



March 17, 2023

Ms. Sunny Becker
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

Subject: Fourth Quarter 2022 Progress Report, Southwest Harbor Project Remediation Areas 1, 2, 3, and 5 Ecology Facility/Site Numbers 2384, 2385, 2127, and 2383

Dear Sunny:

This letter provides the quarterly progress report for the Ecology-lead portions of the Southwest Harbor Project (SWHP) for remediation areas (RAs) 1, 2, 3, and 5 and covers landfill gas monitoring for October, November, and December of 2022. This report satisfies the reporting requirement stipulated in the consent decrees for these sites as modified by the Port's November 15, 2016, letter to Ecology and subsequent communication from Ecology to the Port on December 2, 2016, and June 30, 2017. The reporting frequency for 2023 is being reduced from a quarterly basis to an annual basis, per communication from Ecology to the Port on November 15, 2023. The next annual report will be submitted to Ecology in early 2024 and will include all 2023 monitoring data.

Due to the consistency of landfill monitoring data, we are requesting that the landfill monitoring frequency be reduced from a bi-weekly basis to a monthly basis. Please provide written confirmation if this reduction in monitoring frequency is granted.

A. List of on-site activities that have taken place during the quarter.

Landfill Monitoring:

The landfill gas collection system is currently operating in passive mode. The system was transitioned to passive operation December 2016, by replumbing the system discharge piping to bypass the blower and shutting the blower off.

Landfill gas was monitored at the following locations during this quarter:

- Off-site soil gas probes located beyond the former landfill margin to the west, along Harbor Avenue (SG-302, SG-303, SG-304, and SG-329).
- On-site soil gas probes located beyond the former landfill margin to the north and south of the former landfill (VP-1 to the north, and VP-2, VP-3, and VP-4 to the south).
- System sampling ports located at various locations within the gas collection system piping (SP-01 through SP-13).

Monitoring details are shown in Attachment 1. Historical monitoring results are tabulated in Attachment 2; findings for methane in on- and off-site soil gas probes are summarized below:

- Methane was not detected in any of the off-site soil gas probes along Harbor Avenue this quarter.
- Methane in VP-1, VP-2, VP-3, and VP-4 was detected below the action level of 5 percent.
- Methane levels inside the landfill, as reflected by the system sampling ports in the landfill gas collection piping, ranged widely from 0.4 to 71 percent this quarter, as would be expected.

Semiannual Inspection:

The semiannual inspection of site pavement caps, drainage, ballast cover areas, fencing, and warning signs was conducted on November 21, 2022 (Attachment 3).

The next semiannual inspection is scheduled for the second quarter of 2023.

B. Detailed description of any deviations from the required tasks not otherwise documented above or in project plans or amendment requests.

There have been no deviations during the past quarter.

C. Description of all deviations from the schedule during the current quarter and any planned deviations in the upcoming quarter.

There have been no deviations during the past quarter. No deviations are planned in the upcoming quarter.

D. For any deviations in schedule, a plan for recovering lost time and maintaining compliance with the schedule.

No deviations are anticipated.

E. All raw data (including laboratory reports) received by the Port during the past quarter and an identification of the source of the sample.

No raw laboratory data were received during this quarter.

F. A list of deliverables and activities for the upcoming quarter.

The next deliverable will be an annual 2023 monitoring report, which will document the ongoing landfill gas monitoring. Prompt notification will be provided to Ecology if methane gas is detected in excess of the 5 percent action level in the perimeter monitoring points in 2023.

Please contact me at (206) 787-3193 if you have any questions or comments about this report.

Sincerely,

Brick Spangler
Sr. Environmental Program Manager

Attachment 1 – 4Q22 Quarterly Landfill Gas Monitoring Results Memorandum
Attachment 2 – 4Q22 Quarterly Landfill Gas Cumulative Monitoring Results Tables
Attachment 3 – Semiannual Inspection of T-5 Ecology-lead Sites: 2022 Year-End Inspection – Fourth
Quarter 2022

cc: Paul Kalina, AECOM
Jamalyn Green, AECOM



ATTACHMENT 1

Landfill Gas Monitoring Results Memorandum



AECOM
1111 Third Avenue
Suite 1600
Seattle, WA 98101
aecom.com

Project name:
Terminal 5 CEM Landfill

Project ref:
60693871

From:
Paul Kalina

Date:
March 17, 2023

To:
Brick Spangler, Port of Seattle

CC:

Memo

**Subject: Terminal 5 Landfill Gas Collection System
Fourth Quarter 2022 Monitoring Results**

This memorandum summarizes the results of the quarterly monitoring at the Terminal 5 (T-5) Remediation Area 3 former landfill. The location of the former landfill in relation to nearby features is shown on Figure 1. The landfill gas collection system, soil gas probes, and system monitoring points are shown on Figure 2. A schematic cross-section through the landfill is shown on Figure 3.

Landfill Gas Monitoring

Gas concentrations were measured in the field using an LMS-40 or Landtec GEM 5000 gas analyzer. The landfill gas collection system is currently operating in passive mode. In December 2016, the system was transitioned to passive operation by replumbing the system discharge piping to bypass the blower and shutting the blower off.

The following locations were monitored during this quarter:

- Off-site soil gas probes located beyond the former landfill margin to the west along Harbor Avenue (SG-302, SG-303, SG-304, and SG-329);
- On-site soil gas probes located beyond the former landfill margin to the north, east, southeast, and south of the former landfill (VP-1, VP-3, VP-3, and VP-4, respectively); and
- System sampling ports located at various locations within the gas collection system piping (SP-01 through SP-13).

Results

Complete monitoring results are presented in Attachment 2. A summary of methane concentrations detected in the fourth quarter of 2022 is provided in the following sections.

Off-Site Soil Gas Probes

Methane was not detected in any of the off-site soil gas probes along Harbor Avenue (SG-302, SG-303, SG-304, and SG-329) this quarter.

On-Site Soil Gas Probes

In this quarter, methane was not detected soil gas probe VP-3, which is located beyond the former landfill margin to the south, respectively. Methane was detected below the action level of 5 percent in probes VP-1, VP-2, and VP-4, which are located beyond the former landfill margin to the north, southeast, and south, respectively. Methane ranged from 0.0 to 0.8 percent in VP-1, from 0.1 to 2.1 percent in VP-2, and from 0.4 to 2.2 percent in VP-4. No methane was detected in VP-3.

Collection System Sampling Ports

Methane levels inside the landfill, as reflected by the system sampling ports in the landfill gas collection piping, ranged widely from 0.4 to 71 percent, as would be expected. Readings from the flow meter at the system outlet indicated an average exhaust rate of less than one cubic foot per minute.

Conclusions

Bi-monthly monitoring was first conducted by AECOM on December 28, 2022. The remainder of 2022 monitoring presented in this report was provided by Haley & Aldrich, Inc., the former consultant to the Port of Seattle on this project. Due to the consistency of landfill gas monitoring data over time, it is proposed to reduce the current monitoring frequency of twice a month to a monitoring frequency of once a month. Landfill gas monitoring will continue to be conducted twice a month by AECOM until written approval to reduce the monitoring frequency is provided.

Attachments:

Figure 1 – Vicinity Map Showing Nearby Structures

Figure 2 – Site Plan

Figure 3 – Cap Schematic Cross Section

Figure 4 – Methane Monitoring Results



Legend

- Approximate Geomembrane Limits
- Existing Building

0 250 500 1,000 Feet



Port of Seattle, Southwest Harbor Terminal 5
Seattle, Washington

Vicinity Map Showing Nearby Structures

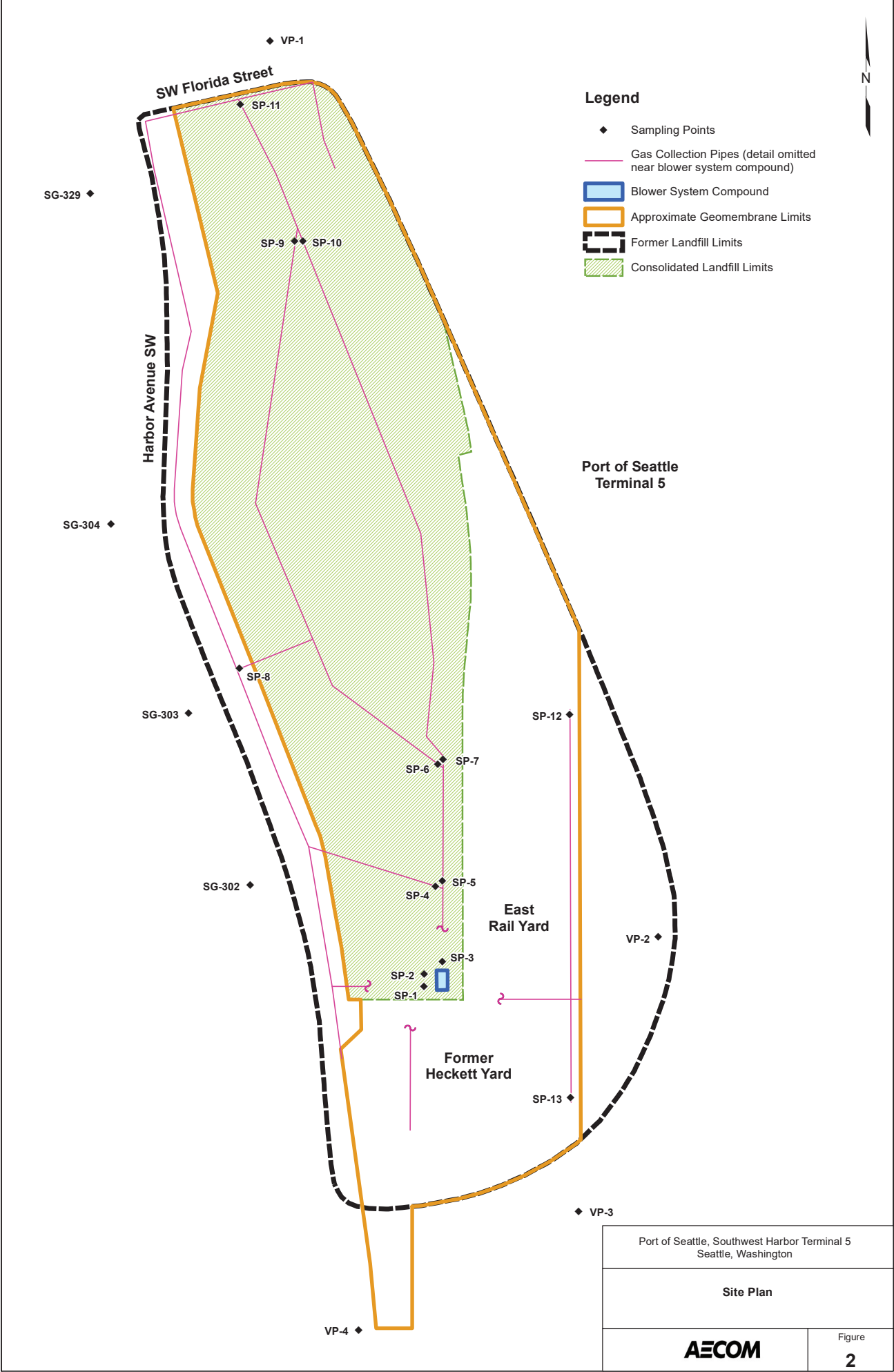
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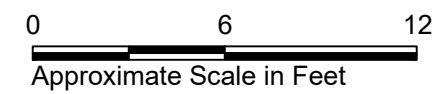
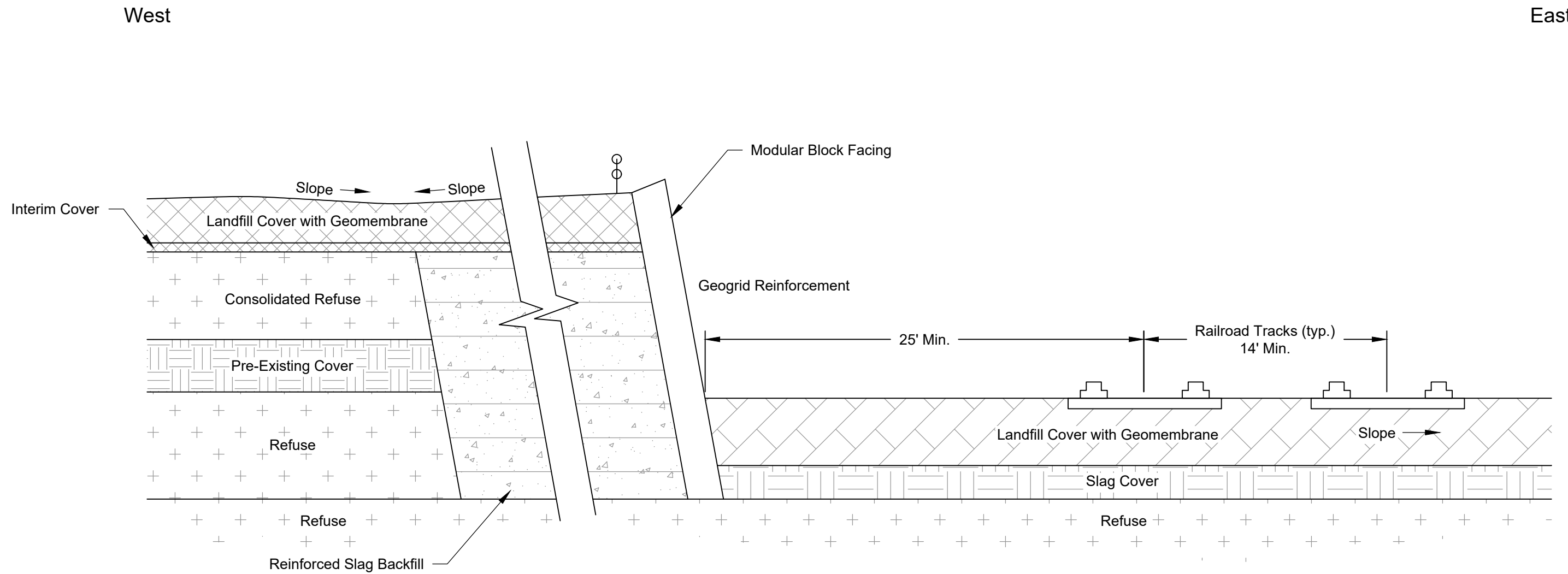
AECOM

Figure

1



File: \\na.aecomnet.com\files\AMER\Seattle-USSEA01\DCS\Projects\ENV\PROJECTS\WPort of Seattle\MELT01-5_T-10_T-18300 - Communications\H01762706\CAD\1762706-001 (XSec).dwg Layout:11x17 - H Date: 01-11-2023 Author: RaleanuP



Port of Seattle, Southwest Harbor Terminal 5
Seattle, Washington

Cap Schematic Cross Section

17627-06

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AECOM

Figure

3

Sources: Figure prepared from PDF "Cross Section - Final Landfill Cover System," created by Woodward-Clyde Consultants, dated 2/21/95.



ATTACHMENT 2

Landfill Gas Monitoring Results Tables

Terminal 5 / RA-3 Landfill Gas Monitoring

Parameter: METHANE

(LMS-40 or GEM 2000 instrument field measurement - percent by volume.)

Date	Off-Site Soil Gas Probes				On-Site Soil Gas Probes				Landfill Gas Collection System Monitoring Points												
	SG-302	SG-303	SG-304	SG-329	VP-1	VP-2	VP-3	VP-4	SP-01	SP-02	SP-03	SP-04	SP-05	SP-06	SP-07	SP-08	SP-09	SP-10	SP-11	SP-12	SP-13
12/28/22	0.00	0.00	0.00	0.00	0.80	0.80	0.00	N/A	30.10	9.70	58.40	64.90	57.60	58.00	43.40	25.20	51.10	54.10	N/A	14.40	16.80
12/14/22	0.00	0.00	0.00	0.00	0.00	2.10	0.00	2.20	0.40	18.70	49.60	53.40	70.80	63.20	59.20	16.20	60.90	63.40	30.50	0.70	9.80
11/17/22	0.00	0.00	0.00	0.00	0.00	0.30	0.00	2.20	1.10	15.60	50.30	51.00	68.90	61.70	54.60	15.30	64.30	65.50	32.10	2.20	15.20
10/19/22	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.40	0.70	10.40	48.20	48.20	68.30	60.80	53.20	17.10	64.30	62.60	30.80	0.90	17.30
10/06/22	0.00	0.00	0.00	0.00	0.00	2.10	0.00	2.10	0.80	20.20	8.30	54.60	70.60	56.70	60.10	18.20	63.80	65.50	30.70	0.80	19.30
09/22/22	0.00	0.00	0.00	0.00	0.00	2.30	0.00	2.10	0.70	18.70	50.40	55.10	72.40	60.10	58.90	16.50	63.40	63.50	32.10	0.80	17.80
09/08/22	0.00	0.00	0.00	0.00	0.00	2.40	0.00	0.30	0.80	15.30	51.60	54.10	70.30	62.30	59.20	17.30	60.60	65.40	32.10	3.10	16.40
08/11/02	0.00	0.00	0.00	0.00	0.00	0.90	0.20	3.10	0.90	15.40	51.30	52.90	69.80	58.90	56.70	16.30	61.20	60.80	32.60	2.00	19.40
07/28/22	0.00	0.00	0.00	0.00	0.00	0.70	0.00	3.00	0.80	16.40	49.70	55.80	69.30	59.70	57.80	15.00	59.70	62.30	33.00	1.80	22.30
07/13/22	0.00	0.00	0.00	0.00	0.00	0.10	0.00	2.80	0.70	20.60	48.40	54.80	70.20	60.20	55.10	15.20	60.80	65.60	31.20	1.60	18.90
06/22/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.70	0.60	21.30	47.60	55.30	71.50	63.40	56.30	16.20	63.80	64.80	31.50	0.70	16.40
06/10/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.30	0.60	17.30	50.40	56.40	71.40	65.40	56.40	16.90	63.80	65.40	30.80	0.90	15.40
05/27/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.40	0.50	16.80	46.30	57.80	70.90	66.20	57.80	18.10	65.40	65.50	33.20	2.60	17.80
05/12/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.50	0.80	14.80	47.80	51.60	70.60	63.40	57.60	17.30	64.40	64.30	32.40	2.50	20.90
04/29/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.60	0.70	15.40	51.30	50.80	71.50	65.60	58.90	15.40	67.30	66.20	32.50	0.80	18.70
04/06/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.70	0.80	15.70	51.40	51.20	72.30	63.50	56.70	15.80	66.50	65.40	32.20	0.70	17.60
03/18/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.50	0.60	16.30	49.70	54.60	69.80	59.80	59.60	15.80	64.30	63.70	32.40	0.80	15.00
03/03/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.60	0.60	17.40	48.30	54.30	68.90	58.90	58.60	14.30	60.50	63.80	31.80	0.60	20.90
02/18/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.30	0.70	15.60	46.70	55.70	70.30	62.50	60.10	17.30	61.20	60.90	30.90	3.10	21.60
02/03/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.50	0.30	20.10	50.20	55.80	70.20	63.20	57.80	18.20	59.80	65.20	33.20	0.60	22.00
01/21/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.70	0.40	17.30	51.40	55.30	70.50	60.10	57.60	16.40	59.70	64.80	32.80	0.50	15.80
01/06/22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.80	0.70	17.20	49.80	55.40	71.60	63.70	59.80	16.20	60.30	63.70	33.10	2.50	16.40
12/22/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.00	0.10	20.20	49.50	54.10	72.20	65.00	59.10	17.40	59.30	65.50	28.60	N/A	N/A
12/06/21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.70	13.70	50.30	56.80	70.30	63.20	54.20	16.50	60.10	66.20	30.90	N/A	N/A
12/02/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/11/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.30	0.50	17.30	51.90	55.30	71.40	56.20	61.20	18.70	64.80	64.10	33.40	N/A	N/A
10/28/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.80	0.20	12.60	48.20	24.50	69.20	57.80	58.60	20.40	63.20	63.80	32.20	N/A	N/A
09/30/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	3.10	0.80	25.00	51.60	54.80	70.10	65.40	59.00	15.30	68.60	66.00	32.30	2.10	19.60
09/17/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.40	0.10	22.20	50.90	54.30	68.20	59.80	62.11	18.70	59.80	65.20	4.60	3.80	16.50
08/27/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.30	0.70	17.50	52.60	55.60	72.30	73.80	65.90	21.30	66.60	63.30	33.60	5.30	22.70
08/05/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	2.70	0.70	12.40	52.30	28.70	73.80	67.10	63.40	22.00	64.00	63.20	32.00	0.20	19.00
07/22/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	0.50	0.20	12.30	40.80	54.30	76.50	57.40	59.70	19.10	63.90	67.10	29.80	5.30	22.90
06/30/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	4.10	0.10	15.40	58.30	61.40	69.70	69.30	49.70	22.80	47.80	63.00	21.20	10.20	26.50
06/10/21	0.00	0.00	0.00	0.00	0.00	N/A	N/A	3.20	0.00	21.60	46.50	54.10	68.10	59.30	58.00	14.90	65.60	69.10	31.00	3.50	15.80

Terminal 5 / RA-3 Landfill Gas Monitoring

Parameter: OXYGEN

(LMS-40 or GEM 2000 instrument field measurement - percent by volume.)

Date	Off-Site Soil Gas Probes				On-Site Soil Gas Probes				Landfill Gas Collection System Monitoring Points												
	SG-302	SG-303	SG-304	SG-329	VP-1	VP-2	VP-3	VP-4	SP-01	SP-02	SP-03	SP-04	SP-05	SP-06	SP-07	SP-08	SP-09	SP-10	SP-11	SP-12	SP-13
12/28/22	17.50	18.00	21.50	16.20	8.10	3.60	0.10	N/A	0.90	10.30	0.20	0.30	0.30	0.20	4.20	1.00	0.10	1.80	N/A	8.60	0.60
12/14/22	19.40	17.60	21.00	20.10	5.60	0.30	8.10	0.10	20.10	6.10	0.20	0.30	0.40	0.30	0.50	0.20	0.30	0.10	0.60	0.50	0.20
11/17/22	17.80	15.60	18.40	19.50	5.30	0.30	6.50	0.20	19.80	4.90	0.30	0.50	0.20	0.20	0.50	0.60	0.10	0.40	0.70	0.40	0.20
10/19/22	17.00	14.70	18.60	18.40	7.80	0.40	10.80	0.20	19.40	5.40	0.20	0.40	0.20	0.30	0.20	0.70	0.20	0.20	0.80	0.50	0.30
10/06/22	19.00	18.40	18.30	18.70	5.60	0.30	6.90	0.10	19.80	5.60	0.30	0.60	0.20	0.20	0.20	0.60	0.10	0.30	0.70	0.20	0.20
09/22/22	18.60	18.30	18.70	19.60	5.40	0.20	7.50	0.10	20.20	5.70	0.20	0.40	0.30	0.20	0.50	0.50	0.20	0.30	0.80	0.50	0.30
09/08/22	18.30	15.80	18.00	19.30	6.50	0.30	12.50	0.10	20.10	5.70	0.40	0.30	0.40	0.20	0.30	0.70	0.30	0.20	0.80	0.40	0.40
08/26/22	18.40	18.10	17.50	20.10	5.80	0.10	7.30	0.20	20.00	6.30	0.50	0.40	0.50	0.30	0.40	0.60	0.30	0.20	0.70	0.20	0.50
08/11/02	15.00	17.30	18.10	19.70	4.70	0.20	6.30	0.20	19.70	6.70	0.30	0.30	1.30	0.20	0.30	0.50	0.20	0.10	0.80	0.30	0.10
07/28/22	16.80	16.90	16.30	19.40	7.30	0.20	11.20	0.10	19.30	7.80	0.30	0.40	0.70	0.50	0.60	0.40	0.20	0.10	0.40	0.30	0.20
07/13/22	17.30	16.80	17.50	20.30	7.50	0.50	5.90	0.10	20.40	10.20	0.20	0.80	0.60	0.20	0.50	0.30	0.00	0.10	0.50	0.10	0.30
06/22/22	17.40	14.50	17.80	18.50	6.40	N/A	N/A	0.20	20.00	5.90	0.40	0.50	0.50	0.20	0.30	0.30	0.50	0.20	0.90	0.20	0.30
06/10/22	18.90	20.80	21.00	18.60	6.80	N/A	N/A	0.10	20.20	6.30	0.50	0.50	0.40	0.30	0.30	0.20	0.40	0.10	0.70	0.10	0.30
05/27/22	16.20	15.40	18.50	20.10	7.00	N/A	N/A	0.30	20.10	6.00	0.20	0.30	0.20	0.30	0.30	0.10	0.50	0.30	0.80	0.20	0.20
05/12/22	16.80	19.10	18.30	20.00	7.90	N/A	N/A	0.10	18.90	5.70	0.20	0.20	0.30	0.30	0.20	0.10	0.20	0.30	0.50	0.40	0.20
04/29/22	17.40	18.30	15.90	19.00	7.40	N/A	N/A	0.10	18.70	5.80	0.20	0.40	0.50	0.40	0.20	0.20	0.30	0.20	0.60	0.30	0.20
04/06/22	17.30	16.60	16.80	19.50	7.50	N/A	N/A	0.10	18.40	6.20	0.20	0.20	0.40	0.30	0.30	0.50	0.30	0.10	0.60	0.10	0.50
03/18/22	17.60	15.70	16.70	18.80	7.60	N/A	N/A	0.10	19.00	6.50	0.30	0.10	0.50	0.70	0.40	0.40	0.40	0.00	0.90	0.10	0.30
03/03/22	18.50	17.50	17.40	18.30	6.90	N/A	N/A	0.20	20.40	8.40	0.60	0.20	0.70	0.30	0.00	0.20	0.50	0.20	0.80	0.20	0.20
02/18/22	18.10	15.50	17.60	18.20	6.90	N/A	N/A	0.20	20.30	8.70	0.50	0.30	0.60	0.20	0.30	0.30	0.20	0.20	0.70	N/A	N/A
02/03/22	16.50	14.70	18.70	20.10	6.80	N/A	N/A	0.20	18.80	8.80	0.30	0.20	1.40	0.20	0.20	0.40	0.30	0.30	0.70	N/A	N/A
01/21/22	17.00	17.60	17.80	18.30	5.40	N/A	N/A	0.10	20.70	8.30	0.30	0.10	1.30	0.10	0.20	0.30	0.40	0.20	0.90	N/A	N/A
01/06/22	18.20	18.10	18.30	17.90	5.50	N/A	N/A	0.10	18.80	8.50	0.40	0.40	1.10	0.20	0.00	0.20	0.40	0.40	0.70	N/A	N/A
12/22/21	18.30	15.70	18.20	18.30	7.90	N/A	N/A	0.20	18.90	5.60	0.30	0.30	0.80	0.20	0.20	0.10	0.50	0.20	0.60	N/A	N/A
12/06/21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.70	8.60	0.60	0.40	1.00	0.30	0.20	0.20	0.50	0.20	0.50	N/A	N/A
12/02/21	15.70	19.20	19.50	20.10	3.20	N/A	N/A	0.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/11/21	17.60	18.10	14.50	20.50	6.70	N/A	N/A	0.10	20.80	5.70	0.50	0.30	1.10	0.30	0.30	0.60	0.40	0.40	0.60	N/A	N/A
10/28/21	19.30	20.40	15.40	19.80	5.30	N/A	N/A	0.10	20.70	7.30	0.20	0.10	0.40	0.20	0.40	0.70	0.50	0.20	0.70	N/A	N/A
09/30/21	19.10	18.70	18.70	20.00	6.80	NA	NA	0.20	18.70	20.60	0.30	0.30	0.30	0.30	0.40	0.80	0.50	0.20	0.70	11.20	0.20
09/17/21	17.80	18.10	18.20	20.60	5.90	NA	NA	0.10	18.80	6.10	0.40	0.40	1.00	0.20	0.60	0.60	0.40	0.40	0.60	0.40	0.50
08/27/21	18.60	14.60	17.50	18.30	5.40	NA	NA	0.10	18.10	5.80	0.60	0.60	0.30	0.30	0.50	0.40	0.20	0.20	0.90	0.40	0.10
08/05/21	18.60	17.40	20.10	18.60	11.50	NA	NA	0.10	20.40	8.30	0.10	0.10	1.10	0.10	1.00	0.00	0.30	0.10	0.70	0.20	0.20
07/22/21	17.10	15.70	14.50	19.30	5.40	NA	NA	2.30	20.30	8.40	0.70	0.80	0.80	2.10	0.20	0.70	0.20	0.30	3.70	0.10	0.30
06/30/21	18.20	16.30	15.10	18.40	7.40	NA	NA	1.20	18.40	5.20	0.40	0.10	0.90	0.40	0.20	0.20	0.40	0.20	0.10	0.10	0.90
06/10/21	17.60	21.90	15.80	19.40	4.10	NA	NA	0.30	18.50	8.60	0.20	0.10	0.10	0.60	0.50	0.20	0.30	0.10	0.20	0.60	0.30

(Gauge - inches of water.)

[illegible]

Terminal 5 / RA-3 Landfill Gas Monitoring

Parameter: CARBON DIOXIDE

(LMS-40 or GEM 2000 instrument field measurement - percent by volume.)

Date	Off-Site Soil Gas Probes				On-Site Soil Gas Probes				Landfill Gas Collection System Monitoring Points												
	SG-302	SG-303	SG-304	SG-329	VP-1	VP-2	VP-3	VP-4	SP-01	SP-02	SP-03	SP-04	SP-05	SP-06	SP-07	SP-08	SP-09	SP-10	SP-11	SP-12	SP-13
12/28/22	0.60	3.10	0.40	2.10	8.10	3.60	0.10	N/A	5.90	3.60	4.60	1.50	4.90	5.40	2.10	8.60	7.50	6.00	N/A	4.30	4.90
12/14/22	2.30	2.00	2.90	2.60	3.20	3.00	0.00	3.20	0.10	3.80	4.20	2.10	2.30	3.20	1.20	10.20	6.50	4.00	3.20	9.90	7.40
11/17/22	1.80	1.90	3.40	2.20	3.10	2.60	0.00	2.80	0.20	4.50	4.30	2.30	4.40	3.60	0.80	6.30	6.30	5.30	7.90	10.40	7.20
10/19/22	2.20	1.60	3.30	2.10	3.30	2.10	0.00	2.40	0.00	4.00	5.10	2.40	4.30	3.50	0.90	5.80	10.40	4.20	0.00	10.10	4.80
10/06/22	2.40	2.10	3.30	2.80	3.20	2.10	0.00	2.80	0.00	4.20	4.70	2.30	4.00	4.60	1.10	6.40	6.30	4.50	3.70	9.90	5.50
09/22/22	2.20	2.00	3.80	2.10	3.10	3.00	0.00	3.70	0.00	4.00	4.40	2.40	2.60	3.30	0.80	5.90	4.50	3.80	0.00	9.80	4.80
09/08/22	2.10	2.00	2.40	3.20	3.00	2.40	0.00	3.20	0.10	3.60	4.10	2.30	3.20	3.50	0.80	6.30	3.60	4.20	7.00	8.90	5.00
08/26/22	2.00	1.50	3.40	2.90	4.50	0.80	0.00	3.40	0.20	4.00	4.10	2.10	4.40	5.90	2.60	0.00	3.70	6.00	0.00	9.90	6.00
08/11/02	2.00	2.90	3.50	2.70	4.30	4.20	0.00	2.40	0.20	4.60	4.50	1.90	3.40	3.40	0.80	6.00	8.90	4.80	8.10	8.90	5.70
07/28/22	1.70	2.30	3.50	2.40	3.60	2.80	0.00	3.80	0.40	4.30	5.10	2.10	3.40	3.40	0.80	6.00	10.80	4.50	4.60	6.00	5.40
07/13/22	1.60	2.00	3.60	2.50	3.20	3.10	0.00	3.90	0.00	3.90	4.10	1.80	4.70	4.90	1.20	11.30	4.20	5.80	9.10	5.80	6.70
06/22/22	1.70	0.60	2.00	2.70	4.20	N/A	N/A	2.70	2.60	2.30	4.80	4.50	4.70	5.70	1.30	6.40	3.60	8.30	9.30	9.30	5.30
06/10/22	1.30	2.10	3.80	2.80	3.10	N/A	N/A	2.60	3.50	4.30	3.80	4.20	3.30	3.60	0.90	3.80	3.80	8.40	8.70	7.00	5.80
05/27/22	1.10	3.40	2.10	2.90	2.80	N/A	N/A	3.20	4.00	3.70	7.70	9.30	2.60	3.80	3.50	6.50	4.80	7.90	7.80	8.50	6.00
05/12/22	0.60	3.00	1.80	2.40	2.70	N/A	N/A	3.30	3.90	3.80	4.20	4.70	2.30	4.00	6.40	6.30	6.30	7.30	9.20	8.60	6.30
04/29/22	2.00	3.80	0.80	2.50	2.10	N/A	N/A	2.50	3.80	4.10	4.00	4.40	2.10	4.30	5.40	0.50	5.10	4.70	11.00	10.00	7.20
04/06/22	2.40	4.00	2.10	2.60	2.80	N/A	N/A	3.00	3.00	0.10	3.60	4.10	2.50	4.20	5.70	8.90	5.20	8.90	9.80	11.00	5.50
03/18/22	2.20	4.10	2.40	3.20	1.70	N/A	N/A	2.80	3.50	0.20	4.00	4.10	2.60	4.10	6.10	6.70	3.80	8.60	9.70	12.00	5.40
03/03/22	2.10	0.30	3.40	0.40	1.60	N/A	N/A	2.70	4.00	0.20	4.60	4.50	2.20	3.60	2.30	12.30	4.50	9.30	10.30	N/A	N/A
02/18/22	0.10	3.20	3.50	2.50	1.50	N/A	N/A	2.10	3.40	4.40	3.90	4.10	2.20	3.20	4.30	11.20	7.60	9.60	8.40	N/A	N/A
02/03/22	1.40	3.40	3.60	2.40	0.00	N/A	N/A	2.20	0.00	2.60	2.30	4.80	2.10	3.80	5.80	7.90	4.20	10.20	8.30	N/A	N/A
01/21/22	1.70	3.00	2.00	2.50	2.80	N/A	N/A	2.80	4.50	0.70	5.50	6.10	2.50	3.60	4.50	7.80	4.30	11.30	4.50	N/A	N/A
01/06/22	1.30	3.80	1.90	2.50	2.40	N/A	N/A	27.00	3.20	5.40	3.60	3.90	2.70	3.40	6.00	10.80	3.90	8.20	10.20	N/A	N/A
12/22/21	2.20	4.00	2.40	2.20	0.00	N/A	N/A	3.10	0.00	6.20	4.50	4.30	2.80	3.80	5.70	11.10	3.80	11.00	10.20	N/A	N/A
12/06/21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	4.60	3.20	4.20	2.10	3.80	6.00	10.90	4.10	8.70	11.00	N/A	N/A
12/02/21	3.10	5.00	3.00	3.10	3.00	N/A	N/A	2.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/11/21	1.40	4.30	2.10	2.50	3.10	N/A	N/A	3.20	0.00	7.90	5.80	0.90	3.60	3.50	4.20	12.50	3.20	9.10	8.60	N/A	N/A
10/28/21	1.00	4.50	1.60	2.40	0.30	N/A	N/A	2.70	0.00	8.10	2.40	3.20	2.60	3.60	2.30	8.60	3.70	8.90	9.40	N/A	N/A
09/30/21	2.00	4.40	2.20	2.50	0.00	NA	NA	2.30	0.00	4.40	5.60	4.70	2.30	3.60	5.20	11.40	3.70	7.00	10.60	10.80	5.20
09/17/21	3.30	5.40	2.40	3.20	5.60	NA	NA	3.10	0.00	8.10	7.10	0.30	3.20	3.80	4.10	6.80	4.80	5.10	10.00	11.70	5.60
08/27/21	1.00	3.60	3.10	2.60	3.20	NA	NA	2.60	0.20	12.20	2.30	0.50	3.50	3.90	3.30	0.00	5.30	4.90	11.00	10.50	6.10
08/05/21	1.20	6.50	2.80	3.20	1.80	NA	NA	3.10	0.10	7.30	3.90	4.20	2.90	4.90	6.30	4.50	11.60	4.40	8.00	10.60	6.20
07/22/21	2.30	4.70	2.20	2.40	4.20	NA	NA	2.80	0.10	10.50	8.10	2.60	4.10	6.00	2.70	11.60	4.20	8.90	6.20	10.20	6.30
06/30/21	3.80	3.00	3.50	2.10	0.00	NA	NA	2.90	0.50	6.10	5.20	3.40	2.50	4.70	4.80	12.30	7.10	11.60	5.30	11.10	5.60
06/10/21	2.10	4.50	2.20	2.10	6.80	NA	NA	3.20	0.20	5.20	6.40	2.10	3.90	4.20	2.40	11.30	3.60	5.90	8.90	6.00	4.10

Terminal 5 / RA-3 Landfill Gas Monitoring

Parameter: TEMPERATURE

(IR thermometer, degrees Fahrenheit)

Date	Landfill Gas Collection System Monitoring Points												
	SP-01	SP-02	SP-03	SP-04	SP-05	SP-06	SP-07	SP-08	SP-09	SP-10	SP-11	SP-12	SP-13
12/28/22	52.10	55.60	52.90	54.90	54.50	52.90	53.50	N/A	50.40	50.80	49.60	48.30	49.40
12/14/22	65.60	54.20	63.40	61.00	60.20	59.10	62.50	63.60	69.30	67.80	68.30	69.10	69.00
11/17/22	68.30	56.40	63.20	62.40	60.30	60.20	63.50	64.10	63.70	68.10	69.80	70.00	68.90
10/19/22	69.70	70.00	68.00	68.40	63.80	67.90	66.80	68.10	68.90	73.80	72.30	68.70	69.70
10/06/22	64.30	68.50	67.50	63.40	67.00	64.20	71.40	74.30	75.40	70.20	72.00	73.00	72.90
09/22/22	66.70	66.70	67.20	62.10	66.50	65.20	72.00	72.50	71.60	70.00	73.40	73.00	76.50
09/08/22	65.40	65.10	65.00	63.70	65.40	63.00	72.40	73.00	70.60	69.10	73.60	73.22	74.60
08/26/22	65.00	63.00	65.00	62.00	66.00	63.00	79.00	74.00	73.00	68.00	72.00	73.00	75.30
08/11/02	72.00	69.00	68.00	64.00	61.00	65.00	75.30	75.60	69.80	78.20	71.60	65.00	68.00
07/28/22	71.00	73.00	73.00	70.00	73.00	69.00	73.70	72.30	66.00	66.00	65.60	70.50	71.00
07/13/22	74.10	73.00	71.80	78.80	79.80	78.00	79.10	77.40	79.20	78.20	78.10	70.30	70.00
06/22/22	73.00	76.00	78.80	79.00	86.00	78.00	75.50	73.40	78.20	73.00	75.30	73.40	74.00
06/10/22	81.30	85.30	65.60	64.90	66.20	60.90	70.00	77.00	76.00	65.00	68.00	52.80	48.70
05/27/22	73.70	72.30	62.60	60.70	73.90	67.00	66.20	71.30	71.80	70.50	71.00	51.30	50.70
05/12/22	70.30	68.70	66.00	65.60	64.90	52.00	53.00	51.00	52.00	56.00	56.00	44.30	48.00
04/29/22	69.00	69.00	63.10	62.60	60.70	58.00	59.00	59.00	60.00	59.00	60.00	48.20	51.40
04/06/22	59.00	61.00	58.00	58.00	51.00	55.00	56.00	51.00	58.00	51.00	58.00	54.10	50.70
03/18/22	58.00	53.00	53.00	53.00	54.00	55.00	55.00	52.00	59.00	54.00	51.00	50.00	51.00
03/03/22	58.00	54.00	54.00	55.00	51.00	51.00	50.00	52.00	53.00	53.00	53.00	51.00	58.00
02/18/22	48.00	50.00	50.00	50.00	49.00	46.00	54.00	49.00	51.00	49.00	48.00	54.00	54.00
02/03/22	54.00	57.00	52.00	50.00	47.00	48.00	61.00	53.00	63.00	60.00	60.00	51.00	55.00
01/21/22	61.00	51.00	56.00	58.00	53.00	58.00	48.00	51.00	58.00	61.00	60.00	49.00	49.00
01/06/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	47.00	48.00
12/22/21	62.10	54.00	60.20	58.20	56.70	60.00	60.20	61.00	60.10	62.10	61.40	N/A	N/A
12/06/21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	62.10	63.50	60.20	N/A	N/A
11/11/21	65.70	54.40	63.20	61.40	60.20	59.20	62.80	63.60	N/A	N/A	N/A	N/A	N/A
10/28/21	68.40	56.20	63.40	62.00	60.30	60.10	63.50	64.10	63.70	68.10	69.80	N/A	N/A
09/30/21	67.90	70.10	70.80	68.10	63.80	67.90	66.50	70.10	68.90	73.80	72.30	68.70	69.70
09/17/21	72.20	77.00	69.80	70.20	67.90	71.50	71.30	66.70	70.90	76.50	72.00	68.40	70.10
08/27/21	74.20	80.00	71.20	72.30	68.80	76.40	67.80	65.10	68.20	78.70	71.70	66.90	71.80
08/05/21	68.00	70.20	68.70	69.80	65.20	68.80	66.50	68.90	63.90	71.50	71.20	69.90	70.20
07/22/21	73.20	76.60	73.50	69.80	68.70	75.60	65.40	74.30	79.60	75.80	72.80	71.20	75.50
06/30/21	70.90	75.60	71.20	70.10	69.30	68.50	67.90	74.10	70.60	75.60	78.60	72.30	71.30
06/10/21	66.50	61.10	62.40	69.80	71.10	62.30	65.00	70.20	62.50	69.80	65.40	68.30	67.20



ATTACHMENT 3

Semiannual Inspection of T-5 Ecology-lead Sites: 2022 Year-End Inspection – Fourth Quarter 2022

Port of Seattle: Terminal 5 Cap Inspection Report

RA-1 (FORMER BURLINGTON NORTHERN BUCKLEY YARD PROPERTY), RA-2, RA-3, INSPECTION FORM FOR PAVEMENT AND BALLAST COVERS, SURFACE WATER COLLECTION SYSTEMS, AND SECURITY SYSTEMS

Name of Inspector: Vaish Komaravolu, EIT (Haley & Aldrich), Jamalyn Green (AECOM), Paul Kalina (AECOM), Gus Freidman (AECOM), and Cary Brown (AECOM)

Date (D/M/Y): 11/21/2022

Title: Civil/Environmental Engineers

Employer: Haley & Aldrich, Inc. and AECOM

FORMER RA-1 BUCKLEY YARD, RA-2 AND RA-3 PAVEMENT AND BALLAST COVERS

1. Inquire about condition of pavement and ballast covers including location(s) of any penetrations, cracks, tears, gouges, persistent ponding of water on pavement or around surface water collection system components. Inquire about condition of security fencing and security measures effectiveness. A summary of findings is described below, including location, nature of the problem, and possible corrective actions.

Haley & Aldrich, Inc. (Haley & Aldrich) staff performed this inspection in November 2022. Some tenant activity was occurring within the terminal area during the inspection; this activity was generally located in the south end of the original Terminal 5 area and the former Salmon Bay Steel North property (Remediation Area 2 [RA-2]). Gate and access security to the terminal continues to be maintained; a guard continues to control access at the terminal entrance.

Our inspection consisted of examining cap surfaces, select drainage features, fencing, and access controls (e.g., locks), at the former Burlington Northern Buckley Yard (BNBY) property (RA-1), RA-2, and the former Seattle Steel Inc. (SSI) property (RA-3).

The chain-link security fencing surrounding the consolidated landfill was examined. Most of the vegetation along the fence on the west and south sides of the landfill has been removed, aiding in this inspection.

2. Inspect pavement and ballast covers, observable surface water collection system components, and site security measures. Identify areas which represent potential pathways for infiltration of surface water through pavement. Include exact location, the nature of the problem, and possible corrective actions. Estimate percentage of pavement with surficial cracks (cracks that do not completely penetrate pavement cover) if surficial cracking appears prevalent. If large areas of site pavement are inaccessible at the time of inspection due to container placement or site activities, identify these locations. Inspect surface water collection system catch basins and identify maintenance (clean out) or possible repair requirements. Also inspect perimeter fencing and comment on site security measures. A summary of findings is described below, including location, nature of the problem, and possible corrective actions.

The pavements, ballast covers, fencing, and surface features associated with the stormwater drainage systems were examined during this inspection. Some ponding as a result of depressions on the asphalt layer was observed in the consolidated landfill area (Attachment 1: map note 4; Attachment 2: photo 4). The depressions are likely the result of previously stored equipment or machinery.

Vegetation growth was observed in the drainage swale at three locations impacting the function of the existing stormwater drainage system (Attachment 1: map notes 1, 2, and 3; Attachment 2: photos 1, 2, and 3).

There were no signs of erosion or exposure of the underlying consolidated landfill liner during this inspection.

The landfill cover area east of Harbor Avenue SW and outside of the fenced consolidated landfill area was checked for signs of erosion. No erosion was observed in this area.

3. Immediately contact Port of Seattle Environmental Manager at (206) 787-3193 if any crack, tear, or hole is present in the pavement or ballast cover that provides direct contact to subsurface soils. Penetrations through the cap/covers that provide direct contact to subsurface soils require immediate repair. Minor surficial pavement cracks are to be repaired on a more routine maintenance schedule but on a schedule that prevents exacerbation of cracking to allow infiltration of surface water or direct contact with subsurface soils.

No large cracks, holes, or penetrations through the cap/cover were observed during the inspection.

RAILROAD TRACK AREA

Ballast covering ties, shoulders as designed: Y

Ballast rutted or uneven, requiring regrading: N

Repair Type/Location: Not applicable.

PAVEMENT AREA

Open cracks and/or ruts: None _____ Repair needed _____

Surface Drainage (ponding): None _____ Repair needed _____

Repair Type/Location: Not applicable.

SURFACE WATER COLLECTION

Slow drainage or ponding at catch basin: None X Repair needed _____

Ponding in other areas: None X Repair needed _____

Maintenance/Repair Type/Location: Vegetation growth in drainage swale of the consolidated landfill should be removed to aid with stormwater drainage.

SITE SECURITY

Signs, fence & gates in place Yes X Repair needed _____

Repair Type/Location: Not applicable.

4. Sketch site. Attach a site sketch indicating areas inspected, locations of problem areas (prevalent surface cracking in pavement, etc.), and inaccessible areas. Include photographs of problem areas if appropriate.

A map (Attachment 1) and photos (Attachment 2) are attached showing locations and issues noted in this inspection report.

CONSOLIDATED LANDFILL COVER

1. Inspect the cover surface semi-annually to check for erosion and any areas of ponding. If erosion extends to the depth of the geotextile layer, the geotextile must be inspected for any damage (punctures, tears, bulging, etc.) and repaired in accordance with the Field Quality Control Manual. The Port's Environmental Specialist shall be notified regarding any damage or alteration to the landfill cover or surface water collection systems.

Does erosion of the cover exist in any form resulting in the potential for exposure of the underlying geotextile layer? ☐ YES ☒ NO

No erosion was observed during this inspection.

Are there areas of persistent ponding of water that result from depressions in the pavement surface or from lack of catch basin/storm drain maintenance?

☐ YES ☒ NO

Note any problem areas on an attached site sketch or map and include photographs as needed.

Water ponding was observed in the consolidated landfill area

SUMMARY OF RECOMMENDATIONS

The conditions identified in this report requiring follow-up actions are listed below:

Condition Noted	Map (Attachment 1) reference	Recommendation
Vegetation growth along the drainage swale	1, 2, 3	Remove vegetation from these locations during maintenance. Check during future inspections.
Ponding water	4	Check during future inspections

List attachments:

Attachment 1. Figure: TERMINAL 5 ECOLOGY-LED REMEDIATION AREAS LOCATIONS OF OBSERVATIONS NOTED IN 2022 YEAR END CAP INSPECTION

Attachment 2. Select Inspection Photographs

C:\GIS\haleyaldrich.com\share\sea_projects\Notebooks\1762706_Erw_Services_Harbor_Island_and_T-5\GIS\Maps\2022_12\202557_000_000_1_YEAR_END_INSPECTION.mxd - mscweitzer - 12/27/2022 12:34:12 PM



SITE PHOTO DETAILS

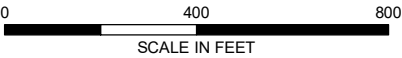
- 1 - VEGETATION GROWTH
- 2 - VEGETATION GROWTH
- 3 - VEGETATION GROWTH
- 4 - PONDING WATER

LEGEND

○ SITE PHOTO

NOTES

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 2. AERIAL IMAGERY SOURCE: NEARMAP, 28 AUGUST 2020



**HALEY
ALDRICH**

PORT OF SEATTLE, SOUTHWEST HARBOR TERMINAL 5
SEATTLE, WASHINGTON

TERMINAL 5 ECOLOGY-LED
REMEDATION AREAS LOCATIONS OF
OBSERVATIONS NOTED IN 2022
YEAR END CAP INSPECTION

DECEMBER 2022

ATTACHMENT 1



Photo 1: Vegetation overgrowth obstructing drainage swale (Figure 1, Note 3).



Photo 2: Vegetation overgrowth obstructing drainage swale (Figure 1, Note 4).



Photo 3: Vegetation overgrowth obstructing drainage swale (Figure 1, Note 5).



Photo 4: Ponding water (Figure 1, Note 6).