Monthly Compliance Report

Solid Waste Permit #588
Bristol Integrated Solid Waste Management Facility
2655 Valley Drive
Bristol, VA 24201
(276) 645-7233

SCS ENGINEERS

02218208.05 | November 10, 2022

15521 Midlothian Turnpike Suite 305
Midlothian, VA 23113
804-378-7440

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EXECUTIVE SUMMARY

On behalf of the City of Bristol, Virginia (City), SCS Engineers has prepared this report to the Virginia Department of Environmental Quality (VDEQ) outlining steps taken towards the action items outlined in the Plan of Action submitted to VDEQ on July 6, 2022. This report covers the Solid Waste Permit #588 landfill during the month of October.

1.0 GAS COLLECTION

The City has continued steps to operate, develop, and improve the facility's landfill gas collection and control system (GCCS). The following sections outline steps City is taking in collaboration with its consultants and operations and monitoring contractor.

1.1 SURFACE AND LEACHATE COLLECTION EMISSIONS

1.1.1 Surface Emissions

In addition to standard regulatory quarterly surface emissions monitoring, SCS performed additional surface emissions monitoring on October 10, 2022, October 21, 2022, and October 28, 2022. This Surface Emissions Monitoring (SEM) Event was performed in accordance with Section 3.5 of the Plan of Action in Response to the Expert Panel Report, submitted to VDEQ on July 6, 2022.

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 included applicable areas 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 outside of the active filling area.

SCS submitted letters to VDEQ outlining the results of the October 21, 2022, and October 28, 2022. Copies of those submittals are included in Appendix A. Table 1 summarizes the results of the three monitoring events in October.

Table 1. Summary of October Surface Emissions Monitoring

Description	October 10, 2022	October 21, 2022	October 28, 2022
Number of Points Sampled	140	142	140
Number of Points in Serpentine Route	100	102	100
Number of Points at Surface Cover Penetrations	40	40	40
Number of Exceedances[1]	15	7	6

[1] Exceedance locations were marked in the field with red flagging and were identified to landfill personnel to initiate corrective actions.

Description	October 10, 2022	October 21, 2022	October 28, 2022
Number of Serpentine Exceedances	0	0	0
Number of Pipe Penetration Exceedances	15	7	6

1.1.2 Leachate Collection emissions

SCS Field Services (SCS-FS) visited the Bristol Landfill during the month of October 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 SCS-FS' summary report for the month of October dated November 8, 2022. A copy of this report is included in Appendix B. The monitoring data for the clean-outs at the southern end of the landfill are listed as LC01 – LC10. The monitoring data for the clean-outs at the northern end of the landfill are listed as NC01 – NC10. Based on site records and correspondence, SCS prepared a summary of the pipe numbering relative to the function of the pipes shown in Table 2.

Table 2. Cleanout Pipe Identification

Northern Cleanouts		Southern Cleanouts	
ID #	Description	ID #	Description
NC01	Leachate East	LC01	Gradient West
NC02	Leachate Center	LC02	Gradient East
NC03	Leachate West	LC03	Leachate Center
NC04	Witness East	LC04	Witness East
NC05	Witness Center	LC05	Leachate West
NC06	Witness West	LC06	Gradient Center West
NC07	Gradient East	LC07	Leachate East
NC08	Gradient Center East	LC08	Gradient Center East
NC09	Gradient Center West	LC09	Leachate West
NC10	Gradient West	LC10	Witness Center

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 SCS-FS' summary report for the month of October.

In addition to the activities outlined in the report on October 14, 2022 SCS submitted the design drawings for upgrades to the southern leachate clean-out gas collection system to the City. The City initiated procurement of materials for the project. The project is anticipated to be completed by SCS-FS in November.

The project involves replacing the existing 4-inch landfill gas (LFG) header connecting the wellheads on the southern cleanouts with the rest of the (GCCS) with a larger header. The header will be

replaced by an 8-inch or 12-inch header depending on the location. The resulting upgrades are anticipated to increase LFG flows from the southern clean-outs.

1.3 REMOTE MONITORING SYSTEM

SCS Remote Monitoring & Control (SCS-RMC) had previously furnished 25 industrial internet of things (IIoT) temperature sensors for installation on landfill gas wells at the Bristol Landfill, VA. The sensors are capable of recording and transmitting gas temperatures and GPS locations. The sensors will upload data collected via a cellular connection to a database managed by SCS-RMC

Two sensors were initially installed on wells and began recording temperature data. An initial review of the data and comparison with temperature readings recorded by field staff indicated that the measurements taken by the remote sensors were impacted by ambient air temperatures. The installation of additional sensors was put on hold until the installations could be modified to improve the accuracy of temperature readings.

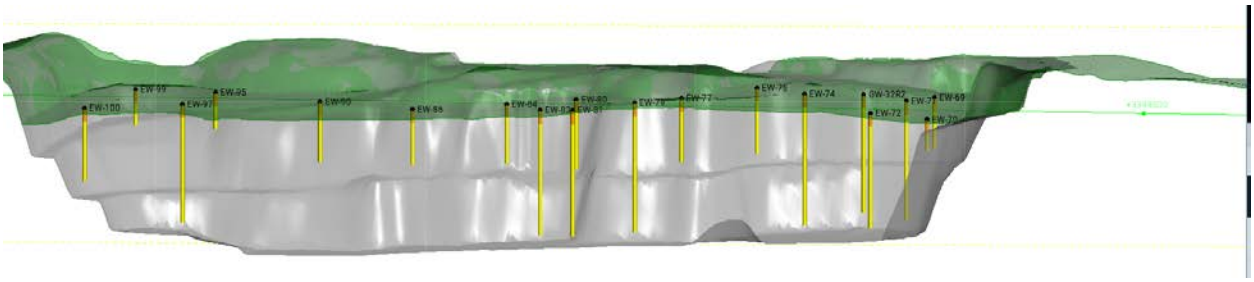
During the month of October the City, SCS, SCS-FS, and SCS-RMC coordinated with the wellhead manufacturer to identify an installation configuration that provided more direct access to gas flow. The proposed solution was to thread the sensor into a saddle that could be attached to the wellhead. The City procured the necessary adapter parts which were delivered to the site during the month of October. Figure 1 shows a sensor attached to the saddle adaptor. SCS-FS will begin the installation of the remaining sensors in November.

Figure 1. Wellhead Temperature Sensor and Adaptor Saddle

1.4 LARGE-DIAMETER DUAL-PHASE EXTRACTION WELLS

SCS has initiated design work on an expansion of the existing GCCS. The proposed expansion is anticipated to include at least 5 large diameter dual-phase extraction wells. A conceptual cross section of the proposed additional wells is shown in Figure 2. SCS will submit the design to VDEQ prior to December 31, 2022. The City intends to initiate the bidding process for construction of the GCCS prior to December 31, 2022.

Figure 2. Conceptual Cross Section of Dual-Phase Extraction Wells included in Landfill GCCS Expansion



1.5 VDEQ CONCURRENCE ON WELLS

The City has engaged with VDEQ in discussions about the proposed approach for landfill GCCS improvements and expansions. On October 27, 2022 SCS provided VDEQ with an overview of the proposed GCCS expansion design outlined in Section 1.4. The City and SCS intend to continue engaging with the Department throughout the design and installation process. The City intends to delay installation of temporary or final cover systems until the City and VDEQ agree that the GCCS is sufficient.

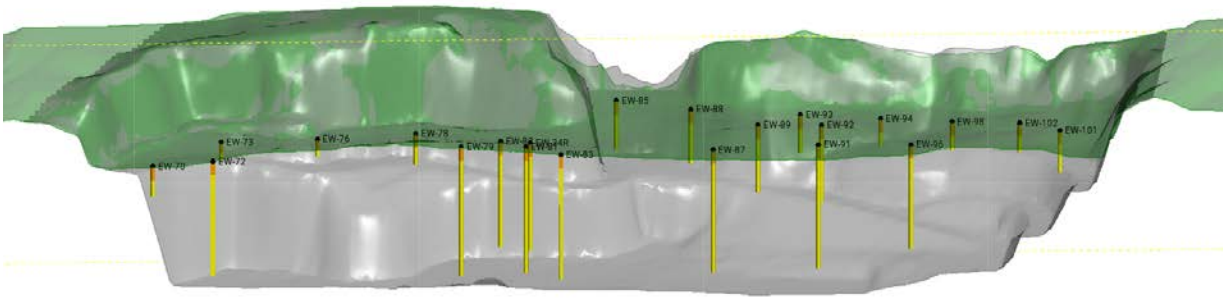
2.0 SIDEWALL ODOR MITIGATION

The City has initiated design work to address fugitive emission emanating from the quarry sidewalls. Specific aspects of the proposed design features are outlined in the following sections.

2.1 PERIMETER GAS COLLECTION SYSTEM

SCS' design of the GCCS expansion outlined in Section 1.5 will include perimeter LFG wells. These wells are intended to collect gas near the sidewalls that may not be collected by the rest of the GCCS. These wells will be placed 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. A conceptual cross section of the proposed additional wells is shown in Figure 3. SCS will submit a design to VDEQ which includes these wells prior to December 31, 2022. The City intends to initiate the bidding process for construction of the GCCS expansion prior to December 31, 2022.

Figure 3. Conceptual Cross Section of Perimeter Gas Extraction Wells included in Landfill GCCS Expansion

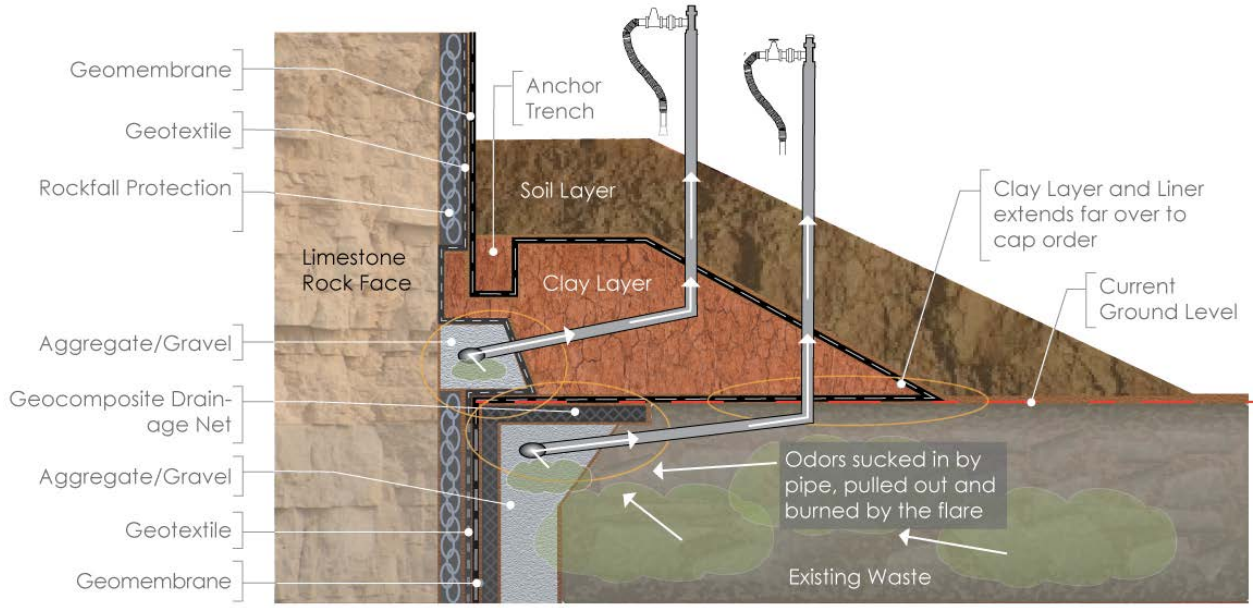


2.2 SIDEWALL ODOR MITIGATION SYSTEM

On behalf of the City and in an effort to capture emissions from the quarry sidewall SCS prepared the design of a sidewall odor mitigation system during the month of October. A conceptual cross section of the proposed system is shown in Figure 4. The system consists of the following features:

- A perimeter LFG horizontal collector
- An external odor mitigation system horizontal collector
- A low permeability soil plug
- A protective soil cover

Figure 4. Conceptual Cross Section of the Sidewall Odor Mitigation System



The perimeter LFG horizontal collector will be installed in a trench excavated in the waste. It will consist of a perforated pipe, aggregate, and the existing geocomposite drainage layer. It is intended to intercept LFG that may be flowing through the aggregate/fluff layer adjacent to the sidewall or the

geocomposite drainage layer. The collector will serve as a final piece of collection infrastructure between the waste and sidewall liner to collect gas that is not captured by the rest of the GCCS.

The external odor mitigation system horizontal collector will have the same basic construction as the perimeter LFG horizontal collector, but will be installed behind the sidewall liner. The sidewall liner will be removed above the existing grade and the collector will be placed above the waste. The geotextile from the sidewall liner system will be wrapped around the collector and tied back to the sidewall liner system.

The external odor mitigation system horizontal collector will be covered by a low permeability soil with a minimum thickness of 5 feet. The geomembrane from the sidewall liner will be wrapped around the low permeability soil layer. Additional geomembrane will be attached to supplement as needed. The entire system will be covered with a 2 foot thick soil layer to protect the system from weather and impact from other activities on the site.

The proposed system will be connected to the existing GCCS as well as a secondary blower flare. A series of valves will allow the City to direct gas one or both collectors to the existing GCCS or to the secondary flare. At low points along the SOMS, pumps will be placed in vertical pipes to remove liquids from the system. Liquids discharged from the pumps will flow into forcemains connected to the existing GCCS.

On October 20, 2022 SCS provided an overview of the proposed system to VDEQ staff. The design of this system was prepared in anticipation of submittal to VDEQ on November 1st. A copy of the design of this system in included in Appendix C. A project manual detailing the system specifications of the system was developed concurrently with the design of the system.

2.3 PILOT SYSTEM CONSTRUCTION

The City intends to put the proposed system out for bid during the month of November. The proposed system is designed to be constructed in two phases. Phase 1 will include approximately 200 feet along the western sidewall. The intent is for Phase 1 to serve as a test segment prior to completing construction of the remainder of the system. The City intends to include a milestone date of December 31, 2022 in the contract for construction of the proposed system.

2.4 FULL SYSTEM CONSTRUCTION

The remainder of the sidewall odor mitigation system will be constructed as part of Phase 2. Based on constructability and effectiveness of Phase 1, modifications to the design and methods of construction may be made prior to constructing Phase 2. The City intends to include contract times in the construction contract that require the contractor to complete Phase 2 before June 14, 2023.

3.0 WASTE TEMPERATURE MONITORING

On behalf of the City SCS has designed a temperature monitoring system that is designed to collect temperature data throughout the waste mass. The City has selected a contractor to install the system. That contractor mobilized to the site and began working in October.

3.1 TEMPURATURE MONITORING SYSTEM DESIGN

The temperature monitoring system consists of 9 boreholes drilled into the waste mass. A steel casing will be placed in each borehole and the hole will be backfilled around the casing with

aggregate. A series of temperature sensors will be placed inside the steel casing. At the top of each borehole, an industrial internet of things (IIoT) transmitter will collect the data from the sensors and transmit it to a cloud-based RMC system. The City intends to submit design of the temperature monitoring system to VDEQ by November 30, 2022.

3.2 TEMPURATURE MONITORING SYSTEM INSTALLATION

On October 1st, 2022 the City awarded the construction contract for the temperature monitoring system to Connelly & Associates, Inc (Connelly). Connelly began drilling on October 26, 2022. By October 31st, 2022 Connelly had completed 160 feet of the first borehole. Drilling and installation is expected to continue into November. A photo of drilling activities taken during the month of October is shown in Figure 5.

Figure 5. Temperature Monitoring System Drilling

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 about the leachate. The following sections detail steps taken to achieve these goals.

4.1 EXISTING SYSTEM OPTIMIZATION

During mobilizations to conduct surface emissions monitoring outlined in Section 1.1.1, SCS also collected stroke counter data from the pumps installed in the GCCS wells. Stroke counts were collected from 18 wells on October 10, 2022; October 21, 2022; and October 28, 2022. The data collected is summarized in Table 3.

Table 3. Summary of Dual Extraction Well Pump Stroke Counter Data

Well	October 10, 2022	October 21, 2022	October 28, 2022
GW64	97936	97942	97942
GW61	193233	211534	211540
GW50	497578	524193	551369
GW49	438118	438133	438133
GW60	55250	55250	55250
GW52	227419	227419	227419
GW68	1259680	1259685	1259685
GW67	87445	87445	87445
GW54	105740	105740	105740
GW55	529010	529010	529010
GW58	1608419	1608418	1608418
GW59		547361	547361
GW57	120591	120834	124834
GW65	552	558	558
GW63	47624	47625	47625
GW62	113958	113995	113995
GW53	779731	779736	779736
GW56	28427	29172	29930

Based on this data and stroke counts taken on September 30, 2022, SCS can estimate the number of gallons of liquid pumped from each well. SCS assumed that each stroke correlates to approximately 0.3 gallons of liquid removed from the well. 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 is shown in Table 4 below.

Table 4. Summary of Dual Extraction Well Pump Liquids Removal

Well	Liquids Removed (gal) September 30, 2022 to October 10, 2022	Liquids Removed (gal) October 10, 2022 to October 21, 2022	Liquids Removed (gal) October 21, 2022 to October 28, 2022
EW64	0	1.8	0
EW61	3583.5	5490.3	1.8
EW50	10019.4	7984.5	8152.8
EW49	0	4.5	0
EW60	0	0	0
EW52[2]	0	0	0
EW68	0	1.5	0
EW67	0	0	0
EW54	0	0	0
EW55	0	0	0
EW58[3]	0	0	0
EW59	7.8	-	0
EW57	-	-	0
EW65	150.9	72.9	1200
EW63	1.2	1.8	0
EW62	0	0.3	0
EW53	0	11.1	0
EW56	0	1.5	0

As outlined in Appendix B repairs were made to the liquids removal system during the month of October. The effects of those repairs may not be fully reflected in this data. The City's contractors will continue repairs of pumping infrastructure and pumps during the month of November.

4.2 SAMPLING AND ANALYSIS PLAN

SCS prepared a the Dual Phase Landfill Gas Extraction Well Leachate Monitoring Plan for the Bristol Integrated Solid Waste Management Facility Solid Waste Permit #588 Landfill for submittal to VDEQ on November 1, 2022. The Plan documents procedures and instructions necessary to implement a leachate monitoring program for the Dual Phase Landfill Gas Extraction Wells (LFG-EWs) installed within the Permit #588 Landfill. The Plan was prepared in response to the Expert Panel Report

[2] Subsequent investigation indicated that the pump in EW 52 is working but strokes are not being recorded.
[3] Subsequent investigation indicated that the pump in EW 58 is working but strokes are not being recorded.

prepared by the Expert Panel convened by the Virginia Department of Environmental Quality to address odor problems and operational concerns at the Facility. A copy of the plan is included in Appendix D.

4.3 SAMPLING AND ANALYSIS

SCS will begin sampling and analysis in accordance with the submitted plan on the City's behalf in November.

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

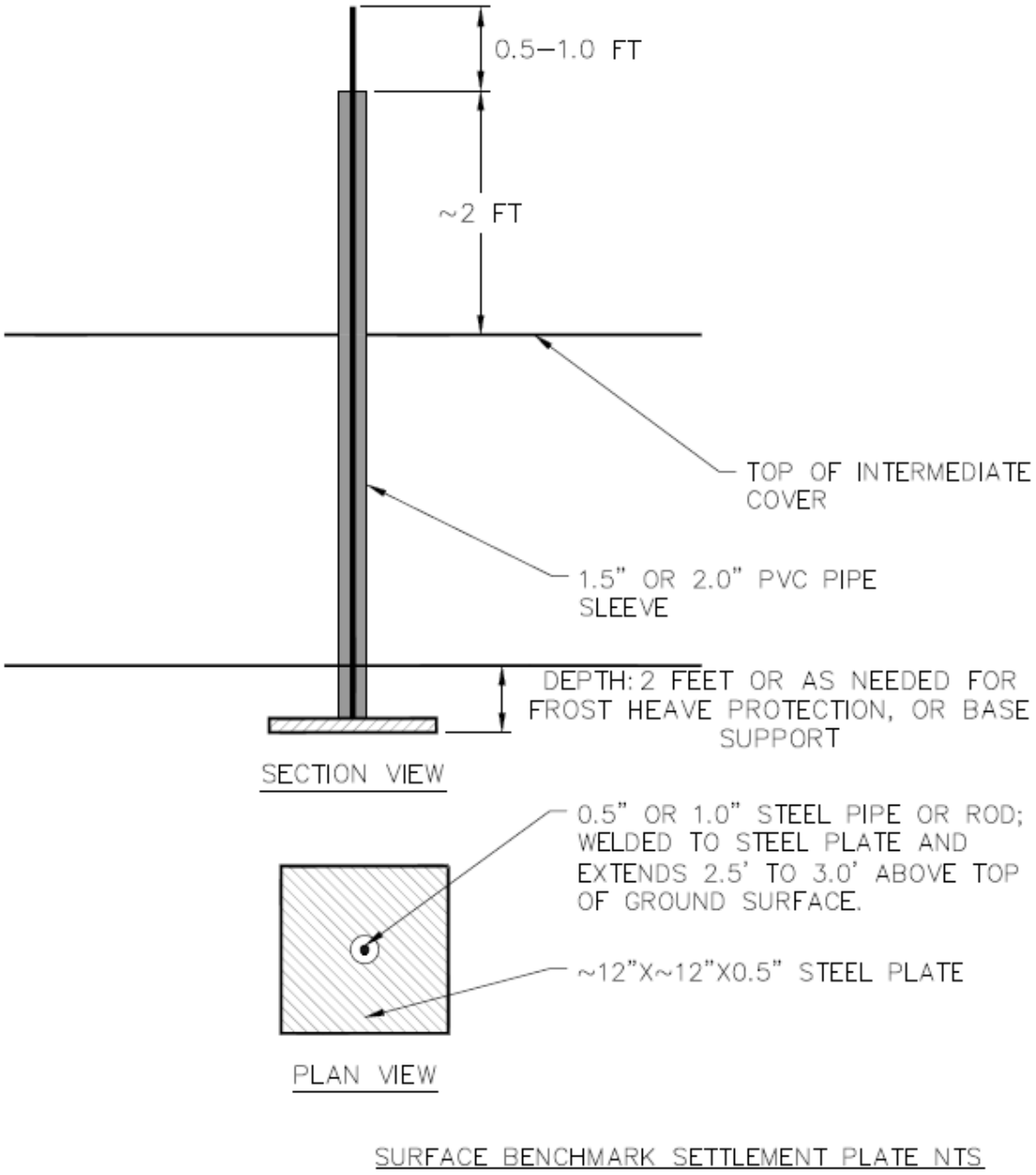
On behalf of the City SCS has begun preparing a settlement monitoring and management plan. The plan will address both how to monitor settlement and how to mitigate the effects of settlement on landfill infrastructure.

Settlement monitoring is anticipated to include two components:

- Installation and monitoring of settlement plates installed within the waste mass
- Monthly surveys of the landfill topography

The City contracted with SCS-FS to fabricate settlement plates based on the design included in the Plan of Action. The general settlement plate design is shown in Figure 6. The settlement plates will be installed during the month of November.

Figure 6. Settlement Plate Detail



5.2 MONTHLY TOPOGRAPHIC SURVEYS

The City through SCS, contracted with NV5 (formerly Quantum Spatial) to collect topographic data of the entire landfill property using aerial Light Detection and Ranging (Lidar). On October 7, 2022 the flight was completed and the topographic data collected. The topographic data collected is shown on Sheet 1 in Appendix E.

The topography within the landfill footprint was compared to topographic data collected by Draper Aden Associates (DAA) in June 2021. A drawing depicting the June 2021 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 102,100 cubic yards. During that same time period approximately 120,700 cubic yards of waste and cover soil were placed on the landfill. This resulted in a net volume increase of approximately 18,600 cubic yards. Filling primarily occurred in the southwest corner of the landfill. Settlement was spread across the remainder of the landfill. A visual depiction of settlement and filling at the landfill during this time is depicted on Sheet 4 in Appendix E.

SCS will collect topographic data covering the landfill surface again in November using photogrammetric methods via an unmanned aerial vehicle (UAV or drone). This data will be compared to the data collected in October.

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.

6.1 INTERMEDIATE COVER INSTALLATION

The City has been hauling soil to the landfill to install a 12-inch thick intermediate cover across the entire landfill. The cover is being placed in accordance with 9VAC20-81-140(B)(1)(d). The City completed hauling and placement prior to October 10, 2022.

On October 11, 2022 an employee of Golder Associates dug test holes which were observed by SCS' project manager Brandon King. All of the test holes indicated at least 12 inches of soil cover was in place on top of the waste. On October 20, 2022 SCS dug 7 additional test holes across the landfill confirm the depth of intermediate cover. The depth of intermediate cover exceeded 12 inches at all 7 locations. The approximate locations of the test holes are shown in Figure 7.

Figure 7. Intermediate Cover Depth Checks

Intermediate Cover Depth Check Locations

6.2 EVOH COVER SYSTEM DESIGN

SCS has begun the process of preparing a scope for the EVOH cover system design for submittal to the City.

6.3 EVOH COVER SYSTEM PROCUREMENT

City has initiated discussion with EVOH cover vendors to facilitate future procurement of an EVOH cover system.

6.4 EVOH COVER SYSTEM INSTALLATION

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

7.0 STORM WATER MANAGEMENT

SCS is reviewing the topography collected on October 7, 2022 to determine the scope of design needed to manage stormwater on the site. SCS is preparing an approach for submittal to the City that will address stormwater management design, construction, and stormwater sampling.

8.0 CEASE WASTE ACCEPTANCE

The City ceased acceptance of offsite waste at the Solid Waste Permit #588 landfill prior to September 12, 2022.

9.0 LONG-TERM PLAN

The City has begun reviewing available resources and the workload associate with long term maintenance and monitoring of the landfill.

10.0 COMMUNITY OUTREACH PROGRAM

The City has hired an outside consulted to lead community outreach efforts. In additional to posting updates and data on the City's website the City has set up a website specific to the landfill (bristolvalandfill.org).

Earlier this month, the City began planning for an open house held on November 1, 2022. The open house was set-up to provide the public with the opportunity to get information about activities at the landfill and to ask questions.

Appendix A

Surface Emissions Monitoring Summary Letters

October 27, 2022
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 21, 2022
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 21, 2022. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Section 3.5 of the Plan of Action in Response to the Expert Panel Report, submitted to VDEQ on July 6, 2022.

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 included applicable areas 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 outside of the active filling area. 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 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 monitory is provided in Table 1.

Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	142
Number of Points in Serpentine Route	102
Number of Points at Surface Cover Penetrations	40
Number of Exceedances1	7
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	7

Proposed corrective actions at these locations involved addition and compaction of low permeability soil as well as vacuum adjustments to adjacent vertical wells. Results of corrective actions and remonitoring results will be presented in subsequent reports.

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 performed corrective actions including wellhead vacuum adjustments and addition of soil cover prior to this event at locations that previously exhibited elevated methane concentrations[2].

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 re-tests.

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

1 Exceedance locations were marked in the field with red flagging and were identified to landfill personnel to initiate corrective actions.

Table 2. Ongoing Weekly SEM Exceedances

Point ID	Initial Exceedance Date	10/21/22 Event	10/21/22 Event Result	Comments
Tag 25	9/16/22	30-Day Retest	Pass	No Further Action
EW-38	9/16/22	30-Day Retest	Pass	No Further Action
EW-34	9/23/22	Not Required	Pass	Requires 30-Day Retest
EW-66	9/23/22	Not Required	Pass	Requires 30-Day Retest
EW-46	10/10/22	First10-Day Retest	Pass	Requires 30-Day Retest
EW-67	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-56	8/4/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-57	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-41	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-53	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-40	8/4/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-51	8/4/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-68	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-42	8/12/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-52	8/19/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-39	8/19/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-48	8/26/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-47	8/26/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-54	9/2/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-35	9/9/22	N/A	Fail	Subject to 1960(c)(4)(v)

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

Sincerely,

Charles J. Warren
Project Manager
SCS Engineers

Lucas S. Nachman
Project Professional
SCS Engineers

LSN/LEH/cjw

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jake Chandler, City of Bristol
Crystal Bazyk, VDEQ
Charles Warren, SCS Engineers

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

S C S E N G I N E E R S

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 21, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
1	3.8 PPM	OK			Start Serpentine Route
2	6.1 PPM	OK			
3	3.7 PPM	OK			
4	34.1 PPM	OK			
5	11.6 PPM	OK			
6	35.8 PPM	OK			
7	151.0 PPM	OK			
8	8.3 PPM	OK			
9	6.7 PPM	OK			
10	113.0 PPM	OK			
11	266.0 PPM	OK			
12	118.0 PPM	OK			
13	100.0 PPM	OK			
14	93.5 PPM	OK			
15	258.0 PPM	OK			
16	80.5 PPM	OK			
17	65.5 PPM	OK			
18	269.0 PPM	OK			
19	294.0 PPM	OK			
20	229.0 PPM	OK			
21	23.7 PPM	OK			
22	42.8 PPM	OK			
23	13.7 PPM	OK			
24	104.0 PPM	OK			
25	32.8 PPM	OK			
26	97.4 PPM	OK			
27	455.0 PPM	OK			
28	424.0 PPM	OK			
29	237.0 PPM	OK			
30	384.0 PPM	OK			
31	144.0 PPM	OK			
32	104.0 PPM	OK			
33	67.6 PPM	OK			
34	40.0 PPM	OK			
35	90.0 PPM	OK			
36	9.2 PPM	OK			
37	4.5 PPM	OK			
38	15.8 PPM	OK			
39	60.1 PPM	OK			
40	209.0 PPM	OK			
41	27.4 PPM	OK			
42	61.0 PPM	OK			

S C S E N G I N E E R S

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 21, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
43	401.0 PPM	OK			
44	22.3 PPM	OK			
45	2.6 PPM	OK			
46	6.7 PPM	OK			
47	8.9 PPM	OK			
48	33.4 PPM	OK			
49	2.6 PPM	OK			
50	1.2 PPM	OK			
51	1.2 PPM	OK			
52	10.8 PPM	OK			
53	3.9 PPM	OK			
54	2.0 PPM	OK			
55	5.6 PPM	OK			
56	64.2 PPM	OK			
57	11.6 PPM	OK			
58	7.8 PPM	OK			
59	10.6 PPM	OK			
60	23.6 PPM	OK			
61	6.7 PPM	OK			
62	7.1 PPM	OK			
63	27.6 PPM	OK			
64	21.4 PPM	OK			
65	9.7 PPM	OK			
66	4.7 PPM	OK			
67	3.5 PPM	OK			
68	33.6 PPM	OK			
69	5.7 PPM	OK			
70	49.3 PPM	OK			
71	19.9 PPM	OK			
72	64.0 PPM	OK			
73	8.1 PPM	OK			
74	6.0 PPM	OK			
75	36.3 PPM	OK			
76	16.2 PPM	OK			
77	8.4 PPM	OK			
78	8.4 PPM	OK			
79	4.7 PPM	OK			
80	299.0 PPM	OK			
81	90.4 PPM	OK			
82	57.1 PPM	OK			
83	129.0 PPM	OK			
84	82.7 PPM	OK			

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 21, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
85	10.2 PPM	OK			
86	15.2 PPM	OK			
87	40.4 PPM	OK			
88	6.9 PPM	OK			
89	5.7 PPM	OK			
90	5.4 PPM	OK			
91	4.8 PPM	OK			
92	10.2 PPM	OK			
93	9.5 PPM	OK			
94	22.8 PPM	OK			
95	16.0 PPM	OK			
96	24.5 PPM	OK			
97	335.0 PPM	OK			
98	14.2 PPM	OK			
99	252.0 PPM	OK			
100	56.3 PPM	OK			
101	196.0 PPM	OK			
102	24.2 PPM	OK			End Serpentine Route
103	4396.0 PPM	HIGH_ALRM	36.59916	-82.14769	EW-35
104	5957.0 PPM	HIGH_ALRM	36.59900	-82.14750	EW-52
105	296.0 PPM	OK			EW-60
106	4461.0 PPM	HIGH_ALRM	36.59950	-82.14753	EW-48
107	3.7 PPM	OK			EW-61
108	4.4 PPM	OK			EW-36
109	138.0 PPM	OK			EW-34
110	11.6 PPM	OK			EW-65
111	56.0 PPM	OK			EW-50
112	134.0 PPM	OK			EW-55
113	1318.0 PPM	HIGH_ALRM	36.59865	-82.14743	EW-54
114	228.0 PPM	OK			EW-47
115	40.9 PPM	OK			EW-67
116	9838.0 PPM	HIGH_ALRM	36.59864	-82.14796	EW-40
117	245.0 PPM	OK			EW-53
118	84.8 PPM	OK			EW-41
119	114.0 PPM	OK			EW-46
120	16.6 PPM	OK			EW-66
121	202.0 PPM	OK			EW-58
122	446.0 PPM	OK			EW-57
123	3.6 PPM	OK			EW-59
124	6071.0 PPM	HIGH_ALRM	36.59789	-82.14790	EW-56
125	895.0 PPM	HIGH_ALRM	36.59884	-82.14786	EW-51

S C S E N G I N E E R S

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 21, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
126	213.0 PPM	OK			EW-39
127	41.8 PPM	OK			EW-68
128	468.0 PPM	OK			EW-38
129	2.0 PPM	OK			EW-49
130	1.5 PPM	OK			EW-31R
131	3.1 PPM	OK			EW-37
132	5.8 PPM	OK			EW-65
133	3.3 PPM	OK			EW-30R
134	4.8 PPM	OK			EW-63
135	361.0 PPM	OK			EW-42
136	4.8 PPM	OK			EW-33R
137	4.4 PPM	OK			EW-62
138	1.8 PPM	OK			EW-29R
139	8.8 PPM	OK			EW-25
140	5.6 PPM	OK			EW-24
141	2.7 PPM	OK			EW-32
142	6.9 PPM	OK			EW-32R

Number of locations sampled:	142
Number of exceedance locations:	7

NOTES:
Points 1 through 102 represent serpentine SEM route.
Points 103 through 143 represent SEM at Pipe Penetrations
Weather Conditions: Sunny 55°F Wind: 0 MPH

Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm

10/21/2022	8:57	ZERO	0.1 PPM
10/21/2022	9:00	SPAN	504.0 PPM

Background Reading:

10/21/2022	9:10	Upwind	2.2 PPM
10/21/2022	9:12	Downwind	6.3 PPM

NOTES:

1. TAGS 1 – 102 REPRESENT SERPENTINE SEM ROUTE
2. TAGS 103 – 142 REPRESENT SEM AT PIPE PENETRATIONS
3. WEEKLY SEM PERFORMED ON OCTOBER 21, 2022

(PERMIT No. 221)

EXISTING CITY OF BRISTOL YARD WASTE COMPOST (PERMIT No. 156)

EXISTING CITY OF BRISTOL LANDFILL (PERMIT No. 498)

CITY OF BRISTOL PARCEL 425– A–4 DB 333 PG 430

GW–48
GW–35
GW–52
GW–51
GW–40
GW–54
GW–56

N

0 100 200 300
SCALE IN FEET

LEGEND

- SEM ROUTE
- GW–61 GAS WELL
- 79 EXCEEDANCE LOCATION
- 75 MONITORING ROUTE ENDPOINT

NO.	REVISION	DATE

SHEET TITLE: **BRISTOL SEM ROUTE**

PROJECT TITLE: **WEEKLY SURFACE EMISSIONS MONITORING SOLID WASTE PERMIT #588**

CLIENT: **BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
2125 SHAKESVILLE RD
BRISTOL, VA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO.	DWN. BY:	Q/A R/W BY:
02218208.04	LSN	
DSN. BY:	CHK. BY:	APP. BY:
LSN	DBK	

CADD FILE:

DATE: 10/21/22

SCALE: AS SHOWN

DRAWING NO. 1 of 1

November 2, 2022
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 28, 2022
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 28, 2022. This Weekly Surface Emissions Monitoring (SEM) Event was performed in accordance with Section 3.5 of the Plan of Action in Response to the Expert Panel Report, submitted to VDEQ on July 6, 2022.

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 included applicable areas 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 outside of the active filling area. 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 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 monitory is provided in Table 1.

Table 1. Summary of Surface Emissions Monitoring

Description	Quantity
Number of Points Sampled	140
Number of Points in Serpentine Route	100
Number of Points at Surface Cover Penetrations	40
Number of Exceedances[1]	6
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	6

Proposed corrective actions at these locations involved addition and compaction of low permeability soil as well as vacuum adjustments to adjacent vertical wells. In some select locations a foam seal or a well bore skirt may be installed. Results of corrective actions and remonitoring results will be presented in subsequent reports.

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 performed corrective actions including wellhead vacuum adjustments and addition of soil cover prior to this event at locations that previously exhibited elevated methane concentrations[2].

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 re-tests.

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

1 Exceedance locations were marked in the field with red flagging and were identified to landfill personnel to initiate corrective actions.

Table 2. Ongoing Weekly SEM Exceedances

Point ID	Initial Exceedance Date	10/28/22 Event	10/28/22 Event Result	Comments
EW-34	9/23/22	30-Day Retest	Pass	No Further Action
EW-66	9/23/22	30-Day Retest	Pass	No Further Action
EW-46	10/10/22	N/A	Pass	Requires 30-Day Retest
EW-67	8/4/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-56	8/4/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-57	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-41	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-53	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-40	8/4/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-51	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-68	8/4/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-42	8/12/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-52	8/19/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-39	8/19/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-48	8/26/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-47	8/26/22	N/A	Pass	Subject to 1960(c)(4)(v)
EW-54	9/2/22	N/A	Fail	Subject to 1960(c)(4)(v)
EW-35	9/9/22	N/A	Fail	Subject to 1960(c)(4)(v)

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

Sincerely,

Charles J. Warren
Project Manager
SCS Engineers

Lucas S. Nachman
Project Professional
SCS Engineers

LSN/LEH/cjw

cc: Randall Eads, City of Bristol
Mike Martin, City of Bristol
Joey Lamie, City of Bristol
Jake Chandler, City of Bristol
Crystal Bazyk, VDEQ
Charles Warren, SCS Engineers

Encl. Surface Emissions Monitoring Results
Bristol SEM Route Drawing

S C S E N G I N E E R S

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 28, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
1	122.0 PPM	OK			Start Serpentine Route
2	223.0 PPM	OK			
3	7.5 PPM	OK			
4	9.7 PPM	OK			
5	80.0 PPM	OK			
6	10.2 PPM	OK			
7	108.0 PPM	OK			
8	40.1 PPM	OK			
9	9.3 PPM	OK			
10	15.9 PPM	OK			
11	20.7 PPM	OK			
12	42.4 PPM	OK			
13	47.2 PPM	OK			
14	129.0 PPM	OK			
15	17.5 PPM	OK			
16	35.8 PPM	OK			
17	32.8 PPM	OK			
18	33.1 PPM	OK			
19	21.1 PPM	OK			
20	35.4 PPM	OK			
21	33.0 PPM	OK			
22	42.4 PPM	OK			
23	89.2 PPM	OK			
24	44.8 PPM	OK			
25	99.3 PPM	OK			
26	53.8 PPM	OK			
27	58.2 PPM	OK			
28	90.0 PPM	OK			
29	13.7 PPM	OK			
30	6.9 PPM	OK			
31	2.5 PPM	OK			
32	3.3 PPM	OK			
33	16.3 PPM	OK			
34	18.0 PPM	OK			
35	8.1 PPM	OK			
36	4.8 PPM	OK			
37	1.5 PPM	OK			
38	43.6 PPM	OK			
39	55.8 PPM	OK			
40	22.0 PPM	OK			
41	71.1 PPM	OK			
42	324.0 PPM	OK			

SCS ENGINEERS

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 28, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
43	63.8 PPM	OK			
44	8.8 PPM	OK			
45	2.8 PPM	OK			
46	3.6 PPM	OK			
47	5.2 PPM	OK			
48	6.5 PPM	OK			
49	21.9 PPM	OK			
50	21.5 PPM	OK			
51	9.0 PPM	OK			
52	6.0 PPM	OK			
53	18.1 PPM	OK			
54	9.1 PPM	OK			
55	7.7 PPM	OK			
56	11.4 PPM	OK			
57	22.3 PPM	OK			
58	21.0 PPM	OK			
59	16.2 PPM	OK			
60	17.6 PPM	OK			
61	9.3 PPM	OK			
62	8.3 PPM	OK			
63	3.6 PPM	OK			
64	7.2 PPM	OK			
65	7.0 PPM	OK			
66	28.7 PPM	OK			
67	8.0 PPM	OK			
68	18.1 PPM	OK			
69	16.3 PPM	OK			
70	7.4 PPM	OK			
71	35.3 PPM	OK			
72	79.7 PPM	OK			
73	97.2 PPM	OK			
74	7.6 PPM	OK			
75	98.4 PPM	OK			
76	48.1 PPM	OK			
77	26.2 PPM	OK			
78	35.9 PPM	OK			
79	26.4 PPM	OK			
80	13.5 PPM	OK			
81	13.3 PPM	OK			
82	165.0 PPM	OK			
83	11.6 PPM	OK			
84	20.4 PPM	OK			

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 28, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
85	5.9 PPM	OK			
86	7.8 PPM	OK			
87	10.5 PPM	OK			
88	18.6 PPM	OK			
89	11.2 PPM	OK			
90	7.2 PPM	OK			
91	33.1 PPM	OK			
92	8.8 PPM	OK			
93	11.8 PPM	OK			
94	47.6 PPM	OK			
95	28.4 PPM	OK			
96	279.0 PPM	OK			
97	8.7 PPM	OK			
98	65.0 PPM	OK			
99	11.7 PPM	OK			
100	42.3 PPM	OK			End Serpentine Route
101	1426.0 PPM	HIGH_ALRM	36.59916	-82.14769	EW-35
102	12100.0 PPM	HIGH_ALRM	36.59900	-82.14750	EW-52
103	79.1 PPM	OK			EW-60
104	365.0 PPM	OK			EW-48
105	13.2 PPM	OK			EW-61
106	15.7 PPM	OK			EW-36
107	44.8 PPM	OK			EW-34
108	10.1 PPM	OK			EW-65
109	64.7 PPM	OK			EW-50
110	124.0 PPM	OK			EW-55
111	1260.0 PPM	HIGH_ALRM	36.59865	-82.14743	EW-54
112	290.0 PPM	OK			EW-47
113	145.0 PPM	OK			EW-41
114	21100.0 PPM	HIGH_ALRM	36.59864	-82.14774	EW-67
115	29800.0 PPM	HIGH_ALRM	36.59864	-82.14796	EW-40
116	430.0 PPM	OK			EW-53
117	10.3 PPM	OK			EW-46
118	11.1 PPM	OK			EW-66
119	193.0 PPM	OK			EW-58
120	15.1 PPM	OK			EW-57
121	2136.0 PPM	HIGH_ALRM	36.59789	-82.14790	EW-56
122	276.0 PPM	OK			EW-59
123	31.9 PPM	OK			EW-51
124	51.8 PPM	OK			EW-39
125	94.2 PPM	OK			EW-68

S C S E N G I N E E R S

EXHIBIT 1. SURFACE EMISSIONS MONITORING RESULTS
WEEKLY MONITORING EVENT - OCTOBER 28, 2022
BRISTOL INTEGRATED SOLID WASTE FACILITY - BRISTOL, VIRGINIA

ID #	Methane Concentration	Compliance	GPS Coordinates Lat.	Long.	Comments
126	6.3 PPM	OK			EW-38
127	5.1 PPM	OK			EW-49
128	1.5 PPM	OK			EW-31R
129	0.4 PPM	OK			EW-37
130	1.7 PPM	OK			EW-64
131	1.4 PPM	OK			EW-30R
132	27.7 PPM	OK			EW-63
133	7.0 PPM	OK			EW-42
134	2.9 PPM	OK			EW-33R
135	4.3 PPM	OK			EW-62
136	13.1 PPM	OK			EW-25
137	12.7 PPM	OK			EW-24
138	3.7 PPM	OK			EW-32
139	15.5 PPM	OK			EW-29
140	11.9 PPM	OK			EW-32R

Number of locations sampled:	140
Number of exceedance locations:	6

NOTES:
Points 1 through 100 represent serpentine SEM route.
Points 101 through 140 represent SEM at Pipe Penetrations
Weather Conditions: Sunny 55°F Wind: E - 10 MPH

Sampling Calibration: Methane - 500 ppm, Zero Air - 0.0 ppm

10/28/2022	8:59	ZERO	0.0 PPM
10/28/2022	9:02	SPAN	502.0 PPM

Background Reading:

10/28/2022	9:09	Upwind	2 PPM
10/28/2022	9:10	Downwind	1.8 PPM

NOTES:

1. TAGS 1 – 100 REPRESENT SERPENTINE SEM ROUTE
2. TAGS 101 – 140 REPRESENT SEM AT PIPE PENETRATIONS
3. WEEKLY SEM PERFORMED ON OCTOBER 28, 2022

EXISTING CITY OF BRISTOL LANDFILL (PERMIT No. 498)

EXISTING CITY OF BRISTOL YARD WASTE COMPOST (PERMIT No. 156)

CITY OF BRISTOL PARCEL 425– A–4 DB 333 PG 430

0 100 200 300
SCALE IN FEET

LEGEND

- SEM ROUTE
- GW–61 GAS WELL
- 79 EXCEEDANCE LOCATION
- 75 MONITORING ROUTE ENDPOINT

NO.	REVISION	DATE

SHEET TITLE: **BRISTOL SEM ROUTE**

PROJECT TITLE: **WEEKLY SURFACE EMISSIONS MONITORING SOLID WASTE PERMIT #588**

CLIENT: **BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
2125 SHAKESVILLE RD
BRISTOL, VA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
15321 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO.	DWN. BY:	CHK. BY:	QA/QC BY:
02218208.04	LSN	DBK	
DSN. BY: LSN			APP. BY:

CADD FILE:

DATE: 10/28/22

SCALE: AS SHOWN

DRAWING NO. 1 of 1

Appendix B

SCS-FS October Summary Report

November 8, 2022
Job No. 07220028.00

Mr. Michael Martin
City of Bristol
2125 Shakesville Road
Bristol, VA 24201

Subject: Summary of Operation, Monitoring, and Maintenance (OM&M) Services for Gas Collection Control System (GCCS) at the City of Bristol Landfill, Bristol, Virginia October 2022

Dear Mr. Martin:

SCS Field Services (SCS-FS) visited the Bristol Landfill during the month of October, 2022, for routine and non-routine monitoring and maintenance on the gas collection and control system (GCCS). This report summarizes the work performed and presents the data collected. The monitoring data is presented in the following attachments:

Attachment 1. Wellfield Monitoring Data
Attachment 2. Exceedance Detail Report
Attachment 3. Enhanced Monitoring Record Form and Analytical Results
Attachment 4. Daily Logs

GCCS SITE ACTIVITES

On October 12, SCS-FS visited the landfill for routine and non-routine monitoring. The Flare was operating and the Ingenco Power Plant was not operating. SCS-FS monitored the blower/flare station (BFS) and the extraction wells (EW) in Cell 221 and 588.

SCS-FS conducted non-routine enhanced monitoring and sampling for carbon monoxide (CO) analysis (enhanced monitoring) for compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAP). SCS-FS sampled EW-37, -57, and -67, and submitted the samples to Enthalpy Analytical for analysis. Analytical results are included in Attachment 3.

Between October 12 and 14, SCS-FS made the following repairs and system modifications:

- Repaired two broken air lines and one broken force main in Cell 588.
- Installed an air release valve on the force main near EW-32R.
- Replaced a 6-inch butterfly valve on the header for Cell 498.
- Started investigating lack of vacuum on header in Cell 498.
- Repaired a broken test port on boundary probe GP-9.
- Installed new fittings on EW-37, -40, and -67.
- Repaired the discharge line on EW-57.

On October 19, SCS-FS monitored the BFS and conducted non-routine enhanced monitoring at EW-37 and -57. A sample was collected for CO at EW-37 and submitted to Enthalpy Analytical for analysis. A sample could not be collected from EW-57 due to liquid at the sampling port. SCS-FS

conducted non-routine recheck monitoring at EW-40 for a pressure exceedance and found no available vacuum on the system or the well sides of the wellhead. SCS-FS monitored the north and south leachate clean outs.

On October 26, SCS-FS monitored the BFS and conducted non-routine enhanced monitoring and CO analysis sampling at EW-57. SCS-FS conducted non-routine recheck monitoring at EW-40 for a pressure exceedance and determined there was vacuum on the system and well sides of the wellhead. SCS-FS monitored the north and south leachate clean outs.

RECOMMENDATIONS

SCS-FS has the following recommendations based on observations made during our site visits:

- Continue adding cover to the landfill surface and realigning the header so liquid drains to condensate sumps.
- Maintain spare pumps in working order.
- Connect wells in permit area 498 to the active extraction system.

SCS-FS appreciates the opportunity to provide our services. Please contact either of the undersigned if you have any questions or need additional information.

Very truly yours,

Mike Gibbons
Project Manager
SCS FIELD SERVICES

Thomas M. Lock
Vice President / Northeast Region Manager
SCS FIELD SERVICES

Attachments

cc: Bob Dick, SCS Engineers

Attachments

1. Wellfield Monitoring Data
2. Exceedance Detail Report
3. Enhanced Monitoring Record Forms and Analytical Results
4. Daily Logs

Attachment 1

Wellfield Monitoring Data

Bristol Virginia Landfill - Blower/Flare Station Data - 10/01/2022 to 10/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Static Pressure ("H2O)	Temp (F)	Flow (scfm)	Comments
Blower Inlet	10/12/2022 08:38	26.7	25.5	8.3	39.5	-24.3	64.8	894.0	
Blower Inlet	10/12/2022 15:04	23.0	21.1	11.8	44.1	-24.3	84.5	778.0	
Blower Inlet	10/14/2022 10:30	34.6	29.8	5.8	29.8	-24.2	77.4	780.0	
Blower Inlet	10/19/2022 10:27	31.2	31.0	6.0	31.8	-24.3	78.3	765.0	
Blower Inlet	10/26/2022 08:09	31.4	29.5	6.0	33.1	-24.3	54.0	690.0	
L221 Header	10/12/2022 08:35	14.9	11.3	14.7	59.1	-24.1	61.4	890.0	
L221 Header	10/14/2022 09:38	33.7	29.8	6.1	30.4	-24.3	59.4	768.0	

Technician/Weather

Field Technician	Record Date	Ambient Temp	Barometric Pressure	Wind Speed	Wind Direction	General Weather			
Will Fabre/Ryan Seymour	10/12/2022	52	28.22	12	NE	Partly Cloudy			
Ryan Seymour	10/14/2022	68	28.34	9	SW	Clear			
Ryan Seymour	10/26/2022	45	27.83	12	NE	Partly Cloudy			

Bristol Virginia Landfill - Extraction Well Data - 10/01/2022 to 10/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	Flow (scfm)	System Pressure ("H20)	Comments
01	10/12/2022 09:16	21.4	15.6	11.4	51.6	-22.8	-22.7	59.6		-22.6	
02	10/12/2022 09:06	34.4	23.2	8.7	33.7	-18.5	-18.5	56.7	62.3	-22.5	Slightly Open
03	10/12/2022 08:56	18.6	13.6	14.5	53.3	-9.4	-9.4	57.4	5.2	-22.6	
04	10/12/2022 08:52	51.5	38.4	2.0	8.1	-5.7	-5.6	57.5	10.8	-22.5	
05	10/12/2022 08:48	53.9	39.8	0.9	5.4	-24.9	-22.5	60.3		-22.3	
06	10/12/2022 09:49	18.7	12.3	14.2	54.8	-20.4	-20.4	64.3	3.0	-22.5	
07	10/12/2022 09:45	57.9	40.1	0.0	2.0	-9.4	-9.4	67.7		-22.5	
08	10/12/2022 09:38	4.4	3.1	19.4	73.1	-1.9	-1.9	64.5		-22.4	
09	10/12/2022 09:34	50.0	35.7	3.1	11.2	-21.9	-21.9	61.1		-22.3	
10	10/12/2022 09:30	56.5	41.5	0.0	2.0	-1.3	-1.2	64.6	2.9	-22.4	Fully Closed
11	10/12/2022 09:23	25.0	18.6	12.4	44.0	-22.6	-22.6	59.3		-22.4	
12	10/12/2022 09:19	27.5	20.0	12.3	40.2	-22.8	-22.8	66.0	5.6	-22.7	
13	10/12/2022 08:59	55.0	38.7	5.3	1.0	-22.5	-22.5	60.3	9.0	-22.5	
14	10/12/2022 09:41	39.5	24.5	7.5	28.5	-1.6	-1.6	67.8		-22.4	
15	10/12/2022 09:10	59.4	40.6	0.0	0.0	-22.6	-22.6	60.7	5.5	-22.7	Slightly Open
16	10/12/2022 10:02	38.7	35.1	0.2	26.0	-10.9	-10.9	70.2		-18.8	
17	10/12/2022 10:06	33.1	26.6	13.1	27.2	-15.2	-15.1	58.7		-22.5	
18	10/12/2022 10:34	48.9	39.0	0.1	12.0	-12.1	-12.1	65.6	3.6	-22.5	
23	10/12/2022 10:14	0.2	0.5	21.4	77.9	-20.1	-20.1	56.5		-22.0	
24	10/12/2022 09:34	2.0	2.2	19.6	76.2	-1.1	-1.0	59.8	4.0	-21.7	
25	10/12/2022 09:32	0.1	0.3	20.5	79.1	-0.1	-0.1	59.2	27.4	-22.2	
29	10/12/2022 09:39	59.1	40.9	0.0	0.0	-2.6	-2.7	108.0	98.9	-10.7	
30R	10/12/2022 10:23	32.2	23.4	5.9	38.5	-1.3	-1.3	89.0	70.6	-1.3	
31R	10/12/2022 10:01	23.5	23.4	5.9	47.2	-1.6	-1.5	85.8	70.7	-1.4	
31R	10/12/2022 10:20	32.2	66.0	1.8	0.0	-1.2	-1.1	168.3	46.6	-1.0	
31R	10/19/2022 10:55	19.9	21.2	6.8	52.1	-1.5	-1.5	131.2			
32R	10/12/2022 09:22	47.8	37.8	0.0	14.4	-3.1	-3.1	133.8	35.9	-8.2	
32	10/12/2022 09:27	58.0	42.0	0.0	0.0	-11.2	-11.3	76.4		-18.5	
33	10/19/2022 10:39	29.1	24.4	5.0	41.5	-2.3	-2.3	69.3	97.0	-2.3	Well needs extension/lowered
34	10/12/2022 10:12	15.1	71.5	0.0	13.4	-12.0	-11.9	132.3		-11.6	
35	10/12/2022 11:05	59.4	35.3	3.0	2.3	-2.4	-2.4	88.5	1.5	-12.4	
36	10/12/2022 11:39	42.0	29.1	6.3	22.6	-1.3	-1.3	63.1	68.7	-1.2	
37	10/12/2022 10:08	20.5	25.5	7.6	46.4	-2.7	-2.6	152.0	91.2	-12.4	
37	10/12/2022 14:36	28.3	26.1	7.1	38.5	-2.7	-2.8	151.0	94.8	-13.0	

Bristol Virginia Landfill - Extraction Well Data - 10/01/2022 to 10/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	Flow (scfm)	System Pressure ("H20)	Comments
37	10/19/2022 10:59	20.0	27.0	7.4	45.6	-2.9	-2.9	149.0		-13.3	
38	10/12/2022 10:54	60.8	34.5	2.9	1.8	-6.4	-6.4	105.7	163.5	-6.4	
39	10/12/2022 10:57	59.0	40.9	0.1	0.0	-8.0	-8.4	110.2	192.1	-8.1	
40	10/12/2022 11:30	56.8	43.2	0.0	0.0	1.1	1.1	105.1		1.1	
40	10/14/2022 09:56	57.9	42.0	0.1	0.0	1.4	1.4	110.6		1.4	Fully Open,Surging Flow,Bad Sample Port,No system vac due to liquid
40	10/26/2022 09:07	30.0	21.3	17.1	31.6	-2.9	-2.9	120.1	102.9	-13.9	
41	10/12/2022 11:24	57.3	40.7	1.0	1.0	-12.3	-12.3	143.9		-12.3	
42	10/12/2022 09:47	47.0	35.0	2.7	15.3	-1.4	-1.4	115.6	72.8	-1.4	
46	10/12/2022 11:20	43.0	38.3	4.8	13.9	-13.5	-13.5	119.4	4.0	-13.7	
47	10/12/2022 11:22	58.4	41.6	0.0	0.0	-16.5	-16.5	132.8		-16.5	
48	10/12/2022 10:47	55.0	39.6	3.2	2.2	-16.7	-16.6	66.5		-16.5	
49	10/12/2022 10:31	42.2	32.6	3.4	21.8	-6.6	-6.5	134.1		-15.4	
50	10/12/2022 10:35	46.5	30.4	5.0	18.1	-1.5	-1.4	130.6	19.2	-16.9	
51	10/12/2022 11:03	56.6	40.0	3.4	0.0	-10.7	-10.7	144.4		-10.7	
52	10/12/2022 11:11	50.9	37.3	3.9	7.9	-12.7	-12.6	110.5		-11.5	
53	10/12/2022 11:29	56.9	43.1	0.0	0.0	-5.8	-5.7	137.3	43.1	-12.0	
54	10/12/2022 11:17	54.5	45.2	0.3	0.0	-15.9	-15.9	141.1		-15.9	
55	10/12/2022 11:14	32.2	23.5	7.5	36.8	-15.9	-15.9	97.5		-15.8	
56	10/12/2022 10:45	56.4	43.6	0.0	0.0	-9.6	-10.0	134.7		-9.2	
57	10/12/2022 11:02	18.8	14.7	10.2	56.3	-0.1	-1.0	183.6		-9.7	
57	10/19/2022 11:14	52.3	44.5	1.0	2.2	-18.1	-18.1	152.9		-18.2	
57	10/26/2022 09:16	32.4	29.3	8.0	30.3	-18.3	-18.3	149.3		-18.4	
58	10/12/2022 11:05	0.6	1.0	21.0	77.4	-14.6	-14.6	66.9	6.2	-14.8	
59	10/12/2022 10:50	53.4	43.7	0.3	2.6	-4.5	-4.4	125.8		-0.5	
60	10/12/2022 10:50	59.6	36.1	1.3	3.0	-13.2	-13.1	135.7		-13.1	
61	10/12/2022 10:40	35.3	44.7	4.2	15.8	-0.6	-0.5	132.7	31.9	-0.5	
62	10/12/2022 09:44	54.7	45.3	0.0	0.0	-0.1	0.0	95.8	1.7	-1.1	
62	10/14/2022 10:13	18.9	19.4	7.8	53.9	-3.8	-3.8	125.5	62.7	-11.3	
63	10/12/2022 09:51	20.1	21.6	7.2	51.1	-0.2	-0.2	127.4	4.0	-0.4	
64	10/12/2022 10:04	15.3	17.3	10.1	57.3	-2.4	-2.3	138.5	88.8	-2.3	
65	10/12/2022 10:16	1.6	2.1	20.3	76.0	-0.4	-0.3	107.4	8.7	-0.4	
66	10/12/2022 11:09	46.9	52.1	1.0	0.0	-2.4	-2.4	135.5		-13.8	

Bristol Virginia Landfill - Extraction Well Data - 10/01/2022 to 10/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	Flow (scfm)	System Pressure ("H20)	Comments
67	10/12/2022 11:24	46.2	53.8	0.0	0.0	-16.2	-16.2	154.5		-16.2	
67	10/12/2022 14:12	39.9	58.0	0.2	1.9	-18.1	-18.1	154.7		-18.1	
67	10/19/2022 11:11	31.8	56.0	0.2	12.0	-18.7	-18.7	140.3	17.9	-18.8	
68	10/12/2022 11:35	57.1	40.8	2.0	0.1	0.2	-0.1	77.6		-0.1	
68	10/14/2022 09:49	59.0	40.2	0.8	0.0	-7.2	-7.3	125.3	76.1	-17.5	
HC01	10/12/2022 11:15	0.1	0.4	21.5	78.0	-13.5	-13.5	64.2			

Bristol Virginia Landfill - North/South Cleanouts Data - 10/01/2022 to 10/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Static Pressure ("H2O)	Temp (F)	Comments
LC01	10/19/2022 12:06	0.7	0.6	20.5	78.2	-4.3	71.1	
LC01	10/26/2022 09:46	50.1	49.9	0.0	0.0	-2.3	67.2	
LC02	10/19/2022 12:07	0.8	0.7	20.6	77.9	-4.5	71.5	
LC02	10/26/2022 09:48	0.8	0.7	21.1	77.4	-3.9	67.8	
LC03	10/19/2022 12:08	1.0	0.9	20.5	77.6	-4.3	71.1	
LC03	10/26/2022 09:49	52.5	47.1	0.5		-7.3	67.8	
LC04	10/19/2022 12:09	0.1	0.1	20.8	79.0	-4.2	67.9	
LC04	10/26/2022 09:50	53.1	46.3	0.6	0.0	-7.0	67.3	
LC05	10/19/2022 12:10	0.1	0.1	20.9	78.9	-4.5	70.2	
LC05	10/26/2022 09:52	51.2	48.8	0.0	0.0	-2.4	65.6	
LC06	10/19/2022 12:12	0.1	0.1	20.9	78.9	-4.3	66.8	
LC06	10/26/2022 09:53	54.5	45.1	0.4	0.0	-7.2	66.2	
LC07	10/19/2022 12:13	48.1	26.1	2.5	23.3	-4.3	68.6	
LC08	10/19/2022 12:15	52.6	28.7	0.5	18.2	-4.3	69.3	
LC08	10/26/2022 09:55	49.2	50.8	0.0	0.0	-2.4	70.7	
LC09	10/19/2022 12:16	50.3	27.5	1.3	20.9	-4.3	69.2	
LC09	10/26/2022 09:57	52.6	47.3	0.1	0.0	-7.3	68.5	
LC10	10/19/2022 12:17	0.2	0.2	20.8	78.8	-4.1	69.3	
LC10	10/26/2022 09:58	52.5	47.5	0.1		-7.2	68.1	
NC01	10/19/2022 12:43	50.3	48.7	1.0	0.0	-5.1	76.0	
NC01	10/26/2022 08:16	2.7	1.9	19.3	76.1	0.0	55.0	
NC02	10/19/2022 12:44	4.0	4.5	18.5	73.0	-6.4	76.2	
NC02	10/26/2022 08:18	2.8	1.9	19.4	75.9	-0.1	55.1	
NC03	10/19/2022 12:46	50.9	48.6	0.5	0.0	-9.0	75.6	
NC03	10/26/2022 08:19	4.0	2.6	19.0	74.4	-0.1	55.1	
NC04	10/19/2022 12:47	46.1	43.0	2.4	8.5	-9.3	75.4	
NC04	10/26/2022 08:20	51.0	27.7	6.0	15.3	0.0	55.2	
NC05	10/19/2022 12:49	49.1	50.9	0.0	0.0	-5.2	74.5	
NC05	10/26/2022 08:22	39.3	21.8	5.3	33.6	-0.1	55.2	
NC06	10/19/2022 12:50	49.5	45.0	1.6	3.9	-9.1	73.4	
NC06	10/26/2022 08:23	25.0	13.4	12.0	49.6	0.0	55.1	

Bristol Virginia Landfill - North/South Cleanouts Data - 10/01/2022 to 10/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Static Pressure ("H2O)	Temp (F)	Comments
NC07	10/19/2022 12:54	75.0	8.0	0.0	17.0	-0.2	72.2	
NC07	10/26/2022 08:24	47.3	25.5	1.7	25.5	0.0	55.3	
NC08	10/19/2022 12:53	46.7	53.3	0.0	0.0	-5.3	72.6	
NC08	10/26/2022 08:25	50.6	27.9	1.1	20.4	-0.1	55.2	
NC09	10/19/2022 12:55	51.1	48.2	0.7	0.0	-9.6	71.8	
NC09	10/26/2022 08:28	51.2	28.2	1.0	19.6	-0.1	55.2	
NC10	10/19/2022 12:57	49.2	50.8	0.0	0.0	-9.4	71.5	
NC10	10/26/2022 08:31	43.6	24.2	3.6	28.6	0.0	55.2	

Attachment 2

Exceedance Detail Report

Exceedance Detail Report
Date Range: 10/01/2022 to 10/31/2022

Report Date: 11/08/2022
Site Name: Bristol Virginia Landfill

Point ID	Point Name	Record Date	Days Between Readings	Point Status	% by Volume		Temperature (°F)		Static Pressure		Operation Comments	Total Days Open	Corrective Action Comments	Corrective Action Due Dates		
					CH4	O2	Initial Temp	Adjusted Temp	Initial Static Pressure (H2O)	Adjusted Static Pressure (H2O)						
BRTLGW37				**Active**			**>= 145**	**>= 145**	**>= 0**	**>= 0**			**NESHAP AAAA HOV 145**	**5 Day**	**15 Day**	**120 Day**
37		3/30/2022 12:20:33 PM	0		13.8	6.4	150	150	-1.24	-1.75	heck,,,,,,			4/3/2022	4/13/2022	7/27/2022
37		4/6/2022 12:14:16 PM	7		14.2	7.3	149	149	-1.98	-1.95	Comments:No Change,,,,,,,					
37		4/13/2022 1:45:11 PM	7		16.5	7	159	159	-1.70	-1.70	Comments:,,,,,,,					
37		4/13/2022 1:47:58 PM	0		16	7	159	159	-2.10	-2.14	Comments:,,,,,,,					
37		4/21/2022 7:24:55 AM	8		13.1	8.3	159	159	-2.35	-2.27	Comments:,,,,,,,					
37		5/4/2022 12:21:07 PM	13		13	7.3	149	149	-2.57	-2.42	Open,No Change,,,,,,					
37		5/16/2022 10:51:43 AM	12		11.6	9.8	150	150	-2.21	-2.39	Comments:Adjustment,,,,,,,					
37		5/16/2022 2:09:00 PM	0		14.9	9.8	159	159	-2.48	-2.48	Comments:,,,,,,,					
37		5/24/2022 10:23:52 AM	8		17	7.8	150	150	-3.44	-3.43	Comments:,,,,,,,					
37		5/24/2022 10:26:15 AM	0		17.3	7.9	150	150	-3.47	-3.44	Comments:,,,,,,,					
37		6/1/2022 12:43:16 PM	8		22	6.2	150	150	-2.89	-2.89	Comments:,,,,,,,					
37		6/8/2022 11:34:45 AM	7		6.5	14.8	155.8	155.9	-12.72	-12.63	Comments:,,,,,,,					
37		6/16/2022 1:35:06 PM	8		21.6	6.7	153.9	153.8	-2.56	-2.54	Comments:,,,,,,,					
37		7/6/2022 12:59:43 PM	20		19.2	6.6	154.2	153.8	-2.44	-2.43	Comments:,,,,,,,					
37		7/11/2022 1:31:12 PM	5		19.8	6.7	155.5	155.5	-2.25	-2.19	Comments:,,,,,,,					
37		7/11/2022 1:36:48 PM	0		19.6	6.5	155.7	155.8	-2.12	-2.10	Comments:,,,,,,,					
37		8/3/2022 12:31:49 PM	23		20	7.3	155.5	155.5	-2.39	-2.38	Comments:,,,,,,,					
37		8/3/2022 12:35:39 PM	0		20.2	7.3	155.4	155.4	-2.72	-2.77	Comments:,,,,,,,					
37		8/3/2022 2:29:58 PM	0		19.5	6.6	152.2	152.9	-3.03	-3.01	Comments:,,,,,,,					
37		8/24/2022 11:44:07 AM	21		19.2	7.6	152.7	152.8	-15.16	-15.14	Open,,,,,,,					
37		9/1/2022 11:37:46 AM	8		20.8	7.6	155	154.7	-3.14	-3.14	Comments:,,,,,,,					
37		9/1/2022 12:28:35 PM	0		18.9	7.9	152.7	152.7	-15.15	-15.13	Comments:,,,,,,,					
37		10/12/2022 10:08:08 AM	41		20.5	7.6	152	151.5	-2.69	-2.64	Comments:,,,,,,,					
37		10/12/2022 2:36:59 PM	0		28.3	7.1	151	151	-2.74	-2.75	Comments:,,,,,,,					
37		10/19/2022 10:59:40 AM	7		20	7.4	149	149.1	-2.94	-2.85	Comments:,,,,,,,	216				
BRTLGW40				**Active**			**>= 210**	**>= 210**	**>= 0**	**>= 0**			**NSPS AAAA HOV 210**	**5 Day**	**15 Day**	**120 Day**
40		10/12/2022 11:30:24 AM	0		56.8	0	105.1	105.2	1.11	1.10	Comments:,,,,,,,		good reading on 10/26/2022	10/16/2022	10/26/2022	2/8/2023
40		10/14/2022 9:55:31 AM	2		58.3	0.2	110.3	110.5	1.58	1.58	Open,Surging Flow,Bad		good reading on 10/26/2022			
40		10/14/2022 9:56:33 AM	0		57.9	0.1	110.6	110.7	1.36	1.41	Open,Surging Flow,Bad		good reading on 10/26/2022			
40		10/26/2022 9:07:18 AM	12		30	17.1	120.1	121.5	-2.87	-2.87	Comments:,,,,,,,	15				
BRTLGW57				**Active**			**>= 145**	**>= 145**	**>= 0**	**>= 0**			**NESHAP AAAA HOV 145**	**5 Day**	**15 Day**	**120 Day**
57		10/12/2022 11:02:07 AM	0		18.8	10.2	183.6	183.8	-0.11	-0.95	Comments:,,,,,,,			10/16/2022	10/26/2022	2/8/2023
57		10/19/2022 11:14:39 AM	7		52.3	1	152.9	152.9	-18.09	-18.06	Comments:,,,,,,,					
57		10/26/2022 9:16:32 AM	7		32.4	8	149.3	149.3	-18.29	-18.29	Comments:,,,,,,,	20				
BRTLGW67				**Active**			**>= 145**	**>= 145**	**>= 0**	**>= 0**			**NESHAP AAAA HOV 145**	**5 Day**	**15 Day**	**120 Day**
67		10/12/2022 11:24:40 AM	0		46.2	0	154.5	155.3	-16.21	-16.18	Comments:,,,,,,,		good reading on 10/19/2022	10/16/2022	10/26/2022	2/8/2023
67		10/12/2022 2:12:15 PM	0		39.9	0.2	154.7	154.7	-18.10	-18.12	Comments:,,,,,,,		good reading on 10/19/2022			
67		10/19/2022 11:11:24 AM	7		31.8	0.2	140.3	141	-18.70	-18.69	Comments:,,,,,,,	8				

Exceedance Detail Report
Date Range: 10/01/2022 to 10/31/2022

Report Date: 11/08/2022
Site Name: Bristol Virginia Landfill

Point ID	Point Name	Record Date	Days Between Readings	Point Status	% by Volume		Temperature (°F)		Static Pressure		Operation Comments	Total Days Open	Corrective Action Comments	Corrective Action Due Dates		
					CH4	O2	Initial Temp	Adjusted Temp	Initial Static Pressure (H2O)	Adjusted Static Pressure (H2O)						
BRTLGW68				**Active**			**>= 145**	**>= 145**	**>= 0**	**>= 0**			**NESHAP AAAA HOV 145**	**5 Day**	**15 Day**	**120 Day**
68		10/12/2022 11:35:18 AM	0		57.1	2	77.6	78.9	0.24	-0.11	Comments:,,,,,,,		good reading on 10/14/2022	10/16/2022	10/26/2022	2/8/2023
68		10/12/2022 11:35:18 AM	0		57.1	2	77.6	78.9	0.24	-0.11	Comments:,,,,,,,		good reading on 10/14/2022			
68		10/14/2022 9:49:40 AM	2		59	0.8	125.3	125.3	-7.20	-7.27	Comments:,,,,,,,	3				

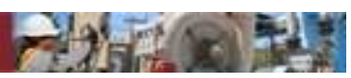
Points with Exceedances 5

Closed Exceedances 3

Open Exceedances 2

Parameter exceeds rule (Exceedance)

Parameter in compliance (Exceedance cleared)



Attachment 3

Enhanced Monitoring Record Forms and Analytical Results

ENHANCED MONITORING RECORD FORM

- FORM TO BE COMPLETED IF ANY WELLHEAD TEMPERATURES OVER 145F THAT CANNOT BE CORRECTED IN 7 DAYS
- WEEKLY MONITORING MUST BEGIN WITHIN 7 DAYS OF EXCEEDANCE FOR CO AND VISUAL OBSERVATIONS
- TEMPERATURES AT OR ABOVE 165F REQUIRE ANNUAL DOWNHOLE TEMPERATURE MONITORING (10FT INTERVALS)
- TEMPERATURES AT OR ABOVE 170F REQUIRE 24-HOUR PADEP NOTIFICATION; IMMEDIATELY CONTACT ENGINEERS IN THIS CASE

Landfill Name: Bristol **Technician: Ryan Seymour**

Well ID	Date & Time	GEM Reading			If Temp >145F					If Temp ≥165F	If Temp ≥170F	Comments
		CH4 (%)	O2 (%)	Well Temp (°F)	Gas Sample Collected	Pickup Scheduled?	Visible Emissions (e.g. smoke)?	Smoldering Ash Observed?	Damage to Well?	Downhole Temp Monitoring Performed?	Contacted Engineers for Notification?	
					Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	
37	2022-10-12 14:15:00	28.3	7.1	151	yes	yes	no	no	no	no	yes	No comment needed
67	2022-10-12 14:12:00	39.9	0.2	154	yes	yes	no	no	no	no	no	My sample train gauge didn't work both times I took a sample in 2 different cans the pressure never changed
57	2022-10-12 13:45:00	18.8	10.2	183.6	no	no	yes	no	yes	no	yes	No sample on this well due to steam and black foam at port. I didn't want to risk my gem or ruin a canister

ENHANCED MONITORING RECORD FORM

- FORM TO BE COMPLETED IF ANY WELLHEAD TEMPERATURES OVER 145F THAT CANNOT BE CORRECTED IN 7 DAYS
- WEEKLY MONITORING MUST BEGIN WITHIN 7 DAYS OF EXCEEDANCE FOR CO AND VISUAL OBSERVATIONS
- TEMPERATURES AT OR ABOVE 165F REQUIRE ANNUAL DOWNHOLE TEMPERATURE MONITORING (10FT INTERVALS)
- TEMPERATURES AT OR ABOVE 170F REQUIRE 24-HOUR PADEP NOTIFICATION; IMMEDIATELY CONTACT ENGINEERS IN THIS CASE

Landfill Name: Bristol **Technician: Ryan Seymour**

Well ID	Date & Time	GEM Reading			If Temp >145F					If Temp ≥165F	If Temp ≥170F	Comments
		CH4 (%)	O2 (%)	Well Temp (°F)	Gas Sample Collected	Pickup Scheduled?	Visible Emissions (e.g. smoke)?	Smoldering Ash Observed?	Damage to Well?	Downhole Temp Monitoring Performed?	Contacted Engineers for Notification?	
					Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	
57	2022-10-19 11:07:00	52.3	1.0	152.9	yes	yes	yes	no	no	no	no	Well 67 beside it has visible smoke/steam coming out the ground around it
37	2022-10-19 10:59:00	20.0	7.4	149	yes	yes	no	no	no	no	no	

ENHANCED MONITORING RECORD FORM

- FORM TO BE COMPLETED IF ANY WELLHEAD TEMPERATURES OVER 145F THAT CANNOT BE CORRECTED IN 7 DAYS
- WEEKLY MONITORING MUST BEGIN WITHIN 7 DAYS OF EXCEEDANCE FOR CO AND VISUAL OBSERVATIONS
- TEMPERATURES AT OR ABOVE 165F REQUIRE ANNUAL DOWNHOLE TEMPERATURE MONITORING (10FT INTERVALS)
- TEMPERATURES AT OR ABOVE 170F REQUIRE 24-HOUR PADEP NOTIFICATION; IMMEDIATELY CONTACT ENGINEERS IN THIS CASE

Landfill Name: Bristol **Technician: Ryan Seymour**

Well ID	Date & Time	GEM Reading			If Temp >145F					If Temp ≥165F	If Temp ≥170F	Comments
		CH4 (%)	O2 (%)	Well Temp (°F)	Gas Sample Collected	Pickup Scheduled?	Visible Emissions (e.g. smoke)?	Smoldering Ash Observed?	Damage to Well?	Downhole Temp Monitoring Performed?	Contacted Engineers for Notification?	
					Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	
57	2022-10-26 09:13:00	32.4	8.0	149.3	yes	yes	no	no	no	no	no	

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	October 18, 2022 10:28
	4330 Lewis Road, Suite 1	Date Issued:	October 21, 2022 14:15
	Harrisburg, PA 17111	Project Number:	[none]
Submitted To:	Tom Lock	Purchase Order:	
Client Site I.D.:	Bristol		

Enclosed are the results of analyses for samples received by the laboratory on 10/18/2022 10:28. 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.

TNI Accredited
VELAP ID 460021

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	October 18, 2022 10:28
	4330 Lewis Road, Suite 1	Date Issued:	October 21, 2022 14:15
	Harrisburg, PA 17111	Project Number:	[none]
Submitted To:	Tom Lock	Purchase Order:	
Client Site I.D.:	Bristol		

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
37	22J0865-01	Air	10/12/2022 14:23	10/18/2022 10:28
67	22J0865-02	Air	10/12/2022 14:00	10/18/2022 10:28

ENTHALPY ANALYTICAL

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 18, 2022 10:28 October 21, 2022 14:15
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

ANALYTICAL RESULTS

Project Location:

Field Sample #: 37

Sample ID: 22J0865-01

Sample Matrix: Air

Sampled: 10/12/2022 14:23

Sample Type: LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00087::00335

Canister Size: 1.4

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 9.2

Receipt Vacuum(in Hg): 9.2

Flow Controller Type: Passive

Flow Controller ID:

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis
ALT-145

Analyte	ppmv Result	MDL	LOQ	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	94.5	90.0	90.0		9	1	10/20/22 11:46	DFH

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 18, 2022 10:28 October 21, 2022 14:15
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

ANALYTICAL RESULTS

Project Location:

Field Sample #: 67

Sample ID: 22J0865-02

Sample Matrix: Air

Sampled: 10/12/2022 14:00

Sample Type: LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00204::9205

Canister Size: 1.4

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 4.2

Receipt Vacuum(in Hg): 4.2

Flow Controller Type: Passive

Flow Controller ID:

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis
ALT-145

Analyte	ppmv Result	MDL	LOQ	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	580	90.0	90.0		9	1	10/20/22 13:06	DFH

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 18, 2022 10:28 October 21, 2022 14:15
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis			**Preparation Method:**	**No Prep VOC GC Air**	
22J0865-01	1.00 mL / 1.00 mL	ALT-145	BFJ0773	SFJ0750	AG00026
22J0865-02	1.00 mL / 1.00 mL	ALT-145	BFJ0773	SFJ0750	AG00026

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 18, 2022 10:28 October 21, 2022 14:15
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFJ0773 - No Prep VOC GC Air										
Blank (BFJ0773-BLK1)					Prepared & Analyzed: 10/20/2022					
Carbon Monoxide	<	10.0	ppmv							
LCS (BFJ0773-BS1)					Prepared & Analyzed: 10/20/2022					
Methane	4480	500	ppmv	5000		89.6	0-200			
Carbon dioxide	4420	500	ppmv	5000		88.4	0-200			
Oxygen (O2)	5100	500	ppmv	5000		102	0-200			
Nitrogen (N2)	5530	2000	ppmv	5000		111	0-200			
Hydrogen (H2)	5710	200	ppmv	5100		112	0-200			
Carbon Monoxide	4800	10	ppmv	5000		95.9	0-200			
Duplicate (BFJ0773-DUP1)			**Source: 22J0865-01**		Prepared & Analyzed: 10/20/2022					
Methane	147000	4500	ppmv		146000			0.992	25	
Carbon dioxide	223000	4500	ppmv		219000			1.53	25	
Oxygen (O2)	71900	4500	ppmv		71200			0.989	25	
Hydrogen (H2)	11700	1800	ppmv		11600			0.305	25	
Nitrogen (N2)	421000	18000	ppmv		416000			1.18	25	
Carbon Monoxide	<	90.0	ppmv		94.5			NA	25	
Duplicate (BFJ0773-DUP3)			**Source: 22J0731-01**		Prepared & Analyzed: 10/20/2022					
Methane	311000	4500	ppmv		312000			0.268	25	
Carbon dioxide	282000	4500	ppmv		282000			0.0129	25	
Oxygen (O2)	10200	4500	ppmv		10300			0.915	25	
Hydrogen (H2)	<	1800	ppmv		<1800			NA	25	
Nitrogen (N2)	326000	18000	ppmv		328000			0.436	25	
Carbon Monoxide	<	90.0	ppmv		<90.0			NA	25	

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 18, 2022 10:28 October 21, 2022 14:15
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Certified Analytes included in this Report

Analyte	Certifications	Analyte	Certifications

Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2022
NCDEQ	North Carolina DEQ	495	12/31/2022
NYDOH	New York DOH Drinking Water	12096	04/01/2023
PADEP	NELAP-Pennsylvania Certificate #007	68-03503	10/31/2022
VELAP	NELAP-Virginia Certificate #12098	460021	06/14/2023
WVDEP	West Virginia DEP	350	11/30/2022

Qualifiers and Definitions

RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
PF	Preparation Factor
MDL	Method Detection Limit
LOQ	Limit of Quantitation
ppbv	parts per billion by volume
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.

All EPA method 3C results are reported as normalized values when the sum total of all evaluated constituents is outside ± 10% of the absolute.

ENTHALPY ANALYTICAL
formerly Air, Water & Soil Laboratories

AIR ANALYSIS
CHAIN OF CUSTODY

Equipment due 10/31

COMPANY NAME: SCS Field Services - Harrisburg	INVOICE TO: **Same**	PROJECT NAME/Quote #: **Bristol**
CONTACT:	INVOICE CONTACT:	SITE NAME: Bristol
ADDRESS:	INVOICE ADDRESS:	PROJECT NUMBER:
PHONE #:	INVOICE PHONE #:	P.O. #:
FAX #: EMAIL:		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	**Regulatory State:** VA	Is sample from a chlorinated supply? YES (NO)
SAMPLER NAME (PRINT): Ryan Seymour	SAMPLER SIGNATURE: Ryan Seymour	**Turn Around Time:** Circle: 10 (5 Days) or __ Day

PWS I.D. #:

Matrix Codes: AA=Indoor/Ambient Air SG=Soil Gas LV=Landfill/Vent Gas OT=Other OT

063-22I-0016

	CLIENT SAMPLE I.D.	Regulator Info: Flow Controller ID	Regulator Info: Cal Flow (mL/min)	Canister Information: Canister ID	Size (L)	Cleaning Batch ID	LAB Outgoing Canister Vacuum (in Hg)	LAB Receiving Canister Vacuum (in Hg)	Sampling Start Information: Barometric Pres. (in Hg): Start Date	Start Time (24hr clock)	Initial Canister Vacuum (in Hg)	Starting Sample Temp °F	Sampling Stop Information: Barometric Pres. (in Hg): Stop Date	Stop Time (24hr clock)	Final Canister Vacuum (in Hg)	Ending Sample Temp °F	Matrix (See Codes)	ANALYSIS: Alt 145 CO		
1)	37	LAB	LAB	335	1.4	220412-07	20	9.2	10/12/22	14:20	18	151	~~10/12~~	14:28	3		LG	x		
2)	67	LAB	LAB	9205	1.4	220901-01	20	4.2	10/12/22	13:58	0	154	10/12/22	14:00	0	154	LG	x		
3)	57	—	—	10224	1.4	220919-02	20	this well is black foam	183 degrees. coming out I		spewing steam and didn't want to						LG	x		
4)	67			11317	1.4	220728-01	20	Suck up	10/12/22	in my gem. 14:50	0						LG	x		

no Seal no ice 20.2 310

RELINQUISHED:		RECEIVED: DATE / TIME: fedexground	QC Data Package: Level I ☐
RELINQUISHED: DATE / TIME: fedexground		RECEIVED: DATE / TIME: 40 10/18/22 10:28	Level II ☐
RELINQUISHED: DATE / TIME		RECEIVED: DATE / TIME	Level III ☐
			Level IV ☐

LAB USE ONLY

SCS Field Services **22J0865**
Bristol
Recd: 10/18/2022 **Due: 10/25/2022**
v130325002

The sample train guage didn't work.

ENTHALPY ANALYTICAL

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Certificate of Analysis

Final Report

Laboratory Order ID 22J0865

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 18, 2022 10:28 October 21, 2022 14:15
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Sample Conditions Checklist

Samples Received at:	**20.20°C**
How were samples received?	FedEx Ground
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
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?	No
Are all volatile organic and TOX containers free of headspace?	NA
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.	NA
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Work Order Comments

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Certificate of Analysis

Final Report

Laboratory Order ID 22J1080

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	October 21, 2022 10:25
	4330 Lewis Road, Suite 1	Date Issued:	October 28, 2022 15:13
	Harrisburg, PA 17111	Project Number:	[none]
Submitted To:	Tom Lock	Purchase Order:	
Client Site I.D.:	Bristol		

Enclosed are the results of analyses for samples received by the laboratory on 10/21/2022 10:25. 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.

TNI Accredited
VELAP ID 460021

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Certificate of Analysis

Final Report

Laboratory Order ID 22J1080

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	October 21, 2022 10:25
	4330 Lewis Road, Suite 1	Date Issued:	October 28, 2022 15:13
	Harrisburg, PA 17111	Project Number:	[none]
Submitted To:	Tom Lock	Purchase Order:	

Client Site I.D.: Bristol

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
57	22J1080-01	Air	10/19/2022 11:15	10/21/2022 10:25
37	22J1080-02	Air	10/19/2022 11:00	10/21/2022 10:25

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Certificate of Analysis

Final Report

Laboratory Order ID 22J1080

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 21, 2022 10:25 October 28, 2022 15:13
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

ANALYTICAL RESULTS

Project Location:

Field Sample #: 57

Sample ID: 22J1080-01

Sample Matrix: Air

Sampled: 10/19/2022 11:15

Sample Type: LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00373: 13954

Canister Size: 1.4

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 6.6

Receipt Vacuum(in Hg): 6.6

Flow Controller Type: passive

Flow Controller ID:

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis
ALT-145

Analyte	ppmv Result	MDL	LOQ	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	102	90.0	90.0		9	1	10/24/22 9:24	DFH

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Certificate of Analysis

Final Report

Laboratory Order ID 22J1080

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 21, 2022 10:25 October 28, 2022 15:13
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

ANALYTICAL RESULTS

Project Location:

Field Sample #: 37

Sample ID: 22J1080-02

Sample Matrix: Air

Sampled: 10/19/2022 11:00

Sample Type: LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00372: 13957

Canister Size: 1.4

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 7.8

Receipt Vacuum(in Hg): 7.8

Flow Controller Type: passive

Flow Controller ID:

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis
ALT-145

Analyte	ppmv Result	MDL	LOQ	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	94.9	90.0	90.0		9	1	10/24/22 10:17	DFH

ENTHALPY ANALYTICAL

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

Certificate of Analysis

Final Report

Laboratory Order ID 22J1080

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 21, 2022 10:25 October 28, 2022 15:13
Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis			**Preparation Method:**	**No Prep VOC GC Air**	
22J1080-01	1.00 mL / 1.00 mL	ALT-145	BFJ0870	SFJ0832	AG00026
22J1080-02	1.00 mL / 1.00 mL	ALT-145	BFJ0870	SFJ0832	AG00026

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Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFJ0870 - No Prep VOC GC Air										
Blank (BFJ0870-BLK1)					Prepared & Analyzed: 10/24/2022					
Carbon Monoxide	<	10.0	ppmv							
LCS (BFJ0870-BS1)					Prepared & Analyzed: 10/24/2022					
Methane	4490	500	ppmv	5000		89.8	0-200			
Carbon dioxide	4110	500	ppmv	5000		82.3	0-200			
Oxygen (O2)	5520	500	ppmv	5000		110	0-200			
Nitrogen (N2)	6690	2000	ppmv	5000		134	0-200			
Hydrogen (H2)	5790	200	ppmv	5100		113	0-200			
Carbon Monoxide	4820	10	ppmv	5000		96.3	0-200			
Duplicate (BFJ0870-DUP1)			**Source: 22J1080-01**		Prepared & Analyzed: 10/24/2022					
Methane	412000	4500	ppmv		412000			0.0289	25	
Carbon dioxide	408000	4500	ppmv		407000			0.277	25	
Oxygen (O2)	20700	4500	ppmv		20700			0.0361	25	C
Nitrogen (N2)	81500	18000	ppmv		81100			0.426	25	
Hydrogen (H2)	22200	1800	ppmv		22300			0.0724	25	
Carbon Monoxide	105	90.0	ppmv		102			3.05	25	
Duplicate (BFJ0870-DUP2)			**Source: 22J1080-02**		Prepared & Analyzed: 10/24/2022					
Methane	149000	4500	ppmv		149000			0.0974	25	
Carbon dioxide	229000	4500	ppmv		229000			0.293	25	
Oxygen (O2)	73200	4500	ppmv		73100			0.120	25	C
Hydrogen (H2)	10200	1800	ppmv		10100			0.769	25	
Nitrogen (N2)	431000	18000	ppmv		430000			0.125	25	
Carbon Monoxide	97.0	90.0	ppmv		94.9			2.25	25	
Duplicate (BFJ0870-DUP3)			**Source: 22J1078-01**		Prepared & Analyzed: 10/24/2022					
Methane	324000	4500	ppmv		325000			0.413	25	
Carbon dioxide	268000	4500	ppmv		269000			0.419	25	
Oxygen (O2)	10900	4500	ppmv		11100			1.79	25	C
Nitrogen (N2)	322000	18000	ppmv		323000			0.549	25	
Hydrogen (H2)	<	1800	ppmv		<1800			NA	25	
Carbon Monoxide	<	90.0	ppmv		<90.0			NA	25	

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Laboratory Order ID 22J1080

Client Name: SCS Field Services - Harrisburg, PA
4330 Lewis Road, Suite 1

Harrisburg, PA 17111

Date Received: October 21, 2022 10:25
Date Issued: October 28, 2022 15:13

Submitted To: Tom Lock
Client Site I.D.: Bristol

Project Number: [none]
Purchase Order:

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFJ0870 - No Prep VOC GC Air										
Duplicate (BFJ0870-DUP4)			**Source: 22J1089-01**		Prepared & Analyzed: 10/24/2022					
Methane	276000	4500	ppmv		275000			0.425	25	
Carbon dioxide	492000	4500	ppmv		491000			0.156	25	
Oxygen (O2)	<	4500	ppmv		<4500			NA	25	C
Hydrogen (H2)	124000	1800	ppmv		124000			0.0336	25	
Nitrogen (N2)	69000	18000	ppmv		68900			0.0724	25	
Carbon Monoxide	647	90.0	ppmv		636			1.71	25	
Duplicate (BFJ0870-DUP5)			**Source: 22J1089-02**		Prepared & Analyzed: 10/24/2022					
Methane	312000	4500	ppmv		309000			0.742	25	
Carbon dioxide	494000	4500	ppmv		489000			0.982	25	
Oxygen (O2)	19800	4500	ppmv		19700			0.433	25	C
Hydrogen (H2)	46300	1800	ppmv		46000			0.745	25	
Nitrogen (N2)	72200	18000	ppmv		72000			0.355	25	
Carbon Monoxide	371	90.0	ppmv		367			1.05	25	
Duplicate (BFJ0870-DUP6)			**Source: 22J1089-03**		Prepared & Analyzed: 10/24/2022					
Methane	64600	4500	ppmv		64800			0.259	25	
Carbon dioxide	631000	4500	ppmv		631000			0.0692	25	
Oxygen (O2)	13900	4500	ppmv		14100			1.73	25	C
Hydrogen (H2)	182000	1800	ppmv		182000			0.212	25	
Nitrogen (N2)	52400	18000	ppmv		53300			1.80	25	
Carbon Monoxide	1430	90.0	ppmv		1430			0.196	25	
Duplicate (BFJ0870-DUP7)			**Source: 22J1307-01**		Prepared: 10/24/2022 Analyzed: 10/27/2022					
Methane	265000	9000	ppmv		265000			0.114	25	
Carbon dioxide	463000	9000	ppmv		461000			0.335	25	
Oxygen (O2)	<	9000	ppmv		<9000			NA	25	
Hydrogen (H2)	107000	3600	ppmv		107000			0.0419	25	
Nitrogen (N2)	49500	36000	ppmv		50000			1.06	25	
Carbon Monoxide	559	180	ppmv		565			0.992	25	

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Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFJ0870 - No Prep VOC GC Air										
Duplicate (BFJ0870-DUP8)			**Source: 22J1307-02**		Prepared: 10/24/2022 Analyzed: 10/27/2022					
Methane	207000	9000	ppmv		204000			1.66	25	
Carbon dioxide	549000	9000	ppmv		542000			1.27	25	
Oxygen (O2)	<	9000	ppmv		<9000			NA	25	
Nitrogen (N2)	61200	36000	ppmv		60100			1.83	25	
Hydrogen (H2)	71400	3600	ppmv		70100			1.91	25	
Carbon Monoxide	338	180	ppmv		<180			NA	25	
Duplicate (BFJ0870-DUP9)			**Source: 22J1307-03**		Prepared: 10/24/2022 Analyzed: 10/27/2022					
Methane	179000	9000	ppmv		176000			1.42	25	
Carbon dioxide	332000	9000	ppmv		331000			0.378	25	
Oxygen (O2)	63600	9000	ppmv		63100			0.683	25	
Nitrogen (N2)	231000	36000	ppmv		229000			0.869	25	
Hydrogen (H2)	61200	3600	ppmv		60600			0.931	25	
Carbon Monoxide	523	180	ppmv		514			1.77	25	
Duplicate (BFJ0870-DUPA)			**Source: 22J1332-01**		Prepared: 10/24/2022 Analyzed: 10/28/2022					
Methane	311000	4500	ppmv		309000			0.793	25	
Carbon dioxide	308000	4500	ppmv		305000			0.760	25	
Oxygen (O2)	58900	4500	ppmv		58900			0.000610	25	
Hydrogen (H2)	23100	1800	ppmv		23300			1.16	25	
Nitrogen (N2)	216000	18000	ppmv		216000			0.132	25	
Carbon Monoxide	129	90.0	ppmv		120			6.80	25	

Certified Analytes included in this Report

Analyte	Certifications	Analyte	Certifications

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Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2022
NCDEQ	North Carolina DEQ	495	12/31/2022
NYDOH	New York DOH Drinking Water	12096	04/01/2023
PADEP	NELAP-Pennsylvania Certificate #007	68-03503	10/31/2022
VELAP	NELAP-Virginia Certificate #12098	460021	06/14/2023
WVDEP	West Virginia DEP	350	11/30/2022

Qualifiers and Definitions

C	Continuing calibration verification response for this analyte is outside specifications.
RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
PF	Preparation Factor
MDL	Method Detection Limit
LOQ	Limit of Quantitation
ppbv	parts per billion by volume
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.

All EPA method 3C results are reported as normalized values when the sum total of all evaluated constituents is outside ± 10% of the absolute.

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formerly Air, Water & Soil Laboratories

AIR ANALYSIS CHAIN OF CUSTODY

Equipment due ~~9/30/22~~ 10/30/22

COMPANY NAME: SCS Field Services - Harrisburg	INVOICE TO: **Same**	PROJECT NAME/Quote #: Bristol
CONTACT: **Mike Byk**	INVOICE CONTACT:	SITE NAME: Bristol
ADDRESS:	INVOICE ADDRESS:	PROJECT NUMBER:
PHONE #:	INVOICE PHONE #:	P.O. #:
FAX #: EMAIL:		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	**Regulatory State:** VA	Is sample from a chlorinated supply? YES (NO) PWS I.D. #:
SAMPLER NAME (PRINT): Ryan Seymour	SAMPLER SIGNATURE: Ryan Seymour	**Turn Around Time:** Circle: 10 (5 Days) or __ Day

Matrix Codes: AA=Indoor/Ambient Air SG=Soil Gas LV=Landfill/Vent Gas OT=Other LV

063-22I-0009

	CLIENT SAMPLE I.D.	Regulator Info: Flow Controller ID	Regulator Info: Cal Flow (mL/min)	Canister Information: Canister ID	Canister Information: Size (L)	Canister Information: Cleaning Batch ID	Canister Information: LAB Outgoing Canister Vacuum (in Hg)	Canister Information: LAB Receiving Canister Vacuum (in Hg)	Sampling Start Information: Start Date	Sampling Start Information: Start Time (24hr clock)	Sampling Start Information: Initial Canister Vacuum (in Hg)	Sampling Start Information: Starting Sample Temp °F	Sampling Stop Information: Stop Date	Sampling Stop Information: Stop Time (24hr clock)	Sampling Stop Information: Final Canister Vacuum (in Hg)	Sampling Stop Information: Ending Sample Temp °F	Matrix (See Codes)	ANALYSIS: Alt 145 CO		
1)	57	N BOX		13954	1.4	220902-01	30	~~-29~~ -6.6	10/19/22	11:14 AM	-29	152°	10/19/22	11:15 AM	-2	152°	LG	x		
2)	37	N BOX		13957	1.4	220902-01	30	~~-29~~ -7.5	10/19/22	10:59 AM	-29	149°	10/19/22	11:00 AM	-2	149°	LG	x		
3)				13964	1.4	220902-01	30										LG	x		
4)				13967	1.4	220902-01	30										LG	x		

316 203 no ice noseal

RELINQUISHED:		RECEIVED: fedex ground DATE / TIME	QC Data Package	LAB USE ONLY
INQUISHED: fedex ground DATE / TIME		RECEIVED: 10 10/21/22 10:25 DATE / TIME	Level I ☐	SCS Field Services 22J1080
INQUISHED: DATE / TIME		RECEIVED: DATE / TIME	Level II ☐	Bristol
			Level III ☐	Recd: 10/21/2022 Due: 10/28/2022
			Level IV ☐	v130325002

22J1080

Page 10 of 12

Bristol CO in air (2)

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Submitted To:	Tom Lock	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	

Sample Conditions Checklist

Samples Received at:	**20.30°C**
How were samples received?	FedEx Ground
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
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?	No
Are all volatile organic and TOX containers free of headspace?	NA
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.	NA
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Work Order Comments

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

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Laboratory Order ID 22J1332

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	October 27, 2022 10:12
	4330 Lewis Road, Suite 1	Date Issued:	November 3, 2022 16:29
	Harrisburg, PA 17111	Project Number:	Bristol
Submitted To:	Tom Lock	Purchase Order:	
Client Site I.D.:	Bristol		

Enclosed are the results of analyses for samples received by the laboratory on 10/27/2022 10:12. 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.

TNI Accredited
VELAP ID 460021

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	4330 Lewis Road, Suite 1	Date Issued:	November 3, 2022 16:29
	Harrisburg, PA 17111	Project Number:	Bristol
Submitted To:	Tom Lock	Purchase Order:	

Client Site I.D.: Bristol

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
57	22J1332-01	Air	10/26/2022 09:17	10/27/2022 10:12

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Submitted To:	Tom Lock	Project Number:	Bristol
Client Site I.D.:	Bristol	Purchase Order:	

ANALYTICAL RESULTS

Project Location:

Field Sample #: 57

Sample ID: 22J1332-01

Sample Matrix: Air

Sampled: 10/26/2022 09:17

Sample Type: LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00208::00286

Canister Size: 1.4

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 16

Receipt Vacuum(in Hg): 16

Flow Controller Type: Passive

Flow Controller ID:

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis
ALT-145

Analyte	ppmv Result	MDL	LOQ	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	133	90.0	90.0		9	1	10/28/22 10:01	MER

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Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis			**Preparation Method:**	**No Prep VOC GC Air**	
22J1332-01	1.00 mL / 1.00 mL	ALT-145	BFJ0870	SFJ1078	AG00026

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Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFJ0870 - No Prep VOC GC Air										
Blank (BFJ0870-BLK1)					Prepared & Analyzed: 10/24/2022					
Carbon Monoxide	<	10.0	ppmv							
LCS (BFJ0870-BS1)					Prepared & Analyzed: 10/24/2022					
Methane	4490	500	ppmv	5000		89.8	0-200			
Carbon dioxide	4110	500	ppmv	5000		82.3	0-200			
Oxygen (O2)	5520	500	ppmv	5000		110	0-200			
Nitrogen (N2)	6690	2000	ppmv	5000		134	0-200			
Hydrogen (H2)	5790	200	ppmv	5100		113	0-200			
Carbon Monoxide	4820	10	ppmv	5000		96.3	0-200			
Duplicate (BFJ0870-DUP1)				**Source: 22J1080-01**	Prepared & Analyzed: 10/24/2022					
Methane	412000	4500	ppmv		412000			0.0289	25	
Carbon dioxide	408000	4500	ppmv		407000			0.277	25	
Oxygen (O2)	20700	4500	ppmv		20700			0.0361	25	C
Nitrogen (N2)	81500	18000	ppmv		81100			0.426	25	
Hydrogen (H2)	22200	1800	ppmv		22300			0.0724	25	
Carbon Monoxide	105	90.0	ppmv		102			3.05	25	
Duplicate (BFJ0870-DUP2)				**Source: 22J1080-02**	Prepared & Analyzed: 10/24/2022					
Methane	149000	4500	ppmv		149000			0.0974	25	
Carbon dioxide	229000	4500	ppmv		229000			0.293	25	
Oxygen (O2)	73200	4500	ppmv		73100			0.120	25	C
Hydrogen (H2)	10200	1800	ppmv		10100			0.769	25	
Nitrogen (N2)	431000	18000	ppmv		430000			0.125	25	
Carbon Monoxide	97.0	90.0	ppmv		94.9			2.25	25	
Duplicate (BFJ0870-DUP3)				**Source: 22J1078-01**	Prepared & Analyzed: 10/24/2022					
Methane	324000	4500	ppmv		325000			0.413	25	
Carbon dioxide	268000	4500	ppmv		269000			0.419	25	
Oxygen (O2)	10900	4500	ppmv		11100			1.79	25	C
Nitrogen (N2)	322000	18000	ppmv		323000			0.549	25	
Hydrogen (H2)	<	1800	ppmv		<1800			NA	25	
Carbon Monoxide	<	90.0	ppmv		<90.0			NA	25	

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Submitted To:	Tom Lock	Project Number:	Bristol
Client Site I.D.:	Bristol	Purchase Order:	

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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Duplicate (BFJ0870-DUP4)			**Source: 22J1089-01**		Prepared & Analyzed: 10/24/2022					
Methane	276000	4500	ppmv		275000			0.425	25	
Carbon dioxide	492000	4500	ppmv		491000			0.156	25	
Oxygen (O2)	<	4500	ppmv		<4500			NA	25	C
Hydrogen (H2)	124000	1800	ppmv		124000			0.0336	25	
Nitrogen (N2)	69000	18000	ppmv		68900			0.0724	25	
Carbon Monoxide	647	90.0	ppmv		636			1.71	25	
Duplicate (BFJ0870-DUP5)			**Source: 22J1089-02**		Prepared & Analyzed: 10/24/2022					
Methane	312000	4500	ppmv		309000			0.742	25	
Carbon dioxide	494000	4500	ppmv		489000			0.982	25	
Oxygen (O2)	19800	4500	ppmv		19700			0.433	25	C
Hydrogen (H2)	46300	1800	ppmv		46000			0.745	25	
Nitrogen (N2)	72200	18000	ppmv		72000			0.355	25	
Carbon Monoxide	371	90.0	ppmv		367			1.05	25	
Duplicate (BFJ0870-DUP6)			**Source: 22J1089-03**		Prepared & Analyzed: 10/24/2022					
Methane	64600	4500	ppmv		64800			0.259	25	
Carbon dioxide	631000	4500	ppmv		631000			0.0692	25	
Oxygen (O2)	13900	4500	ppmv		14100			1.73	25	C
Hydrogen (H2)	182000	1800	ppmv		182000			0.212	25	
Nitrogen (N2)	52400	18000	ppmv		53300			1.80	25	
Carbon Monoxide	1430	90.0	ppmv		1430			0.196	25	
Duplicate (BFJ0870-DUP7)			**Source: 22J1307-01**		Prepared: 10/24/2022 Analyzed: 10/27/2022					
Methane	265000	9000	ppmv		265000			0.114	25	
Carbon dioxide	463000	9000	ppmv		461000			0.335	25	
Oxygen (O2)	<	9000	ppmv		<9000			NA	25	
Hydrogen (H2)	107000	3600	ppmv		107000			0.0419	25	
Nitrogen (N2)	49500	36000	ppmv		50000			1.06	25	
Carbon Monoxide	546	180	ppmv		567			3.72	25	

ENTHALPY ANALYTICAL

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

Certificate of Analysis

Final Report

Laboratory Order ID 22J1332

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 27, 2022 10:12 November 3, 2022 16:29
Submitted To:	Tom Lock	Project Number:	Bristol
Client Site I.D.:	Bristol	Purchase Order:	

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFJ0870 - No Prep VOC GC Air										
Duplicate (BFJ0870-DUP8)			**Source: 22J1307-02**		Prepared: 10/24/2022 Analyzed: 10/27/2022					
Methane	207000	9000	ppmv		204000			1.66	25	
Carbon dioxide	549000	9000	ppmv		542000			1.27	25	
Oxygen (O2)	<	9000	ppmv		<9000			NA	25	
Nitrogen (N2)	61200	36000	ppmv		60100			1.83	25	
Hydrogen (H2)	71400	3600	ppmv		70100			1.91	25	
Carbon Monoxide	354	180	ppmv		350			1.14	25	
Duplicate (BFJ0870-DUP9)			**Source: 22J1307-03**		Prepared: 10/24/2022 Analyzed: 10/27/2022					
Methane	179000	9000	ppmv		176000			1.42	25	
Carbon dioxide	332000	9000	ppmv		331000			0.378	25	
Oxygen (O2)	63600	9000	ppmv		63100			0.683	25	C
Nitrogen (N2)	231000	36000	ppmv		229000			0.869	25	
Hydrogen (H2)	61200	3600	ppmv		60600			0.931	25	
Carbon Monoxide	530	180	ppmv		507			4.45	25	
Duplicate (BFJ0870-DUPA)			**Source: 22J1332-01**		Prepared: 10/24/2022 Analyzed: 10/28/2022					
Methane	311000	4500	ppmv		309000			0.793	25	
Carbon dioxide	308000	4500	ppmv		305000			0.760	25	
Oxygen (O2)	58900	4500	ppmv		58900			0.000610	25	C
Hydrogen (H2)	23100	1800	ppmv		23300			1.16	25	
Nitrogen (N2)	216000	18000	ppmv		216000			0.132	25	
Carbon Monoxide	135	90.0	ppmv		133			1.28	25	

Certified Analytes included in this Report

Analyte	Certifications	Analyte	Certifications

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

Certificate of Analysis

Final Report

Laboratory Order ID 22J1332

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 27, 2022 10:12 November 3, 2022 16:29
Submitted To:	Tom Lock	Project Number:	Bristol
Client Site I.D.:	Bristol	Purchase Order:	

Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2022
NC	North Carolina DENR	495	07/31/2023
NCDEQ	North Carolina DEQ	495	07/31/2023
NCDOH	North Carolina Department of Health	51714	07/31/2023
NYDOH	New York DOH Drinking Water	12096	04/01/2023
PADEP	NELAP-Pennsylvania Certificate #007	68-03503	10/31/2023
VELAP	NELAP-Virginia Certificate #12157	460021	06/14/2023
WVDEP	West Virginia DEP	350	11/30/2022

Qualifiers and Definitions

C	Continuing calibration verification response for this analyte is outside specifications.
RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
PF	Preparation Factor
MDL	Method Detection Limit
LOQ	Limit of Quantitation
ppbv	parts per billion by volume
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.

All EPA method 3C results are reported as normalized values when the sum total of all evaluated constituents is outside ± 10% of the absolute.

ENTHALPY ANALYTICAL
formerly Air, Water & Soil Laboratories

AIR ANALYSIS
CHAIN OF CUSTODY

Equipment due 10/31/2022

COMPANY NAME: SCS Field Services - Harrisburg	INVOICE TO: **Same**	PROJECT NAME/Quote #:
CONTACT: **Mike Byk**	INVOICE CONTACT:	SITE NAME: Bristol
ADDRESS:	INVOICE ADDRESS:	PROJECT NUMBER: Bristol
PHONE #:	INVOICE PHONE #:	P.O. #:
FAX #: EMAIL:		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	**Regulatory State:** VA	Is sample from a chlorinated supply? YES (NO) PWS I.D. #:
SAMPLER NAME (PRINT): Ryan Seymour	SAMPLER SIGNATURE: Ryan Seymour	**Turn Around Time:** Circle: 10 (5 Days) or __ Day

Matrix Codes: AA=Indoor/Ambient Air SG=Soil Gas LV=Landfill/Vent Gas OT=Other_____

063-22J-0014

	CLIENT SAMPLE I.D.	Regulator Info: Flow Controller ID	Regulator Info: Cal Flow (mL/min)	Canister Information: Canister ID	Canister Information: Size (L)	Canister Information: Cleaning Batch ID	Canister Information: LAB Outgoing Canister Vacuum (in Hg)	Canister Information: LAB Receiving Canister Vacuum (in Hg)	Sampling Start Information: Barometric Pres. (in Hg): Start Date	Start Time (24hr clock)	Initial Canister Vacuum (in Hg)	Starting Sample Temp °F	Sampling Stop Information: Barometric Pres. (in Hg): Stop Date	Stop Time (24hr clock)	Final Canister Vacuum (in Hg)	Ending Sample Temp °F	Matrix (See Codes)	ANALYSIS: Alt 145 CO		
1)	57	KF2		286	1.4	220921-02	30		10/26/22	9:14 AM	35 Hg	149°	10/26/22 9:17 AM	9:17 AM	16 Hg	149°	LG	x		
2)				11078	1.4	220921-02	30										LG	x		
3)				11307	1.4	220921-03	30										LG	x		
4)				12464	1.4	220921-02	30										LG	x		

20.3°C 310 noice noseal

RELINQUISHED: Ryan Seymour	2:45 pm	RECEIVED: FedEx Ground	DATE / TIME	QC Data Package: Level I ☐
RELINQUISHED: FedEx Ground	DATE / TIME 10/26/22	RECEIVED: [signature] 10/27/22 10:2	DATE / TIME	Level II ☐
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME	Level III ☐ Level IV ☐

LAB USE ONLY

SCS Field Services **22J1332**
Bristol
Recd: 10/27/2022 **Due: 11/03/2022**
v130325002

...3014-Bristol CO -COC

ENTHALPY ANALYTICAL

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

Certificate of Analysis

Final Report

Laboratory Order ID 22J1332

Client Name:	SCS Field Services - Harrisburg, PA 4330 Lewis Road, Suite 1 Harrisburg, PA 17111	Date Received: Date Issued:	October 27, 2022 10:12 November 3, 2022 16:29
Submitted To:	Tom Lock	Project Number:	Bristol
Client Site I.D.:	Bristol	Purchase Order:	

Sample Conditions Checklist

Samples Received at:	**20.30°C**
How were samples received?	FedEx Ground
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
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?	No
Are all volatile organic and TOX containers free of headspace?	NA
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.	NA
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Work Order Comments

Attachment 4

Daily Logs

SCS FIELD SERVICES DAILY LOG

JOB NO.	90000017.07	**TASK NO.**	00001	**DATE**	10.12.22	**PROJECT NAME**	BRISTOL
TEMP	45	**WEATHER**	Partly cloudy	**B.P.**	28.15	**WIND**	12NE

SCS-FS LABOR	HOURS	OT		HOURS	OT	
Ryan Seymour	8					
			DAILY TOTAL	8		

EQUIP, SVCS, , MLG	QTY	UNITS		QTY	UNITS	
GEM 5000	1	Day	MX4		Day	
Truck	1	Day	Generator		Day	

INSTRUMENT CALIBRATION (CAL. GAS)		CH4 (%-VOL)	CH4 (%-LEL)	02 LOW CALE %-VOL)	CO2 (%-VOL)	H2S (PPM)	
MODEL	S/N						
5000	500399	50		20.9	35.1		

SUMMARY	Scs was on site for monthly well monitoring and some fixes of the quarry and probe 9. I calibrated my gem and mx4. Got fitted with 2 badges my project manager gave me. Blower reading: CH4- 26.7% C02-25.5 % 02-8.3 % BAL-39.6 %
	While in the quarry I get a strong odor of sulfur walking down the road.
I had to replace flex hose at 68 it was too short.	
EW57 was at 183 degrees it's going to need down hole temp probe and dug up. I couldn't get a sample off it because it's steaming.	
Will had 2 exeedances. 37 and 67 they were both over 145 degrees.	

PREPARED BY:
RYAN
SEYMOUR

ACCEPTED BY: _____

I understand that when performing a one person job assignment, I am acting as my own supervisor.

SCS FIELD SERVICES DAILY LOG

JOB NO.	02218208.04	**TASK NO.**	4	**DATE**	10/12/2022	**PROJECT NAME**	City of Bristol
TEMP	72deg	**WEATHER**	Mostly Cloudy	**B.P.**	28.18	**WIND**	S 9MPH

SCS-FS LABOR	HOURS	OT		HOURS	OT
Mike Gibbons	8				
Ryan Seymour	6				
			DAILY TOTAL		

EQUIP, SVCS, , MLG	QTY	UNITS		QTY	UNITS
Tool Truck	1	DAY			
Generator 3500watt	1	DAY			
C-4 Fusion Equipment	1	DAY			

INSTRUMENT CALIBRATION (CAL. GAS)		CH4 (%-VOL)	CH4 (%-LEL)	02 LOW SCALE %-VOL)	CO2 (%-VOL)	H2S (PPM)
MODEL	S/N					

SUMMARY	SCS-FS arrived on site at 7:30am

At 7:45am SCS-FS began wearing the organic vapors badges at the scale house.

@8:00am SCS-FS fueled up equipment at the landfill office garage.

@8:30am SCS-FS began making the repair to the first air-line brake near the poly tank.

@9:30am SCS-FS began operating the mini excavator to uncover the second air-line brake and force main brake.

@1:00pm SCS-FS (mike) assisted Ryan with doing some CO sampling at extraction well 67 and Brandon had me make a repair at well 57.

@3:00pm SCS-FS began uncovering the force main near extraction 32 and installed a 4" HDPE tee for an air release valve.

@7:30pm end of day and took off badges

PREPARED BY: Mike Gibbons ACCEPTED BY: _____

I understand that when performing a one person job assignment, I am acting as my own supervisor.

SCS FIELD SERVICES DAILY LOG

JOB NO.	02218208.04	**TASK NO.**	4	**DATE**	10/13/2022	**PROJECT NAME**	City of Bristol
TEMP	69deg	**WEATHER**	Mostly Cloudy	**B.P.**	29.77	**WIND**	W 13MPH

SCS-FS LABOR	HOURS	OT		HOURS	OT
Mike Gibbons	8				
Ryan Seymour	10				
			DAILY TOTAL		

EQUIP, SVCS, , MLG	QTY	UNITS		QTY	UNITS
Tool Truck	1	DAY	Hand Tools	1	DAY
Generator 3500watt	1	DAY			
C-6 Fusion Equipment	1	DAY			

INSTRUMENT CALIBRATION (CAL. GAS)		CH4 (%-VOL)	CH4 (%-LEL)	02 LOW SCALE %-VOL)	CO2 (%-VOL)	H2S (PPM)
MODEL	S/N					

SUMMARY	SCS-FS arrived on site at 7:30am

At 8:00am SCS-FS began wearing the organic vapors badges at the scale house.

@8:30am SCS-FS fueled up equipment at the landfill office garage.

@8:30am SCS-FS (Mike) checked inspected a manhole where he city would like to have a valve replaced. (leachate tank)

@9:00am SCS-FS began operating the mini excavator to uncover the broken valve for permit area 498 and replaced it.

@1:00pm SCS-FS began locating the 6" header for 498 on other side of road

@6:00pm end of day and took off badges

PREPARED BY: Mike Gibbons ACCEPTED BY: _____

I understand that when performing a one person job assignment, I am acting as my own supervisor.

SCS FIELD SERVICES DAILY LOG

JOB NO.	02218208.04	**TASK NO.**	4	**DATE**	10/14/2022	**PROJECT NAME**	City of Bristol
TEMP	68deg	**WEATHER**	Clear	**B.P.**	28.34	**WIND**	SW 9MPH

SCS-FS LABOR	HOURS	OT		HOURS	OT
Mike Gibbons	8				
Ryan Seymour	8				
			DAILY TOTAL		

EQUIP, SVCS, , MLG	QTY	UNITS		QTY	UNITS
Tool Truck	1	DAY			
Generator 3500watt	1	DAY			
C-6 Fusion Equipment	1	DAY			

INSTRUMENT CALIBRATION (CAL. GAS)		CH4 (%-VOL)	CH4 (%-LEL)	02 LOW SCALE %-VOL)	CO2 (%-VOL)	H2S (PPM)
MODEL	S/N					

SUMMARY	SCS-FS arrived on site at 7:30am

At 8:00am SCS-FS began wearing the organic vapors badges at the scale house.

@8:30am SCS-FS fueled up equipment at the landfill office garage.

@9:00am SCS-FS began uncovering the 6" header piping in permit area 498

@12:00pm stopped for lunch and to delivery badges to FedEx for shipment in TN.

@2:00pm continued uncovering header but still could find any issue to why there is no vacuum at EW19.

@3:30pm began to recovering the header piping.

@5:30pm completed recovering header piping

PREPARED BY: Mike Gibbons ACCEPTED BY: _____

I understand that when performing a one person job assignment, I am acting as my own supervisor.

SCS FIELD SERVICES DAILY LOG

JOB NO.	90000017.07	**TASK NO.**	00001	**DATE**	10.19.22	**PROJECT NAME**	BRISTOL
TEMP		**WEATHER**		**B.P.**		**WIND**	12NE

SCS-FS LABOR	HOURS	OT		HOURS	OT	
Ryan Seymour	13					
			DAILY TOTAL	13		

EQUIP, SVCS, , MLG	QTY	UNITS		QTY	UNITS	
GEM 5000	1	Day	MX4		Day	
Truck	1	Day	Generator		Day	

INSTRUMENT CALIBRATION (CAL. GAS)		CH4	CH4	02 LOW CALE	CO2		
MODEL	S/N	(%-VOL)	(%-LEL)	%-VOL)	(%-VOL)	H2S (PPM)	
5000	500399	50		20.9	35.1		

SUMMARY	Scs was on site for exceedance rechecks and to grab samples from wells over 145 degrees. Blower reading: CH4- 31.2% C02-31.0 % 02- 6.0 % BAL-31.8 %

I drilled and tapped 33 to get a reading. It's by a bunch of excavation. Not reachable.

Put new fittings on 37, 67, and 40. I could not get vacuum to 40. But I grabbed samples from 57 and 37 today.

I also collected data from the North and South Lechete cleanouts. I didn't grab strobe counters.
I tried to work on temperature probes but the one attached to 68 that I was going to work on was not operating correctly. Next week I will work on installing a "saddle" to the QED well head for the temp probe.

PREPARED BY:
RYAN
SEYMOUR

ACCEPTED BY: _____

I understand that when performing a one person job assignment, I am acting as my own supervisor.

SCS FIELD SERVICES DAILY LOG

JOB NO.	07220028.00	**TASK NO.**	00001	**DATE**	10.26.22	**PROJECT NAME**	BRISTOL
TEMP	45	**WEATHER**	Partly cloudy	**B.P.**	28.15	**WIND**	12NE

SCS-FS LABOR	HOURS	OT		HOURS	OT	
Ryan Seymour	13					
			DAILY TOTAL	13		

EQUIP, SVCS, , MLG	QTY	UNITS		QTY	UNITS	
GEM 5000	1	Day	MX4		Day	
Truck	1	Day	Generator		Day	

INSTRUMENT CALIBRATION (CAL. GAS)		CH4 (%-VOL)	CH4 (%-LEL)	02 LOW CALE %-VOL)	CO2 (%-VOL)	H2S (PPM)	
MODEL	S/N						
5000	500399	50		20.9	35.1		

SUMMARY	Scs was on site for exceedance rechecks and to grab samples from wells over 145 degrees. As well as I put a new saddle on ew 68 for the temperature probes. I took readings at the blower, and the cleanouts north and south sides. Got vacuum on 40. And sampled 57 Blower reading: CH4- 31.4% C02-29.5 % 02- 6.0 % BAL-33.1%
	While in the quarry I get a strong odor of sulfur walking down the road.

The saddles will work good for the temperature probes.

PREPARED BY:
RYAN
SEYMOUR

ACCEPTED BY: _____

I understand that when performing a one person job assignment, I am acting as my own supervisor.

Appendix C

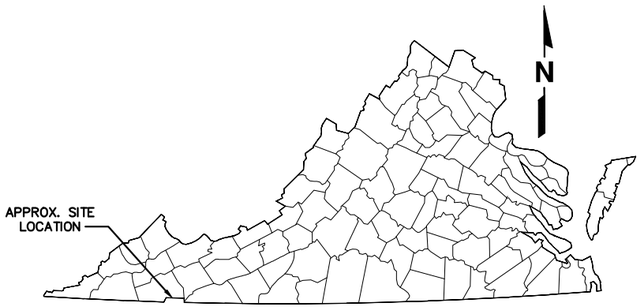
Sidewall Odor Mitigation System Design Drawings

BRISTOL, VIRGINIA INTEGRATED SOLID WASTE MANAGEMENT FACILITY
SOLID WASTE PERMIT #588

SIDEWALL ODOR MITIGATION SYSTEM

BRISTOL, VIRGINIA

INDEX OF DRAWINGS



VIRGINIA

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. 02218208.11

NOVEMBER 1, 2022

COMMONWEALTH OF VIRGINIA
Charles J. Warren
Lic. No. 053809
11/01/22
PROFESSIONAL ENGINEER

NO.	REVISION	DATE

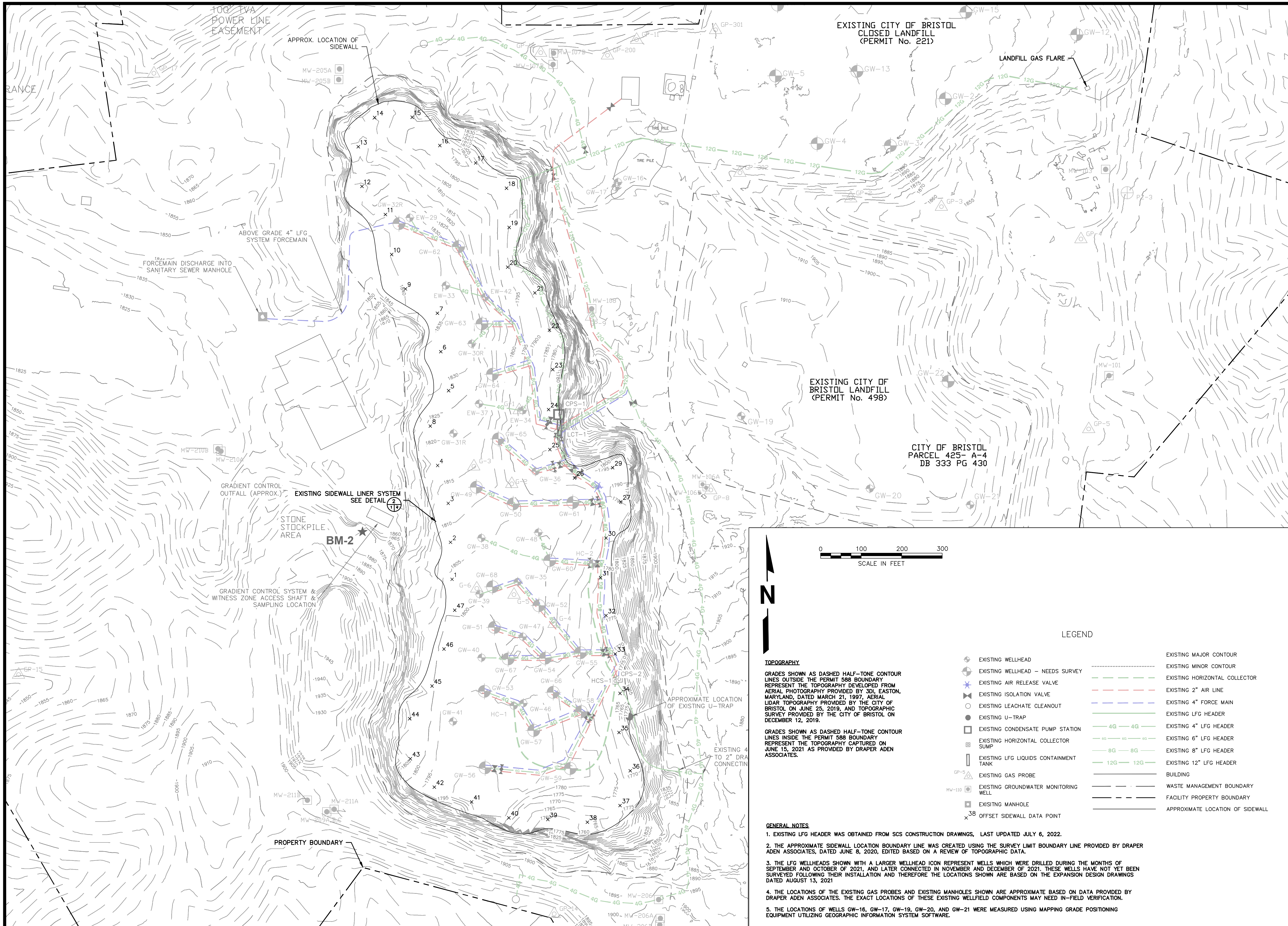
SHEET TITLE: COVER SHEET
PROJECT TITLE: SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.11 | DSN. BY: HGW | DWN. BY: HGW | CHK. BY: CJW | QA RVW BY: RED | APP. BY: CJW

CADD FILE: 02218208.11
DATE: 11/01/2022
SCALE:
DRAWING NO. 0 of 7



LEGEND

Symbol	Description
	EXISTING WELLHEAD
	EXISTING WELLHEAD – NEEDS SURVEY
	EXISTING AIR RELEASE VALVE
	EXISTING ISOLATION VALVE
	EXISTING LEACHATE CLEANOUT
	EXISTING U-TRAP
	EXISTING CONDENSATE PUMP STATION
	EXISTING HORIZONTAL COLLECTOR SUMP
	EXISTING LFG LIQUIDS CONTAINMENT TANK
GP-5	EXISTING GAS PROBE
MW-110	EXISTING GROUNDWATER MONITORING WELL
	EXISITNG MANHOLE
×38	OFFSET SIDEWALL DATA POINT

Line	Description
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING HORIZONTAL COLLECTOR
	EXISTING 2" AIR LINE
	EXISTING 4" FORCE MAIN
	EXISTING LFG HEADER
4G 4G	EXISTING 4" LFG HEADER
6G 6G 6G	EXISTING 6" LFG HEADER
8G 8G	EXISTING 8" LFG HEADER
12G 12G	EXISTING 12" LFG HEADER
	BUILDING
	WASTE MANAGEMENT BOUNDARY
	FACILITY PROPERTY BOUNDARY
	APPROXIMATE LOCATION OF SIDEWALL

TOPOGRAPHY

GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES OUTSIDE THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY 3DI, EASTON, MARYLAND, DATED MARCH 21, 1997, AERIAL LIDAR TOPOGRAPHY PROVIDED BY THE CITY OF BRISTOL ON JUNE 25, 2019, AND TOPOGRAPHIC SURVEY PROVIDED BY THE CITY OF BRISTOL ON DECEMBER 12, 2019.

GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES INSIDE THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY CAPTURED ON JUNE 15, 2021 AS PROVIDED BY DRAPER ADEN ASSOCIATES.

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 WERE MEASURED USING MAPPING GRADE POSITIONING EQUIPMENT UTILIZING GEOGRAPHIC INFORMATION SYSTEM SOFTWARE.

COMMONWEALTH OF VIRGINIA PROFESSIONAL ENGINEER
Charles J. Warren
Lic. No. 053809
11/01/22

NO.	REVISION	DATE

SHEET TITLE
EXISTING CONDITIONS

PROJECT TITLE
SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.11	DWN. BY: HGW	Q/A RVW BY: RED
DSN. BY: HGW	CHK. BY: CJW	APP. BY: CJW

CADD FILE: 02218208.11
DATE: 11/01/22
SCALE: AS SHOWN
DRAWING NO. 1

HORIZONTAL WELLHEAD CONNECTIONS SEE DETAIL 2/15

TEMPORARY TERMINATION OF PHASE I COLLECTORS SEE DETAIL 4/15

4" ISOLATION VALVES SEE DETAIL 5/14

ODOR MITIGATION SYSTEM INSTALLATION SEE DETAIL 1/14

HORIZONTAL COLLECTOR PUMP INSTALLATION SEE DETAIL 1/17

CONNECT TO EXISTING BLOWER AND FLARE STATION SEE DETAIL 2/15

TEMPORARY TERMINATION OF PHASE I COLLECTORS SEE DETAIL 4/15

AIR/FM CONNECTION AT HC PUMP SEE DETAILS 1/17 3/17

AIR AND FORCEMAIN COMMON TRENCH INSTALLATION SEE DETAIL 2/17

APPROXIMATE LOCATION OF SIDEWALL

HC-1 HC-2 HC-3 HC-4 HC-5 HC-6 HCP-1 HCP-2 HCS-1 CPS-1 CPS-2 LCT-1

GW-19 GW-30R GW-34 GW-35 GW-36 GW-37 GW-38 GW-39 GW-40 GW-41 GW-46 GW-47 GW-48 GW-49 GW-50 GW-51 GW-52 GW-53 GW-54 GW-55 GW-57 GW-58 GW-60 GW-61 GW-63 GW-64 GW-65 GW-66 GW-67 GW-68

0 50 100 150
SCALE IN FEET

LEGEND

- EXISTING WELLHEAD
- EXISTING WELLHEAD – NEEDS SURVEY
- EXISTING AIR RELEASE VALVE
- EXISTING ISOLATION VALVE
- PROPOSED ISOLATION VALVE
- EXISTING LEACHATE CLEANOUT
- EXISTING CONDENSATE PUMP STATION
- EXISTING HORIZONTAL COLLECTOR SUMP
- EXISTING LFG LIQUIDS CONTAINMENT TANK
- PROPOSED HORIZONTAL COLLECTOR PUMP
- EXISTING HORIZONTAL COLLECTOR
- PROPOSED HORIZONTAL COLLECTOR
- EXISTING 2" AIR LINE
- PROPOSED 2" AIR LINE
- EXISTING 4" FORCE MAIN
- PROPOSED 4" FORCE MAIN
- EXISTING 4" LFG HEADER
- PROPOSED 4" LFG HEADER
- EXISTING 6" LFG HEADER
- PROPOSED 6" LFG HEADER
- EXISTING 8" LFG HEADER
- EXISTING 12" LFG HEADER
- BUILDING
- WASTE MANAGEMENT BOUNDARY
- FACILITY PROPERTY BOUNDARY

NOTES:

1. FOR SIDEWALL ODOR MITIGATION SYSTEM SEE DETAIL NO. 1 ON SHEET 4.
2. INSTALLATION SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
3. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF DISCREPANCIES OR CONSIDERATIONS THAT MAY PREVENT PROPER INSTALLATION.
4. CONTRACTOR SHALL REPAIR ANY EXISTING DAMAGE TO EXPOSED GEOSYNTHETICS AND ANY DAMAGE CAUSED TO GEOSYNTHETICS DURING PROJECT INSTALLATION.
5. THE EXTENTS OF THE PROPOSED HORIZONTAL COLLECTORS ARE ANTICIPATED TO OVERLAP, BUT THE LOCATIONS ON THE DRAWING HAVE BEEN SEPARATED FOR CLARITY.

COMMONWEALTH OF VIRGINIA
Charles J. Warren
Lic. No. 053809
11/01/22
PROFESSIONAL ENGINEER

NO.	REVISION	DATE

SHEET TITLE: PHASE I SIDEWALL ODOR MITIGATION SYSTEM

PROJECT TITLE: SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
8521 MIDLOTHIAN TPKE - MIDLOTHIAN, VA 23113
PH: (804) 379-7440 FAX: (804) 379-7433

PROJ. NO. 02218208.11 | DWN. BY: HGW | Q/A RVW BY: KED | APP. BY: CJW
DSN. BY: HGW | CHK. BY: CJW

CADD FILE: 02218208.11
DATE: 11/01/22
SCALE: AS SHOWN
DRAWING NO. 2

LFG HEADER PIPE TO TREATMENT STATION W/ CONNECTIONS AT APPROX. 100' O.C.

SIDEWALL ODOR MITIGATION SYSTEM BLOWER/ TREATMENT STATION (IF SEPARATE STATION IS WARRANTED)

LANDFILL GAS FLARE

PROPERTY BOUNDARY

SCALE IN FEET
0 50 100 150

N

LEGEND

- EXISTING WELLHEAD
- EXISTING WELLHEAD – NEEDS SURVEY
- EXISTING AIR RELEASE VALVE
- EXISTING ISOLATION VALVE
- PROPOSED ISOLATION VALVE
- EXISTING LEACHATE CLEANOUT
- EXISTING CONDENSATE PUMP STATION
- EXISTING HORIZONTAL COLLECTOR SUMP
- EXISTING LFG LIQUIDS CONTAINMENT TANK
- PROPOSED HORIZONTAL COLLECTOR PUMP
- EXISTING HORIZONTAL COLLECTOR
- PROPOSED HORIZONTAL COLLECTOR
- EXISTING 2" AIR LINE
- PROPOSED 2" AIR LINE
- EXISTING 4" FORCE MAIN
- PROPOSED 4" FORCE MAIN
- EXISTING 4" LFG HEADER
- PROPOSED 4" LFG HEADER
- EXISTING 6" LFG HEADER
- PROPOSED 6" LFG HEADER
- EXISTING 8" LFG HEADER
- EXISTING 12" LFG HEADER
- BUILDING
- WASTE MANAGEMENT BOUNDARY
- FACILITY PROPERTY BOUNDARY

NOTES:

1. FOR SIDEWALL ODOR MITIGATION SYSTEM SEE DETAIL NO. 1 ON SHEET 4.
2. INSTALLATION SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
3. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF DISCREPANCIES OR CONSIDERATIONS THAT MAY PREVENT PROPER INSTALLATION.
4. CONTRACTOR SHALL REPAIR ANY EXISTING DAMAGE TO EXPOSED GEOSYNTHETICS AND ANY DAMAGE CAUSED TO GEOSYNTHETICS DURING PROJECT INSTALLATION.
5. THE EXTENTS OF THE PROPOSED HORIZONTAL COLLECTORS ARE ANTICIPATED TO OVERLAP, BUT THE LOCATIONS ON THE DRAWING HAVE BEEN SEPARATED FOR CLARITY.

COMMONWEALTH OF VIRGINIA
Charles J. Warren
Lic. No. 053809
11/01/22
PROFESSIONAL ENGINEER

NO.	REVISION	DATE

SHEET TITLE: PHASE II SIDEWALL ODOR MITIGATION SYSTEM

PROJECT TITLE: SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
15821 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
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PROJ. NO. 02218208.11
DSN. BY: HGW
DWN. BY: HGW
CHK. BY: CJW
QA/QC BY: CJW
APP. BY: CJW

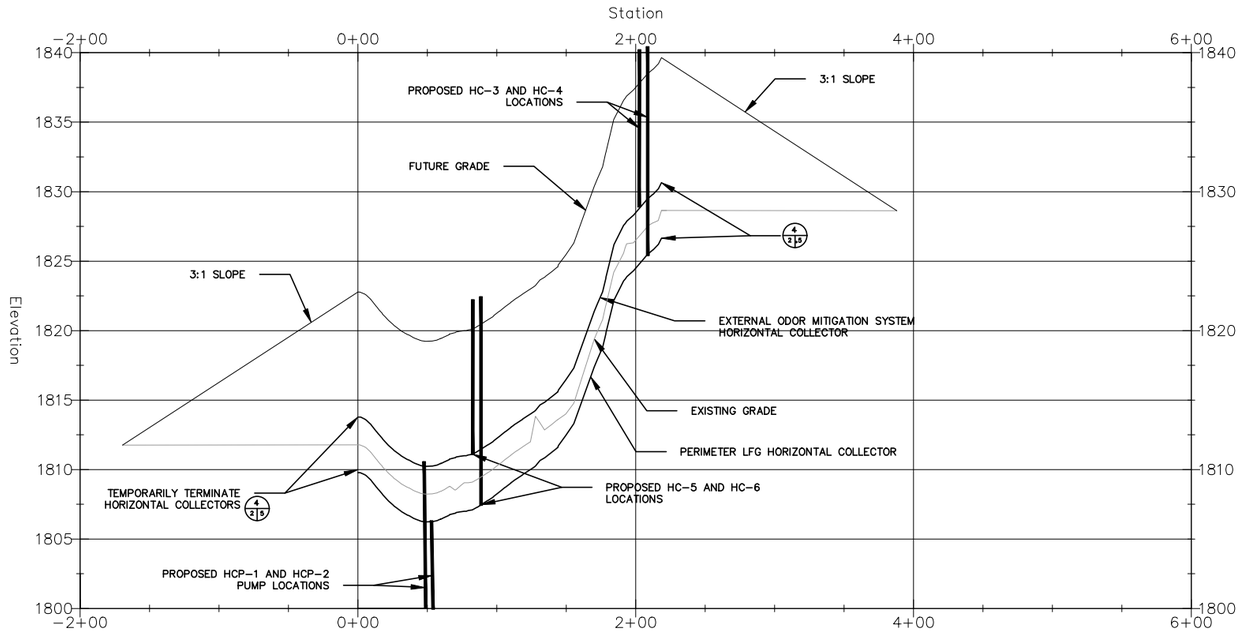
CADD FILE: 02218208.11

DATE: 11/01/22

SCALE: AS SHOWN

DRAWING NO. 2A

PHASE I PROFILE



SCALE: H:1"=50'
V:1"=5'

Charles J. Warren
Lic. No. 053809
11/01/22

NO.	REVISION	DATE

SHEET TITLE
SYSTEM PROFILE VIEW

PROJECT TITLE
SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
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PH: (804) 379-1440 FAX: (804) 379-1453

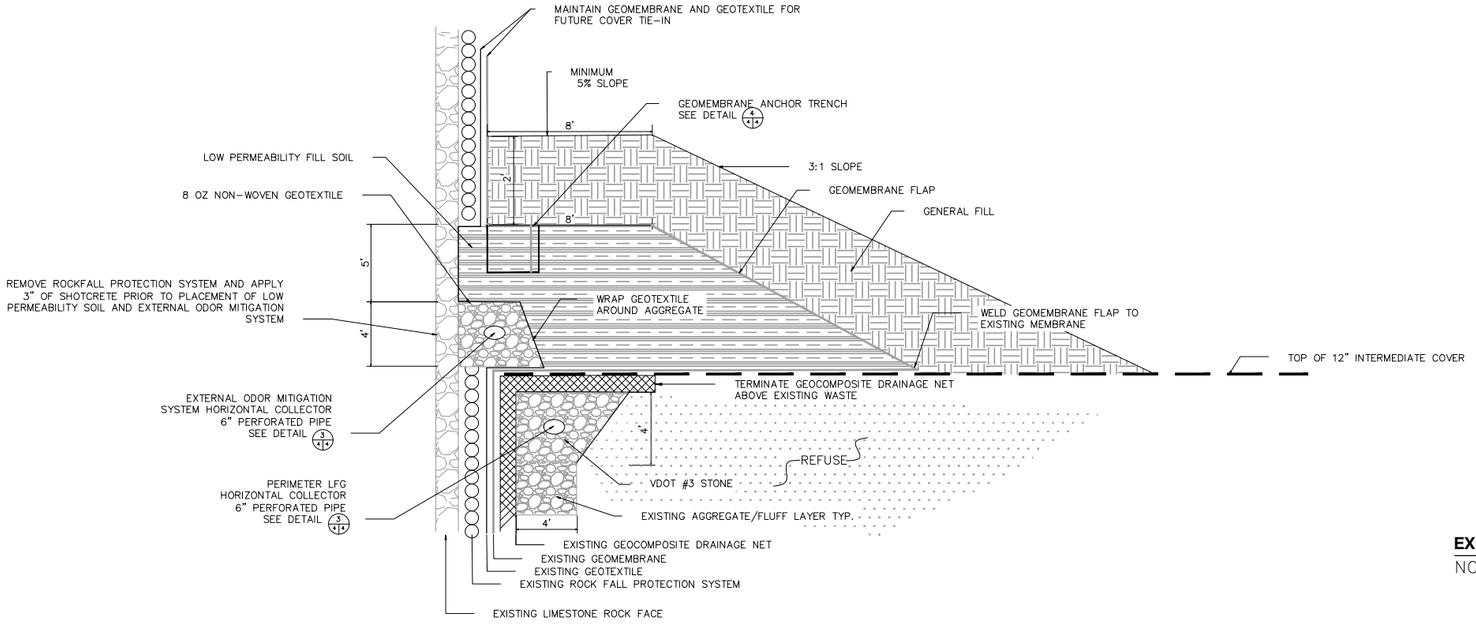
PROJ. NO.	DWN. BY: HGW	Q/A RVW BY:
02218208.11		RED
DSN. BY: HGW	CHK. BY: CJW	APP. BY: CJW

CADD FILE: 02218208.11

DATE: 11/01/22

SCALE: AS SHOWN

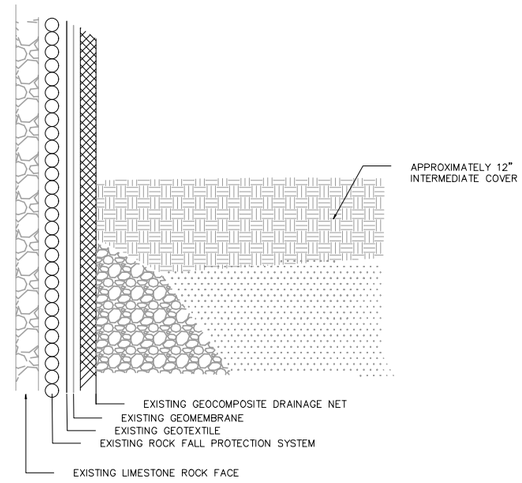
DRAWING NO.
3



ODOR MITIGATION SYSTEM DETAIL

NOT TO SCALE

1 / 2 | 4



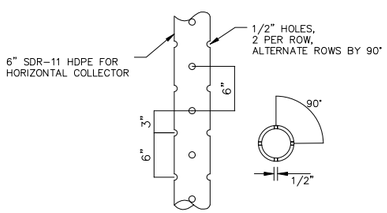
EXISTING SIDEWALL LINER SYSTEM DETAIL

NOT TO SCALE

2 / 1 | 4

NOTES:

1. CONTRACTOR SHOULD EXCAVATE IN SUCH A MANNER AS TO PREVENT DAMAGE TO THE EXISTING LINER. EXCAVATION BY HAND WILL BE REQUIRED. ANY DAMAGE TO THE LINER SYSTEM MUST BE REPAIRED PRIOR TO BACKFILLING.
2. CONTRACTOR TO PROVIDE ADDITIONAL GEOSYNTHETICS AND INSTALL AS NEEDED TO ACHIEVE THE CONFIGURATION SHOWN. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
3. CONTRACTOR SHALL INSPECT EXISTING INTERMEDIATE COVER PRIOR TO GEOMEMBRANE PLACEMENT AND CONFIRM THAT THE MATERIAL MEETS THE PROJECT SPECIFICATIONS.
4. CONTRACTOR SHALL INSTALL ADDITIONAL GEOSYNTHETICS AS NEEDED TO ACHIEVE THE DIMENSIONS SHOWN ON THE DETAIL. GEOSYNTHETICS SHALL BE JOINED TO EXISTING GEOSYNTHETICS AS OUTLINED IN THE CORRESPONDING MATERIAL SPECIFICATIONS.



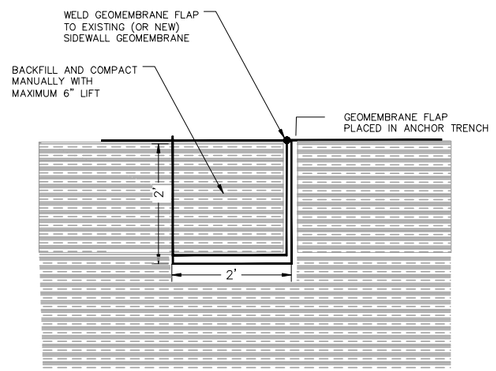
PERFORATED PIPE DETAIL

NOT TO SCALE

3 / 4 | 4

NOTES:

1. PERFORATIONS SPACED 90° APART HORIZONTALLY.
2. PERFORATIONS SPACED 6" APART VERTICALLY.
3. 90° AND 270° ROWS STAGGERED 3" BELOW 0° AND 180° ROWS.



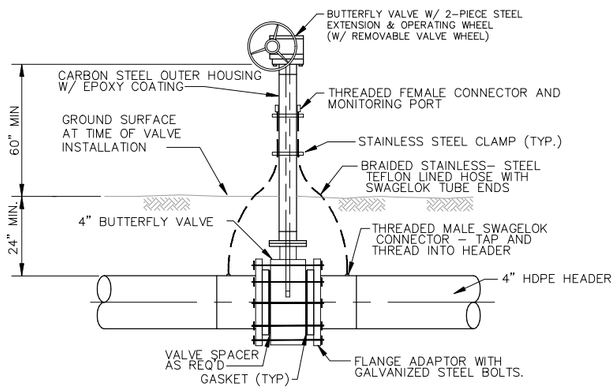
GEOMEMBRANE ANCHOR TRENCH DETAIL

NOT TO SCALE

4 / 4 | 4

NOTES:

1. ANCHOR TRENCH FILL SOIL SHALL BE THE SAME SOIL TYPE AS THE SURROUNDING SOIL.
2. ADDITIONAL GEOMEMBRANE FLAP TO BE INSTALLED BETWEEN ANCHOR TRENCH AND QUARRY WALL USING EXTRUSION WELDS.



ISOLATION VALVE DETAIL

NOT TO SCALE

5 / 2 | 4

NOTES:

1. WRAP AND TAPE THE VALVE, FLANGE, AND BOLTS IN POLYETHYLENE SHEETING PRIOR TO BACKFILLING.

COMMONWEALTH OF VIRGINIA
Charles J. Warren
Lic. No. 053809
11/01/22
PROFESSIONAL ENGINEER

NO.	REVISION	DATE

SHEET TITLE: **DETAIL SHEET 1**

PROJECT TITLE: **SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT**

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
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1821 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
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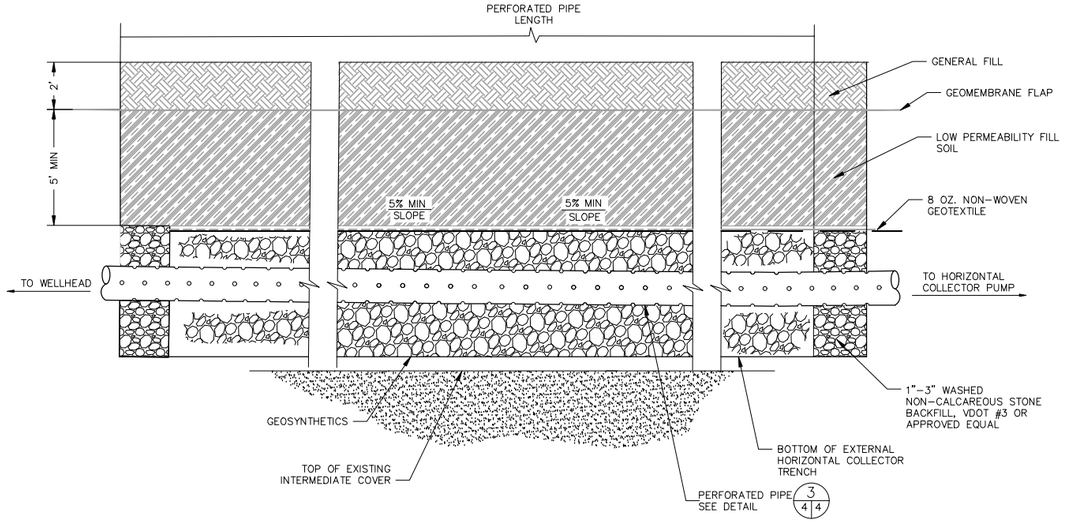
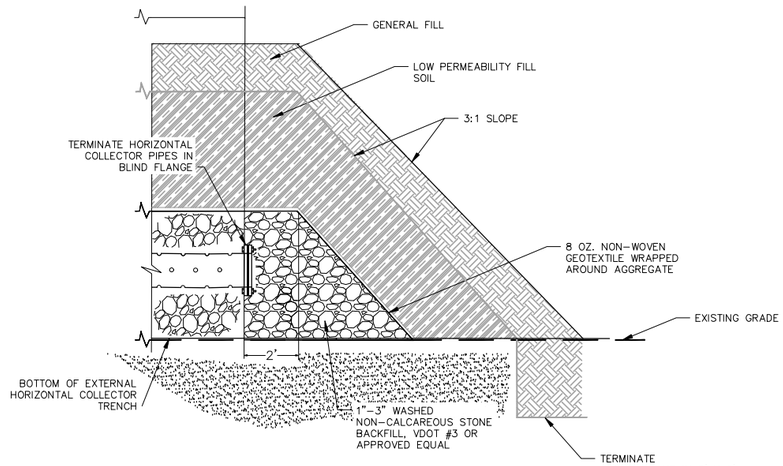
PROJ. NO. 02218208.11
DSN. BY: HGW
DWN. BY: HGW
CHK. BY: CJW
QA/A RVW BY: RED
APP. BY: CJW

CADD FILE: 02218208.11
DATE: 11/01/22
SCALE: AS SHOWN
DRAWING NO. **4**



HORIZONTAL COLLECTOR DETAIL 1 5 5

NOT TO SCALE

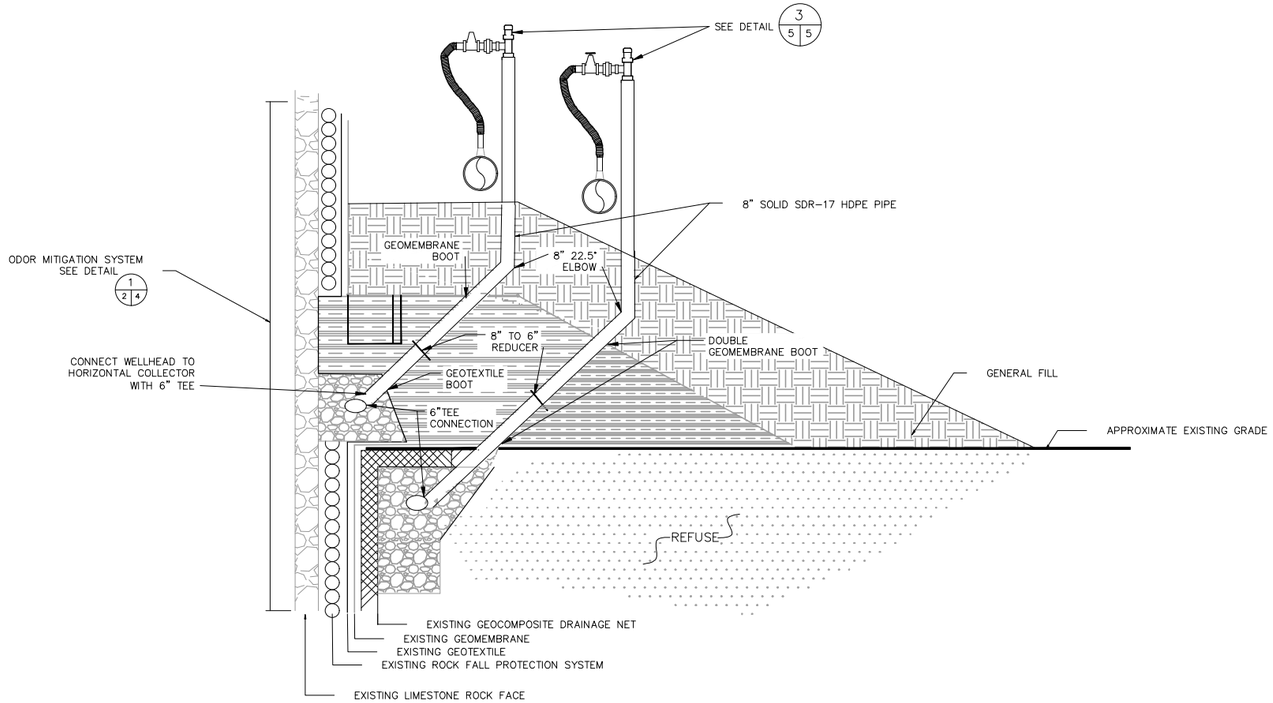


TEMPORARY TERMINATION OF PHASE I HORIZONTAL COLLECTOR DETAIL 4 2 5

NOT TO SCALE

NOTE:

1. ROCKFALL PROTECTION SHALL BE REMOVED FROM QUARRY WALL PRIOR TO PLACING EXTERNAL HORIZONTAL COLLECTOR AND STONE AGAINST QUARRY WALL.
2. ROCKFALL PROTECTION SHALL BE REMOVED FROM QUARRY WALL AND 3" OF SHOTCRETE APPLIED PRIOR TO PLACING LOW PERMABILITY FILL SOIL AGAINST QUARRY WALL.

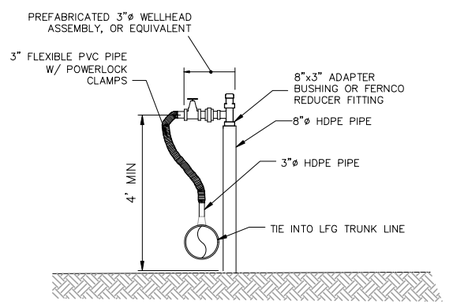


HORIZONTAL COLLECTOR WELLHEAD TIE-IN DETAIL 2 2 5

NOT TO SCALE

NOTE:

1. CONNECTION OF THE HORIZONTAL COLLECTOR TO SOLID 6" HDPE VERTICAL RISER TO BE MADE WITH A TEE OR BRANCH SADDLE USING HEAT FUSION PROCESSES RECOMMENDED BY THE MANUFACTURER.



HORIZONTAL COLLECTOR WELLHEAD DETAIL 3 5 5

NOT TO SCALE

Charles J. Warren
Lic. No. 053809
11/01/22

NO.	REVISION	DATE

SHEET TITLE: **DETAIL SHEET 2**

PROJECT TITLE: **SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
15821 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 379-7440 FAX. (804) 379-1433

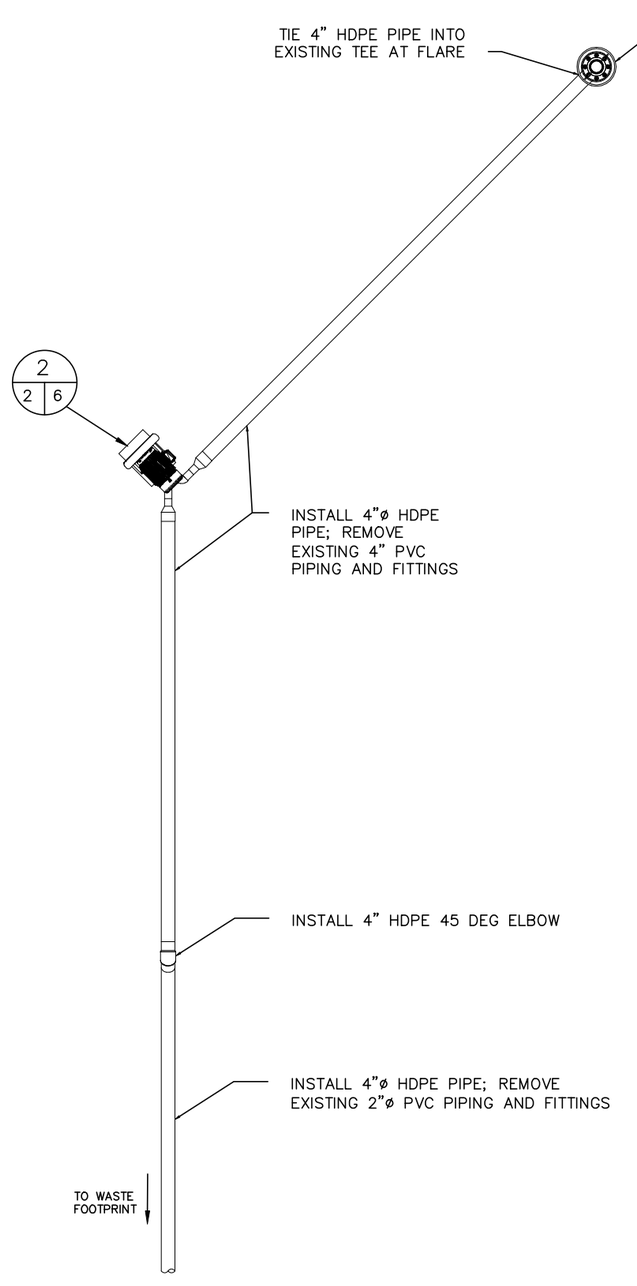
PROJ. NO. 02218208.11
DSN. BY: HGW
DWN. BY: HGW
CHK. BY: CJW
Q/A THW. BY: FED
APP. BY: CJW

CADD FILE: 02218208.11

DATE: 11/01/22

SCALE: AS SHOWN

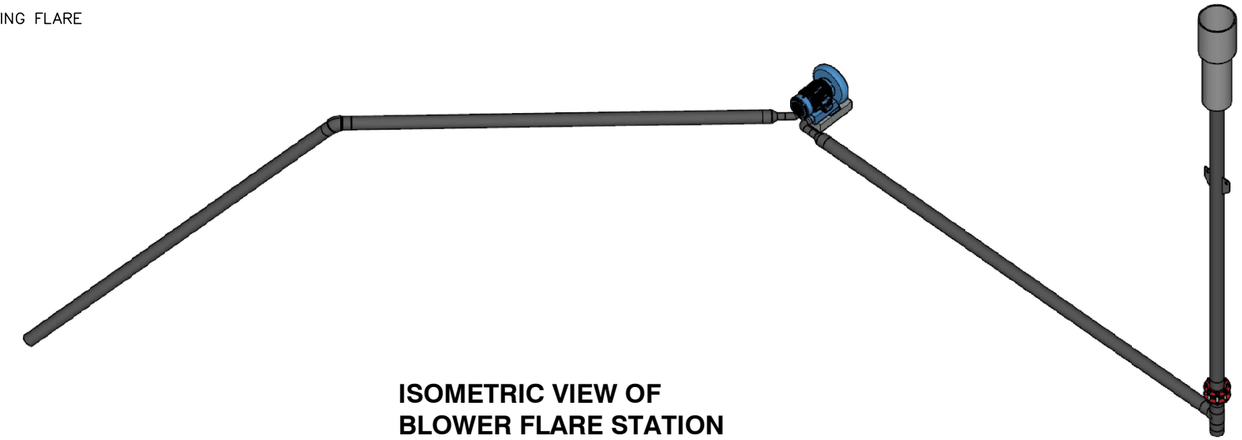
DRAWING NO. **5**



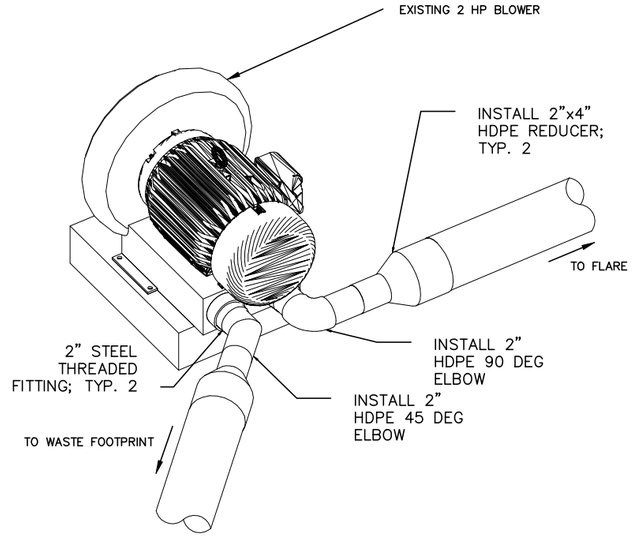
PHASE I BLOWER FLARE STATION DETAIL

1
6 6

NOT TO SCALE



ISOMETRIC VIEW OF BLOWER FLARE STATION



BLOWER CONNECTION POINT DETAIL

2
2 6

NOT TO SCALE

Charles J. Warren
Lic. No. 053809
11/01/22

NO.	REVISION	DATE

SHEET TITLE: DETAIL SHEET 3

PROJECT TITLE: SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
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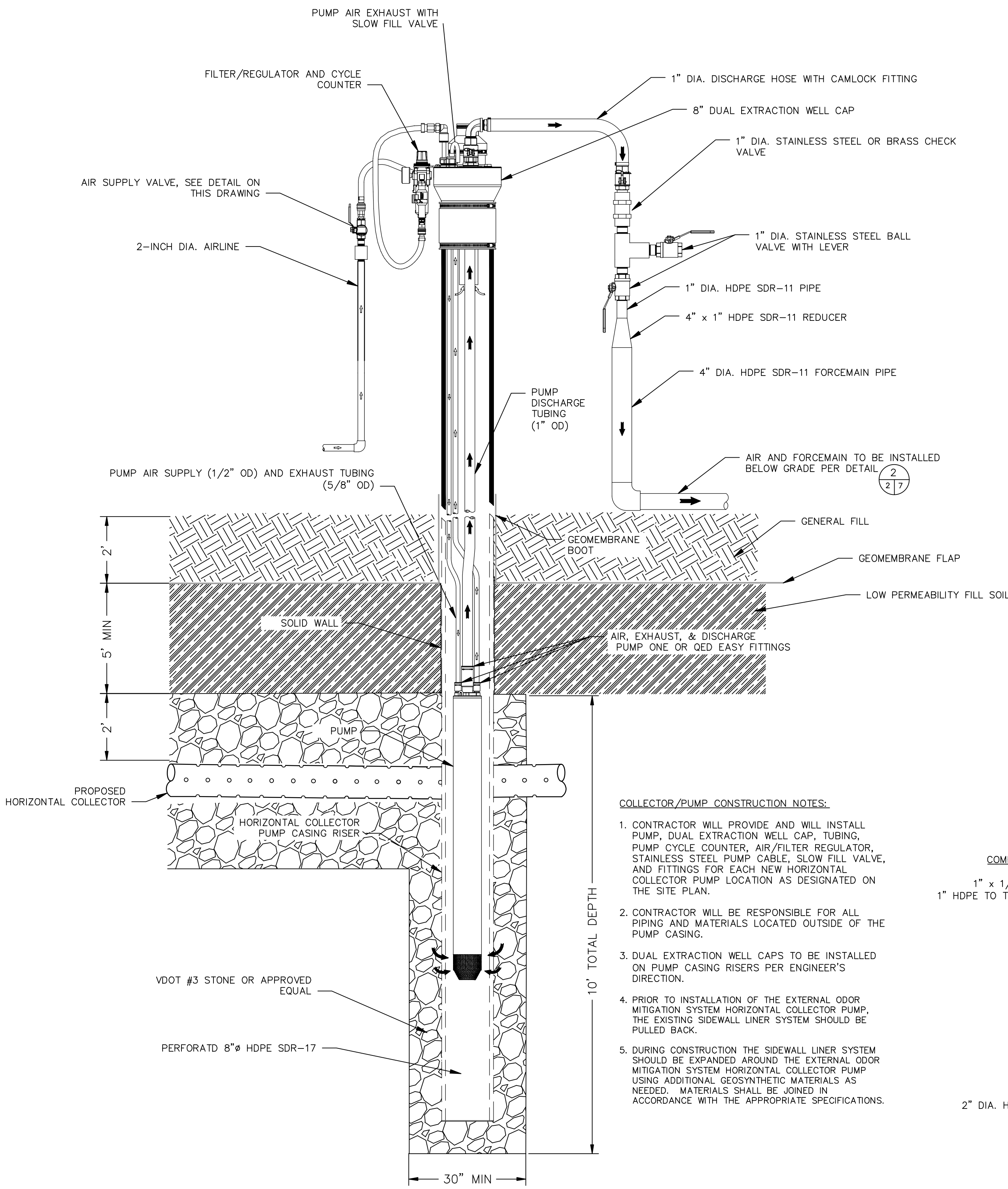
PROJ. NO. 02218208.11
DSN. BY: SRB
DWN. BY: SRB
CHK. BY: C.J.W
QA/QC BY: RED
APP. BY: C.J.W

CADD FILE: 02218208.11

DATE: 11/01/22

SCALE: AS SHOWN

DRAWING NO. 6

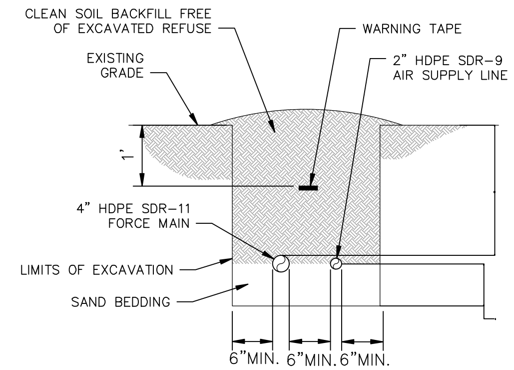


COLLECTOR/PUMP CONSTRUCTION NOTES:

1. CONTRACTOR WILL PROVIDE AND WILL INSTALL PUMP, DUAL EXTRACTION WELL CAP, TUBING, PUMP CYCLE COUNTER, AIR/FILTER REGULATOR, STAINLESS STEEL PUMP CABLE, SLOW FILL VALVE, AND FITTINGS FOR EACH NEW HORIZONTAL COLLECTOR PUMP LOCATION AS DESIGNATED ON THE SITE PLAN.
2. CONTRACTOR WILL BE RESPONSIBLE FOR ALL PIPING AND MATERIALS LOCATED OUTSIDE OF THE PUMP CASING.
3. DUAL EXTRACTION WELL CAPS TO BE INSTALLED ON PUMP CASING RISERS PER ENGINEER'S DIRECTION.
4. PRIOR TO INSTALLATION OF THE EXTERNAL ODOR MITIGATION SYSTEM HORIZONTAL COLLECTOR PUMP, THE EXISTING SIDEWALL LINER SYSTEM SHOULD BE PULLED BACK.
5. DURING CONSTRUCTION THE SIDEWALL LINER SYSTEM SHOULD BE EXPANDED AROUND THE EXTERNAL ODOR MITIGATION SYSTEM HORIZONTAL COLLECTOR PUMP USING ADDITIONAL GEOSYNTHETIC MATERIALS AS NEEDED. MATERIALS SHALL BE JOINED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS.

HORIZONTAL COLLECTOR PUMP DETAIL (1, 2/7)

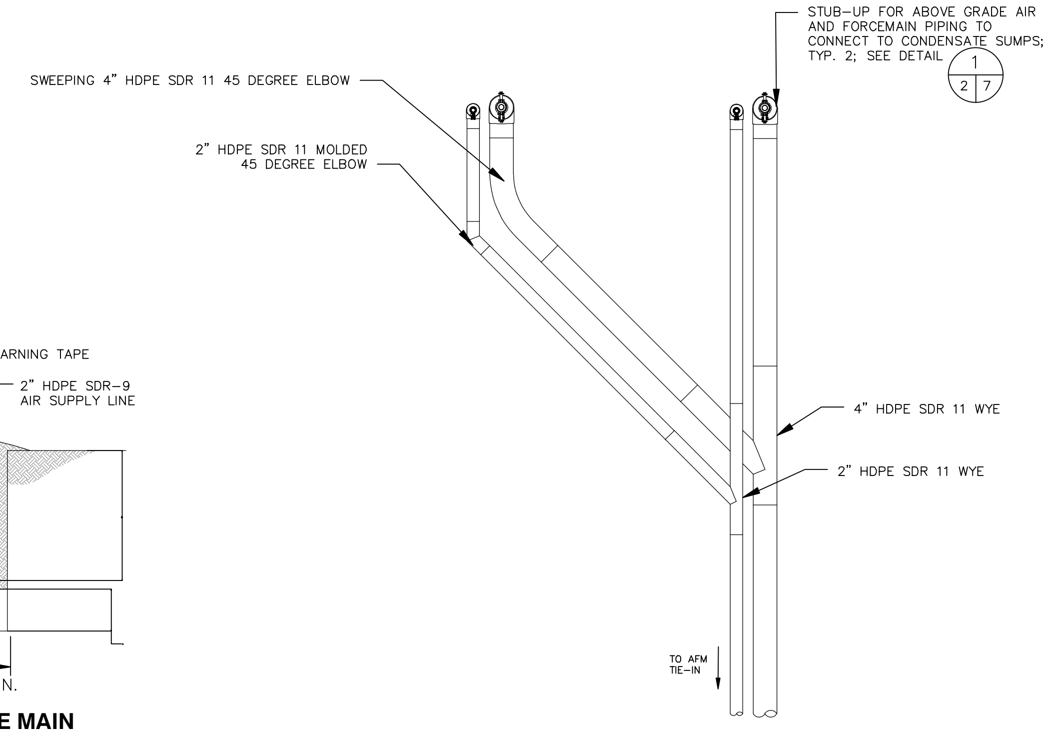
NOT TO SCALE



AIR SUPPLY AND FORCE MAIN PIPE TRENCH DETAIL (2, 2/7)

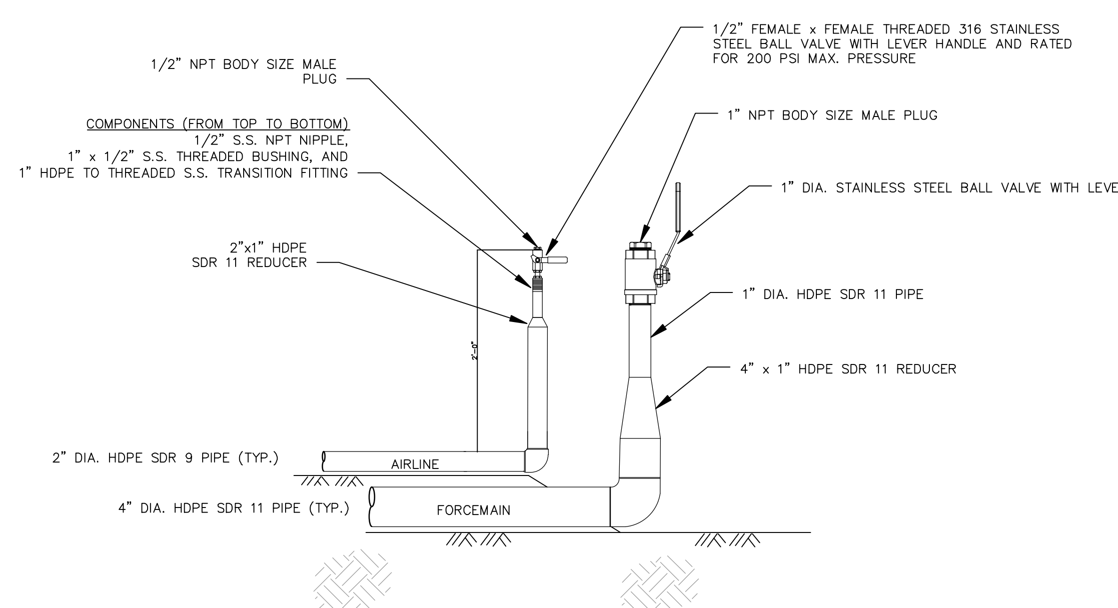
NOT TO SCALE

NOTES:
1. TRENCH DEPTH SHALL BE 18" MIN. WITHIN WASTE LIMITS.
2. AIR SUPPLY AND FORCE MAIN PIPES SHALL BE IN COMMON TRENCH.



AIR AND FORCEMAIN STUB-UP DETAIL PLAN VIEW (4, 7/7)

NOT TO SCALE



NOTES:
1. STUB-UPS SHALL BE INSTALLED ON NEW AIR AND FORCMAIN PIPING ADJACENT TO HORIZONTAL COLLECTOR PUMP (HCP) LOCATIONS.
2. AIR AND FORCEMAIN PIPING SHALL BE INSTALLED BELOW GRADE PER DETAIL 2 ON THIS SHEET.

AIR AND FORCEMAIN STUB-UP DETAIL (3, 2/7)

NOT TO SCALE

COMMONWEALTH OF VIRGINIA PROFESSIONAL ENGINEER
Charles J. Warren
Lic. No. 053809
11/01/22

NO.	REVISION	DATE

SHEET TITLE: DETAIL SHEET 4

PROJECT TITLE: SIDEWALL ODOR MITIGATION SYSTEM CAPITAL PROJECT

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.11 | DSN. BY: HGW/SRB | DWN. BY: HGW/SRB | CHK. BY: CJW | Q/A RVW BY: RED | APP. BY: CJW

CADD FILE: 02218208.11

DATE: 11/01/22

SCALE: AS SHOWN

DRAWING NO. 7

Appendix D

Dual Phase Landfill Gas Extraction Well Leachate Monitoring Plan

Dual Phase Landfill Gas Extraction Well Leachate Monitoring Plan

Bristol Integrated Solid Waste Management Facility

Solid Waste Permit #588

2125 Shakesville Road
Bristol, VA 24201

SCS ENGINEERS

02218208.15 | November 1, 2022

296 Victory Road
Winchester, VA 22602
540-662-7097

Signature/Certification Sheet

We certify that we have prepared this Plan, that it has been prepared in accordance with industry standards and practices, and that the information contained herein is truthful and accurate to the best of our knowledge.

Name: Jennifer S. Robb, Vice President/Project Director

Signature: _____

Date: November 1, 2022

Name: Charles Warren, PE, Project Manager

Signature: _____

Date: November 1, 2022

Virginia Professional Engineer's Certification:

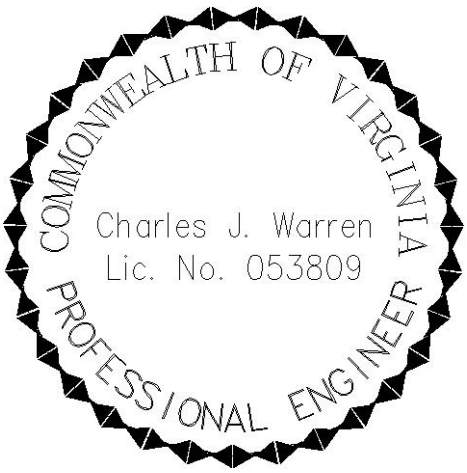


Table of Contents

List of Figures

List of Appendices

1.0 INTRODUCTION

This Monitoring Plan documents procedures and instructions necessary to implement a leachate monitoring program for Dual Phase Landfill Gas Extraction Wells (LFG-EWs) installed within the City of Bristol Integrated Solid Waste Management Facility Solid Waste Permit #588 Landfill. This plan was prepared in response to the Expert Panel Report (Virginia Tech, 2022) prepared by the Expert Panel convened by the Virginia Department of Environmental Quality (VDEQ) to address odor problems and operational concerns at the Facility.

1.1 SITE BACKGROUND

The City of Bristol Integrated Solid Waste Management Facility, which includes Solid Waste Permit Landfills #221, 498, and 588, is owned and operated by the City of Bristol. Solid Waste Permit #588 was issued by VDEQ on February 13, 1996. The Facility is located in the southeastern section of the City of Bristol, approximately 1,000 feet north of the Tennessee border.

The Permit #588 Landfill is constructed within a former rock quarry. Prior to July 2007, the waste was baled prior to its placement in the landfill. In July 2007, the City of Bristol initiated placement of loose waste in the former quarry as the primary method of waste disposal. The Permit #588 Landfill is lined with a primary high-density polyethylene geomembrane and compacted clay liner placed above a secondary compacted clay liner, with a 12-inch witness zone between the two liner systems. An additional linear low-density polyethylene geomembrane liner system is in place on the quarry walls. A gradient control underdrain system is in place beneath the secondary liner for the purpose of controlling the water level to a maximum elevation of 1,557 feet above mean sea level. This gradient control water currently discharges to the Bristol Virginia Utilities (BVU) Authority Sewer.

1.2 PHYSICAL SETTING

The City of Bristol Integrated Solid Waste Management Facility is located on Shakesville Road in the southeastern section of the City of Bristol, approximately 1,000 feet north of the Tennessee border. The location of the Facility is illustrated on a portion of the Bristol, Virginia, United States Geologic Society 7.5-minute topographic quadrangle map presented as **Figure 1**. The land surrounding the Facility is primarily wooded and residential. Residents in the area are served by public water supply.

The Facility encompasses approximately 138 acres. The limits of waste occupied by the Permit #588 Landfill encompasses approximately 20 acres. The base of the quarry covers approximately 5.6 acres. The Permit #588 Landfill is bordered to the east by the Permit #498 Landfill and to the north by intermittent streams which drain into Sinking Creek.

Based on a review of the Bristol, Virginia USGS 7.5-minute topographic quadrangle map, several unnamed tributaries of Sinking Creek are intermittent streams located east of the adjacent Permit No. 498 landfill. Sinking Creek is the nearest permanent water body and is located east/southeast of the adjacent Permit No. 498 facility.

1.3 LANDFILL GAS EXTRACTION SYSTEM

Permit No. 588 was required to have an active LFG collection system operational in Phase I by May 2, 2001. The City previously installed horizontal collectors in Permit No. 588 in stages upon placement of vertical lifts of waste. This ceased when waste reached a depth that allowed the installation of vertical gas collection wells. Additional gas collection lines installed in Landfill No. 588

became operational during July 2010. Three additional vertical gas wells were installed in Permit No. 588 to increase LFG flows in preparation for the landfill gas to energy project. The additional wells became operational in September 2013.

The Landfill Gas to Energy plant began operating in December 2015. The plant is owned and operated by Ingenco, LLC. Subsequent gas collection and control system expansions have occurred in the Permit No. 588 landfill in 2016 and 2017. An additional expansion project at the Permit 588 landfill occurred in the Fall of 2021. During this expansion, 21 new vertical extraction wells were installed along with new header and force main lines. Subsequently, dewatering infrastructure was constructed and dewatering pumps were placed in 19 of the vertical wells.

As of July 2022, there are 52 vertical wells in the gas collection system: 15 in Permit 221 and 37 in Permit 588. Note that an additional six functional collectors located in Permit 221. An additional four, non-functioning wells are located in Permit 498. Several leachate cleanouts and horizontal collectors are also found at the Facility. The layout of the Permit #588 Landfill gas collection system is shown on **Figure 2**.

2.0 LFG-EW LEACHATE MONITORING PROGRAM

Sampling of the leachate in the Dual-Phase LFG-EWs will be conducted on a monthly basis. In addition, extraction pump cycle count data will be recorded on a weekly basis. A sample pump cycle log is included in **Appendix A**. The current list of dual phase LFG-EWs include those shown below and their locations are shown on **Figure 2**. New dual-phase LFG-EWs will be incorporated into this monitoring plan.

- EW-49, EW-50, EW-51, EW-52, EW-53, EW-54, EW-55, EW-56, EW-57, EW-58, EW-59, EW-60, EW-61, EW-62, EW-63, EW-64, EW-65 EW-67, and EW-68

2.1 EXTRACTION WELL AND PUMP MAINTENANCE

During each monitoring event, the field technician will visually observe each Dual-Phase LFG-EW for evidence of damage and obstructions. Conditions of the Dual-Phase LFG-EW will be documented. A sample daily field log is included in **Appendix A**. If the well is damaged, a note will be made on the daily field log and the project manager will be alerted so the need for repair or replacement of the well can be assessed. Repair of the well should occur within 30-days of identification of the issue. If this timeframe cannot be met, VDEQ will be notified of an alternate schedule. If the well requires replacement, VDEQ will be notified of the need and schedule for replacement.

In addition, a liquid level will be measured and recorded to assess the presence of liquids within the well if weekly pump cycle count data indicates no leachate has been extracted from the Dual-Phase LFG-EW. A sample liquid level measurement log is included in **Appendix A**. If liquids are found to be present at a level at which extraction should be occurring, a note will be made on the daily field log and the project manager will be alerted so the need for maintenance or replacement of the pump can be assessed. Maintenance or replacement of the pump should occur within 30-days of identification of the issue. If this timeframe cannot be met, VDEQ will be notified of an alternate schedule.

2.2 LEACHATE SAMPLING PROCEDURES

The following subsections outline the procedures for monitoring event preparation and sample collection. Procedures are also provided for field documentation of sample collection.

2.2.1 Bottle Kit Preparation

A sample collection bottle kit will be prepared by the laboratory according to the laboratory analytical/bottle kit request sheet and in accordance with approved sample analysis methods. A sample of the laboratory analytical/bottle kit request sheet is included in **Appendix A**. The sample kit will be stored in clean laboratory-provided coolers for transport to the site.

2.2.2 Sample Collection Procedures

Samples will be collected from the manual ball valve located along the liquids discharge line of the extraction pump at the wellhead as shown on **Exhibit 1**. At the time of sample collection, the following parameters will be measured and recorded: pH, dissolved oxygen, oxidation-reduction potential, temperature, turbidity, and specific conductivity. A sample Dual Phase LFG-EW sample collection log is included in **Appendix A**.

Exhibit 1. Dual-Phase LFG Extraction Wellhead

Samples for laboratory analysis will be collected in new, laboratory-provided sampling containers with the appropriate volume and preservatives needed as specified by the selected analytical method. The sampler will be careful not to displace the preservative from the pre-preserved sample container. Samples will be stored in a clean, iced cooler immediately after sample collection and secured and tracked using chain-of-custody procedures as specified by the contract laboratory.

If a sample is unable to be collected, the liquid level within the well will be measured and recorded to assess the presence of liquids within the well. If liquids are found to be present at a level at which extraction should be occurring, a note will be made on the daily field log and the project manager will be alerted so the need for maintenance or replacement of the pump can be assessed. Maintenance or replacement of the pump should occur within 30-days of identification of the issue. If this timeframe cannot be met, VDEQ will be notified of an alternate schedule.

2.2.3 Sample Documentation

The following subsections outline the sample documentation procedures. These procedures include sample bottle labeling, field log documentation, and sample chain-of-custody forms.

2.2.3.1 Sample Bottle Labeling

The sample containers will be laboratory certified bottles and properly labeled for identification including the following information. A sample label is included in **Appendix A**.

- Sample ID
- Date and Time
- Sample Type – grab or composite
- Analysis Parameter(s)/Method
- Preservative
- Sampler(s)
- Project Name/Site ID

2.2.3.2 Field Logs

As previously indicated, field technicians will maintain field logs documenting information pertaining to field activities. The field notes will be reviewed monthly to verify that the monitoring requirements of this Plan are met and to identify unusual circumstances which may affect the implementation of the Plan.

2.2.3.3 Chain-of-Custody

Sample transport and handling will be controlled to reduce the opportunity of the samples to be tampered with. Chain-of-Custody control for the samples will consist of the following:

- Sample containers will be securely placed in coolers (iced) and will remain in the continuous possession of the field technician until transfer of the samples to the laboratory.

- If the samples leave the possession of the sampling crew, the sample containers or coolers will be individually sealed to reduce the opportunity for disruption/tampering of the samples during transportation. A sample custody seal is included in **Appendix A**.

- Upon delivery to a Virginia Environmental Laboratory Accreditation Program (VELAP) certified laboratory, samples will be given unique laboratory sample numbers and recorded into a logbook indicating the client, well number, and date and time of delivery. The laboratory director or his/her designee will sign the Chain-of-Custody form(s) and formally receive the samples. The field technician and laboratory director will work together to maintain proper refrigeration of the samples.

- The Chain-of-Custody document will contain the following information (see example in **Appendix A**):

  - Client Name
  - Client Project Name
  - Client Contact
  - Client Address
  - Client Phone/Fax Number/Email Address
  - Date of Collection
  - Time of Collection
  - Type of Container and Preservative
  - Number of Containers
  - Sample Matrix

- Sampler(s) Name and Signature
- Sample ID(s)
- Sample Type - Grab or Composite
- Analysis Parameter(s)/Method

2.3 QUALITY CONTROL SAMPLING

Field quality control may involve the collection and analysis trip blanks, to verify that the sample handling processes have not impaired the quality of the samples. Trip blanks are prepared for volatile organic compound analysis via SW-846 Methods 8260. Laboratory personnel fill one of each type of sample bottle with distilled/deionized water and transport them to the site. Trip blanks are prepared immediately prior to the sampling event and transported with the empty bottle kits. Field personnel handle the trip blanks like a sample; they remain un-opened, are transported in the sample cooler, and are returned to the laboratory for analysis. A trip blank is used to indicate potential contamination due to migration of volatile organic compounds from the air on-site or in the sample shipping containers through the septum or around the lid of the sampling vials and into the sample.

2.4 LABORATORY ANALYSIS

The leachate samples will be analyzed for parameters listed in Appendix E of the Expert Panel Report (Virginia Tech, 2022) via wastewater matrix methods, if available. A list of these parameters provided below. Laboratory analysis will be performed by a VELAP certified laboratory. The laboratory's Quality Assurance/Quality Control Manual will be used to maintain the integrity of the data.

- Ammonia
- Biological Oxygen Demand
- Chemical Oxygen Demand
- Nitrate and Nitrite
- Total Kjeldahl Nitrogen
- Semi-Volatile Organic Compound: Anthracene
- Total Metals: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, and Zinc
- Total Recoverable Phenolics
- Volatile Fatty Acids: Acetic Acid, Butyric Acid, Lactic Acid, Propionic Acid, and Pyruvic Acid
- Volatile Organic Compounds: Acetone, Benzene, Ethyl benzene, Methyl ethyl ketone, Tetrahydrofuran, Toluene, and Total Xylenes

Upon receipt by the laboratory, samples, including the blanks, will be assigned a unique laboratory identification number and inspected for integrity and consistency with information entered on the Chain-of-Custody document. The samples will also be tested for proper preservation or, in the case of volatile organic samples, inspected for lack of air bubbles in the sample vials. Deviations from applicable protocol will be noted on the Chain-of-Custody document and laboratory's sample conditions checklist. If possible, missing, broken, or improperly preserved samples will be replaced within 10 working days from the date that the deviation is first noted.

While awaiting analysis, samples will be stored in a secure location under the appropriate method of preservation (i.e. refrigeration). If a method-prescribed holding time is exceeded, the sample will be discarded and replaced. If possible, samples will be replaced within 10 working days from the date that the deviation is first noted.

Sample analyses should be completed within 14 days after receipt by the contract laboratory. The laboratory will alert the project manager if there is to be a delay in analysis. Analytical results will be

reported relative to the limit of quantitation (LOQ). LOQ values are parameter, method, and matrix-specific. Sub-LOQ results will be reported as not detected.

2.5 DATA VALIDATION

Data validation will be performed within 14 days of receipt of the final laboratory's certificate of analysis for each semi-annual monitoring event. Data from each monitoring event are reviewed to identify analytical data that may not represent valid results. Samples with parameter detections less than five times that of the trip blank and/or method/laboratory blank detection but greater than the laboratory's LOQ are flagged with a "B" qualifier. Samples with common lab contaminant parameter (Yacoub, 1996) detections less than 10 times that of the trip blank and/or method/laboratory blank detection but greater than the laboratory laboratory's LOQ are flagged with a "B" qualifier. B qualified detections are considered not validated as the detection may be anomalous to due to sampling, laboratory, or transportation errors.

3.0 REPORTING

Monthly monitoring reports will be submitted to VDEQ by the tenth of the following month. The monthly report will document the following. The report will also include historical pump cycle data and leachate analytical results and may include notifications of well or pump replacement, if needed.

- Weekly pump cycle recordings
- Monthly LFG-EW leachate sample collection and laboratory analyses
- Extraction well maintenance (if any)
- Extraction pump maintenance (if any)

Reporting may be submitted as part of a larger monthly report outlining remediation activities at the Solid Waste Permit #588 landfill or may be submitted as a standalone document.

4.0 REFERENCES

United States Environmental Protection Agency. National Functional Guidelines for Organic Superfunds Methods Data Review. January 2017.

United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium (SW-846). July 2014.

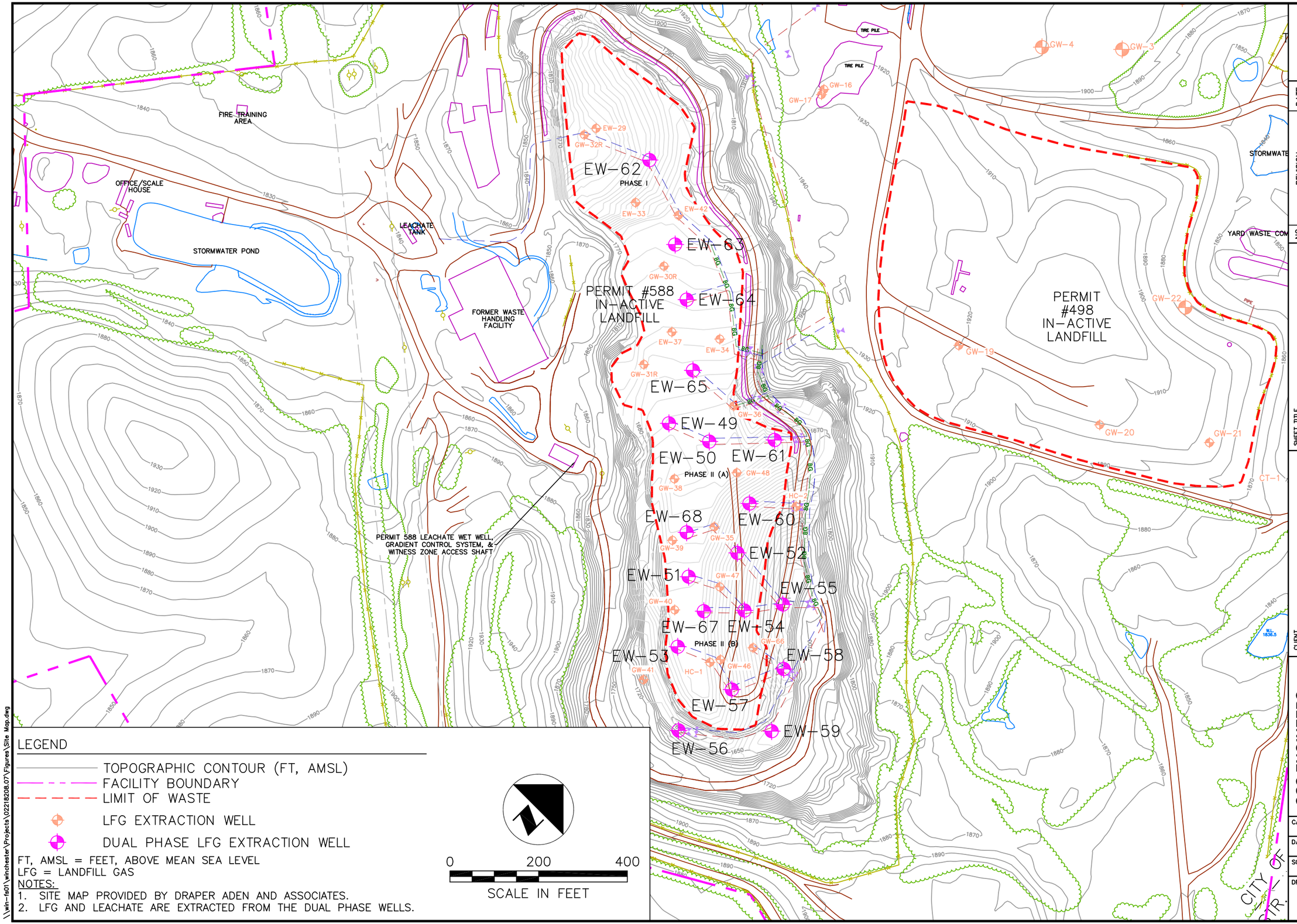
Virginia Tech College of Engineering. Expert Panel Report: Bristol Integrated Solid Waste Management Facility, Bristol, Virginia. April 25, 2022.

Yacoub, Nabil. Common Laboratory Contaminants. ECL User's Manual. Appendix C. July 27, 2016

Figures

1 - Topographic Quadrangle Map
2 - Site Map

FIGURE 1 - TOPOGRAPHIC QUADRANGLE MAP



\\win-fs01\winchester\Projects\02218208.07\Figures\Site Map.dwg

NO.	REVISION	DATE

SHEET TITLE: SITE MAP

PROJECT TITLE: LANDFILL GAS EXTRACTION NETWORK

CLIENT: CITY OF BRISTOL SANITARY LANDFILLS BRISTOL, VA SOLID WASTE PERMIT #588 & 498

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
11260 ROGER BACON DRIVE, SUITE 201, RESTON, VA 20190
PH. (703) 471-6150 FAX. (703) 471-6676

PROJ. NO.: 02218208.07
DSN. BY:
DWN. BY: JSR
CHK. BY:
QA/A PVW BY:
APP. BY:

CADD FILE: SITE MAP

DATE: 10/27/22

SCALE: AS SHOWN

DRAWING NO. 1 of 1

Appendix A

Dual Phase LFG-EW Pump Cycle Count Log
Daily Field Log
Dual Phase LFG-EW Liquid Level Measurement Log
Laboratory Analytical/Bottle Kit Request Sheet
Dual Phase LFG-EW Sample Collection Log
Sample Label
Custody Seal
Chain-of-Custody Form

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Pump Cycle Count Log

Date	Personnel Initials	EW-49	EW-50	EW-51	EW-52

Log Checked By: _____

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Pump Cycle Count Log

Date	Personnel Initials	EW-53	EW-54	EW-55	EW-56

Log Checked By: _____

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Pump Cycle Count Log

Date	Personnel Initials	EW-57	EW-58	EW-59	EW-60

Log Checked By: _____

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Pump Cycle Count Log

Date	Personnel Initials	EW-61	EW-62	EW-63	EW-64

Log Checked By: _____

City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Pump Cycle Count Log

Date	Personnel Initials	EW-65	EW-67	EW-68

Log Checked By: _____

DAILY FIELD LOG

Site Name:			
Project Manager:		**Field Personnel:**	
Date:	**Vehicle:**	**Miles Billed:**	**Travel Time:**
Weather:			

Labor	Hours	Equipment	Materials

Work Completed:

Prepared By:	**Review By:**

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

Location ID		EW-49	EW-50	EW-51	EW-52
Well Casing Depth (ft)		100	93	105	103
Pump Depth (ft)		90	83	95	93
Date	Personnel Initials	Depth to Liquid (ft)			

Log Checked By: _____

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

Location ID		EW-53	EW-54	EW-55	EW-56
Well Casing Depth (ft)		38	85	90	58
Pump Depth (ft)		---	75	90	58
Date	Personnel Initials	Depth to Liquid (ft)			

Log Checked By: _____

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

Location ID		EW-57	EW-58	EW-59	EW-60
Well Casing Depth (ft)		100	92	74	98
Pump Depth (ft)		90	82	64	88
Date	Personnel Initials	Depth to Liquid (ft)			

Log Checked By: _____

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

Location ID		EW-61	EW-62	EW-63	EW-64
Well Casing Depth (ft)		102	83	64	123
Pump Depth (ft)		92	80	64	113
Date	Personnel Initials	Depth to Liquid (ft)			

Log Checked By: _____

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

Location ID		EW-65	EW-67	EW-68
Well Casing Depth (ft)		44	104	78
Pump Depth (ft)		50	100	68
Date	Personnel Initials	Depth to Liquid (ft)		

Log Checked By: _____

Laboratory Analytical/Bottle Kit Request Sheet

Location IDs		Laboratory Parameters
EW-49	EW-59	Ammonia
EW-50	EW-60	Chemical Oxygen Demand
EW-51	EW-61	Biological Oxygen Demand
EW-52	EW-62	Total Kjeldahl Nitrogen
EW-53	EW-63	Semi-Volatile Organic Compound: Anthracene
EW-54	EW-64	Total Metals: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, and Zinc
EW-55	EW-65	Total Recoverable Phenolics
EW-56	EW-67	Toxicity Testing for Nitrification
EW-57	EW-6[illegible]	Volatile Fatty Acids: Acetic Acid, Butyric Acid, Lactic Acid, Propionic Acid, and Pyruvic Acid
EW-58		Volatile Organic Compounds: Acetone, Benzene, Ethyl benzene, Methyl ethyl ketone, Tetrahydrofuran, Toluene, and Total Xylenes

Quality Control Sample	Laboratory Parameters
Trip Blank	Volatile Organic Compounds: Acetone, Benzene, Ethyl benzene, Methyl ethyl ketone, Tetrahydrofuran, Toluene, and Total Xylenes

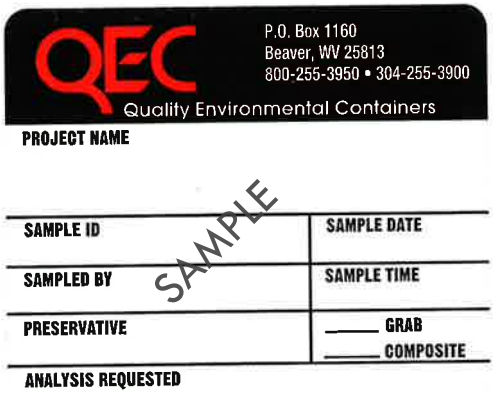
City of Bristol SWP 588 Landfill
Dual Phase LFG-EW Sample Collection Log

Location ID	Sample Date	Sample Time	Temperature (°C)	pH (s.u.)	Specific Conductance (uS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Observations
EW-49									
EW-50									
EW-51									
EW-52									
EW-53									
EW-54									
EW-55									
EW-56									
EW-57									
EW-58									
EW-59									
EW-60									
EW-61									
EW-62									
EW-63									
EW-64									
EW-65									
EW-67									
EW-68									

Sampler: _____ Samples Shipped By: _____

Log Checked By: _____ Laboratory: _____

SAMPLE LABEL



CUSTODY SEAL

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be complete accurately.

Page: Of

Section A	Section B	Section C
Required Client Information:	**Required Project Information:**	**Invoice Information:**
Company:	Report To:	Attention:
Address:	Copy To:	Company Name:
	PN #:	Address:
Email to:	Purchase Order No.	Pace Quote Reference:
Phone:	Client Project ID:	Pace Project Manager:
Requested Due Date/TAT:	Container Order Number:	Pace Profile#:

Regulatory Agency

State / Location

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9/,-) Sample ids must be unique	Matrix / CODE Drinking Water DW Water WT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Other OT Tissue TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analyses Test	Residual Chlorine (Y/N)
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					

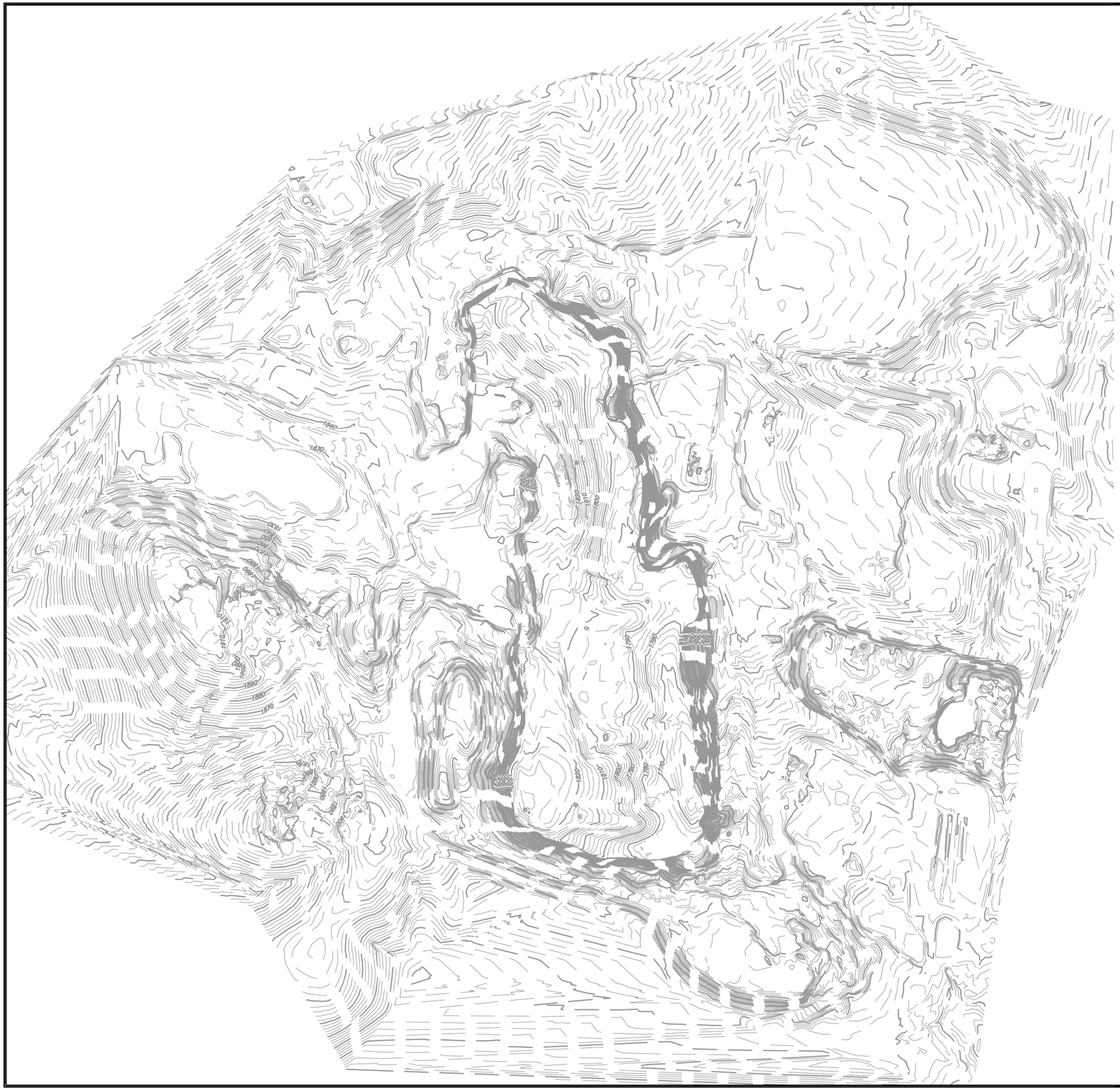
SAMPLE

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE		TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:					
SIGNATURE of SAMPLER:	DATE Signed:				

Appendix E

Monthly Topography Analysis



LEGEND

MAJOR CONTOURS (EVERY 10')
MINOR CONTOURS (EVERY 2')

NOTES:

1. GRADES SHOWN AS DASHED CONTOUR LINES REPRESENT THE TOPOGRAPHY CAPTURED ON OCTOBER 7, 2022 BY NV5 (FORMERLY QUANTUM SPATIAL).
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 SOUTH ZONE NAD–83 (2011)
4. THE VERTICAL DATUM IS BASED UPON NAVD–88

150 75 0 150 300
SCALE: 1"=150'

NO.	REVISION	DATE

SHEET TITLE: OCTOBER 2022 SITE TOPOGRAPHY

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 CONSULTING ENGINEERS, INC.
53 SOUTH MAIN ST; SUITE A - MEDFORD, NJ 08055
PH. (609) 654-4000 SCSENGINEERS.COM

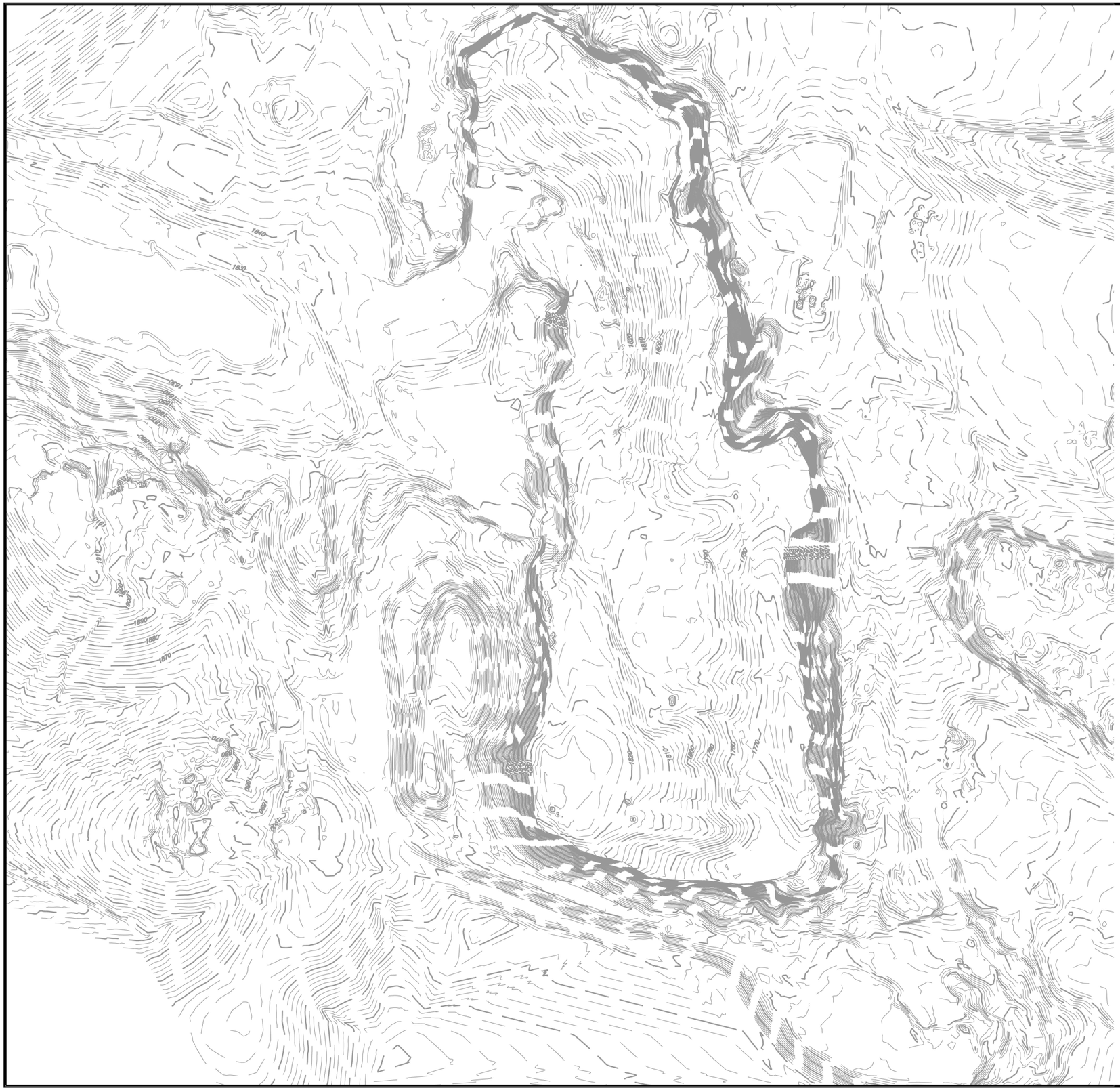
PROJ. NO.	DSN. BY: SRB	CHK. BY: CJW	S/A RVW BY: CJW	APP. BY: CJW
DSN. BY: SRB				

CADD FILE:

DATE: 11/10/2022

SCALE: 1" = 100'

DRAWING NO. 1 of 4



LEGEND

MAJOR CONTOURS (EVERY 10')
MINOR CONTOURS (EVERY 2')

NOTES:

1. GRADES SHOWN AS DASHED CONTOUR LINES REPRESENT THE TOPOGRAPHY CAPTURED ON OCTOBER 7, 2022 BY NV5 (FORMERLY QUANTUM SPATIAL).
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 SOUTH ZONE NAD-83 (2011)
4. THE VERTICAL DATUM IS BASED UPON NAVD-88

100 50 0 100 200
SCALE: 1"=100'

NO.	REVISION	DATE
1		
2		
3		
4		
5		
6		

SHEET TITLE
OCTOBER 2022 SITE TOPOGRAPHY

PROJECT TITLE
MONTHLY TOPOGRAPHY ANALYSIS
SOLID WASTE PERMIT #588

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

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PROJ. NO.		DWN. BY:	SRB	D/A PKG BY:	CJW
DSN. BY:	SRB	CHK. BY:	CJW	APP. BY:	CJW

CADD FILE:

DATE: 11/10/2022

SCALE: 1" = 100'

DRAWING NO.
2 of **4**

LEGEND

MAJOR CONTOURS (EVERY 10')
MINOR CONTOURS (EVERY 2')

NOTES:

1. GRADES SHOWN AS CONTOUR LINES ONLY WITHIN THE PERMIT 588 BOUNDARY REPRESENT THE TOPOGRAPHY CAPTURED ON JUNE 15, 2021 AS PROVIDED BY DRAPER ADEN ASSOCIATES.
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 SOUTH ZONE NAD-83 (2011)
4. THE VERTICAL DATUM IS BASED UPON NAVD-88

100 50 0 100 200
SCALE: 1"=100'

NO.	REVISION	DATE
1		
2		
3		
4		
5		
6		

SHEET TITLE
JUNE 2021 LANDFILL TOPOGRAPHY

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
CONSULTING ENGINEERS, INC.
53 SOUTH MAIN ST; SUITE A - MEDFORD, NJ 08055
PH. (609) 654-4000 SCSENGINEERS.COM

PROJ. NO.	DWN. BY: SRB	CHK. BY: CJW	QA/QC BY: CJW	APP. BY: CJW
DSN. BY: SRB				

CADD FILE:

DATE: 11/10/2022

SCALE: 1"=100'

DRAWING NO.

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	−20.000	−10.000	
2	−10.000	0.000	
3	0.000	10.000	
4	10.000	20.000	
5	20.000	30.000	
6	30.000	40.000	

Volume
Base Surfcce LF 210615
Comparison Surface TOPO – OCT 2022

Cut Volume 102074.96 Cu. Yd.
Fill Volume 120703.02 Cu. Yd.
Net Fill 18628.06 Cu. Yd.

NOTES:

1. THE ELEVATION CHANGES ARE CALCULATED BETWEEN THE AREIAL TOPOGRAPHY DATA COLLECTED ON JUNE 15, 2021 BY DRAPER ADEN ASSOCIATES AND THE AERIAL TOPOGRAPHY DATA COLLECTED ON OCTOBER 7, 2022 BY NV5 (FORMERLY QUANTUM SPACIAL). POSITIVE VALUE (+) INDICATES FILL AND NEGATIVE VALUES (−) INDICATE 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 SOUTH ZONE NAD−83 (2011)
4. THE VERTICAL DATUM IS BASED UPON NAVD−88

LEGEND

MAJOR CONTOURS (EVERY 10')
MINOR CONTOURS (EVERY 2')

100 50 0 100 200
SCALE: 1"=100'

NO.	REVISION	DATE

SHEET TITLE
AIRSPACE VOLUME CHANGE

PROJECT TITLE
MONTHLY TOPOGRAPHY ANALYSIS
SOLID WASTE PERMIT #588

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

SCS ENGINEERS
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PROJ. NO. 02218208.05 | DSN. BY: SRB | DRK. BY: CJW | Q/A BY: CJW | APP. BY: CJW

CADD FILE:

DATE: 11/10/2022

SCALE: 1"=100'

DRAWING NO. **4** of **4**