (MEK)	02	78-93-3	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		3.00	10.0	1	ug/L	RJB
Acetone	02	67-64-1	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		7.00	10.0	1	ug/L	RJB
Benzene	02	71-43-2	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		0.40	1.00	1	ug/L	RJB
Ethylbenzene	02	100-41-4	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		0.40	1.00	1	ug/L	RJB
Toluene	02	108-88-3	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		0.50	1.00	1	ug/L	RJB
Xylenes, Total	02	1330-20-7	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		1.00	3.00	1	ug/L	RJB
Tetrahydrofuran	02	109-99-9	SW8260D	10/13/2023 17:52	10/13/2023 17:52	BLOD		10.0	10.0	1	ug/L	RJB
Surr: 1,2-Dichloroethane-d4 (Surr)	02	107 %	70-120	10/13/2023 17:52	10/13/2023 17:52							
Surr: 4-Bromofluorobenzene (Surr)	02	103 %	75-120	10/13/2023 17:52	10/13/2023 17:52							
Surr: Dibromofluoromethane (Surr)	02	101 %	70-130	10/13/2023 17:52	10/13/2023 17:52							
Surr: Toluene-d8 (Surr)	02	104 %	70-130	10/13/2023 17:52	10/13/2023 17:52							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0615 - EPA200.8 R5.4

Blank (BGJ0615-BLK1)

Prepared: 10/16/2023 Analyzed: 10/17/2023

Mercury	ND	0.200	ug/L							
Arsenic	ND	1.0	ug/L							
Barium	ND	5.00	ug/L							
Cadmium	ND	1.00	ug/L							
Chromium	ND	1.00	ug/L							
Copper	ND	1.00	ug/L							
Lead	ND	1.0	ug/L							
Nickel	ND	1.000	ug/L							
Selenium	ND	1.00	ug/L							
Silver	ND	1.00	ug/L							
Zinc	ND	5.00	ug/L							

LCS (BGJ0615-BS1)

Prepared: 10/16/2023 Analyzed: 10/17/2023

Mercury	0.987	0.200	ug/L	1.00		98.7	80-120
Arsenic	50	1.0	ug/L	50.0		101	80-120
Barium	49.7	5.00	ug/L	50.0		99.3	80-120
Cadmium	51.0	1.00	ug/L	50.0		102	80-120
Chromium	46.9	1.00	ug/L	50.0		93.8	80-120
Copper	50.1	1.00	ug/L	50.0		100	80-120
Lead	51	1.0	ug/L	50.0		102	80-120
Nickel	49.12	1.000	ug/L	50.0		98.2	80-120
Selenium	49.8	1.00	ug/L	50.0		99.6	80-120
Silver	10.0	1.00	ug/L	10.0		100	80-120
Zinc	52.1	5.00	ug/L	50.0		104	80-120

Matrix Spike (BGJ0615-MS1)

Source: 23J0679-01

Prepared: 10/16/2023 Analyzed: 10/17/2023

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0615 - EPA200.8 R5.4

Matrix Spike (BGJ0615-MS1)		Source: 23J0679-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
Mercury	1.00	0.200	ug/L	1.00	BLOD	100	70-130			
Arsenic	50	1.0	ug/L	50.0	0.57	98.1	75-125			
Barium	89.9	5.00	ug/L	50.0	41.7	96.5	75-125			
Cadmium	47.4	1.00	ug/L	50.0	BLOD	94.8	75-125			
Chromium	46.5	1.00	ug/L	50.0	BLOD	92.9	75-125			
Copper	49.8	1.00	ug/L	50.0	2.86	93.9	75-125			
Lead	48	1.0	ug/L	50.0	BLOD	96.7	75-125			
Nickel	50.17	1.000	ug/L	50.0	3.985	92.4	75-125			
Selenium	44.6	1.00	ug/L	50.0	BLOD	89.2	75-125			
Silver	9.50	1.00	ug/L	10.0	BLOD	95.0	75-125			
Zinc	54.9	5.00	ug/L	50.0	10.6	88.6	75-125			

Matrix Spike (BGJ0615-MS2)		Source: 23J0728-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
Mercury	1.02	0.200	ug/L	1.00	BLOD	102	70-130			
Arsenic	51	1.0	ug/L	50.0	BLOD	101	75-125			
Barium	99.9	5.00	ug/L	50.0	49.1	102	75-125			
Cadmium	50.4	1.00	ug/L	50.0	BLOD	101	75-125			
Chromium	52.3	1.00	ug/L	50.0	0.939	103	75-125			
Copper	54.1	1.00	ug/L	50.0	3.60	101	75-125			
Lead	51	1.0	ug/L	50.0	BLOD	102	75-125			
Nickel	52.48	1.000	ug/L	50.0	3.408	98.2	75-125			
Selenium	48.2	1.00	ug/L	50.0	BLOD	96.3	75-125			
Silver	10.2	1.00	ug/L	10.0	BLOD	102	75-125			
Zinc	69.1	5.00	ug/L	50.0	19.6	99.0	75-125			

Matrix Spike Dup (BGJ0615-MSD1)		Source: 23J0679-01			Prepared: 10/16/2023 Analyzed: 10/17/2023					
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Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0615 - EPA200.8 R5.4

Matrix Spike Dup (BGJ0615-MSD1)	Source: 23J0679-01			Prepared: 10/16/2023 Analyzed: 10/17/2023						
Mercury	1.01	0.200	ug/L	1.00	BLOD	101	70-130	0.517	20	
Arsenic	48	1.0	ug/L	50.0	0.57	95.3	75-125	2.85	20	
Barium	87.3	5.00	ug/L	50.0	41.7	91.1	75-125	3.03	20	
Cadmium	45.5	1.00	ug/L	50.0	BLOD	91.0	75-125	4.12	20	
Chromium	43.1	1.00	ug/L	50.0	BLOD	86.2	75-125	7.52	20	
Copper	47.8	1.00	ug/L	50.0	2.86	89.8	75-125	4.24	20	
Lead	45	1.0	ug/L	50.0	BLOD	90.3	75-125	6.80	20	
Nickel	48.44	1.000	ug/L	50.0	3.985	88.9	75-125	3.51	20	
Selenium	43.9	1.00	ug/L	50.0	BLOD	87.8	75-125	1.65	20	
Silver	9.09	1.00	ug/L	10.0	BLOD	90.9	75-125	4.39	20	
Zinc	52.5	5.00	ug/L	50.0	10.6	83.8	75-125	4.40	20	
Matrix Spike Dup (BGJ0615-MSD2)	Source: 23J0728-01			Prepared: 10/16/2023 Analyzed: 10/17/2023						
Mercury	1.05	0.200	ug/L	1.00	BLOD	105	70-130	2.29	20	
Arsenic	51	1.0	ug/L	50.0	BLOD	102	75-125	0.970	20	
Barium	99.0	5.00	ug/L	50.0	49.1	99.7	75-125	0.956	20	
Cadmium	50.9	1.00	ug/L	50.0	BLOD	102	75-125	0.869	20	
Chromium	51.8	1.00	ug/L	50.0	0.939	102	75-125	0.927	20	
Copper	54.0	1.00	ug/L	50.0	3.60	101	75-125	0.176	20	
Lead	51	1.0	ug/L	50.0	BLOD	103	75-125	0.764	20	
Nickel	52.82	1.000	ug/L	50.0	3.408	98.8	75-125	0.630	20	
Selenium	48.2	1.00	ug/L	50.0	BLOD	96.4	75-125	0.0419	20	
Silver	10.4	1.00	ug/L	10.0	BLOD	104	75-125	1.26	20	
Zinc	68.8	5.00	ug/L	50.0	19.6	98.5	75-125	0.368	20	

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0587 - SW5030B-MS										
Blank (BGJ0587-BLK1)				Prepared & Analyzed: 10/13/2023						
2-Butanone (MEK)	ND	10.0	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.00	ug/L							
Ethylbenzene	ND	1.00	ug/L							
Toluene	ND	1.00	ug/L							
Xylenes, Total	ND	3.00	ug/L							
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	51.4		ug/L	50.0		103	70-120			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	52.2		ug/L	50.0		104	75-120			
<i>Surr: Dibromofluoromethane (Surr)</i>	49.2		ug/L	50.0		98.4	70-130			
<i>Surr: Toluene-d8 (Surr)</i>	51.1		ug/L	50.0		102	70-130			
LCS (BGJ0587-BS1)				Prepared & Analyzed: 10/13/2023						
1,1,1,2-Tetrachloroethane	49.4	0.4	ug/L	50.0		98.8	80-130			
1,1,1-Trichloroethane	51.1	1	ug/L	50.0		102	65-130			
1,1,2,2-Tetrachloroethane	55.5	0.4	ug/L	50.0		111	65-130			
1,1,2-Trichloroethane	58.8	1	ug/L	50.0		118	75-125			
1,1-Dichloroethane	54.7	1	ug/L	50.0		109	70-135			
1,1-Dichloroethylene	43.5	1	ug/L	50.0		87.1	70-130			
1,1-Dichloropropene	54.4	1	ug/L	50.0		109	75-135			
1,2,3-Trichlorobenzene	42.5	1	ug/L	50.0		85.1	55-140			
1,2,3-Trichloropropane	53.2	1	ug/L	50.0		106	75-125			
1,2,4-Trichlorobenzene	41.2	1	ug/L	50.0		82.5	65-135			
1,2,4-Trimethylbenzene	50.2	1	ug/L	50.0		100	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	40.2	1	ug/L	50.0		80.5	50-130			
1,2-Dibromoethane (EDB)	51.7	1	ug/L	50.0		103	80-120			

Certificate of Analysis

Client Name: SCS Engineers-Winchester
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 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

LCS (BGJ0587-BS1)

Prepared & Analyzed: 10/13/2023

1,2-Dichlorobenzene	49.0	0.5	ug/L	50.0		97.9	70-120			
1,2-Dichloroethane	51.8	1	ug/L	50.0		104	70-130			
1,2-Dichloropropane	56.1	0.5	ug/L	50.0		112	75-125			
1,3,5-Trimethylbenzene	47.0	1	ug/L	50.0		93.9	75-125			
1,3-Dichlorobenzene	49.0	1	ug/L	50.0		98.0	75-125			
1,3-Dichloropropane	56.8	1	ug/L	50.0		114	75-125			
1,4-Dichlorobenzene	48.7	1	ug/L	50.0		97.4	75-125			
2,2-Dichloropropane	49.4	1	ug/L	50.0		98.8	70-135			
2-Butanone (MEK)	44.8	10	ug/L	50.0		89.5	30-150			
2-Chlorotoluene	49.2	1	ug/L	50.0		98.4	75-125			
2-Hexanone (MBK)	50.6	5	ug/L	50.0		101	55-130			
4-Chlorotoluene	48.4	1	ug/L	50.0		96.8	75-130			
4-Isopropyltoluene	49.0	1	ug/L	50.0		98.1	75-130			
4-Methyl-2-pentanone (MIBK)	53.6	5	ug/L	50.0		107	60-135			
Acetone	46.9	10	ug/L	50.0		93.7	40-140			
Benzene	53.0	1	ug/L	50.0		106	80-120			
Bromobenzene	52.6	1	ug/L	50.0		105	75-125			
Bromochloromethane	52.2	1	ug/L	50.0		104	65-130			
Bromodichloromethane	54.3	0.5	ug/L	50.0		109	75-120			
Bromoform	47.7	1	ug/L	50.0		95.5	70-130			
Bromomethane	36.3	1	ug/L	50.0		72.5	30-145			
Carbon disulfide	39.1	10	ug/L	50.0		78.1	35-160			
Carbon tetrachloride	49.3	1	ug/L	50.0		98.7	65-140			
Chlorobenzene	48.6	1	ug/L	50.0		97.3	80-120			
Chloroethane	44.2	1	ug/L	50.0		88.5	60-135			

Certificate of Analysis

Client Name: SCS Engineers-Winchester
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 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

LCS (BGJ0587-BS1)

Prepared & Analyzed: 10/13/2023

Chloroform	50.9	0.5	ug/L	50.0		102	65-135			
Chloromethane	41.1	1	ug/L	50.0		82.2	40-125			
cis-1,2-Dichloroethylene	53.4	1	ug/L	50.0		107	70-125			
cis-1,3-Dichloropropene	58.3	1	ug/L	50.0		117	70-130			
Dibromochloromethane	55.0	0.5	ug/L	50.0		110	60-135			
Dibromomethane	54.4	1	ug/L	50.0		109	75-125			
Dichlorodifluoromethane	31.8	1	ug/L	50.0		63.7	30-155			
Ethylbenzene	49.7	1	ug/L	50.0		99.4	75-125			
Hexachlorobutadiene	38.4	0.8	ug/L	50.0		76.8	50-140			
Isopropylbenzene	48.9	1	ug/L	50.0		97.8	75-125			
m+p-Xylenes	99.0	2	ug/L	100		99.0	75-130			
Methylene chloride	52.2	4	ug/L	50.0		104	55-140			
Methyl-t-butyl ether (MTBE)	57.3	1	ug/L	50.0		115	65-125			
Naphthalene	44.5	1	ug/L	50.0		89.1	55-140			
n-Butylbenzene	47.7	1	ug/L	50.0		95.4	70-135			
n-Propylbenzene	46.7	1	ug/L	50.0		93.4	70-130			
o-Xylene	52.2	1	ug/L	50.0		104	80-120			
sec-Butylbenzene	51.0	1	ug/L	50.0		102	70-125			
Styrene	52.4	1	ug/L	50.0		105	65-135			
tert-Butylbenzene	47.8	1	ug/L	50.0		95.5	70-130			
Tetrachloroethylene (PCE)	45.8	1	ug/L	50.0		91.7	45-150			
Toluene	51.9	1	ug/L	50.0		104	75-120			
trans-1,2-Dichloroethylene	48.8	1	ug/L	50.0		97.6	60-140			
trans-1,3-Dichloropropene	63.1	1	ug/L	50.0		126	55-140			
Trichloroethylene	51.0	1	ug/L	50.0		102	70-125			

Certificate of Analysis

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 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

LCS (BGJ0587-BS1)

Prepared & Analyzed: 10/13/2023

Trichlorofluoromethane	43.8	1	ug/L	50.0		87.5	60-145			
Vinyl chloride	42.6	0.5	ug/L	50.0		85.3	50-145			
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	53.5		ug/L	50.0		107	70-120			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	53.8		ug/L	50.0		108	75-120			
<i>Surr: Dibromofluoromethane (Surr)</i>	51.8		ug/L	50.0		104	70-130			
<i>Surr: Toluene-d8 (Surr)</i>	51.2		ug/L	50.0		102	70-130			

Matrix Spike (BGJ0587-MS1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

1,1,1,2-Tetrachloroethane	50.1	0.4	ug/L	50.0	BLOD	100	80-130			
1,1,1-Trichloroethane	50.8	1	ug/L	50.0	BLOD	102	65-130			
1,1,2,2-Tetrachloroethane	49.0	0.4	ug/L	50.0	BLOD	97.9	65-130			
1,1,2-Trichloroethane	58.6	1	ug/L	50.0	BLOD	117	75-125			
1,1-Dichloroethane	54.1	1	ug/L	50.0	BLOD	108	70-135			
1,1-Dichloroethylene	40.5	1	ug/L	50.0	BLOD	81.0	50-145			
1,1-Dichloropropene	53.6	1	ug/L	50.0	BLOD	107	75-135			
1,2,3-Trichlorobenzene	52.6	1	ug/L	50.0	BLOD	105	55-140			
1,2,3-Trichloropropane	47.9	1	ug/L	50.0	BLOD	95.7	75-125			
1,2,4-Trichlorobenzene	51.5	1	ug/L	50.0	BLOD	103	65-135			
1,2,4-Trimethylbenzene	52.2	1	ug/L	50.0	BLOD	104	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	41.2	1	ug/L	50.0	BLOD	82.3	50-130			
1,2-Dibromoethane (EDB)	51.5	1	ug/L	50.0	BLOD	103	80-120			
1,2-Dichlorobenzene	45.2	0.5	ug/L	50.0	BLOD	90.5	70-120			
1,2-Dichloroethane	49.6	1	ug/L	50.0	BLOD	99.3	70-130			
1,2-Dichloropropane	54.9	0.5	ug/L	50.0	BLOD	110	75-125			
1,3,5-Trimethylbenzene	48.3	1	ug/L	50.0	BLOD	96.6	75-124			

Certificate of Analysis

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike (BGJ0587-MS1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

1,3-Dichlorobenzene	47.1	1	ug/L	50.0	BLOD	94.1	75-125			
1,3-Dichloropropane	56.6	1	ug/L	50.0	BLOD	113	75-125			
1,4-Dichlorobenzene	56.8	1	ug/L	50.0	BLOD	114	75-125			
2,2-Dichloropropane	49.6	1	ug/L	50.0	BLOD	99.1	70-135			
2-Butanone (MEK)	6400	10	ug/L	50.0	BLOD	12800	30-150			M
2-Chlorotoluene	50.7	1	ug/L	50.0	BLOD	101	75-125			
2-Hexanone (MBK)	77.6	5	ug/L	50.0	BLOD	155	55-130			M
4-Chlorotoluene	50.6	1	ug/L	50.0	BLOD	101	75-130			
4-Isopropyltoluene	49.7	1	ug/L	50.0	BLOD	99.3	75-130			
4-Methyl-2-pentanone (MIBK)	160	5	ug/L	50.0	BLOD	321	60-135			M
Acetone	11800	10	ug/L	50.0	BLOD	23700	40-140			M
Benzene	55.0	1	ug/L	50.0	BLOD	110	80-120			
Bromobenzene	49.7	1	ug/L	50.0	BLOD	99.3	75-125			
Bromochloromethane	52.2	1	ug/L	50.0	BLOD	104	65-130			
Bromodichloromethane	54.2	0.5	ug/L	50.0	BLOD	108	75-136			
Bromoform	46.8	1	ug/L	50.0	BLOD	93.6	70-130			
Bromomethane	33.9	1	ug/L	50.0	BLOD	67.8	30-145			
Carbon disulfide	38.3	10	ug/L	50.0	BLOD	76.6	35-160			
Carbon tetrachloride	50.7	1	ug/L	50.0	BLOD	101	65-140			
Chlorobenzene	49.5	1	ug/L	50.0	BLOD	99.1	80-120			
Chloroethane	42.5	1	ug/L	50.0	BLOD	85.1	60-135			
Chloroform	50.2	0.5	ug/L	50.0	BLOD	100	65-135			
Chloromethane	38.8	1	ug/L	50.0	BLOD	77.6	40-125			
cis-1,2-Dichloroethylene	52.5	1	ug/L	50.0	BLOD	105	70-125			
cis-1,3-Dichloropropene	58.7	1	ug/L	50.0	BLOD	117	47-136			

Certificate of Analysis

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Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike (BGJ0587-MS1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

Dibromochloromethane	55.7	0.5	ug/L	50.0	BLOD	111	60-135			
Dibromomethane	54.2	1	ug/L	50.0	BLOD	108	75-125			
Dichlorodifluoromethane	30.2	1	ug/L	50.0	BLOD	60.3	30-155			
Ethylbenzene	49.9	1	ug/L	50.0	BLOD	99.8	75-125			
Hexachlorobutadiene	44.6	0.8	ug/L	50.0	BLOD	89.3	50-140			
Isopropylbenzene	46.5	1	ug/L	50.0	BLOD	93.0	75-125			
m+p-Xylenes	96.0	2	ug/L	100	BLOD	96.0	75-130			
Methylene chloride	50.8	4	ug/L	50.0	BLOD	102	55-140			
Methyl-t-butyl ether (MTBE)	57.7	1	ug/L	50.0	BLOD	115	65-125			
Naphthalene	68.2	1	ug/L	50.0	BLOD	136	55-140			
n-Butylbenzene	45.4	1	ug/L	50.0	BLOD	90.9	70-135			
n-Propylbenzene	50.6	1	ug/L	50.0	BLOD	101	70-130			
o-Xylene	50.1	1	ug/L	50.0	BLOD	100	80-120			
sec-Butylbenzene	49.5	1	ug/L	50.0	BLOD	99.0	70-125			
Styrene	50.7	1	ug/L	50.0	BLOD	101	65-135			
tert-Butylbenzene	48.4	1	ug/L	50.0	BLOD	96.7	70-130			
Tetrachloroethylene (PCE)	42.7	1	ug/L	50.0	BLOD	85.4	51-231			
Toluene	52.3	1	ug/L	50.0	BLOD	105	75-120			
trans-1,2-Dichloroethylene	49.6	1	ug/L	50.0	BLOD	99.1	60-140			
trans-1,3-Dichloropropene	64.3	1	ug/L	50.0	BLOD	129	55-140			
Trichloroethylene	51.8	1	ug/L	50.0	BLOD	104	70-125			
Trichlorofluoromethane	42.1	1	ug/L	50.0	BLOD	84.1	60-145			
Vinyl chloride	37.6	0.5	ug/L	50.0	BLOD	75.2	50-145			
<hr/>										
Surr: 1,2-Dichloroethane-d4 (Surr)	51.4		ug/L	50.0		103	70-120			
Surr: 4-Bromofluorobenzene (Surr)	49.6		ug/L	50.0		99.2	75-120			

Certificate of Analysis

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike (BGJ0587-MS1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

<i>Surr: Dibromofluoromethane (Surr)</i>	51.3		ug/L	50.0		103	70-130		
<i>Surr: Toluene-d8 (Surr)</i>	50.1		ug/L	50.0		100	70-130		

Matrix Spike Dup (BGJ0587-MSD1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

1,1,1,2-Tetrachloroethane	51.8	0.4	ug/L	50.0	BLOD	104	80-130	3.46	30
1,1,1-Trichloroethane	47.6	1	ug/L	50.0	BLOD	95.3	65-130	6.50	30
1,1,2,2-Tetrachloroethane	48.7	0.4	ug/L	50.0	BLOD	97.4	65-130	0.512	30
1,1,2-Trichloroethane	56.8	1	ug/L	50.0	BLOD	114	75-125	3.10	30
1,1-Dichloroethane	48.2	1	ug/L	50.0	BLOD	96.4	70-135	11.6	30
1,1-Dichloroethylene	36.0	1	ug/L	50.0	BLOD	72.1	50-145	11.6	30
1,1-Dichloropropene	49.2	1	ug/L	50.0	BLOD	98.4	75-135	8.64	30
1,2,3-Trichlorobenzene	51.0	1	ug/L	50.0	BLOD	102	55-140	2.99	30
1,2,3-Trichloropropane	47.5	1	ug/L	50.0	BLOD	94.9	75-125	0.839	30
1,2,4-Trichlorobenzene	48.4	1	ug/L	50.0	BLOD	96.8	65-135	6.18	30
1,2,4-Trimethylbenzene	51.7	1	ug/L	50.0	BLOD	103	75-130	0.925	30
1,2-Dibromo-3-chloropropane (DBCP)	40.8	1	ug/L	50.0	BLOD	81.5	50-130	0.976	30
1,2-Dibromoethane (EDB)	51.3	1	ug/L	50.0	BLOD	103	80-120	0.486	30
1,2-Dichlorobenzene	44.5	0.5	ug/L	50.0	BLOD	89.0	70-120	1.67	30
1,2-Dichloroethane	44.7	1	ug/L	50.0	BLOD	89.4	70-130	10.4	30
1,2-Dichloropropane	52.5	0.5	ug/L	50.0	BLOD	105	75-125	4.45	30
1,3,5-Trimethylbenzene	48.0	1	ug/L	50.0	BLOD	96.0	75-124	0.644	30
1,3-Dichlorobenzene	46.8	1	ug/L	50.0	BLOD	93.6	75-125	0.511	30
1,3-Dichloropropane	54.3	1	ug/L	50.0	BLOD	109	75-125	4.11	30
1,4-Dichlorobenzene	55.0	1	ug/L	50.0	BLOD	110	75-125	3.29	30
2,2-Dichloropropane	45.1	1	ug/L	50.0	BLOD	90.2	70-135	9.42	30

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike Dup (BGJ0587-MSD1)	Source: 23J0725-02			Prepared & Analyzed: 10/13/2023						
2-Butanone (MEK)	5550	10	ug/L	50.0	BLOD	11100	30-150	14.3	30	M
2-Chlorotoluene	51.4	1	ug/L	50.0	BLOD	103	75-125	1.27	30	
2-Hexanone (MBK)	76.6	5	ug/L	50.0	BLOD	153	55-130	1.18	30	M
4-Chlorotoluene	50.5	1	ug/L	50.0	BLOD	101	75-130	0.178	30	
4-Isopropyltoluene	48.1	1	ug/L	50.0	BLOD	96.2	75-130	3.23	30	
4-Methyl-2-pentanone (MIBK)	152	5	ug/L	50.0	BLOD	305	60-135	5.15	30	M
Acetone	10100	10	ug/L	50.0	BLOD	20100	40-140	16.1	30	M
Benzene	52.9	1	ug/L	50.0	BLOD	106	80-120	3.84	30	
Bromobenzene	51.0	1	ug/L	50.0	BLOD	102	75-125	2.66	30	
Bromochloromethane	48.9	1	ug/L	50.0	BLOD	97.8	65-130	6.60	30	
Bromodichloromethane	52.8	0.5	ug/L	50.0	BLOD	106	75-136	2.71	30	
Bromoform	49.4	1	ug/L	50.0	BLOD	98.7	70-130	5.35	30	
Bromomethane	27.4	1	ug/L	50.0	BLOD	54.9	30-145	21.1	30	
Carbon disulfide	35.5	10	ug/L	50.0	BLOD	71.0	35-160	7.61	30	
Carbon tetrachloride	49.7	1	ug/L	50.0	BLOD	99.3	65-140	1.99	30	
Chlorobenzene	50.0	1	ug/L	50.0	BLOD	99.9	80-120	0.844	30	
Chloroethane	35.9	1	ug/L	50.0	BLOD	71.9	60-135	16.8	30	
Chloroform	45.5	0.5	ug/L	50.0	BLOD	91.0	65-135	9.81	30	
Chloromethane	31.9	1	ug/L	50.0	BLOD	63.8	40-125	19.5	30	
cis-1,2-Dichloroethylene	48.0	1	ug/L	50.0	BLOD	95.9	70-125	9.02	30	
cis-1,3-Dichloropropene	57.3	1	ug/L	50.0	BLOD	115	47-136	2.50	30	
Dibromochloromethane	55.6	0.5	ug/L	50.0	BLOD	111	60-135	0.324	30	
Dibromomethane	52.1	1	ug/L	50.0	BLOD	104	75-125	4.01	30	
Dichlorodifluoromethane	27.2	1	ug/L	50.0	BLOD	54.5	30-155	10.1	30	
Ethylbenzene	49.4	1	ug/L	50.0	BLOD	98.7	75-125	1.07	30	

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0587 - SW5030B-MS

Matrix Spike Dup (BGJ0587-MSD1)

Source: 23J0725-02

Prepared & Analyzed: 10/13/2023

Hexachlorobutadiene	42.4	0.8	ug/L	50.0	BLOD	84.8	50-140	5.12	30	
Isopropylbenzene	46.2	1	ug/L	50.0	BLOD	92.4	75-125	0.604	30	
m+p-Xylenes	95.9	2	ug/L	100	BLOD	95.9	75-130	0.104	30	
Methylene chloride	45.6	4	ug/L	50.0	BLOD	91.1	55-140	10.9	30	
Methyl-t-butyl ether (MTBE)	52.2	1	ug/L	50.0	BLOD	104	65-125	10.0	30	
Naphthalene	64.8	1	ug/L	50.0	BLOD	130	55-140	5.19	30	
n-Butylbenzene	43.7	1	ug/L	50.0	BLOD	87.5	70-135	3.81	30	
n-Propylbenzene	51.1	1	ug/L	50.0	BLOD	102	70-130	1.02	30	
o-Xylene	49.5	1	ug/L	50.0	BLOD	99.1	80-120	1.18	30	
sec-Butylbenzene	48.2	1	ug/L	50.0	BLOD	96.5	70-125	2.60	30	
Styrene	50.4	1	ug/L	50.0	BLOD	101	65-135	0.534	30	
tert-Butylbenzene	47.8	1	ug/L	50.0	BLOD	95.6	70-130	1.21	30	
Tetrachloroethylene (PCE)	45.6	1	ug/L	50.0	BLOD	91.1	51-231	6.48	30	
Toluene	50.8	1	ug/L	50.0	BLOD	102	75-120	2.95	30	
trans-1,2-Dichloroethylene	46.6	1	ug/L	50.0	BLOD	93.1	60-140	6.24	30	
trans-1,3-Dichloropropene	63.3	1	ug/L	50.0	BLOD	127	55-140	1.63	30	
Trichloroethylene	50.6	1	ug/L	50.0	BLOD	101	70-125	2.48	30	
Trichlorofluoromethane	36.8	1	ug/L	50.0	BLOD	73.7	60-145	13.3	30	
Vinyl chloride	34.7	0.5	ug/L	50.0	BLOD	69.4	50-145	8.05	30	
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Surr: 1,2-Dichloroethane-d4 (Surr)	47.7		ug/L	50.0		95.4	70-120			
Surr: 4-Bromofluorobenzene (Surr)	49.2		ug/L	50.0		98.5	75-120			
Surr: Dibromofluoromethane (Surr)	47.3		ug/L	50.0		94.7	70-130			
Surr: Toluene-d8 (Surr)	49.1		ug/L	50.0		98.2	70-130			

Batch BGJ0629 - SW5030B-MS

Certificate of Analysis

Client Name: SCS Engineers-Winchester
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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0629 - SW5030B-MS										
Blank (BGJ0629-BLK1)				Prepared & Analyzed: 10/16/2023						
2-Butanone (MEK)	ND	10.0	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.00	ug/L							
Ethylbenzene	ND	1.00	ug/L							
Toluene	ND	1.00	ug/L							
Xylenes, Total	ND	3.00	ug/L							
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	52.5		ug/L	50.0		105	70-120			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	52.6		ug/L	50.0		105	75-120			
<i>Surr: Dibromofluoromethane (Surr)</i>	50.5		ug/L	50.0		101	70-130			
<i>Surr: Toluene-d8 (Surr)</i>	51.1		ug/L	50.0		102	70-130			
LCS (BGJ0629-BS1)				Prepared & Analyzed: 10/16/2023						
1,1,1,2-Tetrachloroethane	46.3	0.4	ug/L	50.0		92.6	80-130			
1,1,1-Trichloroethane	44.8	1	ug/L	50.0		89.6	65-130			
1,1,2,2-Tetrachloroethane	49.1	0.4	ug/L	50.0		98.2	65-130			
1,1,2-Trichloroethane	52.1	1	ug/L	50.0		104	75-125			
1,1-Dichloroethane	46.4	1	ug/L	50.0		92.9	70-135			
1,1-Dichloroethylene	35.6	1	ug/L	50.0		71.1	70-130			
1,1-Dichloropropene	45.7	1	ug/L	50.0		91.4	75-135			
1,2,3-Trichlorobenzene	40.9	1	ug/L	50.0		81.8	55-140			
1,2,3-Trichloropropane	47.7	1	ug/L	50.0		95.4	75-125			
1,2,4-Trichlorobenzene	40.4	1	ug/L	50.0		80.7	65-135			
1,2,4-Trimethylbenzene	45.0	1	ug/L	50.0		90.0	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	38.2	1	ug/L	50.0		76.5	50-130			
1,2-Dibromoethane (EDB)	47.6	1	ug/L	50.0		95.1	80-120			

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Enthalpy Analytical

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Batch BGJ0629 - SW5030B-MS

LCS (BGJ0629-BS1)

Prepared & Analyzed: 10/16/2023

1,2-Dichlorobenzene	44.5	0.5	ug/L	50.0		89.0	70-120			
1,2-Dichloroethane	43.4	1	ug/L	50.0		86.9	70-130			
1,2-Dichloropropane	47.2	0.5	ug/L	50.0		94.3	75-125			
1,3,5-Trimethylbenzene	42.4	1	ug/L	50.0		84.8	75-125			
1,3-Dichlorobenzene	44.6	1	ug/L	50.0		89.2	75-125			
1,3-Dichloropropane	49.5	1	ug/L	50.0		98.9	75-125			
1,4-Dichlorobenzene	44.3	1	ug/L	50.0		88.6	75-125			
2,2-Dichloropropane	43.0	1	ug/L	50.0		85.9	70-135			
2-Butanone (MEK)	41.3	10	ug/L	50.0		82.6	30-150			
2-Chlorotoluene	44.4	1	ug/L	50.0		88.9	75-125			
2-Hexanone (MBK)	45.3	5	ug/L	50.0		90.6	55-130			
4-Chlorotoluene	43.6	1	ug/L	50.0		87.3	75-130			
4-Isopropyltoluene	43.5	1	ug/L	50.0		87.0	75-130			
4-Methyl-2-pentanone (MIBK)	46.0	5	ug/L	50.0		92.0	60-135			
Acetone	36.0	10	ug/L	50.0		72.0	40-140			
Benzene	45.0	1	ug/L	50.0		90.0	80-120			
Bromobenzene	47.8	1	ug/L	50.0		95.5	75-125			
Bromochloromethane	48.0	1	ug/L	50.0		96.1	65-130			
Bromodichloromethane	48.0	0.5	ug/L	50.0		96.0	75-120			
Bromoform	47.0	1	ug/L	50.0		94.1	70-130			
Bromomethane	30.1	1	ug/L	50.0		60.2	30-145			
Carbon disulfide	36.1	10	ug/L	50.0		72.2	35-160			
Carbon tetrachloride	43.9	1	ug/L	50.0		87.8	65-140			
Chlorobenzene	44.2	1	ug/L	50.0		88.3	80-120			
Chloroethane	35.3	1	ug/L	50.0		70.5	60-135			

Certificate of Analysis

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Enthalpy Analytical

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Batch BGJ0629 - SW5030B-MS

LCS (BGJ0629-BS1)

Prepared & Analyzed: 10/16/2023

Chloroform	43.9	0.5	ug/L	50.0		87.8	65-135			
Chloromethane	33.6	1	ug/L	50.0		67.2	40-125			
cis-1,2-Dichloroethylene	46.2	1	ug/L	50.0		92.4	70-125			
cis-1,3-Dichloropropene	51.2	1	ug/L	50.0		102	70-130			
Dibromochloromethane	50.4	0.5	ug/L	50.0		101	60-135			
Dibromomethane	47.5	1	ug/L	50.0		95.1	75-125			
Dichlorodifluoromethane	26.5	1	ug/L	50.0		53.0	30-155			
Ethylbenzene	43.4	1	ug/L	50.0		86.8	75-125			
Hexachlorobutadiene	37.8	0.8	ug/L	50.0		75.5	50-140			
Isopropylbenzene	42.8	1	ug/L	50.0		85.6	75-125			
m+p-Xylenes	86.8	2	ug/L	100		86.8	75-130			
Methylene chloride	46.3	4	ug/L	50.0		92.5	55-140			
Methyl-t-butyl ether (MTBE)	51.4	1	ug/L	50.0		103	65-125			
Naphthalene	42.5	1	ug/L	50.0		85.0	55-140			
n-Butylbenzene	41.6	1	ug/L	50.0		83.3	70-135			
n-Propylbenzene	42.5	1	ug/L	50.0		85.0	70-130			
o-Xylene	45.8	1	ug/L	50.0		91.6	80-120			
sec-Butylbenzene	45.0	1	ug/L	50.0		90.0	70-125			
Styrene	46.7	1	ug/L	50.0		93.5	65-135			
tert-Butylbenzene	43.1	1	ug/L	50.0		86.2	70-130			
Tetrachloroethylene (PCE)	44.2	1	ug/L	50.0		88.5	45-150			
Toluene	44.6	1	ug/L	50.0		89.2	75-120			
trans-1,2-Dichloroethylene	43.9	1	ug/L	50.0		87.9	60-140			
trans-1,3-Dichloropropene	55.4	1	ug/L	50.0		111	55-140			
Trichloroethylene	44.9	1	ug/L	50.0		89.9	70-125			

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Batch BGJ0629 - SW5030B-MS

LCS (BGJ0629-BS1)

Prepared & Analyzed: 10/16/2023

Trichlorofluoromethane	36.3	1	ug/L	50.0		72.6	60-145			
Vinyl chloride	34.7	0.5	ug/L	50.0		69.4	50-145			
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	<i>51.4</i>		<i>ug/L</i>	<i>50.0</i>		<i>103</i>	<i>70-120</i>			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	<i>53.1</i>		<i>ug/L</i>	<i>50.0</i>		<i>106</i>	<i>75-120</i>			
<i>Surr: Dibromofluoromethane (Surr)</i>	<i>51.3</i>		<i>ug/L</i>	<i>50.0</i>		<i>103</i>	<i>70-130</i>			
<i>Surr: Toluene-d8 (Surr)</i>	<i>49.2</i>		<i>ug/L</i>	<i>50.0</i>		<i>98.4</i>	<i>70-130</i>			

Matrix Spike (BGJ0629-MS1)

Source: 23J0733-07RE1

Prepared & Analyzed: 10/16/2023

1,1,1,2-Tetrachloroethane	52.2	0.4	ug/L	50.0	BLOD	104	80-130			
1,1,1-Trichloroethane	47.3	1	ug/L	50.0	BLOD	94.5	65-130			
1,1,2,2-Tetrachloroethane	55.8	0.4	ug/L	50.0	BLOD	112	65-130			
1,1,2-Trichloroethane	58.7	1	ug/L	50.0	BLOD	117	75-125			
1,1-Dichloroethane	49.2	1	ug/L	50.0	BLOD	98.4	70-135			
1,1-Dichloroethylene	37.0	1	ug/L	50.0	BLOD	74.0	50-145			
1,1-Dichloropropene	47.6	1	ug/L	50.0	BLOD	95.2	75-135			
1,2,3-Trichlorobenzene	47.1	1	ug/L	50.0	BLOD	94.3	55-140			
1,2,3-Trichloropropane	52.8	1	ug/L	50.0	BLOD	106	75-125			
1,2,4-Trichlorobenzene	44.5	1	ug/L	50.0	BLOD	89.1	65-135			
1,2,4-Trimethylbenzene	49.8	1	ug/L	50.0	BLOD	99.6	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	41.4	1	ug/L	50.0	BLOD	82.8	50-130			
1,2-Dibromoethane (EDB)	53.3	1	ug/L	50.0	BLOD	107	80-120			
1,2-Dichlorobenzene	49.2	0.5	ug/L	50.0	BLOD	98.4	70-120			
1,2-Dichloroethane	45.6	1	ug/L	50.0	BLOD	91.2	70-130			
1,2-Dichloropropane	52.9	0.5	ug/L	50.0	BLOD	106	75-125			
1,3,5-Trimethylbenzene	46.6	1	ug/L	50.0	BLOD	93.1	75-124			

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Batch BGJ0629 - SW5030B-MS

Matrix Spike (BGJ0629-MS1)

Source: 23J0733-07RE1

Prepared & Analyzed: 10/16/2023

1,3-Dichlorobenzene	49.5	1	ug/L	50.0	BLOD	99.0	75-125			
1,3-Dichloropropane	55.8	1	ug/L	50.0	BLOD	112	75-125			
1,4-Dichlorobenzene	48.6	1	ug/L	50.0	BLOD	97.1	75-125			
2,2-Dichloropropane	45.2	1	ug/L	50.0	BLOD	90.3	70-135			
2-Butanone (MEK)	79.0	10	ug/L	50.0	29.8	98.6	30-150			
2-Chlorotoluene	49.5	1	ug/L	50.0	BLOD	98.9	75-125			
2-Hexanone (MBK)	48.6	5	ug/L	50.0	BLOD	97.2	55-130			
4-Chlorotoluene	48.6	1	ug/L	50.0	BLOD	97.2	75-130			
4-Isopropyltoluene	47.3	1	ug/L	50.0	BLOD	94.5	75-130			
4-Methyl-2-pentanone (MIBK)	52.2	5	ug/L	50.0	BLOD	103	60-135			
Acetone	106	10	ug/L	50.0	93.0	25.6	40-140			M
Benzene	51.9	1	ug/L	50.0	1.64	100	80-120			
Bromobenzene	53.2	1	ug/L	50.0	BLOD	106	75-125			
Bromochloromethane	51.3	1	ug/L	50.0	BLOD	103	65-130			
Bromodichloromethane	53.4	0.5	ug/L	50.0	BLOD	107	75-136			
Bromoform	54.2	1	ug/L	50.0	BLOD	108	70-130			
Bromomethane	30.9	1	ug/L	50.0	BLOD	61.7	30-145			
Carbon disulfide	35.3	10	ug/L	50.0	BLOD	70.6	35-160			
Carbon tetrachloride	50.3	1	ug/L	50.0	BLOD	101	65-140			
Chlorobenzene	48.7	1	ug/L	50.0	BLOD	97.5	80-120			
Chloroethane	36.7	1	ug/L	50.0	BLOD	73.3	60-135			
Chloroform	46.3	0.5	ug/L	50.0	BLOD	92.6	65-135			
Chloromethane	34.4	1	ug/L	50.0	BLOD	68.8	40-125			
cis-1,2-Dichloroethylene	49.0	1	ug/L	50.0	BLOD	98.0	70-125			
cis-1,3-Dichloropropene	57.6	1	ug/L	50.0	BLOD	115	47-136			

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0629 - SW5030B-MS

Matrix Spike (BGJ0629-MS1)	Source: 23J0733-07RE1			Prepared & Analyzed: 10/16/2023						
Dibromochloromethane	58.2	0.5	ug/L	50.0	BLOD	116	60-135			
Dibromomethane	54.2	1	ug/L	50.0	BLOD	108	75-125			
Dichlorodifluoromethane	27.2	1	ug/L	50.0	BLOD	54.4	30-155			
Ethylbenzene	48.4	1	ug/L	50.0	BLOD	96.7	75-125			
Hexachlorobutadiene	40.1	0.8	ug/L	50.0	BLOD	80.1	50-140			
Isopropylbenzene	46.9	1	ug/L	50.0	BLOD	93.8	75-125			
m+p-Xylenes	96.4	2	ug/L	100	BLOD	96.4	75-130			
Methylene chloride	62.1	4	ug/L	50.0	BLOD	124	55-140			
Methyl-t-butyl ether (MTBE)	55.5	1	ug/L	50.0	BLOD	111	65-125			
Naphthalene	48.3	1	ug/L	50.0	BLOD	96.6	55-140			
n-Butylbenzene	45.3	1	ug/L	50.0	BLOD	90.6	70-135			
n-Propylbenzene	46.9	1	ug/L	50.0	BLOD	93.8	70-130			
o-Xylene	50.8	1	ug/L	50.0	BLOD	102	80-120			
sec-Butylbenzene	49.3	1	ug/L	50.0	BLOD	98.6	70-125			
Styrene	51.6	1	ug/L	50.0	BLOD	103	65-135			
tert-Butylbenzene	47.1	1	ug/L	50.0	BLOD	94.3	70-130			
Tetrachloroethylene (PCE)	45.5	1	ug/L	50.0	BLOD	90.9	51-231			
Toluene	50.0	1	ug/L	50.0	BLOD	100	75-120			
trans-1,2-Dichloroethylene	46.6	1	ug/L	50.0	BLOD	93.2	60-140			
trans-1,3-Dichloropropene	63.5	1	ug/L	50.0	BLOD	127	55-140			
Trichloroethylene	50.0	1	ug/L	50.0	BLOD	100	70-125			
Trichlorofluoromethane	37.7	1	ug/L	50.0	BLOD	75.4	60-145			
Vinyl chloride	34.6	0.5	ug/L	50.0	BLOD	69.1	50-145			
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Surr: 1,2-Dichloroethane-d4 (Surr)	49.1		ug/L	50.0		98.2	70-120			
Surr: 4-Bromofluorobenzene (Surr)	52.9		ug/L	50.0		106	75-120			

Certificate of Analysis

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Date Issued: 11/1/2023 3:39:38PM

Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0629 - SW5030B-MS

Matrix Spike (BGJ0629-MS1)

Source: 23J0733-07RE1

Prepared & Analyzed: 10/16/2023

<i>Surr: Dibromofluoromethane (Surr)</i>	48.8		ug/L	50.0		97.6	70-130		
<i>Surr: Toluene-d8 (Surr)</i>	48.8		ug/L	50.0		97.6	70-130		

Matrix Spike Dup (BGJ0629-MSD1)

Source: 23J0733-07RE1

Prepared & Analyzed: 10/16/2023

1,1,1,2-Tetrachloroethane	50.2	0.4	ug/L	50.0	BLOD	100	80-130	3.87	30
1,1,1-Trichloroethane	46.0	1	ug/L	50.0	BLOD	92.1	65-130		30
1,1,2,2-Tetrachloroethane	53.9	0.4	ug/L	50.0	BLOD	108	65-130	3.52	30
1,1,2-Trichloroethane	58.5	1	ug/L	50.0	BLOD	117	75-125	0.273	30
1,1-Dichloroethane	46.8	1	ug/L	50.0	BLOD	93.5	70-135		30
1,1-Dichloroethylene	35.9	1	ug/L	50.0	BLOD	71.7	50-145		30
1,1-Dichloropropene	46.6	1	ug/L	50.0	BLOD	93.1	75-135		30
1,2,3-Trichlorobenzene	45.0	1	ug/L	50.0	BLOD	90.0	55-140		30
1,2,3-Trichloropropane	51.8	1	ug/L	50.0	BLOD	104	75-125	1.80	30
1,2,4-Trichlorobenzene	43.7	1	ug/L	50.0	BLOD	87.5	65-135		30
1,2,4-Trimethylbenzene	47.9	1	ug/L	50.0	BLOD	95.8	75-130	3.87	30
1,2-Dibromo-3-chloropropane (DBCP)	41.3	1	ug/L	50.0	BLOD	82.5	50-130		30
1,2-Dibromoethane (EDB)	51.3	1	ug/L	50.0	BLOD	103	80-120	3.73	30
1,2-Dichlorobenzene	48.0	0.5	ug/L	50.0	BLOD	95.9	70-120	2.57	30
1,2-Dichloroethane	44.3	1	ug/L	50.0	BLOD	88.6	70-130		30
1,2-Dichloropropane	51.6	0.5	ug/L	50.0	BLOD	103	75-125	2.32	30
1,3,5-Trimethylbenzene	45.4	1	ug/L	50.0	BLOD	90.8	75-124		30
1,3-Dichlorobenzene	48.1	1	ug/L	50.0	BLOD	96.1	75-125	2.93	30
1,3-Dichloropropane	55.2	1	ug/L	50.0	BLOD	110	75-125		30
1,4-Dichlorobenzene	46.8	1	ug/L	50.0	BLOD	93.6	75-125	3.69	30
2,2-Dichloropropane	43.4	1	ug/L	50.0	BLOD	86.7	70-135		30

Certificate of Analysis

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0629 - SW5030B-MS

Matrix Spike Dup (BGJ0629-MSD1)

Source: 23J0733-07RE1

Prepared & Analyzed: 10/16/2023

2-Butanone (MEK)	78.9	10	ug/L	50.0	29.8	98.4	30-150		30	
2-Chlorotoluene	47.7	1	ug/L	50.0	BLOD	95.4	75-125		30	
2-Hexanone (MBK)	58.0	5	ug/L	50.0	BLOD	116	55-130		30	
4-Chlorotoluene	46.8	1	ug/L	50.0	BLOD	93.7	75-130		30	
4-Isopropyltoluene	46.1	1	ug/L	50.0	BLOD	92.2	75-130	2.53	30	
4-Methyl-2-pentanone (MIBK)	63.8	5	ug/L	50.0	BLOD	126	60-135		30	
Acetone	119	10	ug/L	50.0	93.0	51.4	40-140		30	
Benzene	50.7	1	ug/L	50.0	1.64	98.1	80-120	2.30	30	
Bromobenzene	51.4	1	ug/L	50.0	BLOD	103	75-125	3.27	30	
Bromochloromethane	49.6	1	ug/L	50.0	BLOD	99.3	65-130	3.27	30	
Bromodichloromethane	52.0	0.5	ug/L	50.0	BLOD	104	75-136	2.71	30	
Bromoform	52.2	1	ug/L	50.0	BLOD	104	70-130	3.76	30	
Bromomethane	28.7	1	ug/L	50.0	BLOD	57.5	30-145		30	
Carbon disulfide	40.1	10	ug/L	50.0	BLOD	80.2	35-160		30	
Carbon tetrachloride	48.5	1	ug/L	50.0	BLOD	96.9	65-140	3.67	30	
Chlorobenzene	46.9	1	ug/L	50.0	BLOD	93.8	80-120	3.83	30	
Chloroethane	34.0	1	ug/L	50.0	BLOD	68.1	60-135		30	
Chloroform	44.6	0.5	ug/L	50.0	BLOD	89.3	65-135		30	
Chloromethane	32.9	1	ug/L	50.0	BLOD	65.8	40-125		30	
cis-1,2-Dichloroethylene	47.4	1	ug/L	50.0	BLOD	94.9	70-125	3.24	30	
cis-1,3-Dichloropropene	56.6	1	ug/L	50.0	BLOD	113	47-136	1.68	30	
Dibromochloromethane	57.0	0.5	ug/L	50.0	BLOD	114	60-135	2.12	30	
Dibromomethane	52.9	1	ug/L	50.0	BLOD	106	75-125	2.48	30	
Dichlorodifluoromethane	26.0	1	ug/L	50.0	BLOD	51.9	30-155		30	
Ethylbenzene	45.8	1	ug/L	50.0	BLOD	91.5	75-125	5.55	30	

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Volatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0629 - SW5030B-MS

Matrix Spike Dup (BGJ0629-MSD1)

Source: 23J0733-07RE1

Prepared & Analyzed: 10/16/2023

Hexachlorobutadiene	39.8	0.8	ug/L	50.0	BLOD	79.5	50-140		30	
Isopropylbenzene	45.1	1	ug/L	50.0	BLOD	90.2	75-125		30	
m+p-Xylenes	91.7	2	ug/L	100	BLOD	91.7	75-130	4.99	30	
Methylene chloride	46.1	4	ug/L	50.0	BLOD	92.2	55-140		30	
Methyl-t-butyl ether (MTBE)	53.4	1	ug/L	50.0	BLOD	107	65-125		30	
Naphthalene	47.7	1	ug/L	50.0	BLOD	95.5	55-140		30	
n-Butylbenzene	44.0	1	ug/L	50.0	BLOD	88.0	70-135	2.91	30	
n-Propylbenzene	45.3	1	ug/L	50.0	BLOD	90.6	70-130	3.49	30	
o-Xylene	48.4	1	ug/L	50.0	BLOD	96.9	80-120	4.74	30	
sec-Butylbenzene	47.7	1	ug/L	50.0	BLOD	95.4	70-125	3.30	30	
Styrene	49.3	1	ug/L	50.0	BLOD	98.5	65-135	4.70	30	
tert-Butylbenzene	46.2	1	ug/L	50.0	BLOD	92.5	70-130	1.93	30	
Tetrachloroethylene (PCE)	43.1	1	ug/L	50.0	BLOD	86.2	51-231	5.37	30	
Toluene	48.9	1	ug/L	50.0	BLOD	97.8	75-120	2.28	30	
trans-1,2-Dichloroethylene	44.0	1	ug/L	50.0	BLOD	88.0	60-140		30	
trans-1,3-Dichloropropene	62.4	1	ug/L	50.0	BLOD	125	55-140	1.68	30	
Trichloroethylene	48.3	1	ug/L	50.0	BLOD	96.6	70-125	3.56	30	
Trichlorofluoromethane	35.7	1	ug/L	50.0	BLOD	71.3	60-145		30	
Vinyl chloride	32.9	0.5	ug/L	50.0	BLOD	65.9	50-145		30	
<hr/>										
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	<i>49.0</i>		<i>ug/L</i>	<i>50.0</i>		<i>97.9</i>	<i>70-120</i>			
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	<i>51.5</i>		<i>ug/L</i>	<i>50.0</i>		<i>103</i>	<i>75-120</i>			
<i>Surr: Dibromofluoromethane (Surr)</i>	<i>47.8</i>		<i>ug/L</i>	<i>50.0</i>		<i>95.7</i>	<i>70-130</i>			
<i>Surr: Toluene-d8 (Surr)</i>	<i>49.1</i>		<i>ug/L</i>	<i>50.0</i>		<i>98.2</i>	<i>70-130</i>			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Blank (BGJ0676-BLK1)

Prepared & Analyzed: 10/17/2023

Anthracene	ND	10.0	ug/L							
<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	79.0		ug/L	100		79.0	5-136			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	38.2		ug/L	50.0		76.3	9-117			
<i>Surr: 2-Fluorophenol (Surr)</i>	42.6		ug/L	100		42.6	5-60			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	39.5		ug/L	50.0		79.0	5-151			
<i>Surr: Phenol-d5 (Surr)</i>	30.6		ug/L	100		30.6	5-60			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	40.6		ug/L	50.0		81.2	5-141			

LCS (BGJ0676-BS1)

Prepared & Analyzed: 10/17/2023

1,2,4-Trichlorobenzene	34.4	10.0	ug/L	50.0		68.9	57-130			
1,2-Dichlorobenzene	38.7	10.0	ug/L	50.0		77.5	22-115			
1,3-Dichlorobenzene	36.0	10.0	ug/L	50.0		72.0	22-112			
1,4-Dichlorobenzene	40.0	10.0	ug/L	50.0		80.1	13-112			
2,4,6-Trichlorophenol	40.4	10.0	ug/L	50.0		80.8	52-129			
2,4-Dichlorophenol	39.6	10.0	ug/L	50.0		79.2	53-122			
2,4-Dimethylphenol	43.2	5.00	ug/L	50.0		86.3	42-120			
2,4-Dinitrophenol	34.8	50.0	ug/L	50.0		69.5	48-127			
2,4-Dinitrotoluene	46.5	10.0	ug/L	50.0		93.1	10-173			
2,6-Dinitrotoluene	46.5	10.0	ug/L	50.0		93.1	68-137			
2-Chloronaphthalene	39.8	10.0	ug/L	50.0		79.5	65-120			
2-Chlorophenol	35.0	10.0	ug/L	50.0		70.0	36-120			
2-Nitrophenol	45.6	10.0	ug/L	50.0		91.2	45-167			
3,3'-Dichlorobenzidine	27.7	10.0	ug/L	50.0		55.4	10-213			
4,6-Dinitro-2-methylphenol	46.6	50.0	ug/L	50.0		93.2	53-130			
4-Bromophenyl phenyl ether	40.7	10.0	ug/L	50.0		81.5	65-120			

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Enthalpy Analytical

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Batch BGJ0676 - SW3510C/EPA600-MS

LCS (BGJ0676-BS1)

Prepared & Analyzed: 10/17/2023

4-Chlorophenyl phenyl ether	38.8	10.0	ug/L	50.0		77.7	38-145			
4-Nitrophenol	15.7	50.0	ug/L	50.0		31.3	13-129			
Acenaphthene	44.9	10.0	ug/L	50.0		89.8	60-132			
Acenaphthylene	49.1	10.0	ug/L	50.0		98.3	54-126			
Acetophenone	38.7	20.0	ug/L	50.0		77.5	0-200			
Anthracene	46.5	10.0	ug/L	50.0		93.0	43-120			
Benzo (a) anthracene	43.7	10.0	ug/L	50.0		87.5	42-133			
Benzo (a) pyrene	44.9	10.0	ug/L	50.0		89.8	32-148			
Benzo (b) fluoranthene	47.3	10.0	ug/L	50.0		94.6	42-140			
Benzo (g,h,i) perylene	39.9	10.0	ug/L	50.0		79.8	10-195			
Benzo (k) fluoranthene	43.8	10.0	ug/L	50.0		87.5	25-146			
bis (2-Chloroethoxy) methane	51.9	10.0	ug/L	50.0		104	49-165			
bis (2-Chloroethyl) ether	41.8	10.0	ug/L	50.0		83.5	43-126			
2,2'-Oxybis (1-chloropropane)	43.7	10.0	ug/L	50.0		87.5	63-139			
bis (2-Ethylhexyl) phthalate	49.1	10.0	ug/L	50.0		98.1	29-137			
Butyl benzyl phthalate	58.5	10.0	ug/L	50.0		117	10-140			
Chrysene	46.3	10.0	ug/L	50.0		92.7	44-140			
Dibenz (a,h) anthracene	39.0	10.0	ug/L	50.0		77.9	10-200			
Diethyl phthalate	45.2	10.0	ug/L	50.0		90.4	10-120			
Dimethyl phthalate	43.2	10.0	ug/L	50.0		86.3	10-120			
Di-n-butyl phthalate	52.8	10.0	ug/L	50.0		106	10-120			
Di-n-octyl phthalate	59.6	10.0	ug/L	50.0		119	19-132			
Fluoranthene	45.8	10.0	ug/L	50.0		91.5	43-121			
Fluorene	62.2	10.0	ug/L	50.0		124	70-120			L
Hexachlorobenzene	29.2	1.00	ug/L	50.0		58.5	10-142			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

LCS (BGJ0676-BS1)

Prepared & Analyzed: 10/17/2023

Hexachlorobutadiene	37.0	10.0	ug/L	50.0		73.9	38-120			
Hexachlorocyclopentadiene	23.9	10.0	ug/L	50.0		47.9	10-76			
Hexachloroethane	38.9	10.0	ug/L	50.0		77.8	55-120			
Indeno (1,2,3-cd) pyrene	37.5	10.0	ug/L	50.0		75.0	10-151			
Isophorone	31.7	10.0	ug/L	50.0		63.4	47-180			
Naphthalene	37.6	5.00	ug/L	50.0		75.2	36-120			
Nitrobenzene	42.2	10.0	ug/L	50.0		84.4	54-158			
n-Nitrosodimethylamine	29.7	10.0	ug/L	50.0		59.3	10-85			
n-Nitrosodi-n-propylamine	42.9	10.0	ug/L	50.0		85.9	14-198			
n-Nitrosodiphenylamine	36.7	10.0	ug/L	50.0		73.3	12-97			
p-Chloro-m-cresol	40.0	10.0	ug/L	50.0		80.0	10-142			
Pentachlorophenol	41.1	20.0	ug/L	50.0		82.2	38-152			
Phenanthrene	65.2	10.0	ug/L	50.0		130	65-120			L
Phenol	19.6	10.0	ug/L	50.5		38.8	17-120			
Pyrene	54.6	10.0	ug/L	50.0		109	70-120			
Pyridine	35.0	10.0	ug/L	50.0		70.0	10-103			
<hr/>										
<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	<i>103</i>		ug/L	<i>100</i>		<i>103</i>	<i>5-136</i>			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	<i>42.2</i>		ug/L	<i>50.0</i>		<i>84.5</i>	<i>9-117</i>			
<i>Surr: 2-Fluorophenol (Surr)</i>	<i>52.6</i>		ug/L	<i>100</i>		<i>52.6</i>	<i>5-60</i>			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	<i>46.1</i>		ug/L	<i>50.0</i>		<i>92.2</i>	<i>5-151</i>			
<i>Surr: Phenol-d5 (Surr)</i>	<i>40.1</i>		ug/L	<i>100</i>		<i>40.1</i>	<i>5-60</i>			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	<i>47.0</i>		ug/L	<i>50.0</i>		<i>94.0</i>	<i>5-141</i>			

Matrix Spike (BGJ0676-MS1)

Source: 23J0762-01

Prepared & Analyzed: 10/17/2023

1,2,4-Trichlorobenzene	24.8	10.0	ug/L	50.0	BLOD	49.5	44-142			
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Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Matrix Spike (BGJ0676-MS1)

Source: 23J0762-01

Prepared & Analyzed: 10/17/2023

1,2-Dichlorobenzene	27.1	10.0	ug/L	50.0	BLOD	54.3	22-115			
1,3-Dichlorobenzene	26.7	10.0	ug/L	50.0	BLOD	53.5	22-112			
1,4-Dichlorobenzene	29.8	10.0	ug/L	50.0	BLOD	59.7	13-112			
2,4,6-Trichlorophenol	29.2	10.0	ug/L	50.0	BLOD	58.5	37-144			
2,4-Dichlorophenol	28.0	10.0	ug/L	50.0	BLOD	56.0	39-135			
2,4-Dimethylphenol	35.5	5.00	ug/L	50.0	BLOD	71.1	32-120			
2,4-Dinitrophenol	33.9	50.0	ug/L	50.0	BLOD	67.8	39-139			
2,4-Dinitrotoluene	35.7	10.0	ug/L	50.0	BLOD	71.4	10-191			
2,6-Dinitrotoluene	35.7	10.0	ug/L	50.0	BLOD	71.4	50-158			
2-Chloronaphthalene	29.3	10.0	ug/L	50.0	BLOD	58.7	60-120			M
2-Chlorophenol	28.2	10.0	ug/L	50.0	BLOD	56.4	23-134			
2-Nitrophenol	36.0	10.0	ug/L	50.0	BLOD	72.0	29-182			
3,3'-Dichlorobenzidine	17.4	10.0	ug/L	50.0	BLOD	34.9	10-262			
4,6-Dinitro-2-methylphenol	38.2	50.0	ug/L	50.0	BLOD	76.3	10-181			
4-Bromophenyl phenyl ether	29.8	10.0	ug/L	50.0	BLOD	59.6	53-127			
4-Chlorophenyl phenyl ether	29.3	10.0	ug/L	50.0	BLOD	58.5	25-158			
4-Nitrophenol	15.1	50.0	ug/L	50.0	BLOD	30.1	10-132			
Acenaphthene	32.6	10.0	ug/L	50.0	BLOD	65.2	47-145			
Acenaphthylene	36.8	10.0	ug/L	50.0	BLOD	73.7	33-145			
Acetophenone	32.5	20.0	ug/L	50.0	BLOD	64.9	0-200			
Anthracene	33.5	10.0	ug/L	50.0	BLOD	66.9	27-133			
Benzo (a) anthracene	36.7	10.0	ug/L	50.0	BLOD	73.4	33-143			
Benzo (a) pyrene	38.5	10.0	ug/L	50.0	BLOD	77.1	17-163			
Benzo (b) fluoranthene	38.8	10.0	ug/L	50.0	BLOD	77.5	24-159			
Benzo (g,h,i) perylene	31.5	10.0	ug/L	50.0	BLOD	62.9	10-219			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Matrix Spike (BGJ0676-MS1)	Source: 23J0762-01			Prepared & Analyzed: 10/17/2023						
Benzo (k) fluoranthene	36.4	10.0	ug/L	50.0	BLOD	72.8	11-162			
bis (2-Chloroethoxy) methane	39.0	10.0	ug/L	50.0	BLOD	78.0	33-184			
bis (2-Chloroethyl) ether	32.4	10.0	ug/L	50.0	BLOD	64.7	12-158			
2,2'-Oxybis (1-chloropropane)	31.9	10.0	ug/L	50.0	BLOD	63.8	36-166			
bis (2-Ethylhexyl) phthalate	43.1	10.0	ug/L	50.0	BLOD	86.3	10-158			
Butyl benzyl phthalate	44.1	10.0	ug/L	50.0	BLOD	88.1	10-152			
Chrysene	38.3	10.0	ug/L	50.0	BLOD	76.5	17-169			
Dibenz (a,h) anthracene	33.4	10.0	ug/L	50.0	BLOD	66.9	10-227			
Diethyl phthalate	33.9	10.0	ug/L	50.0	BLOD	67.8	10-120			
Dimethyl phthalate	31.9	10.0	ug/L	50.0	BLOD	63.7	10-120			
Di-n-butyl phthalate	31.8	10.0	ug/L	50.0	BLOD	63.5	10-120			
Di-n-octyl phthalate	46.4	10.0	ug/L	50.0	BLOD	92.9	10-146			
Fluoranthene	35.0	10.0	ug/L	50.0	BLOD	70.1	26-137			
Fluorene	44.8	10.0	ug/L	50.0	BLOD	89.7	59-121			
Hexachlorobenzene	24.3	1.00	ug/L	50.0	BLOD	48.5	10-152			
Hexachlorobutadiene	29.3	10.0	ug/L	50.0	BLOD	58.7	24-120			
Hexachlorocyclopentadiene	17.5	10.0	ug/L	50.0	BLOD	35.0	10-90			
Hexachloroethane	31.7	10.0	ug/L	50.0	BLOD	63.4	40-120			
Indeno (1,2,3-cd) pyrene	31.2	10.0	ug/L	50.0	BLOD	62.4	10-171			
Isophorone	24.4	10.0	ug/L	50.0	BLOD	48.8	21-196			
Naphthalene	28.1	5.00	ug/L	50.0	BLOD	56.3	21-133			
Nitrobenzene	34.8	10.0	ug/L	50.0	BLOD	69.6	35-180			
n-Nitrosodimethylamine	25.1	10.0	ug/L	50.0	BLOD	50.3	10-85			
n-Nitrosodi-n-propylamine	35.2	10.0	ug/L	50.0	BLOD	70.5	10-230			
n-Nitrosodiphenylamine	25.1	10.0	ug/L	50.0	BLOD	50.2	12-111			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Matrix Spike (BGJ0676-MS1)

Source: 23J0762-01

Prepared & Analyzed: 10/17/2023

p-Chloro-m-cresol	30.6	10.0	ug/L	50.0	BLOD	61.1	10-127			
Pentachlorophenol	34.4	20.0	ug/L	50.0	BLOD	68.7	14-176			
Phenanthrene	45.3	10.0	ug/L	50.0	BLOD	90.5	54-120			
Phenol	16.4	10.0	ug/L	50.5	BLOD	32.4	10-120			
Pyrene	39.9	10.0	ug/L	50.0	BLOD	79.7	52-120			
Pyridine	32.5	10.0	ug/L	50.0	BLOD	65.0	10-110			
<i>Surr: 2,4,6-Tribromophenol (Surr)</i>	75.8		ug/L	100		75.8	5-136			
<i>Surr: 2-Fluorobiphenyl (Surr)</i>	31.1		ug/L	50.0		62.3	9-117			
<i>Surr: 2-Fluorophenol (Surr)</i>	42.6		ug/L	100		42.6	5-60			
<i>Surr: Nitrobenzene-d5 (Surr)</i>	36.5		ug/L	50.0		73.0	5-151			
<i>Surr: Phenol-d5 (Surr)</i>	31.9		ug/L	100		31.9	5-60			
<i>Surr: p-Terphenyl-d14 (Surr)</i>	40.5		ug/L	50.0		80.9	5-141			

Matrix Spike Dup (BGJ0676-MSD1)

Source: 23J0762-01

Prepared & Analyzed: 10/17/2023

1,2,4-Trichlorobenzene	27.3	10.0	ug/L	50.0	BLOD	54.6	44-142		20	
1,2-Dichlorobenzene	30.8	10.0	ug/L	50.0	BLOD	61.6	22-115		20	
1,3-Dichlorobenzene	30.9	10.0	ug/L	50.0	BLOD	61.7	22-112		20	
1,4-Dichlorobenzene	33.5	10.0	ug/L	50.0	BLOD	67.0	13-112		20	
2,4,6-Trichlorophenol	33.8	10.0	ug/L	50.0	BLOD	67.6	37-144		20	
2,4-Dichlorophenol	29.8	10.0	ug/L	50.0	BLOD	59.6	39-135		20	
2,4-Dimethylphenol	39.7	5.00	ug/L	50.0	BLOD	79.4	32-120		20	
2,4-Dinitrophenol	45.2	50.0	ug/L	50.0	BLOD	90.5	39-139		20	
2,4-Dinitrotoluene	42.1	10.0	ug/L	50.0	BLOD	84.2	10-191		20	
2,6-Dinitrotoluene	42.0	10.0	ug/L	50.0	BLOD	84.1	50-158		20	
2-Chloronaphthalene	33.2	10.0	ug/L	50.0	BLOD	66.5	60-120		20	

Certificate of Analysis

Client Name: SCS Engineers-Winchester
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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0676-MSD1)	Source: 23J0762-01			Prepared & Analyzed: 10/17/2023						
2-Chlorophenol	31.4	10.0	ug/L	50.0	BLOD	62.8	23-134		20	
2-Nitrophenol	41.5	10.0	ug/L	50.0	BLOD	83.1	29-182		20	
3,3'-Dichlorobenzidine	20.1	10.0	ug/L	50.0	BLOD	40.3	10-262		20	
4,6-Dinitro-2-methylphenol	49.4	50.0	ug/L	50.0	BLOD	98.7	10-181		20	
4-Bromophenyl phenyl ether	34.8	10.0	ug/L	50.0	BLOD	69.5	53-127		20	
4-Chlorophenyl phenyl ether	33.4	10.0	ug/L	50.0	BLOD	66.8	25-158		20	
4-Nitrophenol	19.2	50.0	ug/L	50.0	BLOD	38.4	10-132		20	
Acenaphthene	37.2	10.0	ug/L	50.0	BLOD	74.4	47-145		20	
Acenaphthylene	42.2	10.0	ug/L	50.0	BLOD	84.4	33-145		20	
Acetophenone	35.6	20.0	ug/L	50.0	BLOD	71.3	0-200	9.34	20	
Anthracene	38.0	10.0	ug/L	50.0	BLOD	76.0	27-133		20	
Benzo (a) anthracene	41.2	10.0	ug/L	50.0	BLOD	82.3	33-143	11.5	20	
Benzo (a) pyrene	44.1	10.0	ug/L	50.0	BLOD	88.3	17-163	13.5	20	
Benzo (b) fluoranthene	45.4	10.0	ug/L	50.0	BLOD	90.8	24-159		20	
Benzo (g,h,i) perylene	30.8	10.0	ug/L	50.0	BLOD	61.6	10-219		20	
Benzo (k) fluoranthene	41.7	10.0	ug/L	50.0	BLOD	83.3	11-162		20	
bis (2-Chloroethoxy) methane	44.3	10.0	ug/L	50.0	BLOD	88.6	33-184	12.7	20	
bis (2-Chloroethyl) ether	36.5	10.0	ug/L	50.0	BLOD	73.0	12-158		20	
2,2'-Oxybis (1-chloropropane)	38.8	10.0	ug/L	50.0	BLOD	77.6	36-166	19.6	20	
bis (2-Ethylhexyl) phthalate	44.4	10.0	ug/L	50.0	BLOD	88.9	10-158		20	
Butyl benzyl phthalate	49.1	10.0	ug/L	50.0	BLOD	98.2	10-152		20	
Chrysene	42.5	10.0	ug/L	50.0	BLOD	85.0	17-169		20	
Dibenz (a,h) anthracene	35.6	10.0	ug/L	50.0	BLOD	71.3	10-227		20	
Diethyl phthalate	37.5	10.0	ug/L	50.0	BLOD	75.0	10-120	10.0	20	
Dimethyl phthalate	35.8	10.0	ug/L	50.0	BLOD	71.5	10-120		20	

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0676-MSD1)

Source: 23J0762-01

Prepared & Analyzed: 10/17/2023

Di-n-butyl phthalate	39.4	10.0	ug/L	50.0	BLOD	78.7	10-120		20	
Di-n-octyl phthalate	52.0	10.0	ug/L	50.0	BLOD	104	10-146		20	
Fluoranthene	42.4	10.0	ug/L	50.0	BLOD	84.8	26-137		20	
Fluorene	51.4	10.0	ug/L	50.0	BLOD	103	59-121	13.6	20	
Hexachlorobenzene	26.5	1.00	ug/L	50.0	BLOD	52.9	10-152	8.68	20	
Hexachlorobutadiene	33.1	10.0	ug/L	50.0	BLOD	66.2	24-120		20	
Hexachlorocyclopentadiene	21.2	10.0	ug/L	50.0	BLOD	42.4	10-90		20	
Hexachloroethane	35.8	10.0	ug/L	50.0	BLOD	71.6	40-120		20	
Indeno (1,2,3-cd) pyrene	33.0	10.0	ug/L	50.0	BLOD	65.9	10-171	5.52	20	
Isophorone	26.9	10.0	ug/L	50.0	BLOD	53.8	21-196		20	
Naphthalene	31.4	5.00	ug/L	50.0	BLOD	62.9	21-133		20	
Nitrobenzene	38.5	10.0	ug/L	50.0	BLOD	77.0	35-180	9.99	20	
n-Nitrosodimethylamine	25.1	10.0	ug/L	50.0	BLOD	50.1	10-85		20	
n-Nitrosodi-n-propylamine	38.6	10.0	ug/L	50.0	BLOD	77.2	10-230	9.13	20	
n-Nitrosodiphenylamine	29.1	10.0	ug/L	50.0	BLOD	58.2	12-111		20	
p-Chloro-m-cresol	33.9	10.0	ug/L	50.0	BLOD	67.8	10-127		20	
Pentachlorophenol	47.5	20.0	ug/L	50.0	BLOD	95.1	14-176		20	
Phenanthrene	53.9	10.0	ug/L	50.0	BLOD	108	54-120		20	
Phenol	17.5	10.0	ug/L	50.5	BLOD	34.7	10-120		20	
Pyrene	43.1	10.0	ug/L	50.0	BLOD	86.2	52-120		20	
Pyridine	33.4	10.0	ug/L	50.0	BLOD	66.9	10-110	2.82	20	
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Surr: 2,4,6-Tribromophenol (Surr)	94.6		ug/L	100		94.6	5-136			
Surr: 2-Fluorobiphenyl (Surr)	35.6		ug/L	50.0		71.2	9-117			
Surr: 2-Fluorophenol (Surr)	46.4		ug/L	100		46.4	5-60			
Surr: Nitrobenzene-d5 (Surr)	41.9		ug/L	50.0		83.8	5-151			

Certificate of Analysis

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Semivolatile Organic Compounds by GCMS - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Batch BGJ0676 - SW3510C/EPA600-MS

Matrix Spike Dup (BGJ0676-MSD1) **Source: 23J0762-01** Prepared & Analyzed: 10/17/2023

<i>Surr: Phenol-d5 (Surr)</i>	34.2		ug/L	100		34.2	5-60
<i>Surr: p-Terphenyl-d14 (Surr)</i>	42.6		ug/L	50.0		85.2	5-141

Certificate of Analysis

 Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0578 - No Prep Wet Chem										
Blank (BGJ0578-BLK1)				Prepared & Analyzed: 10/13/2023						
BOD	ND	2.0	mg/L							
LCS (BGJ0578-BS1)				Prepared & Analyzed: 10/13/2023						
BOD	207	2	mg/L	198		105	84.6-115.4			
Duplicate (BGJ0578-DUP1)				Source: 23J0641-02 Prepared & Analyzed: 10/13/2023						
BOD	3.3	2.0	mg/L		3.3			1.52	20	
Batch BGJ0589 - No Prep Wet Chem										
Blank (BGJ0589-BLK1)				Prepared & Analyzed: 10/13/2023						
Nitrite as N	ND	0.05	mg/L							
LCS (BGJ0589-BS1)				Prepared & Analyzed: 10/13/2023						
Nitrite as N	0.09	0.05	mg/L	0.100		92.0	80-120			
Matrix Spike (BGJ0589-MS1)				Source: 23J0728-02 Prepared & Analyzed: 10/13/2023						
Nitrite as N	0.09	0.05	mg/L	0.100	BLOD	87.0	80-120			
Matrix Spike Dup (BGJ0589-MSD1)				Source: 23J0728-02 Prepared & Analyzed: 10/13/2023						
Nitrite as N	0.09	0.05	mg/L	0.100	BLOD	86.0	80-120	1.16	20	
Batch BGJ0959 - No Prep Wet Chem										
Blank (BGJ0959-BLK1)				Prepared & Analyzed: 10/24/2023						
Cyanide	ND	0.01	mg/L							

Certificate of Analysis

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ0959 - No Prep Wet Chem										
LCS (BGJ0959-BS1)				Prepared & Analyzed: 10/24/2023						
Cyanide	0.23	0.01	mg/L	0.250		92.9	80-120			
Matrix Spike (BGJ0959-MS1)				Source: 23J0721-02 Prepared & Analyzed: 10/24/2023						
Cyanide	0.28	0.01	mg/L	0.250	BLOD	108	80-120			
Matrix Spike (BGJ0959-MS2)				Source: 23J0735-05 Prepared & Analyzed: 10/24/2023						
Cyanide	0.28	0.01	mg/L	0.250	0.02	104	80-120			
Matrix Spike Dup (BGJ0959-MSD1)				Source: 23J0721-02 Prepared & Analyzed: 10/24/2023						
Cyanide	0.28	0.01	mg/L	0.250	BLOD	112	80-120	3.08	20	
Matrix Spike Dup (BGJ0959-MSD2)				Source: 23J0735-05 Prepared & Analyzed: 10/24/2023						
Cyanide	0.28	0.01	mg/L	0.250	0.02	105	80-120	1.11	20	
Batch BGJ0979 - No Prep Wet Chem										
Blank (BGJ0979-BLK1)				Prepared & Analyzed: 10/25/2023						
TKN as N	ND	0.50	mg/L							
LCS (BGJ0979-BS1)				Prepared & Analyzed: 10/25/2023						
TKN as N	5.29	0.50	mg/L	5.00		106	90-110			
Matrix Spike (BGJ0979-MS1)				Source: 23J0760-02 Prepared & Analyzed: 10/25/2023						
TKN as N	6.25	0.50	mg/L	5.00	1.20	101	90-110			
Matrix Spike Dup (BGJ0979-MSD1)				Source: 23J0760-02 Prepared & Analyzed: 10/25/2023						
TKN as N	5.96	0.50	mg/L	5.00	1.20	95.3	90-110	4.72	20	

Certificate of Analysis

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Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ1045 - No Prep Wet Chem										
Blank (BGJ1045-BLK1)				Prepared & Analyzed: 10/25/2023						
Total Recoverable Phenolics	ND	0.050	mg/L							
LCS (BGJ1045-BS1)				Prepared & Analyzed: 10/25/2023						
Total Recoverable Phenolics	0.41	0.050	mg/L	0.505		81.6	80-120			
Matrix Spike (BGJ1045-MS1)				Source: 23J1008-09		Prepared & Analyzed: 10/25/2023				
Total Recoverable Phenolics	0.46	0.050	mg/L	0.500	0.04	83.6	70-130			
Matrix Spike Dup (BGJ1045-MSD1)				Source: 23J1008-09		Prepared & Analyzed: 10/25/2023				
Total Recoverable Phenolics	0.45	0.050	mg/L	0.500	0.04	82.4	70-130	1.32	20	
Batch BGJ1046 - No Prep Wet Chem										
Blank (BGJ1046-BLK1)				Prepared & Analyzed: 10/25/2023						
Nitrate+Nitrite as N	ND	0.10	mg/L							
LCS (BGJ1046-BS1)				Prepared & Analyzed: 10/25/2023						
Nitrate+Nitrite as N	1.03	0.1	mg/L	1.00		103	90-110			
Matrix Spike (BGJ1046-MS1)				Source: 23J1034-01RE1		Prepared & Analyzed: 10/25/2023				
Nitrate+Nitrite as N	1.55	0.1	mg/L	1.00	0.38	117	90-120			
Matrix Spike Dup (BGJ1046-MSD1)				Source: 23J1034-01RE1		Prepared & Analyzed: 10/25/2023				
Nitrate+Nitrite as N	1.55	0.1	mg/L	1.00	0.38	117	90-120	0.00	20	
Batch BGJ1076 - No Prep Wet Chem										
Blank (BGJ1076-BLK1)				Prepared & Analyzed: 10/26/2023						
Ammonia as N	ND	0.10	mg/L							

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Wet Chemistry Analysis - Quality Control

Enthalpy Analytical

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BGJ1076 - No Prep Wet Chem										
LCS (BGJ1076-BS1)				Prepared & Analyzed: 10/26/2023						
Ammonia as N	1.03	0.1	mg/L	1.00		103	90-110			
Matrix Spike (BGJ1076-MS1)				Source: 23J0728-01 Prepared & Analyzed: 10/26/2023						
Ammonia as N	0.98	0.1	mg/L	1.00	BLOD	98.4	89.3-131			
Matrix Spike (BGJ1076-MS2)				Source: 23J1158-02 Prepared & Analyzed: 10/26/2023						
Ammonia as N	1.04	0.1	mg/L	1.00	BLOD	102	89.3-131			
Matrix Spike Dup (BGJ1076-MSD1)				Source: 23J0728-01 Prepared & Analyzed: 10/26/2023						
Ammonia as N	1.02	0.1	mg/L	1.00	BLOD	102	89.3-131	3.10	20	
Matrix Spike Dup (BGJ1076-MSD2)				Source: 23J1158-02 Prepared & Analyzed: 10/26/2023						
Ammonia as N	1.07	0.1	mg/L	1.00	BLOD	105	89.3-131	3.04	20	
Batch BGJ1078 - No Prep Wet Chem										
Blank (BGJ1078-BLK1)				Prepared & Analyzed: 10/26/2023						
COD	ND	10.0	mg/L							
LCS (BGJ1078-BS1)				Prepared & Analyzed: 10/26/2023						
COD	49.7	10.0	mg/L	50.0		99.4	88-119			
Matrix Spike (BGJ1078-MS1)				Source: 23J0633-05 Prepared & Analyzed: 10/26/2023						
COD	48.1	10.0	mg/L	50.0	BLOD	96.2	72.4-130			
Matrix Spike Dup (BGJ1078-MSD1)				Source: 23J0633-05 Prepared & Analyzed: 10/26/2023						
COD	48.7	10.0	mg/L	50.0	BLOD	97.5	72.4-130	1.34	20	

Certificate of Analysis

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 Submitted To: Jennifer Robb

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Analytical Summary

23J0725-01 Subcontract

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods			Preparation Method: EPA200.8 R5.4		
23J0725-01	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
23J0725-01RE1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method: No Prep Wet Chem		
23J0725-01	300 mL / 300 mL	SM5210B-2016	BGJ0578	SGJ0714	
23J0725-01	1.00 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0589	SGJ0575	AJ30203
23J0725-01	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
23J0725-01RE1	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
23J0725-01	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0979	SGJ0976	AJ30347
23J0725-01	1.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
23J0725-01	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ1046	SGJ1040	AJ30359
23J0725-01	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
23J0725-01	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Organic Compounds by GCMS			Preparation Method: SW3510C/EPA600-MS		
23J0725-01	500 mL / 0.500 mL	SW8270E	BGJ0676	SGJ0704	AJ30247

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GCMS			Preparation Method: SW5030B-MS		

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

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Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GCMS			Preparation Method: SW5030B-MS		
23J0725-01	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
23J0725-02	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
23J0725-01RE1	5.00 mL / 5.00 mL	SW8260D	BGJ0629	SGJ0621	AI30208

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

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QC Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods			Preparation Method:	EPA200.8 R5.4	
BGJ0615-BLK1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-BS1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MS1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MS2	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MSD1	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293
BGJ0615-MSD2	50.0 mL / 50.0 mL	SW6020B	BGJ0615	SGJ0664	AJ30293

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method:	No Prep Wet Chem	
BGJ0578-BLK1	300 mL / 300 mL	SM5210B-2016	BGJ0578	SGJ0714	
BGJ0578-BS1	300 mL / 300 mL	SM5210B-2016	BGJ0578	SGJ0714	
BGJ0578-DUP1	300 mL / 300 mL	SM5210B-2016	BGJ0578	SGJ0714	
BGJ0589-BLK1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0589	SGJ0575	AJ30203
BGJ0589-BS1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0589	SGJ0575	AJ30203
BGJ0589-MRL1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0589	SGJ0575	AJ30203
BGJ0589-MS1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0589	SGJ0575	AJ30203
BGJ0589-MSD1	25.0 mL / 25.0 mL	SM4500-NO2B-2011	BGJ0589	SGJ0575	AJ30203
BGJ0959-BLK1	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
BGJ0959-BS1	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
BGJ0959-MRL1	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
BGJ0959-MS1	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
BGJ0959-MS2	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
BGJ0959-MSD1	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340

Certificate of Analysis

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Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Wet Chemistry Analysis			Preparation Method:	No Prep Wet Chem	
BGJ0959-MSD2	6.00 mL / 6.00 mL	SW9012B	BGJ0959	SGJ0935	AJ30340
BGJ0979-BLK1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0979	SGJ0976	AJ30347
BGJ0979-BS1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0979	SGJ0976	AJ30347
BGJ0979-MS1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0979	SGJ0976	AJ30347
BGJ0979-MSD1	25.0 mL / 25.0 mL	EPA351.2 R2.0	BGJ0979	SGJ0976	AJ30347
BGJ1045-BLK1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-BS1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-MRL1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-MS1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1045-MSD1	5.00 mL / 10.0 mL	SW9065	BGJ1045	SGJ1004	AJ30352
BGJ1046-BLK1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ1046	SGJ1040	AJ30359
BGJ1046-BS1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ1046	SGJ1040	AJ30359
BGJ1046-MRL1	5.00 mL / 5.00 mL	SM4500-NO3F-2016	BGJ1046	SGJ1040	AJ30359
BGJ1046-MS1	25.0 mL / 25.0 mL	SM4500-NO3F-2016	BGJ1046	SGJ1040	AJ30359
BGJ1046-MSD1	25.0 mL / 25.0 mL	SM4500-NO3F-2016	BGJ1046	SGJ1040	AJ30359
BGJ1076-BLK1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1076-BS1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1076-MRL1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1076-MS1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1076-MS2	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1076-MSD1	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1076-MSD2	6.00 mL / 6.00 mL	EPA350.1 R2.0	BGJ1076	SGJ1043	AJ30360
BGJ1078-BLK1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-BS1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-MRL1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-MS1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254
BGJ1078-MSD1	2.00 mL / 2.00 mL	SM5220D-2011	BGJ1078	SGJ1044	AJ30254

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Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Organic Compounds by GCMS			Preparation Method:	SW3510C/EPA600-MS	
BGJ0676-BLK1	1000 mL / 1.00 mL	SW8270E	BGJ0676	SGJ0704	AJ30247
BGJ0676-BS1	1000 mL / 1.00 mL	SW8270E	BGJ0676	SGJ0704	AJ30247
BGJ0676-MS1	1000 mL / 1.00 mL	SW8270E	BGJ0676	SGJ0704	AJ30247
BGJ0676-MSD1	1000 mL / 1.00 mL	SW8270E	BGJ0676	SGJ0704	AJ30247

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GCMS			Preparation Method:	SW5030B-MS	
BGJ0587-BLK1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0587-BS1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0587-MS1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0587-MSD1	5.00 mL / 5.00 mL	SW8260D	BGJ0587	SGJ0578	AI30208
BGJ0629-BLK1	5.00 mL / 5.00 mL	SW8260D	BGJ0629	SGJ0621	AI30208
BGJ0629-BS1	5.00 mL / 5.00 mL	SW8260D	BGJ0629	SGJ0621	AI30208
BGJ0629-MS1	0.0500 mL / 5.00 mL	SW8260D	BGJ0629	SGJ0621	AI30208
BGJ0629-MSD1	0.0500 mL / 5.00 mL	SW8260D	BGJ0629	SGJ0621	AI30208

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
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Date Issued: 11/1/2023 3:39:38PM

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA350.1 R2.0 in Non-Potable Water</i>	
Ammonia as N	VELAP,NCDEQ,PADEP,WVDEP
<i>EPA351.2 R2.0 in Non-Potable Water</i>	
TKN as N	VELAP,NCDEQ,WVDEP
<i>SM4500-NO2B-2011 in Non-Potable Water</i>	
Nitrite as N	VELAP,WVDEP,NCDEQ
<i>SM4500-NO3F-2016 in Non-Potable Water</i>	
Nitrate+Nitrite as N	VELAP,WVDEP
<i>SM5210B-2016 in Non-Potable Water</i>	
BOD	VELAP,NCDEQ,WVDEP
<i>SM5220D-2011 in Non-Potable Water</i>	
COD	VELAP,NCDEQ,PADEP,WVDEP
<i>SW6020B in Non-Potable Water</i>	
Mercury	VELAP
Arsenic	VELAP,WVDEP
Barium	VELAP,WVDEP
Cadmium	VELAP,WVDEP
Chromium	VELAP,WVDEP
Copper	VELAP,WVDEP
Lead	VELAP,WVDEP
Nickel	VELAP,WVDEP
Selenium	VELAP,WVDEP
Silver	VELAP,WVDEP
Zinc	VELAP,WVDEP
<i>SW8260D in Non-Potable Water</i>	

Certificate of Analysis

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 Submitted To: Jennifer Robb

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Certified Analyses included in this Report

<u>Analyte</u>	<u>Certifications</u>
2-Butanone (MEK)	VELAP,NCDEQ,PADEP,WVDEP
Acetone	VELAP,NCDEQ,PADEP,WVDEP
Benzene	VELAP,NCDEQ,PADEP,WVDEP
Ethylbenzene	VELAP,NCDEQ,PADEP,WVDEP
Toluene	VELAP,NCDEQ,PADEP,WVDEP
Xylenes, Total	VELAP,NCDEQ,PADEP,WVDEP
Tetrahydrofuran	VELAP,PADEP
<i>SW8270E in Non-Potable Water</i>	
Anthracene	VELAP,PADEP,NCDEQ,WVDEP
<i>SW9012B in Non-Potable Water</i>	
Cyanide	VELAP,WVDEP
<i>SW9065 in Non-Potable Water</i>	
Total Recoverable Phenolics	VELAP,WVDEP

Certificate of Analysis

Client Name: SCS Engineers-Winchester
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Date Issued: 11/1/2023 3:39:38PM

Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2023
NC	North Carolina DENR	495	12/31/2023
NCDEQ	North Carolina DEQ	495	12/31/2023
NCDOH	North Carolina Department of Health	51714	07/31/2024
NYDOH	New York DOH Drinking Water	12069	04/01/2024
PADEP	NELAP-Pennsylvania Certificate #009	68-03503	10/31/2024
SCDHEC	South Carolina Dept of Health and Environmental Control Certificate 93016001	93016	06/14/2024
TXCEQ	Texas Comm on Environmental Quality #T104704576-23-1	T104704576	05/31/2024
VELAP	NELAP-Virginia Certificate #12617	460021	06/14/2024
WVDEP	West Virginia DEP	350	11/30/2023

Certificate of Analysis

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Qualifiers and Definitions

J	The reported result is an estimated value.
L	LCS recovery is outside of established acceptance limits
M	Matrix spike recovery is outside established acceptance limits
RPD	Relative Percent Difference
Qual	Qualifiers
-RE	Denotes sample was re-analyzed
LOD	Limit of Detection
BLOD	Below Limit of Detection
LOQ	Limit of Quantitation
DF	Dilution Factor
TIC	Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library. A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
PCBs, Total	Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.



1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

CHAIN OF CUSTODY

COMPANY NAME: SCS Engineers	INVOICE TO: SAME	PROJECT NAME/Quote #:
CONTACT: Jennifer Robb	INVOICE CONTACT:	SITE NAME: 2023 City of Bristol Landfill Leachate
ADDRESS: 11260 Roger Bacon Drive, Ste. 300, Reston VA 20190	INVOICE ADDRESS:	PROJECT NUMBER: 02218208.15 Task 1
PHONE #: 703-471-6150	EMAIL: jrobb@scsengineers.com	P.O. #:
Is sample for compliance reporting? YES <input checked="" type="radio"/> NO <input type="radio"/>	Regulatory State: V A	Is sample from a chlorinated supply? YES <input type="radio"/> NO <input checked="" type="radio"/>
SAMPLER NAME (PRINT): Logan Nelson / Will Fabric		SAMPLER SIGNATURE: <i>[Signature]</i>
		Turn Around Time: 10 Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)											COMMENTS		
											Ammonia - EPA 350.1	BOD - SM22 5210B-201	COD - SM22 5220D-2011	Cyanide - EPA 335.2	Nitrate SM22 450-NO3F-2011 (report separately from Nitrite)	Nitrite SM22 450-NO3F-2011	SVOC (Anthracene) 8270	Total Metals (As, Ba, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn) 6020	TKN - EPA 351.2 R2.0	Mercury - 6020	Total Recoverable Phenolics - 9065		V. Fatty Acids (See List) 8015	VOCs (See List) 8260
1) EW-78	<input checked="" type="checkbox"/>					10/11/23	1415		GW	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<p>Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol</p> <p>Note VOC 8260 no HCl</p> <p>PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)</p>	
2)									GW															
3)									GW															
4)									GW															
5)									GW															
6)									GW															
7)									GW															
8)									GW															
9)									GW															
10)									DI															

RELINQUISHED: <i>[Signature]</i>	DATE / TIME: 10/12/23/1200	RECEIVED: LCN	DATE / TIME:	QC Data Package	LAB USE ONLY Therm ID: 036	COOLER TEMP 0.5 °C
RELINQUISHED: LCN	DATE / TIME:	RECEIVED: <i>[Signature]</i>	DATE / TIME: 10/13/23 2000	Level III <input type="checkbox"/>	Custody Seals used and intact? <input checked="" type="checkbox"/> (Y/N)	Received on ice? <input checked="" type="checkbox"/> (Y/N)
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:	Level IV <input type="checkbox"/>	SCS-W 23J0725	

2023 City of Bristol Landfill Leach:
Recd: 10/13/2023 Due: 10/27/2023
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Sample Preservation Log

Order ID: 23J0725

Date Performed: 10/13/23

Analyst Performing Check: CSB/RCS

Sample ID	Container ID	Metals		Cyanide		Sulfide		Ammonia		TKN		Phos, Tot		NO3+NO2		DRO		Pesticide (8081/808/808) PCB DW only		SVOC (528/8270/625)		CrVI * **		Pest/PCB (508) / SVOC(525)		Phenolics		COD			
		pH as Received		pH as Received		pH as Received		pH as Received		pH as Received		pH as Received		pH as Received		pH as Received		pH as Received		Res. Cl		Res. Cl		Received pH		pH as Received		pH as Received		pH as Received	
		<2	Other	>12	Other	>9	Other	<2	Other	<2	Other	<2	Other	<2	Other	<2	Other	<2	Other	+	-	+	-	Final pH	Final pH	<2	Other	Final pH	<2	Other	Final pH
1	A	7	<2																												
1	D																									4	<2				
1	L							7	<2	7	<2			7	<2														7	<2	
1	N			12	10																										

NaOH ID: 21400468

HNO3 ID: 3104133

CrVI preserved date/time: _____

Analyst Initials: _____

* pH must be adjusted between 9.3 - 9.7

H2SO4 ID: 3103139

Na2S2O3 ID: _____

Ammonia Buffer Sol'n ID: _____

HCL ID: _____

Na2SO3 ID: _____

5N NaOH ID: _____

Metals were received with pH = 7. HNO3 was added at 1215 on 13 Oct 2023 by RCJ in the Log-In room to bring pH = <2.

Certificate of Analysis

Client Name: SCS Engineers-Winchester
Client Site I.D.: 2023 City of Bristol Landfill Leachate
Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Certificate of Analysis

Client Name: SCS Engineers-Winchester
 Client Site I.D.: 2023 City of Bristol Landfill Leachate
 Submitted To: Jennifer Robb

Date Issued: 11/1/2023 3:39:38PM

Laboratory Order ID: 23J0725

Sample Conditions Checklist

Samples Received at:	0.50°C
How were samples received?	Logistics Courier
Were Custody Seals used? If so, were they received intact?	Yes
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits or received on ice, and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	Yes
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis. In addition, field parameters are always received outside holding time and will be marked accordingly.	No

Work Order Comments

*H2SO4-preserved containers were received with a pH greater than 2, and H2SO4 was added to bring the pH to less than 2.

*

Cyanide was logged by SW9012 per the method the lab supports for groundwater,

Certificate of Analysis

Client Name: SCS Engineers-Winchester

Date Issued: 11/1/2023 3:39:38PM

Client Site I.D.: 2023 City of Bristol Landfill Leachate

Submitted To: Jennifer Robb

which differs from the chain of custody (EPA 335.2).

*Received trip blanks were added to the work order per the bottle labels (10/04/23 1025).

*An NaOH-preserved container was received with a pH less than 12, and NaOH was added to bring the pH to greater than 12.

Jennifer Robb notified via email. MRS 10/13/23 1409

Work Orders: 3J17049

Project: 23J0725

Attn: Enthalpy VA

Client: Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Report Date: 11/01/2023

Received Date: 10/17/2023

Turnaround Time: Normal

Phones: (804) 358-8295

Fax:

P.O. #: PO-054089

Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • LACSD #10143

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Enthalpy VA,

Enclosed are the results of analyses for samples received 10/17/23 with the Chain-of-Custody document. The samples were received in good condition, at 2.2 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:



Ryan J. Gasio
Project Manager



Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Project Number: 23J0725

Reported:

11/01/2023 11:19

Project Manager: Enthalpy VA

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
23J0725-01: EW-78	Client	3J17049-01	Water	10/11/23 14:15	

Enthalpy Analytical - Richmond VA
 1941 Reymet Road
 Richmond, VA 23237

Project Number: 23J0725

Reported:
 11/01/2023 11:19

Project Manager: Enthalpy VA

Sample Results

Sample: 23J0725-01: EW-78
 3J17049-01 (Water) Sampled: 10/11/23 14:15 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Alcohols by GC/FID						
Method: EPA 8015M		Instr: GC09				
Batch ID: W3J1540		Preparation: _NONE (SVOC)			Prepared: 10/19/23 17:00	
		Analyst: alf				
Acetic acid	720	500	mg/l	50	10/20/23	M-05
Butyric acid	ND	500	mg/l	50	10/20/23	M-05
Heptanoic acid	ND	500	mg/l	50	10/20/23	M-05
Hexanoic acid	ND	500	mg/l	50	10/20/23	M-05
Isobutyric acid	ND	500	mg/l	50	10/20/23	M-05
Isocaproic acid	ND	500	mg/l	50	10/20/23	M-05
Isovaleric acid	ND	500	mg/l	50	10/20/23	M-05
Propionic acid	ND	500	mg/l	50	10/20/23	M-05
Valeric acid	ND	500	mg/l	50	10/20/23	M-05

Enthalpy Analytical - Richmond VA
1941 Reymet Road
Richmond, VA 23237

Project Number: 23J0725

Reported:

11/01/2023 11:19

Project Manager: Enthalpy VA

Quality Control Results

Alcohols by GC/FID

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit	Qualifier
Batch: W3J1540 - EPA 8015M										
Blank (W3J1540-BLK1)										
				Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	ND	10	mg/l							
Butyric acid	ND	10	mg/l							
Heptanoic acid	ND	10	mg/l							
Hexanoic acid	ND	10	mg/l							
Isobutyric acid	ND	10	mg/l							
Isocaproic acid	ND	10	mg/l							
Isovaleric acid	ND	10	mg/l							
Propionic acid	ND	10	mg/l							
Valeric acid	ND	10	mg/l							
LCS (W3J1540-BS1)										
				Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	57.1	10	mg/l	50.0		114	50-150			
Butyric acid	49.8	10	mg/l	50.0		100	50-150			
Heptanoic acid	57.3	10	mg/l	50.0		115	50-150			
Hexanoic acid	53.7	10	mg/l	50.0		107	50-150			
Isobutyric acid	57.2	10	mg/l	50.0		114	50-150			
Isocaproic acid	47.7	10	mg/l	50.0		95	50-150			
Isovaleric acid	40.0	10	mg/l	50.0		80	50-150			
Propionic acid	50.1	10	mg/l	50.0		100	50-150			
Valeric acid	45.8	10	mg/l	50.0		92	50-150			
Matrix Spike (W3J1540-MS1)										
		Source: 3129078-01		Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	2780	500	mg/l	2500	ND	111	50-150			
Butyric acid	2490	500	mg/l	2500	ND	100	50-150			
Heptanoic acid	2740	500	mg/l	2500	ND	110	50-150			
Hexanoic acid	2720	500	mg/l	2500	ND	109	50-150			
Isobutyric acid	2830	500	mg/l	2500	ND	113	50-150			
Isocaproic acid	2470	500	mg/l	2500	ND	99	50-150			
Isovaleric acid	2010	500	mg/l	2500	ND	80	50-150			
Propionic acid	2490	500	mg/l	2500	ND	100	50-150			
Valeric acid	2320	500	mg/l	2500	ND	93	50-150			
Matrix Spike Dup (W3J1540-MSD1)										
		Source: 3129078-01		Prepared: 10/19/23 Analyzed: 10/20/23						
Acetic acid	2790	500	mg/l	2500	ND	112	50-150	0.4	25	
Butyric acid	2490	500	mg/l	2500	ND	99	50-150	0.2	25	
Heptanoic acid	2800	500	mg/l	2500	ND	112	50-150	2	25	
Hexanoic acid	2690	500	mg/l	2500	ND	108	50-150	1	25	
Isobutyric acid	2820	500	mg/l	2500	ND	113	50-150	0.06	25	
Isocaproic acid	2410	500	mg/l	2500	ND	97	50-150	2	25	
Isovaleric acid	1990	500	mg/l	2500	ND	80	50-150	0.9	25	
Propionic acid	2520	500	mg/l	2500	ND	101	50-150	1	25	
Valeric acid	2300	500	mg/l	2500	ND	92	50-150	0.8	25	

Enthalpy Analytical - Richmond VA
 1941 Reymet Road
 Richmond, VA 23237

Project Number: 23J0725

Reported:

11/01/2023 11:19

Project Manager: Enthalpy VA

(Continued)

Quality Control Results

Alcohols by GC/FID (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
---------	--------	-----	-------	-------------	---------------	------	-------------	-----	-----------	-----------

Batch: W3J1540 - EPA 8015M (Continued)

Matrix Spike Dup (W3J1540-MSD1)

Source: 3129078-01

Prepared: 10/19/23 Analyzed: 10/20/23

Enthalpy Analytical - Richmond VA
 1941 Reymet Road
 Richmond, VA 23237

Project Number: 23J0725

Reported:

11/01/2023 11:19

Project Manager: Enthalpy VA

Notes and Definitions

Item	Definition
M-05	Due to the nature of matrix interferences, sample was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
Ammonia as N (mg/L)	November-2022	---	---	---	---	---	---	1560	---	1400	---	1380	---	---	---	---	---	---	---	50	50
	December-2022	1700	2280	---	---	2110	---	1410	1310	---	---	---	1150	1780	---	---	---	---	100	100	
	January-2023	---	---	---	---	---	---	936	---	---	---	---	1330	---	---	---	---	---	---	50	50
		---	---	---	---	---	---	---	2440	---	---	---	---	---	---	---	---	---	---	100	100
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	1490	---	---	---	100	100	
	March-2023	---	---	---	---	---	---	667	1480	---	---	---	---	---	---	---	---	---	73.1	100	
	April-2023	---	---	---	---	---	---	1410	---	1220	---	---	---	---	---	---	---	---	73.1	100	
	May-2023	1390	---	---	---	---	---	1860	2380	---	---	---	---	---	---	---	---	---	146	200	
	June-2023	---	---	---	---	---	---	---	2740	---	2370	2170	---	---	---	---	---	---	146	200	
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1180	---	---	---	73.1	100
		---	1570	---	---	---	2260	---	---	---	---	---	---	---	---	---	---	2350	310	146	200
	August-2023	---	---	1600	---	1890	---	---	---	---	---	---	---	---	---	---	---	2140	222	146	200
September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1720	---	---	---	73.1	100	
	---	---	1250	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	146	200	
October-2023	---	---	---	1980	---	---	---	---	---	---	---	---	---	---	1730	2890	---	---	146	200	
Biological Oxygen Demand (mg/L)	November-2022	---	---	---	---	---	---	15700	---	5860	---	5140	---	---	---	---	---	---	0.2	2	
	December-2022	6440	12500	---	---	11400	---	9240	3330	---	---	---	8360	6770	---	---	---	---	0.2	2	
	January-2023	9920	---	---	---	---	---	999	28100	---	---	---	7060	---	---	---	---	---	0.2	2	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	7230	---	---	---	0.2	2	
	March-2023	---	---	---	---	---	---	1570	9190	---	---	---	---	---	---	---	---	---	0.2	2	
	April-2023	---	---	---	---	---	---	8430	---	2860	---	---	---	---	---	---	---	---	0.2	2	
	May-2023	7350	---	---	---	---	---	11900	35300	---	---	---	---	---	---	---	---	---	0.2	2	
	June-2023	---	---	---	---	---	---	---	20000	---	27400	23100	---	---	---	---	---	---	0.2	2	
	July-2023	6820	---	---	---	---	---	32900	---	---	---	---	---	---	---	330	---	31800	937	0.2	2
	August-2023	---	---	>33045	---	>33225	---	---	---	---	---	---	---	---	---	---	---	>32805	506	0.2	2
	September-2023	---	40185.5	---	---	---	---	---	---	---	---	---	---	---	---	659	---	---	---	0.2	2
	October-2023	---	---	---	34600	---	---	---	---	---	---	---	---	---	---	690	37000	---	---	0.2	2

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ		
Parameter	Monitoring Event	Concentration																				
Chemical Oxygen Demand (mg/L)	November-2022	---	---	---	---	---	---	---	---	9790	---	10800	---	---	---	---	---	---	---	1000	1000	
		---	---	---	---	---	---	23500	---	---	---	---	---	---	---	---	---	---	---	2000	2000	
	December-2022	7440	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1000	1000	
		---	---	---	---	---	---	---	13200	8000	---	---	---	20300	14100	---	---	---	---	2000	2000	
		---	---	---	---	22400	---	---	---	---	---	---	---	---	---	---	---	---	---	5000	5000	
	January-2023	---	86800	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10000	10000	
		---	---	---	---	---	---	3630	---	---	---	---	---	---	---	---	---	---	---	500	500	
		14900	---	---	---	---	---	---	---	---	---	---	8430	---	---	---	---	---	---	2000	2000	
	February-2023	---	---	---	---	---	---	---	47600	---	---	---	---	---	---	---	---	---	---	5000	5000	
		---	---	---	---	---	---	---	---	---	---	---	---	---	9210	---	---	---	---	1000	1000	
	March-2023	---	---	---	---	---	---	1690	---	---	---	---	---	---	---	---	---	---	---	500	500	
		---	---	---	---	---	---	---	10600	---	---	---	---	---	---	---	---	---	---	2000	2000	
	April-2023	---	---	---	---	---	---	---	---	7370	---	---	---	---	---	---	---	---	---	1000	1000	
		---	---	---	---	---	---	16800	---	---	---	---	---	---	---	---	---	---	---	2000	2000	
	May-2023	7590	---	---	---	---	---	18700	---	---	---	---	---	---	---	---	---	---	---	2000	2000	
		---	---	---	---	---	---	---	44700	---	---	---	---	---	---	---	---	---	---	4000	4000	
	June-2023	---	---	---	---	---	---	---	---	---	44800	---	---	---	---	---	---	---	---	5000	5000	
		---	---	---	---	---	---	---	41300	---	---	55000	---	---	---	---	---	---	---	10000	10000	
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2180	500	500
		6480	---	---	---	---	---	---	---	---	---	---	---	---	---	2460	---	---	---	1000	1000	
---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	41000	---	5000	5000		
August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10000	10000		
	---	---	59000	---	58600	---	---	---	---	---	---	---	---	---	---	---	---	---	1750	500	500	
September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5000	5000		
	---	87400	---	---	---	---	---	---	---	---	---	---	---	---	6260	---	---	---	1000	1000		
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10000	10000		
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5320	---	---	---	500	500		
	---	---	---	51000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5000	5000		
November-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10000	10000		
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	63600	---	---	---	0.1	0.1	
Nitrate+Nitrite as N (mg/L)	November-2022	---	---	---	---	---	---	2.91	---	0.16	---	0.33	---	---	---	---	---	---	0.1	0.1		

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
Nitrate as N (mg/L)	December-2022	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	0.2	0.2
		---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	0.2	0.6
		ND	ND	---	---	ND	---	ND	---	---	---	---	---	---	---	---	---	---	---	1.1	5.1
	January-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	1.5	5.5
		---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	0.35	1.35
		3.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.1	2.1
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.2	2.2
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	0.35	1.35
	March-2023	---	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	1.04	5.1
	April-2023	---	---	---	---	---	---	ND	---	ND	---	---	---	---	---	---	---	---	---	0.6	2.6
	May-2023	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.1	5.1
		---	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	1.2	5.2
	June-2023	---	---	---	---	---	---	---	ND	---	---	ND	---	---	---	---	---	---	---	1.1	5.1
		---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	1.2	5.2
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.355	---	---	0.15	0.35
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.55	0.75
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	3
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	5.5
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.15	0.35
September-2023	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	1.5	3.5	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.3	1.1	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.7	1.5	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.35	1.35	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	3	
Nitrite as N (mg/L)	December-2022	---	---	---	---	---	---	---	0.12 J	---	---	---	---	---	---	---	---	---	0.1	0.5	
		ND	ND	---	---	ND	---	ND	---	---	---	---	---	ND	ND	---	---	---	---	1	5
	January-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.25	1.25
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	2
		---	---	---	---	---	---	---	---	---	---	---	---	---	0.48 J	---	---	---	---	0.25	1.25
	March-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	5	
	April-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.5	
	May-2023	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	5	
	June-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	5
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.05	0.25
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.5
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	5
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.05
	September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.5
---		---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.2	1	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.25	1.25	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.5	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
Total Kjeldahl Nitrogen (mg/L)	November-2022	---	---	---	---	---	---	---	---	1290	---	1470	---	---	---	---	---	---	---	20	50
		---	---	---	---	---	---	2110	---	---	---	---	---	---	---	---	---	---	---	50	125
	December-2022	1510	3570	---	---	1790	---	1830	1490	---	---	---	1340	1940	---	---	---	---	---	200	500
		1840	---	---	---	---	881	---	---	---	---	1410	---	---	---	---	---	---	---	20	50
	January-2023	---	---	---	---	---	---	2970	---	---	---	---	---	---	---	---	---	---	---	40	100
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	1870	---	---	---	---	16.8	50
	March-2023	---	---	---	---	---	879	1920	---	---	---	---	---	---	---	---	---	---	---	33.6	100
	April-2023	---	---	---	---	---	1820	---	1510	---	---	---	---	---	---	---	---	---	---	16.8	50
	May-2023	1590	---	---	---	---	1950	2910	---	---	---	---	---	---	---	---	---	---	---	40	100
	June-2023	---	---	---	---	---	---	3080	---	---	2750	---	---	---	---	---	---	---	---	100	250
		---	---	---	---	---	---	---	---	2650	---	---	---	---	---	---	---	---	---	200	500
	July-2023	1670	---	---	---	2960	---	---	---	---	---	---	---	---	---	1670	---	2720	285	40	100
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	279	10	25
		---	---	2240	---	2820	---	---	---	---	---	---	---	---	---	---	---	2850	---	100	250
September-2023	---	3340	---	---	---	---	---	---	---	---	---	---	---	---	2680	---	---	---	100	250	
October-2023	---	---	---	1050	---	---	---	---	---	---	---	---	---	---	---	1320	---	---	40	100	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4630	---	---	---	100	250	
Total Recoverable Phenolics (mg/L)	November-2022	---	---	---	---	---	---	---	---	5.68	---	3	---	---	---	---	---	---	0.3	0.5	
		---	---	---	---	---	---	28.8	---	---	---	---	---	---	---	---	---	---	---	0.75	1.25
	December-2022	---	---	---	---	---	---	---	8.94	---	---	---	---	---	---	---	---	---	---	0.3	0.5
		24.9	54.6	---	---	28.3	---	32	---	---	---	---	20.2	36	---	---	---	---	---	1.5	2.5
	January-2023	27.2	---	---	---	---	1.3	---	---	---	---	20.2	---	---	---	---	---	---	---	0.75	1.25
		---	---	---	---	---	---	56.5	---	---	---	---	---	---	---	---	---	---	---	1.5	2.5
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	22.4	---	---	---	---	---	1.5	2.5
	March-2023	---	---	---	---	---	0.4	---	---	---	---	---	---	---	---	---	---	---	---	0.03	0.05
		---	---	---	---	---	---	13.9	---	---	---	---	---	---	---	---	---	---	---	0.3	0.5
	April-2023	---	---	---	---	---	18.7	---	5.1	---	---	---	---	---	---	---	---	---	---	0.3	0.5
	May-2023	18.6	---	---	---	---	20	50	---	---	---	---	---	---	---	---	---	---	---	1.5	2.5
	June-2023	---	---	---	---	---	---	39.1	---	45.6	80.6	---	---	---	---	---	---	---	---	1.5	2.5
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.7	---	---	---	---	0.15	0.25
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.92	0.3	0.5
	11.6	---	---	---	47.9	---	---	---	---	---	---	---	---	---	---	---	37.3	---	1.5	2.5	
August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.46	0.15	0.25	
	---	---	28.6	---	31.4	---	---	---	---	---	---	---	---	---	---	---	40.4	---	1.5	2.5	
September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4.58	---	---	---	0.3	0.5	
	---	38.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	5	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4.13	---	---	---	0.15	0.25	
	---	---	---	37	---	---	---	---	---	---	---	---	---	---	---	38.7	---	---	0.6	1	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ		
Parameter	Monitoring Event	Concentration																	LOD	LOQ		
SEMI-VOLATILE ORGANIC COMPOUND (ug/L)																						
Anthracene	November-2022	---	---	---	---	---	---	---	---	ND	---	ND	---	---	---	---	---	---	46.7	93.5		
	December-2022	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	93.5	187		
	December-2022	---	---	---	---	---	---	---	ND	ND	---	---	---	---	ND	---	---	---	---	9.35	9.35	
		---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11.7	11.7	
	January-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	23.4	23.4	
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	485	971	
		---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	243	485	
		---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	253	505	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	490	980	
		---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	500	1000	
	March-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	187	374	
		---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	187	374	
	April-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	51	102	
		---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	117	234	
	May-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	37.4	74.8	
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	38.8	77.7	
	June-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	490	980	
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	490	980	
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	46.7	93.5
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	100	200	
August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	250	500		
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	1000	2000	
September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	19.6	39.2		
	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1000	2000		
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	40	80		
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	40	80		
TOTAL METALS (mg/L)																						
Arsenic	November-2022	---	---	---	---	---	---	0.863	---	0.464	---	1.3	---	---	---	---	---	---	0.02	0.04		
	December-2022	1.02	0.406	---	---	0.174	---	1.69	0.49	---	---	---	0.159	0.574	---	---	---	---	0.02	0.04		
	January-2023	0.285	---	---	---	---	0.596	0.225	---	---	---	0.846	---	---	---	---	---	---	0.01	0.02		
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	0.29	---	---	---	---	0.005	0.01		
	March-2023	---	---	---	---	---	1.07	1	---	---	---	---	---	---	---	---	---	---	0.01	0.02		
	April-2023	---	---	---	---	---	---	---	0.11	---	---	---	---	---	---	---	---	---	---	0.0005	0.001	
		---	---	---	---	---	---	0.36	---	---	---	---	---	---	---	---	---	---	---	0.005	0.01	
	May-2023	0.26	---	---	---	---	0.3	0.27	---	---	---	---	---	---	---	---	---	---	0.0025	0.005		
	June-2023	---	---	---	---	---	---	0.26	---	0.5	0.14	---	---	---	---	---	---	---	0.0025	0.005		
	July-2023	0.23	---	---	---	---	---	---	---	---	---	---	---	---	0.24	---	0.19	0.06	0.0005	0.001		
		---	---	---	---	0.7	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0025	0.005	
	August-2023	---	---	0.32	---	0.43	---	---	---	---	---	---	---	---	---	---	---	---	0.15	0.0025	0.005	
	September-2023	---	0.42	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.29	0.005	0.01	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.25	---	---	---	0.005	0.01		
---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.24	0.31	---	---	---	0.0005	0.001		

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ
Parameter	Monitoring Event	Concentration																		
Copper	October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.144	0.194	---	---	0.0004	0.001
	November-2022	---	---	---	0.273	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0008	0.002
	December-2022	ND	ND	---	---	ND	---	ND	ND	---	---	---	ND	ND	---	---	---	---	0.016	0.02
	January-2023	ND	---	---	---	---	0.0127	0.0256	---	---	---	ND	---	---	---	---	---	---	0.008	0.01
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	0.00365	---	---	---	---	0.0003	0.001
	March-2023	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	0.008	0.01
	April-2023	---	---	---	---	---	0.00664	---	0.00767	---	---	---	---	---	---	---	---	---	0.0003	0.001
	May-2023	ND	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	0.0015	0.005
	June-2023	---	---	---	---	---	---	0.00154 J	---	0.00362 J	0.00269 J	---	---	---	---	---	---	---	0.0015	0.005
	July-2023	0.00124	---	---	---	0.00163	---	---	---	---	---	---	---	---	0.00811	---	ND	0.0027	0.0003	0.001
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.0015	0.005
	September-2023	---	ND	---	---	---	---	---	---	---	---	---	---	---	0.00407 J	---	---	ND	0.003	0.01
	October-2023	---	---	---	0.00806	---	---	---	---	---	---	---	---	---	0.00361	0.000609 J	---	---	0.0003	0.001
Lead	November-2022	---	---	---	---	---	---	ND	---	ND	---	0.017 J	---	---	---	---	---	---	0.012	0.02
	December-2022	ND	0.0381	---	---	ND	---	ND	ND	---	---	---	ND	ND	---	---	---	---	0.012	0.02
	January-2023	ND	---	---	---	---	ND	ND	---	---	---	ND	---	---	---	---	---	---	0.006	0.01
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	0.006	---	---	---	---	0.001	0.001
	March-2023	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	0.006	0.01
	April-2023	---	---	---	---	---	0.0022	---	0.0067	---	---	---	---	---	---	---	---	---	0.001	0.001
	May-2023	ND	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	0.005	0.005
	June-2023	---	---	---	---	---	---	ND	---	ND	0.0069	---	---	---	---	---	---	---	0.005	0.005
	July-2023	0.0014	---	---	---	0.019	---	---	---	---	---	---	---	---	0.0092	---	ND	0.0017	0.001	0.001
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.005	0.005
	September-2023	---	0.12	---	---	---	ND	---	---	---	---	---	---	---	---	---	0.013	---	0.01	0.01
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0036	0.0034	---	---	0.001	0.001	
		---	---	---	0.0077	---	---	---	---	---	---	---	---	---	---	---	---	---	0.002	0.002

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
Mercury	November-2022	---	---	---	---	---	---	---	---	0.00169	---	0.00053	---	---	---	---	---	---	0.0004	0.0004	
		---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	0.0008	0.0008	
	December-2022	0.00051	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0004	0.0004	
		---	---	---	---	0.00118	---	ND	0.00588	---	---	---	0.0048	ND	---	---	---	---	0.0008	0.0008	
	January-2023	---	ND	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	0.004	0.004	
		---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	0.0004	0.0004	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	0.0004	0.0004	
	March-2023	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	0.0002	0.0002	
		---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	0.0004	0.0004	
	April-2023	---	---	---	---	---	---	---	0.00128	---	---	---	---	---	---	---	---	---	0.0002	0.0002	
	May-2023	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---	0.0004	0.0004	
		ND	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	0.0002	0.0002	
	June-2023	---	---	---	---	---	---	---	ND	---	ND	ND	---	---	---	---	---	---	0.004	0.004	
	July-2023	0.000306	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	ND	0.0002	0.0002
		---	---	---	---	0.0107	---	---	---	---	---	---	---	---	---	---	---	ND	---	0.001	0.001
August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.001	0.001	
	---	---	0.00312	---	0.00397	---	---	---	---	---	---	---	---	---	---	---	ND	---	0.002	0.002	
September-2023	---	0.00503	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	0.002	0.002		
October-2023	---	---	---	0.00165	---	---	---	---	---	---	---	---	---	---	ND	0.00055	---	---	0.0004	0.0004	
Nickel	November-2022	---	---	---	---	---	---	0.0866	---	0.1344	---	0.173	---	---	---	---	---	---	0.014	0.02	
	December-2022	0.1722	0.5025	---	---	0.2989	---	0.1299	0.287	---	---	---	0.1853	0.346	---	---	---	---	0.014	0.02	
	January-2023	0.1074	---	---	---	---	0.1442	0.0407	---	---	---	0.0769	---	---	---	---	---	---	0.007	0.01	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	0.1726	---	---	---	---	0.001	0.001	
	March-2023	---	---	---	---	---	0.1254	0.1033	---	---	---	---	---	---	---	---	---	---	0.007	0.01	
	April-2023	---	---	---	---	---	0.1143	---	0.1732	---	---	---	---	---	---	---	---	---	0.001	0.001	
	May-2023	0.113	---	---	---	---	0.09726	0.05657	---	---	---	---	---	---	---	---	---	---	0.005	0.005	
	June-2023	---	---	---	---	---	---	0.05978	---	0.05892	0.07161	---	---	---	---	---	---	---	0.005	0.005	
	July-2023	0.09872	---	---	---	0.08332	---	---	---	---	---	---	---	---	0.1576	---	0.03074	0.01403	0.001	0.001	
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.02029	0.005	0.005
		---	---	0.1457	---	0.09673	---	---	---	---	---	---	---	---	---	---	---	0.0513	---	0.01	0.01
September-2023	---	0.5152	---	---	---	---	---	---	---	---	---	---	---	0.2387	---	---	---	0.01	0.01		
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.2019	0.09206	---	---	0.001	0.001		
---	---	---	---	0.104	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.002	0.002	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
Selenium	November-2022	---	---	---	---	---	---	ND	---	ND	---	ND	---	---	---	---	---	---	---	0.08	0.1
	December-2022	ND	ND	---	---	ND	---	ND	ND	---	---	---	ND	ND	---	---	---	---	---	0.08	0.1
	January-2023	ND	---	---	---	---	ND	ND	---	---	---	ND	---	---	---	---	---	---	---	0.04	0.05
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00199	---	---	---	---	0.00085	0.001
	March-2023	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	---	0.04	0.05
	April-2023	---	---	---	---	---	0.00189	---	0.00185	---	---	---	---	---	---	---	---	---	---	0.00085	0.001
	May-2023	ND	---	---	---	---	ND	0.00569	---	---	---	---	---	---	---	---	---	---	---	0.00425	0.005
	June-2023	---	---	---	---	---	---	---	ND	---	ND	ND	---	---	---	---	---	---	---	0.00425	0.005
	July-2023	0.00101	---	---	---	0.00331	---	---	---	---	---	---	---	---	---	0.00116	---	0.00251	ND	0.00085	0.001
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.00425	0.005
	September-2023	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	ND	0.0085	0.01
October-2023	---	---	---	---	0.00332	---	---	---	---	---	---	---	---	---	0.00186	0.0044	---	---	0.00085	0.001	
Silver	November-2022	---	---	---	---	---	---	ND	---	ND	---	ND	---	---	---	---	---	---	---	0.01	0.02
	December-2022	ND	0.0187 J	---	---	ND	---	ND	ND	---	---	---	ND	ND	---	---	---	---	---	0.01	0.02
	January-2023	ND	---	---	---	---	ND	ND	---	---	---	ND	---	---	---	---	---	---	---	0.005	0.01
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	0.00006	0.001
	March-2023	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	---	0.005	0.01
	April-2023	---	---	---	---	---	ND	---	0.00011 J	---	---	---	---	---	---	---	---	---	---	0.00006	0.001
	May-2023	ND	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	---	0.0003	0.005
	June-2023	---	---	---	---	---	---	ND	---	ND	ND	---	---	---	---	---	---	---	---	0.0003	0.005
	July-2023	ND	---	---	---	ND	---	---	---	---	---	---	---	---	---	ND	---	ND	ND	0.00006	0.001
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.0003	0.005
	September-2023	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	0.0006	0.01
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	ND	---	---	0.00006	0.001	
Zinc	November-2022	---	---	---	---	---	---	ND	---	0.032	---	0.694	---	---	---	---	---	---	---	0.02	0.02
	December-2022	0.208	29.7	---	---	0.162	---	0.0686	0.75	---	---	---	0.364	0.286	---	---	---	---	---	0.02	0.02
	January-2023	0.133	---	---	---	---	0.15	0.074	---	---	---	0.0752	---	---	---	---	---	---	---	0.01	0.01
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	0.0851	---	---	---	---	---	0.0025	0.005
	March-2023	---	---	---	---	---	0.0689	0.0538	---	---	---	---	---	---	---	---	---	---	---	0.01	0.01
	April-2023	---	---	---	---	---	0.0539	---	---	---	---	---	---	---	---	---	---	---	---	0.0025	0.005
	May-2023	0.079	---	---	---	---	0.0635	0.0519	---	---	---	---	---	---	---	---	---	---	---	0.0125	0.025
	June-2023	---	---	---	---	---	---	0.0538	---	0.0253	0.945	---	---	---	---	---	---	---	---	0.0125	0.025
	July-2023	0.0488	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0714	---	0.354	0.0782	0.0025	0.005
	August-2023	---	---	---	---	---	2.03	---	---	---	---	---	---	---	---	---	---	---	---	0.0125	0.025
	September-2023	---	---	---	---	---	1.71	---	---	---	---	---	---	---	---	---	---	0.914	---	0.025	0.05
	October-2023	---	---	---	---	0.203	---	---	---	---	---	---	---	---	---	---	---	---	---	0.05	0.1
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0788	---	---	---	---	0.025	0.05	
October-2023	---	45	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.25	0.5	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0622	---	---	---	---	0.0025	0.005	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	633	---	---	---	0.005	0.01	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
VOLATILE FATTY ACIDS mg/L																					
Acetic Acid	November-2022	---	---	---	---	---	---	---	---	1600	---	---	---	---	---	---	---	---	---	25	100
		---	---	---	---	---	---	3500	---	---	---	150 J	---	---	---	---	---	---	---	62	250
	December-2022	1800	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	62	250
	January-2023	ND	---	---	---	---	ND	4400	---	---	---	ND	---	---	---	---	---	---	---	---	500
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	500
	March-2023	---	---	---	---	---	ND	640	---	---	---	---	---	---	---	---	---	---	---	---	500
	April-2023	---	---	---	---	---	1200	---	520	---	---	---	---	---	---	---	---	---	---	370	500
	May-2023	990	---	---	---	---	1800	3000	---	---	---	---	---	---	---	---	---	---	---	370	500
	June-2023	---	---	---	---	---	---	5900	---	4100	5000	---	---	---	---	---	---	---	---	750	1000
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	150	200
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	370	500
		---	---	---	---	6100	---	---	---	---	---	---	---	---	---	---	---	750	---	750	1000
August-2023	---	---	3300	---	5300	---	---	---	---	---	---	---	---	---	---	---	4200	ND	---	500	
September-2023	---	7400	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	370	500	
October-2023	---	---	---	3200	---	---	---	---	---	---	---	---	---	---	720	4100	---	---	370	500	
Butyric Acid	November-2022	---	---	---	---	---	---	---	---	430	---	---	---	---	---	---	---	---	---	12	100
		---	---	---	---	---	---	830	---	---	---	ND	---	---	---	---	---	---	---	29	250
	December-2022	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	29	250
	January-2023	ND	---	---	---	---	ND	1800	---	---	---	ND	---	---	---	---	---	---	---	---	500
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	500
	March-2023	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	500
	April-2023	---	---	---	---	---	ND	---	ND	---	---	---	---	---	---	---	---	---	---	330	500
	May-2023	ND	---	---	---	---	ND	1200	---	---	---	---	---	---	---	---	---	---	---	330	500
	June-2023	---	---	---	---	---	---	2500	---	1500	2900	---	---	---	---	---	---	---	---	650	1000
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	130	200
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	330	500
		---	---	---	---	2800	---	---	---	---	---	---	---	---	---	---	---	650	---	650	1000
August-2023	---	---	1400	---	1700	---	---	---	---	---	---	---	---	---	---	---	1600	ND	---	500	
September-2023	---	3100	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	330	500	
October-2023	---	---	---	1200	---	---	---	---	---	---	---	---	---	---	ND	2000	---	---	330	500	
Lactic Acid	November-2022	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	11	100	
		---	---	---	---	---	---	ND	---	---	---	ND	---	---	---	---	---	---	---	27	250
December-2022	90 J	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	27	250	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ		
Parameter	Monitoring Event	Concentration																	LOD	LOQ		
Propionic Acid	November-2022	---	---	---	---	---	---	---	---	620	---	---	---	---	---	---	---	---	---	11	100	
		---	---	---	---	---	---	1600	---	---	---	73 J	---	---	---	---	---	---	---	27	250	
	December-2022	640	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	27	250	
	January-2023	ND	---	---	---	---	ND	2000	---	---	---	ND	---	---	---	---	---	---	---	---	500	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	500	
	March-2023	---	---	---	---	---	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	500	
	April-2023	---	---	---	---	---	600	---	ND	---	---	---	---	---	---	---	---	---	---	340	500	
	May-2023	520	---	---	---	---	800	1400	---	---	---	---	---	---	---	---	---	---	---	340	500	
	June-2023	---	---	---	---	---	---	2900	---	2000	2900	---	---	---	---	---	---	---	---	680	1000	
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	140	200
		ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	340	500
	August-2023	---	---	1200	---	2000	---	---	---	---	---	---	---	---	---	---	---	1900	ND	---	500	
September-2023	---	1800	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	340	500		
October-2023	---	---	---	1300	---	---	---	---	---	---	---	---	---	---	ND	2000	---	---	340	500		
Pyruvic Acid	November-2022	---	---	---	---	---	---	---	---	46 J	---	---	---	---	---	---	---	---	---	12	100	
		---	---	---	---	---	---	98 J	---	---	---	ND	---	---	---	---	---	---	---	30	250	
	December-2022	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	30	250	
VOLATILE ORGANIC COMPOUNDS (ug/L)																						
2-Butanone (MEK)	November-2022	---	---	---	---	---	---	3510	---	---	---	1140	---	---	---	---	---	---	---	30	100	
		---	---	---	---	---	---	---	---	15600	---	---	---	---	---	---	---	---	---	---	300	1000
	December-2022	3140	---	---	---	---	---	---	3390	---	---	---	---	---	---	---	---	---	---	30	100	
		---	26800	---	---	27700	---	5670	---	---	---	---	21700	7150	---	---	---	---	---	300	1000	
	January-2023	3480	---	---	---	---	632	---	---	---	---	---	---	---	---	---	---	---	---	30	100	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	300	1000	
	March-2023	---	---	---	---	---	257	2770	---	---	---	---	---	---	---	---	---	---	---	600	2000	
	April-2023	---	---	---	---	---	3420	---	5530	---	---	---	---	---	---	---	---	---	---	750	2500	
	May-2023	5360	---	---	---	---	5970	---	---	---	---	---	---	---	---	---	---	---	---	150	500	
	June-2023	---	---	---	---	---	---	13600	---	---	---	---	---	---	---	---	---	---	---	---	750	2500
		---	---	---	---	---	---	13800	---	---	---	---	---	---	---	---	---	---	---	---	750	2500
	July-2023	---	---	---	---	---	---	---	---	---	20100	22600	---	---	---	---	---	---	---	---	1500	5000
		5860	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	60	200
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	750	2500
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3000	10000
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	60	200
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7350	150
	September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	750	2500
---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1500	5000	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	60	200	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	750	2500	
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	15	50	
	---	---	---	17800	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1500	5000	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ				
Parameter	Monitoring Event	Concentration																	LOD	LOQ				
Acetone	November-2022	---	---	---	---	---	---	---	---	---	---	4420	---	---	---	---	---	---	---	70	100			
		---	---	---	---	---	---	16100	---	38300	---	---	---	---	---	---	---	---	---	700	1000			
	December-2022	---	---	---	---	---	---	---	15600	5170	---	---	---	---	9800	---	---	---	---	700	1000			
		8500	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1750	2500			
	January-2023	---	53100	---	---	49900	---	---	---	---	---	---	---	45600	---	---	---	---	---	3500	5000			
		---	---	---	---	---	1530	---	---	---	---	---	---	---	---	---	---	---	---	70	100			
	February-2023	---	---	---	---	---	---	---	22200	---	---	---	14000	---	---	---	---	---	---	700	1000			
		8130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1750	2500			
	March-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1400	2000			
		---	---	---	---	---	---	375	---	---	---	---	---	---	---	---	---	---	---	70	100			
	April-2023	---	---	---	---	---	---	---	6810	---	---	---	---	---	---	---	---	---	---	700	1000			
		---	---	---	---	---	---	8290	---	7560	---	---	---	---	---	---	---	---	---	1750	2500			
	May-2023	10700	---	---	---	---	---	11700	---	---	---	---	---	---	---	---	---	---	---	350	500			
		---	---	---	---	---	---	---	29600	---	---	---	---	---	---	---	---	---	---	---	1750	2500		
	June-2023	---	---	---	---	---	---	---	29600	---	---	---	---	---	---	---	---	---	---	---	1750	2500		
		---	---	---	---	---	---	---	---	---	61800	50800	---	---	---	---	---	---	---	---	3500	5000		
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	140	200		
		9780	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	700	1000		
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11600	1750	2500	
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7000	10000		
---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	20900	700	1000		
---		---	---	---	---	---	18700	---	---	---	---	---	---	---	---	---	---	---	---	1750	2500			
September-2023	---	---	72500	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3500	5000			
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	188 J	140	200		
	---	40100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1750	2500			
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	35	50			
	---	---	---	66900	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	92900	3500	5000		
Benzene	November-2022	---	---	---	---	---	---	7.4 J	---	2860	---	50.4	---	---	---	---	---	---	---	4	10			
	December-2022	301	2960	---	---	---	---	---	6.3 J	622	---	---	---	1750	179	---	---	---	---	---	4	10		
		---	---	---	---	---	6550	---	---	---	---	---	---	---	---	---	---	---	---	---	40	100		
	January-2023	240	---	---	---	---	28.7	1620	---	---	---	167	---	---	---	---	---	---	---	4	10			
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	1370	---	---	---	---	4	10			
	March-2023	---	---	---	---	---	1540	727	---	---	---	---	---	---	---	---	---	---	---	4	10			
	April-2023	---	---	---	---	---	3740	---	320	---	---	---	---	---	---	---	---	---	---	4	10			
	May-2023	814	---	---	---	---	4890	3370	---	---	---	---	---	---	---	---	---	---	---	20	50			
	June-2023	---	---	---	---	---	---	---	2630	---	---	---	---	---	---	---	---	---	---	---	8	20		
		---	---	---	---	---	---	---	---	---	1400	1590	---	---	---	---	---	---	---	---	20	50		
	July-2023	824	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8	20		
		---	---	---	---	---	4050	---	---	---	---	---	---	---	---	---	---	---	---	---	80.8	20	50	
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1420	20	50	
		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11800	100	250
		---	---	2320	---	168	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	379	8	20
	September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	20	50	
---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	193	8	20		
October-2023	---	468	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	100	250		
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	399	2	5	
---	---	---	---	---	576	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3100	20	50	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																			
Ethylbenzene	December-2022	67.3	172	---	---	287	---	ND	48.5	---	---	---	108	27.4	---	---	---	---	4	10	
	November-2022	---	---	---	---	---	---	ND	---	194	---	16.2	---	---	---	---	---	---	4	10	
	January-2023	65.1	---	---	---	---	ND	93.9	---	---	---	20.8	---	---	---	---	---	---	4	10	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	151	---	---	---	---	4	10	
	March-2023	---	---	---	---	---	131	71.5	---	---	---	---	---	---	---	---	---	---	4	10	
	April-2023	---	---	---	---	---	186	---	43.4	---	---	---	---	---	---	---	---	---	4	10	
	May-2023	124	---	---	---	---	276	144	---	---	---	---	---	---	---	---	---	---	20	50	
	June-2023	---	---	---	---	---	---	104	---	---	---	---	---	---	---	---	---	---	8	20	
			---	---	---	---	---	---	---	98	116	---	---	---	---	---	---	---	20	50	
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	666	4	10
			128	---	---	---	---	---	---	---	---	---	---	---	---	82	---	---	---	8	20
			---	---	---	---	224	---	---	---	---	---	---	---	---	---	---	87.5	---	20	50
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	16.8 J	8	20
		---	---	80	---	ND	---	---	---	---	---	---	---	---	---	---	ND	---	20	50	
September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	22.8	---	---	---	8	20	
		---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	100	250	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	34.8	---	---	---	2	5	
		---	---	---	42.5 J	---	---	---	---	---	---	---	---	---	---	247	---	---	20	50	
Tetrahydrofuran	November-2022	---	---	---	---	---	---	309	---	---	---	176	---	---	---	---	---	---	100	100	
			---	---	---	---	---	---	---	8530	---	---	---	---	---	---	---	---	1000	1000	
	December-2022	151	---	---	---	---	---	170	1120	---	---	---	---	663	---	---	---	---	100	100	
			---	5210	---	---	19800	---	---	---	---	---	6130	---	---	---	---	---	1000	1000	
	January-2023	183	---	---	---	---	566	1810	---	---	---	352	---	---	---	---	---	---	100	100	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	3760	---	---	---	---	2000	2000	
	March-2023	---	---	---	---	---	353	464	---	---	---	---	---	---	---	---	---	---	100	100	
	April-2023	---	---	---	---	---	2410	---	4790	---	---	---	---	---	---	---	---	---	100	100	
	May-2023	ND	---	---	---	---	2740	2380	---	---	---	---	---	---	---	---	---	---	500	500	
	June-2023	---	---	---	---	---	---	2100	---	---	---	---	---	---	---	---	---	---	200	200	
			---	---	---	---	---	---	---	---	7320	6670	---	---	---	---	---	---	500	500	
	July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2960	100	100
			411	---	---	---	---	---	---	---	---	---	---	---	---	616	---	---	---	200	200
			---	---	---	---	8380	---	---	---	---	---	---	---	---	---	---	5310	---	500	500
	August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2880	200	200
		---	---	7370	---	3210	---	---	---	---	---	---	---	---	---	---	1200	---	500	500	
September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	343	---	---	---	200	200	
		---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2500	2500	
October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	606	---	---	---	50	50	
		---	---	---	4870	---	---	---	---	---	---	---	---	---	---	9140	---	---	500	500	

Historical LFG-EW Leachate Monitoring Results Summary

Well ID		EW-50	EW-52	EW-54	EW-55	EW-57	EW-58	EW-59	EW-60	EW-61	EW-64	EW-65	EW-67	EW-68	EW-78	EW-87	EW-94	EW-98	LOD	LOQ	
Parameter	Monitoring Event	Concentration																	LOD	LOQ	
Toluene	November-2022	---	---	---	---	---	---	ND	---	214	---	32.8	---	---	---	---	---	---	5	10	
	December-2022	122	175	---	---	195	---	ND	113	---	---	---	113	48.3	---	---	---	---	5	10	
	January-2023	122	---	---	---	---	8 J	139	---	---	---	35.3	---	---	---	---	---	---	5	10	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	224	---	---	---	---	5	10	
	March-2023	---	---	---	---	---	182	98.1	---	---	---	---	---	---	---	---	---	---	5	10	
	April-2023	---	---	---	---	---	303	---	94.4	---	---	---	---	---	---	---	---	---	5	10	
	May-2023	258	---	---	---	---	371	239	---	---	---	---	---	---	---	---	---	---	25	50	
	June-2023	---	---	---	---	---	---	---	165	---	---	---	---	---	---	---	---	---	10	20	
			---	---	---	---	---	---	---	---	67	212	---	---	---	---	---	---	25	50	
		July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	965	5	10
			248	---	---	---	---	---	---	---	---	---	---	---	---	107	---	---	---	10	20
			---	---	---	---	218	---	---	---	---	---	---	---	---	---	---	118	---	25	50
		August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	36.6	10	20
		---	---	105	---	ND	---	---	---	---	---	---	---	---	---	---	ND	---	25	50	
	September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	40.6	---	---	---	10	20	
		---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	125	250	
	October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	59.2	---	---	---	2.5	5	
		---	---	---	37 J	---	---	---	---	---	---	---	---	---	---	235	---	---	25	50	
Xylenes, Total	November-2022	---	---	---	---	---	---	ND	---	185	---	37.8	---	---	---	---	---	---	10	30	
	December-2022	161	222	---	---	186	---	ND	112	---	---	---	197	59.9	---	---	---	---	10	30	
	January-2023	138	---	---	---	---	ND	134	---	---	---	38.1	---	---	---	---	---	---	10	30	
	February-2023	---	---	---	---	---	---	---	---	---	---	---	---	240	---	---	---	---	10	30	
	March-2023	---	---	---	---	---	240	111	---	---	---	---	---	---	---	---	---	---	10	30	
	April-2023	---	---	---	---	---	329	---	97.4	---	---	---	---	---	---	---	---	---	10	30	
	May-2023	274	---	---	---	---	441	230	---	---	---	---	---	---	---	---	---	---	50	150	
	June-2023	---	---	---	---	---	---	---	177	---	---	---	---	---	---	---	---	---	20	60	
			---	---	---	---	---	---	---	---	92 J	136 J	---	---	---	---	---	---	50	150	
		July-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1130	10	30
			257	---	---	---	---	---	---	---	---	---	---	---	---	74.4	---	---	---	20	60
			---	---	---	---	230	---	---	---	---	---	---	---	---	---	---	174	---	50	150
		August-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	48.4 J	20	60
		---	---	180	---	ND	---	---	---	---	---	---	---	---	---	---	ND	---	50	150	
	September-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	20	60	
		---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	250	750	
	October-2023	---	---	---	---	---	---	---	---	---	---	---	---	---	30.6	---	---	---	5	15	
		---	---	---	134 J	---	---	---	---	---	---	---	---	---	---	328	---	---	50	150	

--- = not applicable/available

J = Parameter was detected at a concentration greater than the laboratory's LOD, but less than the laboratory's LOQ. Concentration is considered estimated.


LOD = laboratory's Limit of Detection

LOQ = laboratory's Limit of Quantitation

mg/L = milligrams per liter

ND = Not Detected

ug/L = micrograms per liter



Appendix G
Landfill Interim Grades Design Modifications Letter

October 17, 2023
File No. 02218208.16

Mr. Daniel P. Scott, PE
Solid Waste Permits
Land Protection & Revitalization
VA DEQ – Southwest Regional Office
355-A Deadmore Street
Abingdon, Virginia 24210

Subject: Landfill Interim Grades Design Modifications
Integrated Solid Waste Management Facility – Solid Waste Permit No. 588

Dear Mr. Scott:

On behalf of the City of Bristol, Virginia (City), SCS Engineers has developed alternate proposed interim grades for the Solid Waste Permit (SWP) No. 588 Landfill, which is a part of the City of Bristol, Virginia's (City's) Integrated Solid Waste Management Facility (ISWMF). Following a review of potential alternatives for the interim grading development, SCS recommended proposed interim grading for the facility that is different from the grading depicted in the Stormwater Management Plan submitted to the Virginia Department of Environmental Quality (VDEQ or Department) on April 28, 2023. Based on SCS' recommendation, the City would like to construct the alternate interim grades, which are detailed in the following sections. A conceptual drawing set detailing the proposed grading is included with this letter.

BACKGROUND

The SWP No. 588 Landfill, which is a part of the City's ISWMF, is exhibiting signs of Elevated Temperature Landfill (ETLF) conditions. To mitigate these conditions, a panel of experts (Expert Panel) convened by the VDEQ recommended grading of the waste surface to facilitate removal of stormwater as part of their final report.

The Expert Panel stated the following as recommendation 1.8 in the report:

Install a temporary geosynthetic cover over the entire Landfill. This will require substantial grading of the existing Landfill surface to direct runoff to the southeast corner of the Landfill where it is expected a stormwater management pond can be constructed to manage stormwater that is collected on top of the geomembrane cover.

On January 30, 2023, SCS submitted the Interim EVOH Cover System Preliminary Design Plans to the Virginia Department of Environmental Quality (VDEQ). The plans included a further refined grading plan that had been updated to reflect updated topography within the landfill. On February 17, 2023, VDEQ provided feedback on the proposed design. SCS subsequently responded to VDEQ's comments on March 20, 2023.



The design was further refined and submitted to VDEQ in a set of drawings entitled “Interim EVOH Cover System, Stormwater Management Plan” on April 28, 2023. On May 16, 2023, VDEQ provided feedback on the proposed design. SCS subsequently responded to VDEQ’s comments on June 23, 2023. SCS’ response included updates to the proposed design.

ADDITIONAL CONSIDERATIONS

While the single basin recommendation from the expert panel may represent the best low maintenance long term solution, there are short term drawbacks. The large required excavation of waste to form a single basin within the quarry may result in landfill odors. The possibility of the occurrence of odors is supported by the City’s experience with small scale excavations within the waste mass during landfill gas collection system expansion construction. The City believes that the recent work at the landfill has reduced the extent of odors emanating from the landfill and improved community relations. The City would like to avoid any potential negative impacts to community relations that may result from large scale excavation of waste.

The Stormwater Management Plan submitted to VDEQ on April 30, 2023 requires the reshaping of the waste mass to drain stormwater to a single detention basin in the southeast corner. The earthwork includes cuts up to 25 feet in the southeast, and maximum fill is approximately 29 feet in the northeast corner. The approximate earthwork quantities are 65,885 cubic yards (cy) of cut and 139,763 cy of fill, requiring a net import of 73,878 cy for fill. The proposed grading and estimated cut and fill depths are shown in Drawing 3 of the attached conceptual drawings.

The City requested that SCS develop alternate grading that avoids large scale waste excavation.

ALTERNATE GRADING

Based on guidance from the City, SCS developed alternate grading. The alternate scenario was intended to address concerns about odors resulting from waste excavation. The alternate grading was developed with the following design criteria:

- Proposed slopes do not exceed 3H:1V
 - This slope is the maximum prescriptive slope proposed for landfill final grades in Virginia in accordance with 9VAC20-81-160.D.3.
- Proposed slopes are a minimum of 5% to maintain stormwater flow and accommodate limited differential settlement.
 - This minimum slope is steeper than the regulatory requirement of 2% in accordance with 9VAC20-81-160.D.3.
 - This proposed minimum slope provides additional margin for potential differential settlement.
- Stormwater storage basins are designed for the volume of runoff estimated for a 100-yr 24-hour storm event
- Pumping equipment is intended to manage the rainfall from 100-yr 24-hour storm event within 48 hours with 100% redundancy

- The proposed scenarios would discharge stormwater into the existing stormwater basin located near the facility entrance

The proposed alternate grading generally conforms to the existing grades and minimizes earthwork required to develop the final grades. This results in three depressions that will collect stormwater runoff. Cut is minimal and may be eliminated altogether, and fill is generally limited to 15 feet. The estimated net import of fill is 56,902 CY (assuming that cut is eliminated). The proposed grading and estimated cut and fill depths are shown in Drawing 4 of the attached conceptual drawings.

Stormwater runoff is directed via sheet flow to three detention basins located along the east side of the quarry. Each basin will require a skid mounted pump to convey the stormwater through a single force main and discharge to the primary site stormwater basin west of the quarry. Each basin is sized to hold the runoff from the entire 100-year-24-hour storm event from their respective contributing drainage areas without any discharge from the pump stations.

Wellheads, temperature probes, valves and condensate sumps may need to be raised to accommodate the changes in grade, but mostly in the range of 5 to 10 feet.

This proposed grading has advantages over the previously submitted design which include the following:

- Less fill is required to implement the proposed grading which reduces construction costs
- Minimal waste excavation, which has the potential to result in landfill odors
- Areas that do not receive large quantities of fill are less prone to settlement
- Modification to the landfill gas collection and control system will be limited
- Reducing the amount of fill required will reduce the time required for construction

CONCLUSION

The alternate grading reduces overall earthwork and disturbance to the existing waste mass. The stormwater pumping system for alternate grading will require additional pumps and force main for the three basins, resulting in higher operational and maintenance costs. This scenario also avoids major waste excavation that may result in increased odor and may negatively impact relationships with the facility's neighbors.

SCS and the City conveyed the desire to implement the proposed grading during a call with VDEQ on August 31, 2023. Based on that discussion, SCS understands that the department is receptive to the proposed changes. This letter is intended to serve as written notice to the Department of the City's intent to modify the proposed interim grades. SCS will submit a revised Stormwater Management Plan to VDEQ in a future submittal. The City also intends to procure the services of a contractor to implement the proposed grading concurrently with VDEQ's review. SCS and the City believe that concurrent VDEQ review and bidding is necessary to achieve the compliance deadlines outlined by the department.

Mr. Daniel P. Scott, PE

October 9, 2023

Page 4

Please notify us as soon as practical if the Department has any concerns about the proposed modifications to the final grading or with the proposed implementation approach. If you have any questions or require additional information, please contact either of the undersigned.

Sincerely,



Charles J. Warren, PE
Project Manager
SCS Engineers



Thomas R. Williams
Project Engineer
SCS Engineers

CJW/TRW

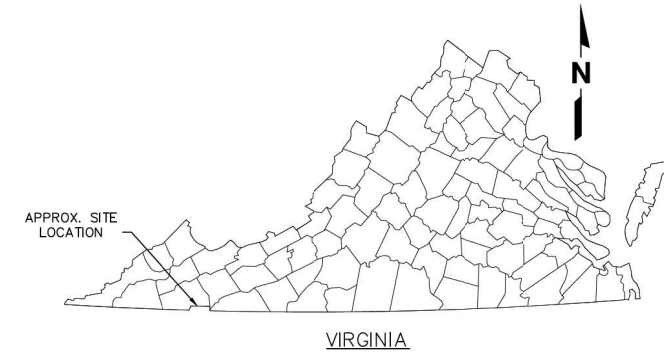
cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jake Chandler, City of Bristol
Jeff Hurst, VDEQ
Crystal Bazyk, VDEQ
Stacy Bowers, VDEQ
Daniel Scott, VDEQ

Encl. Conceptual Alternate Grading Drawings (4 Sheets)

BRISTOL, VIRGINIA INTEGRATED SOLID WASTE MANAGEMENT FACILITY SOLID WASTE PERMIT #588

INTERIM EVOH COVER SYSTEM CONCEPTUAL ALTERNATE GRADING

BRISTOL, VIRGINIA



PLAN SHEETS

SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	EXISTING CONDITIONS
3	PROPOSED GRADING PLAN SCENARIO 1
4	PROPOSED GRADING PLAN SCENARIO 2
5	PROPOSED GRADING PLAN SCENARIO 3
6	CROSS SECTIONS

PREPARED FOR:

CITY OF BRISTOL, VIRGINIA
300 LEE STREET
BRISTOL, VIRGINIA 24201

INTEGRATED SOLID WASTE MANAGEMENT
FACILITY
2655 VALLEY DRIVE
BRISTOL, VIRGINIA 24201

SCS ENGINEERS

STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TURNPIKE, SUITE 305
MIDLOTHIAN, VIRGINIA 23113-7313
PH. (804) 378-7440 FAX. (703) 471-6676
WWW.SCSENGINEERS.COM

SCS PROJECT NO. 02218208.16

AUGUST 16, 2023

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 10/09/2023

NO.	REVISION	DATE

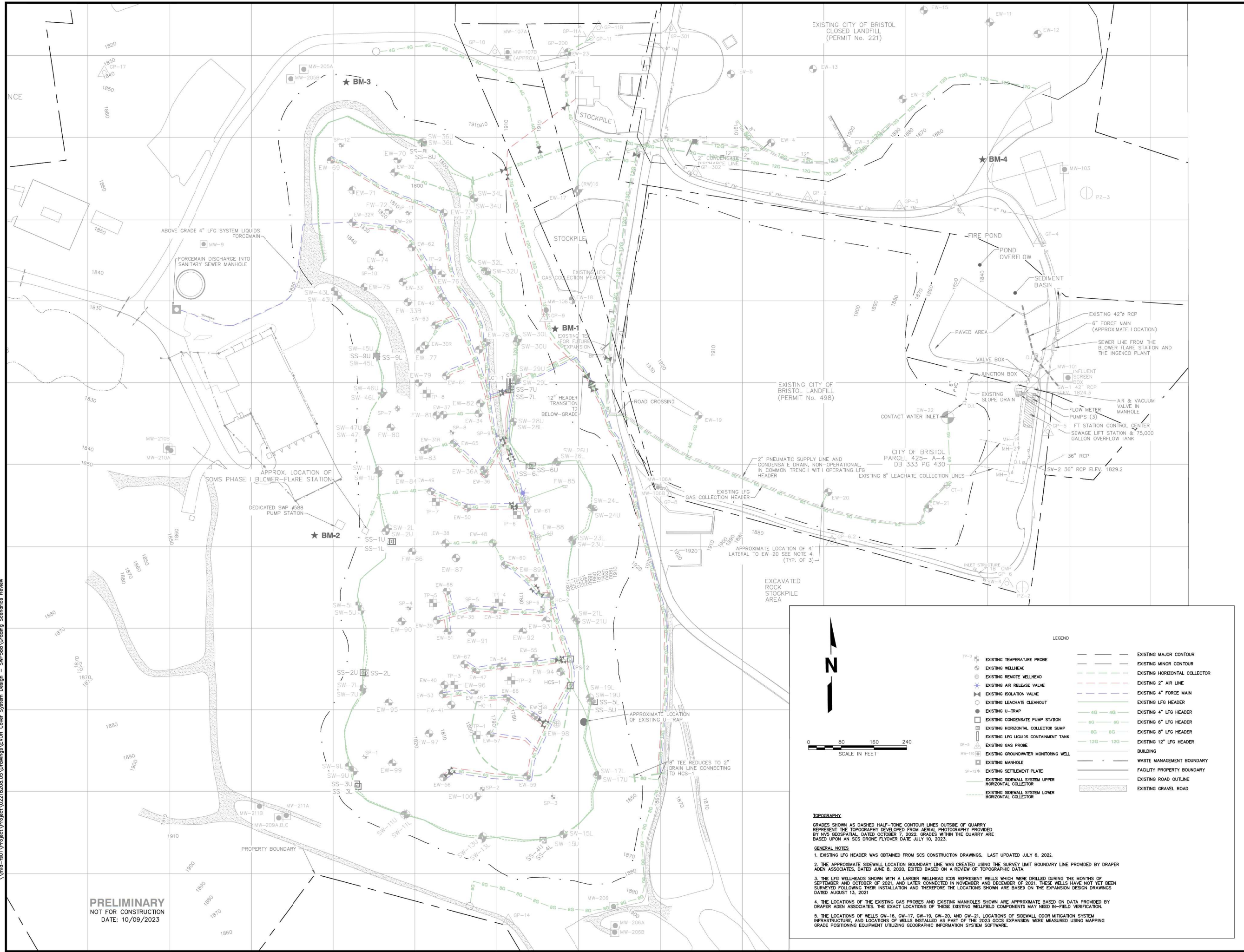
SHEET TITLE	COVER SHEET
PROJECT TITLE	SWP #588 INTERIM EVOH COVER SYSTEM CONCEPTUAL ALTERNATE GRADING

CLIENT	CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201
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SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 15521 MIDLOTHIAN TURNPIKE - MIDLOTHIAN, VA 23113 PH. (804) 378-7440 FAX. (703) 471-6676 WWW.SCSENGINEERS.COM	DATE: 10/09/2023
PROJECT NO. 02218208.16	SCALE:
DESIGNER: JMC	DRAWING NO.
CHECKER: JMC	
DATE: 10/09/2023	
SCALE:	
DRAWING NO.	

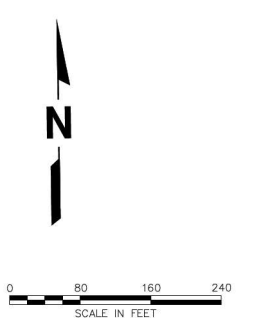
CADD FILE: GADING PLANS
DATE: 10.09.2023
SCALE:
DRAWING NO.
1 of 4

\\mid-101\Project\Project\02218208.05\Drawings\EVOH Cover System Design - SWP588\Grading Scenarios Review



\\mid-101\Project\Project\02218208_05\Drawings\VOH_Cover_System_Design - SW#588\Grading_Scenarios_Review

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 10/09/2023



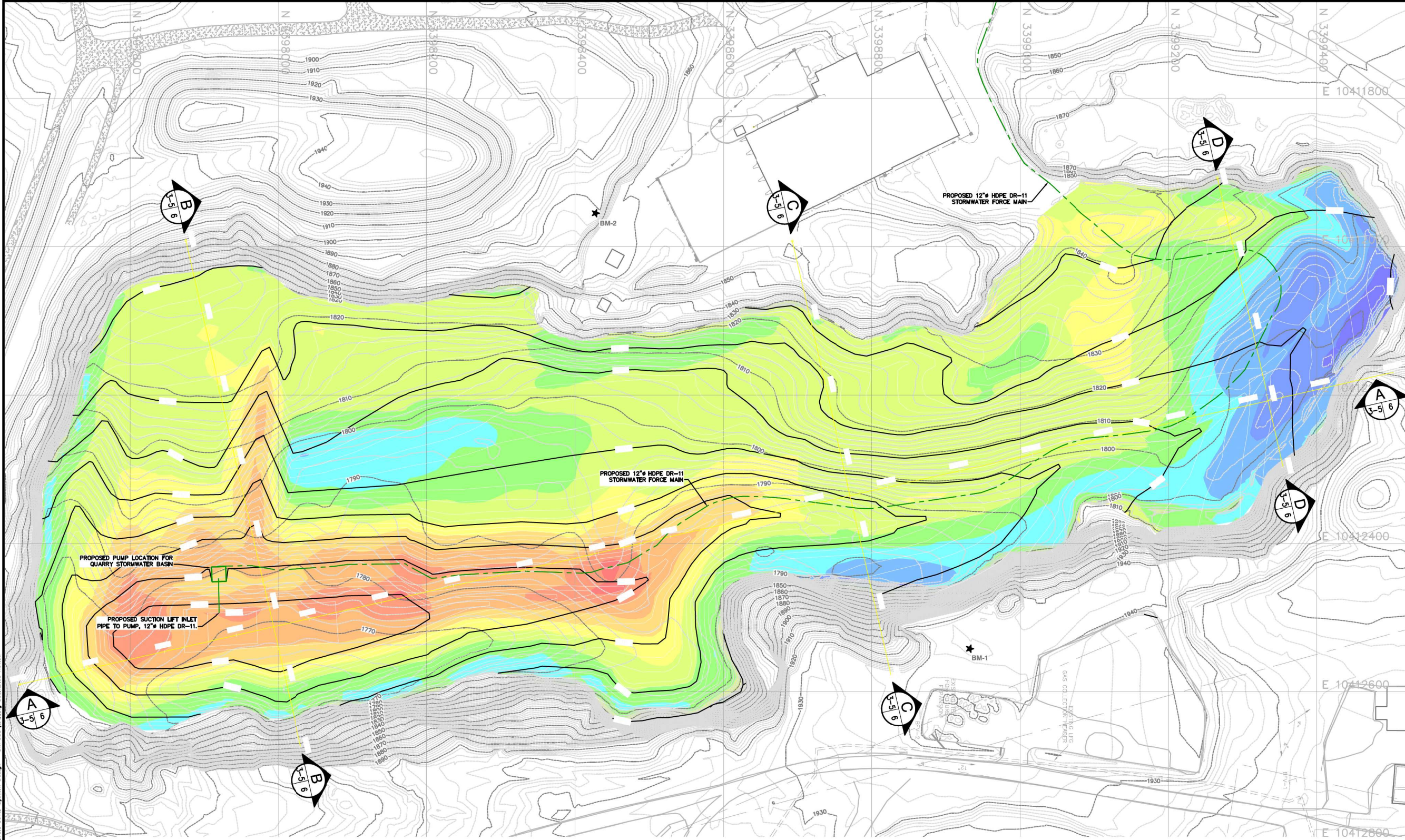
- TOPOGRAPHY**
GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES OUTSIDE OF QUARRY REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY HIS GEOSPATIAL, DATED OCTOBER 7, 2022. GRADES WITHIN THE QUARRY ARE BASED UPON AN SCS DRONE FLYOVER DATE JULY 10, 2023.
- GENERAL NOTES**
1. EXISTING LFG HEADER WAS OBTAINED FROM SCS CONSTRUCTION DRAWINGS. LAST UPDATED JULY 6, 2022.
 2. THE APPROXIMATE SIDEWALL LOCATION BOUNDARY LINE WAS CREATED USING THE SURVEY LIMIT BOUNDARY LINE PROVIDED BY DRAPER ADEN ASSOCIATES, DATED JUNE 8, 2020, EDITED BASED ON A REVIEW OF TOPOGRAPHIC DATA.
 3. THE LFG WELLHEADS SHOWN WITH A LARGER WELLHEAD ICON REPRESENT WELLS WHICH WERE DRILLED DURING THE MONTHS OF SEPTEMBER AND OCTOBER OF 2021, AND LATER CONNECTED IN NOVEMBER AND DECEMBER OF 2021. THESE WELLS HAVE NOT YET BEEN SURVEYED FOLLOWING THEIR INSTALLATION AND THEREFORE THE LOCATIONS SHOWN ARE BASED ON THE EXPANSION DESIGN DRAWINGS DATED AUGUST 13, 2021.
 4. THE LOCATIONS OF THE EXISTING GAS PROBES AND EXISTING MANHOLES SHOWN ARE APPROXIMATE BASED ON DATA PROVIDED BY DRAPER ADEN ASSOCIATES. THE EXACT LOCATIONS OF THESE EXISTING WELLFIELD COMPONENTS MAY NEED IN-FIELD VERIFICATION.
 5. THE LOCATIONS OF WELLS GW-16, GW-17, GW-19, GW-20, AND GW-21, LOCATIONS OF SIDEWALL OODR MITIGATION SYSTEM INFRASTRUCTURE, AND LOCATIONS OF WELLS INSTALLED AS PART OF THE 2023 GCS EXPANSION WERE MEASURED USING MAPPING GRADE POSITIONING EQUIPMENT UTILIZING GEOGRAPHIC INFORMATION SYSTEM SOFTWARE.

LEGEND

TP-3	EXISTING TEMPERATURE PROBE	---	EXISTING MAJOR CONTOUR
EW	EXISTING WELLHEAD	---	EXISTING MINOR CONTOUR
SW	EXISTING REMOTE WELLHEAD	---	EXISTING HORIZONTAL COLLECTOR
AV	EXISTING AIR RELEASE VALVE	---	EXISTING 2" AIR LINE
IV	EXISTING ISOLATION VALVE	---	EXISTING 4" FORCE MAIN
LC	EXISTING LEACHATE CLEANOUT	---	EXISTING LFG HEADER
UT	EXISTING U-TRAP	---	EXISTING 4" LFG HEADER
CP	EXISTING CONDENSATE PUMP STATION	---	EXISTING 6" LFG HEADER
CS	EXISTING HORIZONTAL COLLECTOR SUMP	---	EXISTING 8" LFG HEADER
CT	EXISTING LFG LIQUIDS CONTAINMENT TANK	---	EXISTING 12" LFG HEADER
GP	EXISTING GAS PROBE	---	BUILDING
MW	EXISTING GROUNDWATER MONITORING WELL	---	WASTE MANAGEMENT BOUNDARY
MH	EXISTING MANHOLE	---	FACILITY PROPERTY BOUNDARY
SP	EXISTING SETTLEMENT PLATE	---	EXISTING ROAD OUTLINE
SH	EXISTING SIDEWALL SYSTEM UPPER HORIZONTAL COLLECTOR	---	EXISTING GRAVEL ROAD
SL	EXISTING SIDEWALL SYSTEM LOWER HORIZONTAL COLLECTOR	---	

SHEET TITLE EXISTING CONDITIONS PLAN		NO.	REVISION	DATE
PROJECT TITLE SWP #588 INTERIM EVOH COVER SYSTEM CONCEPTUAL ALTERNATE GRADING		1		
CLIENT CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201		SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 1521 MIDLOTHIAN TWPK - MIDLOTHIAN, VA 23113 PH: (804) 278-7400 FAX: (804) 278-7433 WWW: WWW.SCS-VA.COM PROJECT NO: 202218208.05 DRAWN BY: JMC CHECKED BY: TRW DATE: 10/09/2023		
CADD FILE: SHT 1-2		DATE: 10.09.2023		
SCALE: AS SHOWN		DRAWING NO. 2 of 4		

\\ymlr-1601\Project\Project\022182208.05_Drainage\EVCH_Cover_System_Design - SWP568\Grading_Scenarios_Review



PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 10/09/2023

EARTHWORK LEGEND

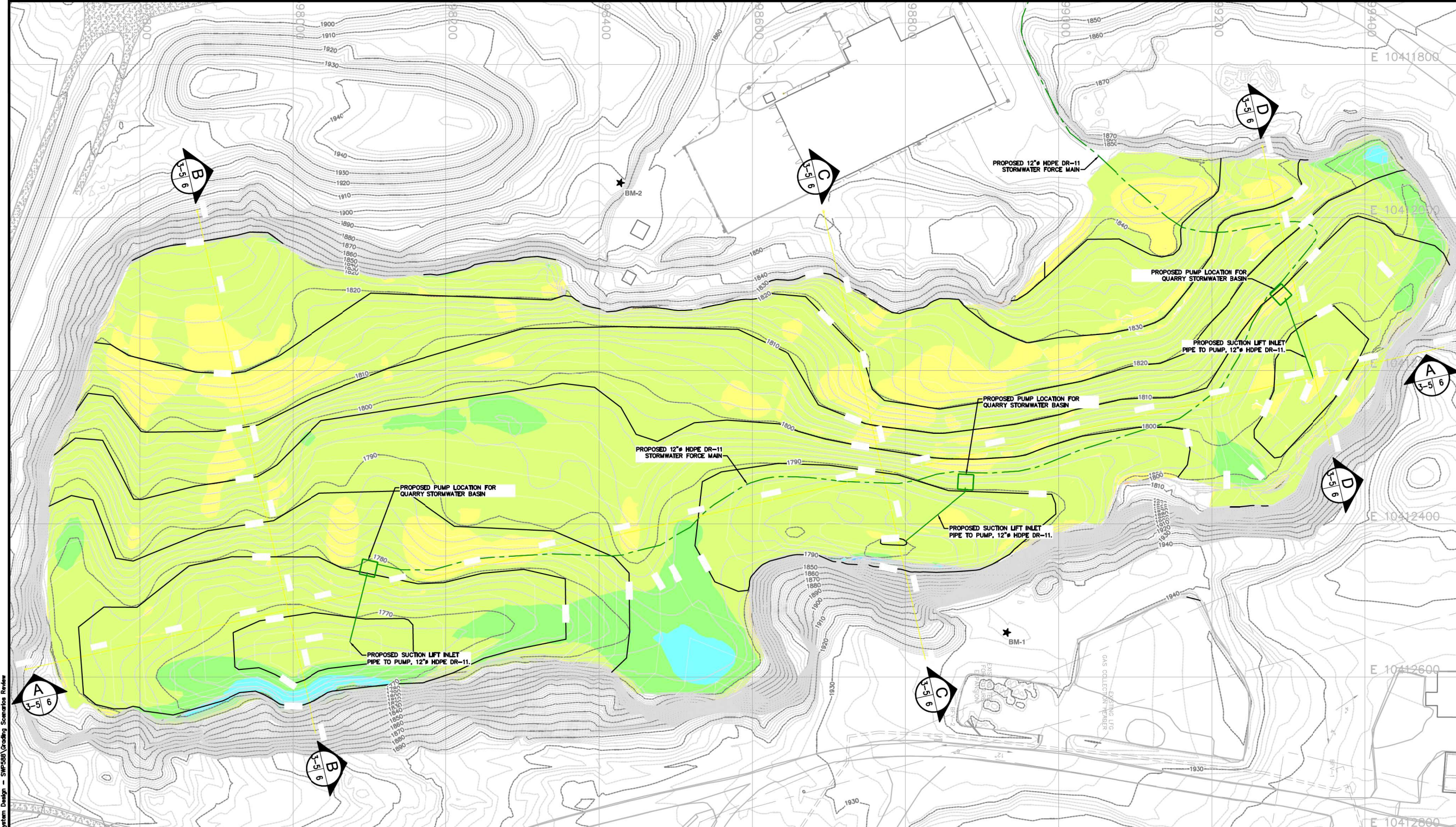
Red	-25' TO -20'
Orange	-20' TO -15'
Yellow-Orange	-15' TO -10'
Yellow	-10' TO -5'
Light Green	-5' TO 0'
Green	0 TO 5'
Light Blue	5' TO 10'
Blue	10' TO 15'
Dark Blue	15' TO 20'
Very Dark Blue	20' TO 25'
Black	25' TO 30'

GRADING VOLUME SCENARIO 1

CUT	65,885 CY
FILL	139,763 CY
NET FILL	73,878 CY



CLIENT CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201	SHEET TITLE GRADING PLAN	PREVIOUSLY SUBMITTED GRADING PLAN	NO. 1 NO. 2 NO. 3 NO. 4 NO. 5 NO. 6	REVISION NO. 1 NO. 2 NO. 3 NO. 4 NO. 5 NO. 6	DATE 10/09/2023 10/09/2023 10/09/2023 10/09/2023 10/09/2023 10/09/2023
	PROJECT TITLE SWP #588 INTERIM EVCH COVER SYSTEM CONCEPTUAL ALTERNATE GRADING				
SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 15221 MIDLOTHIAN TRPK - MIDLOTHIAN, VA 23113 PH: (804) 376-7440 FAX: (804) 376-7433	CADD FILE: SHT 3-4				
DATE: 10.09.2023	SCALE: AS SHOWN				
DRAWING NO. 3 of 4					



\\ymid-1001\Project\Project\022182026\03_Drawings\EVCH_Cover_System_Design - SWP#588\Grading_Scenarios_Review

GENERAL NOTES

1. OUTSIDE OF THE QUARRY FOOTPRINT, GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022. WITHIN THE QUARRY, THE GRADES ARE BASED UPON AN SCS DRONE FLYOVER DATED JULY 10, 2023.
2. THE FULL-TONE CONTOURS SHOW THE PROPOSED EVCH COVER SYSTEM GEOMEMBRANE DEPLOYMENT GRADE.

EARTHWORK LEGEND

- 25' TO -20'
- 20' TO -15'
- 15' TO -10'
- 10' TO -5'
- 5' TO 0'
- 0 TO 5'
- 5' TO 10'
- 10' TO 15'
- 15' TO 20'

GRADING VOLUME SCENARIO 3	
CUT	2,587 CY
FILL	56,902 CY
NET	54,336 CY



<p>CLIENT</p> <p>CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201</p>	NO.	REVISION	DATE
	SHEET TITLE	PROPOSED ALTERNATE GRADING PLAN	
PROJECT TITLE	SWP #588 INTERIM EVCH COVER SYSTEM CONCEPTUAL ALTERNATE GRADING		
CADD FILE:	SHT 3-4		
DATE:	10.09.2023		
SCALE:	AS SHOWN		
DRAWING NO.	4 of 4		

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 10/09/2023