March 26, 2019

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

Subject: Fourth Quarter 2018 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 contains the combined 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 October, November, and December 2018. 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 (see previous Progress Reports for additional details).

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

Biweekly Landfill Monitoring:

Two detections of methane occurred in the SG sampling points located along Harbor Avenue SW during the reporting period. The first detection was a measurement of 11 percent in sampling port SG-329 on November 20, 2018. Three subsequent bi-weekly non-detect measurements were obtained following this detection; therefore, this detection was thought to be anomalous. The second detection was in sampling point SG-303 on December 11, 2018. This detection of 0.3 percent was well below the lower explosive limit (LEL) of five percent. All other SG sampling points along Harbor Avenue SW were non-detect.

On November 19, 2018, four permanent soil vapor probes were installed per Ecology's recommendations. The Soil Vapor Probe Installation Summary memorandum is dated February 15, 2019. Vapor probes VP-1, VP-2, VP-3, and VP-4 were installed to further assess potential subsurface methane gas migration to the north, south, and east of the capped former landfill. Methane concentrations measured at these locations were below the LEL of five percent. The SG sampling results and these new vapor probe results indicate that methane concentrations are below the action level of 5 percent beyond the former landfill boundary.

A vicinity map showing the landfill relative to nearby structures is included as Figure 1; a site map showing the extent of the consolidated landfill, extent of the former landfill area, sampling probe/port locations, and the extent of the landfill cap is included as Figure 2; a representative schematic cross section of typical

landfill cap construction is included as Figure 3; and a map showing methane concentrations since January 2018 is included as Figure 4.

The fourth quarter monitoring results are discussed further in Attachment 1 and monitoring results are presented in Attachment 2.

We will reevaluate the monitoring results and make recommendations as necessary in the next quarterly monitoring report.

Semiannual Inspection: The semiannual inspection of site pavement caps, drainage, ballast cover areas, fencing, and warning signs was conducted on January 9 and 11, 2019 (Attachment 3).

The next semiannual inspection is scheduled for the second quarter of 2019.

B. Detailed description of any deviations from the required tasks not otherwise documented 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.

One monitoring event was completed during October 2018 due to scheduling issues – although the event was made up on November 2, 2018 – making it three monitoring events during the month of November. 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 was received during this quarter.

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

The next routine deliverable will be a letter summarizing the monitoring performed during the first quarter of 2019, and will be titled, First Quarter 2019 Progress Report, Remediation Areas 1, 2, 3, and 5. This progress report will summarize our updated monitoring plan per Ecology's request. As requested in your email dated June 30, 2017, all sampling points, including any newly installed sampling ports, will be included in the monitoring plan and biweekly monitoring will continue until monitoring results indicate stable methane concentrations.

The next semiannual inspection of site pavement caps, drainage, ballast cover areas, fencing, and warning signs is scheduled for the second quarter of 2019.

Please contact me at (206) 787-3193 if you have any questions or comments about our activities at the SWHP site.

Sincerely,

Brick Spangler
Sr. Environmental Program Manager

Attachments:
Figure 1 – Vicinity Map Showing Nearby Structures
Figure 2 – Site Plan
Figure 3 – Cap Schematic Cross Section
Figure 4 – Methane Monitoring Results
Attachment 1 – Terminal 5 Landfill Gas Collection and Treatment System Monitoring Results Memorandum – Fourth Quarter 2018
Attachment 2 – Terminal 5 Landfill Gas Collection and Treatment System Monthly Monitoring Results Tables – Fourth Quarter 2018
Attachment 3 – Semiannual Inspection of T-5 Ecology-lead Sites: 2018 Year-End Inspection – Fourth Quarter 2018

cc: Warren Hansen – Windward Environmental, LLC
Mark Dagel – Hart Crowser, Inc.

Legend

Approximate Geomembrane Limits

0 250 500 1,000 Feet

N

Port of Seattle, Southwest Harbor Terminal 5
Seattle, Washington

Vicinity Map Showing Nearby Structures

17627-06 1/19

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Figure
1

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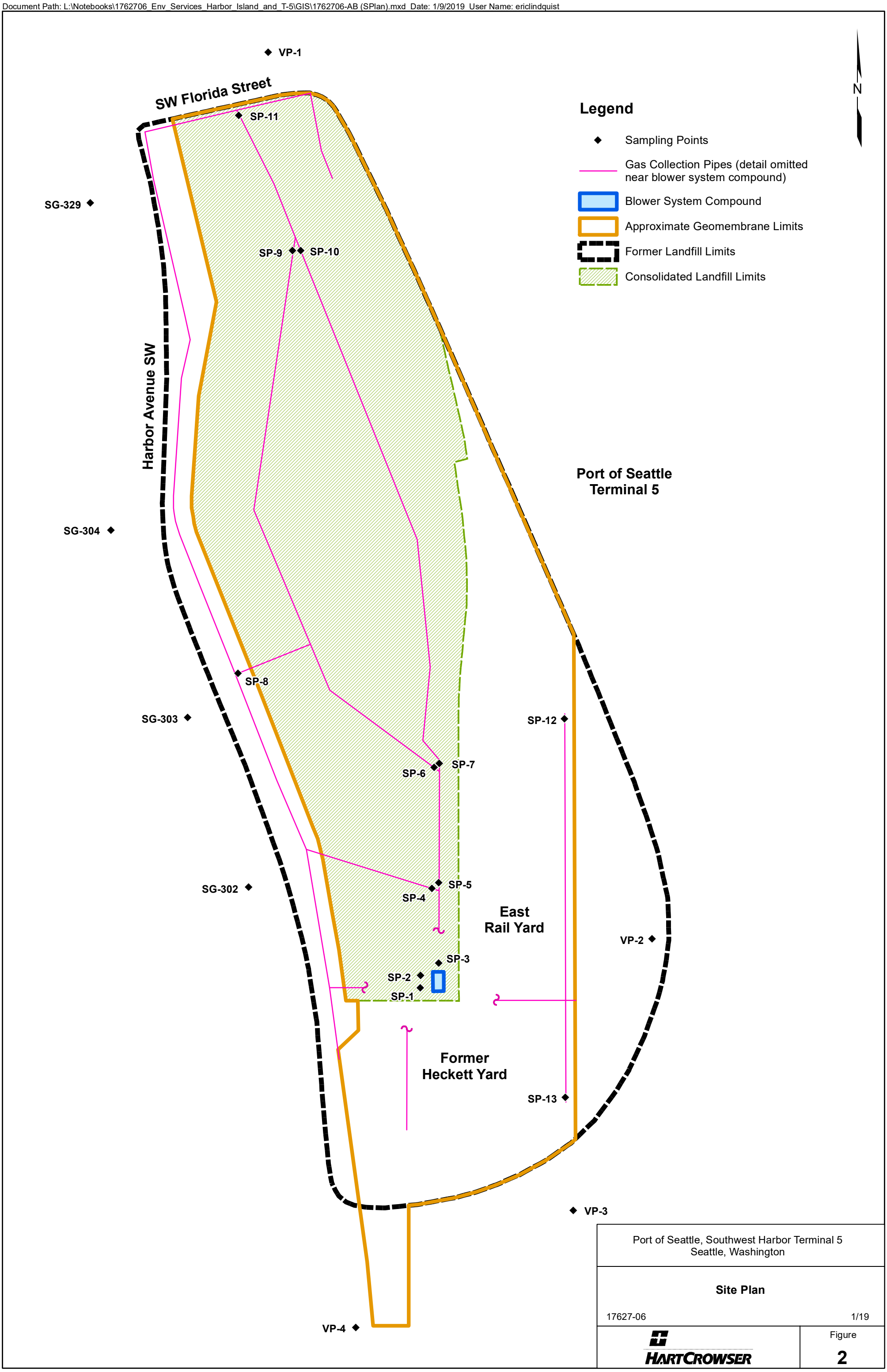

Port of Seattle, Southwest Harbor Terminal 5
Seattle, Washington

Site Plan

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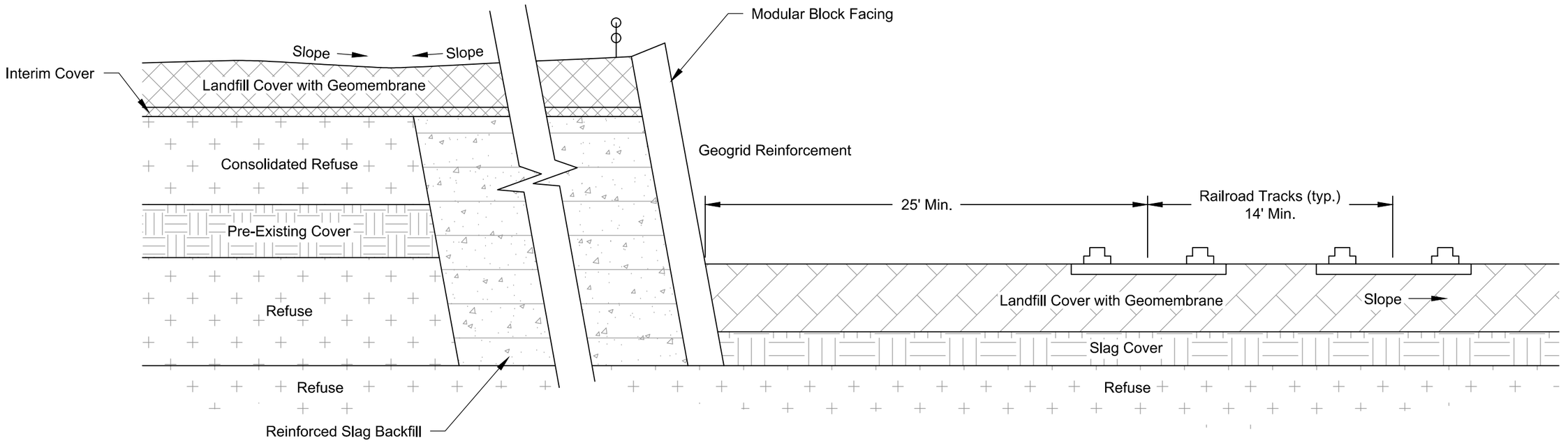
Figure
2

West

East



0 6 12

Approximate Scale in Feet

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

Port of Seattle, Southwest Harbor Terminal 5
Seattle, Washington

Cap Schematic Cross Section

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Figure
3

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Document Path: L:\Notebooks\1762706_Env_Services_Harbor_Island_and_T-5\GIS\1762706-AC (SPlan).mxd Date: 1/9/2019 User Name: ericlindquist

N

Street

SW

SG-329			
Date	Methane	Date	Methane
12/26/18	0	6/15/18	0
12/11/18	0	6/1/18	0
11/30/18	0	5/11/18	0
11/20/18	11	4/26/18	0
11/2/18	0	4/6/18	0
10/8/18	0	3/7/18	0
9/21/18	0	2/21/18	0
9/7/18	0	2/5/18	0
7/30/18	0	1/24/18	0
7/13/18	0	1/9/18	0
6/29/18	0		

VP-1	
Date	Methane
12/26/18	0
12/11/18	0
11/30/18	0

SP-11			
Date	Methane	Date	Methane
12/26/18	35.0	6/15/18	15.0
12/11/18	57.0	6/1/18	30.0
11/30/18	45.0	5/11/18	39.0
11/20/18	53.0	4/26/18	43.5
11/2/18	35.5	4/6/18	44.0
10/8/18	46.0	3/7/18	36.0
9/21/18	46.0	2/21/18	31.0
9/7/18	44.5	2/5/18	37.5
7/30/18	43.0	1/24/18	40.5
7/13/18	0.0	1/9/18	37.0
6/29/18	9.4		

SP-09			
Date	Methane	Date	Methane
12/26/18	5.7	6/15/18	59.0
12/11/18	65.0	6/1/18	57.0
11/30/18	50.0	5/11/18	57.0
11/20/18	66.0	4/26/18	59.0
11/2/18	47.0	4/6/18	--
10/8/18	63.0	3/7/18	49.0
9/21/18	63.0	2/21/18	59.0
9/7/18	61.0	2/5/18	50.0
7/30/18	59.0	1/24/18	59.0
7/13/18	55.0	1/9/18	52.0
6/29/18	55.0		

SP-10			
Date	Methane	Date	Methane
12/26/18	67.0	6/15/18	60.0
12/11/18	65.0	6/1/18	58.0
11/30/18	65.0	5/11/18	60.0
11/20/18	68.0	4/26/18	60.0
11/2/18	58.0	4/6/18	59.0
10/8/18	63.0	3/7/18	58.0
9/21/18	63.0	2/21/18	64.0
9/7/18	63.0	2/5/18	60.0
7/30/18	60.0	1/24/18	60.0
7/13/18	59.0	1/9/18	60.0
6/29/18	59.0		

SG-304			
Date	Methane	Date	Methane
12/26/18	0	6/15/18	0
12/11/18	0	6/1/18	0
11/30/18	0	5/11/18	0
11/20/18	0	4/26/18	0
11/2/18	0	4/6/18	0
10/8/18	0	3/7/18	0
9/21/18	0	2/21/18	0
9/7/18	0	2/5/18	0
7/30/18	0	1/24/18	0
7/13/18	0	1/9/18	0
6/29/18	0		

SP-07			
Date	Methane	Date	Methane
12/26/18	59.0	6/15/18	54.0
12/11/18	59.0	6/1/18	52.0
11/30/18	57.0	5/11/18	50.0
11/20/18	59.0	4/26/18	52.0
11/2/18	46.5	4/6/18	51.0
10/8/18	59.0	3/7/18	50.0
9/21/18	61.0	2/21/18	52.0
9/7/18	61.0	2/5/18	54.0
7/30/18	57.0	1/24/18	54.0
7/13/18	56.0	1/9/18	51.0
6/29/18	56.0		

SP-08			
Date	Methane	Date	Methane
12/26/18	0.0	6/15/18	27.5
12/11/18	52.0	6/1/18	0.7
11/30/18	33.0	5/11/18	6.6
11/20/18	46.0	4/26/18	0
11/2/18	21.5	4/6/18	45.5
10/8/18	40.0	3/7/18	43.5
9/21/18	42.0	2/21/18	23.0
9/7/18	33.0	2/5/18	17.5
7/30/18	28.5	1/24/18	34.5
7/13/18	20.5	1/9/18	17.0
6/29/18	8.0		

SP-06			
Date	Methane	Date	Methane
12/26/18	65.0	6/15/18	66.0
12/11/18	68.0	6/1/18	57.0
11/30/18	66.0	5/11/18	68.0
11/20/18	69.0	4/26/18	65.0
11/2/18	58.0	4/6/18	64.0
10/8/18	67.0	3/7/18	62.0
9/21/18	69.0	2/21/18	60.0
9/7/18	69.0	2/5/18	61.0
7/30/18	70.0	1/24/18	61.0
7/13/18	68.0	1/9/18	60.0
6/29/18	69.0		

SP-12			
Date	Methane	Date	Methane
12/26/18	9.7	6/15/18	10.5
12/11/18	37.0	6/1/18	4.0
11/30/18	44.0	5/11/18	2.5
11/20/18	15.0	4/26/18	38.0
11/2/18	3.8	4/6/18	41.0
10/8/18	16.0	3/7/18	31.0
9/21/18	17.5	2/21/18	10.0
9/7/18	10.5	2/5/18	5.7
7/30/18	5.2	1/24/18	31.5
7/13/18	12.5	1/9/18	14.5
6/29/18	8.5		

SG-303			
Date	Methane	Date	Methane
12/26/18	0	6/15/18	0
12/11/18	0.3	6/1/18	0
11/30/18	0	5/11/18	0
11/20/18	0	4/26/18	0
11/2/18	0	4/6/18	0
10/8/18	0	3/7/18	0
9/21/18	0	2/21/18	0
9/7/18	0	2/5/18	0
7/30/18	0	1/24/18	0
7/13/18	0	1/9/18	0
6/29/18	0		

SP-04			
Date	Methane	Date	Methane
12/26/18	64.0	6/15/18	63.0
12/11/18	69.0	6/1/18	27.5
11/30/18	68.0	5/11/18	60.0
11/20/18	69.0	4/26/18	61.0
11/2/18	47.0	4/6/18	62.0
10/8/18	66.0	3/7/18	59.0
9/21/18	67.0	2/21/18	65.0
9/7/18	67.0	2/5/18	60.0
7/30/18	66.0	1/24/18	60.0
7/13/18	65.0	1/9/18	56.0
6/29/18	64.0		

SP-05			
Date	Methane	Date	Methane
12/26/18	65.0	6/15/18	65.0
12/11/18	60.0	6/1/18	25.0
11/30/18	66.0	5/11/18	66.0
11/20/18	69.0	4/26/18	63.0
11/2/18	57.0	4/6/18	63.0
10/8/18	66.0	3/7/18	61.0
9/21/18	68.0	2/21/18	59.0
9/7/18	68.0	2/5/18	60.0
7/30/18	68.0	1/24/18	60.0
7/13/18	66.0	1/9/18	59.0
6/29/18	65.0		

SG-302			
Date	Methane	Date	Methane
12/26/18	0	6/15/18	0
12/11/18	0	6/1/18	0
11/30/18	0	5/11/18	0
11/20/18	0	4/26/18	0
11/2/18	0	4/6/18	0
10/8/18	0	3/7/18	0
9/21/18	0	2/21/18	0
9/7/18	0	2/5/18	0
7/30/18	0	1/24/18	0
7/13/18	0	1/9/18	0
6/29/18	0		

SP-03			
Date	Methane	Date	Methane
12/26/18	57.0	6/15/18	64.0
12/11/18	68.0	6/1/18	0
11/30/18	66.0	5/11/18	59.0
11/20/18	68.0	4/26/18	62.0
11/2/18	48.0	4/6/18	62.0
10/8/18	66.0	3/7/18	60.0
9/21/18	67.0	2/21/18	58.0
9/7/18	66.0	2/5/18	46.0
7/30/18	65.0	1/24/18	59.0
7/13/18	64.0	1/9/18	54.0
6/29/18	60.0		

VP-2	
Date	Methane
12/26/18	2.2
12/11/18	3.0
11/30/18	2.9

SP-02			
Date	Methane	Date	Methane
12/26/18	40.0	6/15/18	50.0
12/11/18	49.0	6/1/18	3.9
11/30/18	48.0	5/11/18	4.7
11/20/18	52.0	4/26/18	50.0
11/2/18	24.5	4/6/18	53.0
10/8/18	49.0	3/7/18	48.0
9/21/18	51.0	2/21/18	43.5
9/7/18	51.0	2/5/18	45.0
7/30/18	51.0	1/24/18	46.0
7/13/18	48.0	1/9/18	2.7
6/29/18	44.5		

SP-01			
Date	Methane	Date	Methane
12/26/18	22.5	6/15/18	38.0
12/11/18	60.0	6/1/18	20.0
11/30/18	33.0	5/11/18	24.0
11/20/18	43.0	4/26/18	34.0
11/2/18	10.5	4/6/18	36.0
10/8/18	32.5	3/7/18	30.5
9/21/18	37.0	2/21/18	21.0
9/7/18	40.0	2/5/18	25.0
7/30/18	41.0	1/24/18	36.0
7/13/18	40.0	1/9/18	40.5
6/29/18	41.0		

SP-13			
Date	Methane	Date	Methane
12/26/18	12.5	6/15/18	28.0
12/11/18	18.0	6/1/18	28.0
11/30/18	20.0	5/11/18	25.5
11/20/18	20.0	4/26/18	21.0
11/2/18	11.0	4/6/18	22.0
10/8/18	22.0	3/7/18	19.0
9/21/18	19.5	2/21/18	22.0
9/7/18	17.5	2/5/18	24.5
7/30/18	19.0	1/24/18	23.0
7/13/18	29.5	1/9/18	25.5
6/29/18	27.5		

VP-4	
Date	Methane
12/26/18	0
12/11/18	0.7
11/30/18	2.1

VP-3	
Date	Methane
12/26/18	0
12/11/18	0
11/30/18	0

Port of Seattle Terminal 5

East Rail Yard

Former Heckett Yard

Legend

- Sampling Points
- Gas Collection Pipes (detail omitted near blower system compound)
- Blower System Compound
- Approximate Geomembrane Limits
- Former Landfill Limits
- Consolidated Landfill Limits

Notes:
Methane concentration in percent by volume measured with LMS-40 field instrument.
Sampling point locations are based on as-built drawings and GPS coordinates measured in the field.

Port of Seattle, Southwest Harbor Terminal 5
Seattle, Washington

Methane Monitoring Results

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Figure 4

ATTACHMENT 1

Terminal 5 Landfill Gas Collection and Treatment System

Monitoring Results Memorandum

Fourth Quarter 2018

MEMORANDUM

DATE: March 26, 2019

TO: Brick Spangler, Port of Seattle

FROM: Jamalyn Green and Mark Dagel, Hart Crowser

RE: **Terminal 5 Landfill Gas Collection System Monitoring Results**
Fourth Quarter 2018
17627-06

This memorandum presents the results of the fourth quarter of 2018 monitoring at the Terminal 5 (T-5) Remediation Area 3 landfill gas collection system.

Fourth Quarter Monitoring Summary

This quarter's report includes biweekly monitoring from October through December 2018. Gas concentrations were measured in the field using a LMS-40 gas analyzer. The landfill gas collection system was converted to a passive system in December 2016 by replumbing the system discharge piping to bypass the blower and shutting the blower off.

Monitoring was performed at the following locations:

- System effluent sampling port BV-1.
- System sampling ports SP-01 through SP-13.
- Off-site soil gas probes SG-302, SG-303, SG-304, and SG-329.
- Former landfill boundary soil vapor probes VP-1, VP-2, VP-3, and VP-4.

Monitoring locations are shown on Figure 2. Results are presented in Attachment 2 and summarized below.

Effluent Sampling Port Results

Effluent sample port BV-1 is located within the system manifold and represents the vapor concentrations that are exiting the system via the discharge stack. Methane concentrations during this quarter ranged from 31 to 58 percent by volume. Carbon dioxide concentrations ranged from 5.8 to 9.2 percent by volume. Oxygen concentrations ranged from non-detect to 0.9 percent by volume.

Additional parameters measured within the system manifold were vapor temperature and flow rate. Temperature was measured at in-line temperature gage T-1 and averaged 49°F; consistent with normal

ambient subsurface conditions for this time of year. Flow rate was monitored at flow meter F1, located between BV-1 and the condensate drum. The meter indicated a flow rate of non-detect; however, the existing meter was originally installed to measure the higher flow rates in an active system and is not sensitive enough to detect the low flow rates in the current passive system.

Collection System Sampling Port Results

Sampling ports SP-01 though SP-13 allow vapor samples to be collected from various locations within the underground gas collection piping system (Figure 2). Sampling ports SP-12 and SP-13 are located in the easternmost arm of the collection system.

During this quarter, methane concentrations ranged from non-detect to 69 percent, carbon dioxide concentrations ranged from non-detect to 19 percent, and oxygen concentrations ranged from non-detect to 4.9 percent.

Temperature within the each of the sampling ports was measured with an infrared thermometer and values ranged from 44° to 72°F.

Off-Site Soil Gas Probe Results

Off-site soil gas probes SG-302, SG-303, SG-304, and SG-329 are located to the west of the landfill along Harbor Avenue. There were two methane detections during this sampling period. The first detection was in sampling probe SG-329 at a concentration of 11 percent on November 20, 2018, above the lower explosive level (LEL) of five percent. Three subsequent non-detect measurements were collected following this monitoring event (November 30, December 11, and December 26); therefore, this detection was thought to be spurious. The second detection was in sampling probe SG-303 at a concentration of 0.3 percent on December 11, 2018, well below the lower explosive limit (LEL) of five percent. All other sampling probes were non-detect for methane. Methane concentrations ranged from non-detect to 3.0 percent, carbon dioxide concentrations ranged from non-detect to 8.0 percent, oxygen concentrations ranged from non-detect to 9.7 percent. Carbon dioxide concentrations ranged from non-detect to 4.5 percent and oxygen concentrations ranged from 8.0 to 20.6 percent.

Former Landfill Boundary Soil Vapor Probes

Former landfill boundary soil vapor probes VP-1, VP-2, VP-3, VP-4 are located to the north, east, and south of the former landfill boundary. The vapor probes were installed in November 2018. Methane concentrations ranged from non-detect to 3.0 percent, carbon dioxide concentrations ranged from non-detect to 8.0 percent, oxygen concentrations ranged from non-detect to 9.7 percent.

System Maintenance and Other Notes

None.

Trend Analysis

Since conversion to a passive system, methane and oxygen concentrations throughout the collection piping (SP-01 to SP-13) have shown similar trends. Methane concentrations increased markedly upon conversion to passive operation and, since then, have remained within the typical phase IV landfill decomposition range with month-to-month variation. Oxygen concentrations have remained low with occasional spikes in some sampling ports.

We plan to continue bi-weekly monitoring of the system. Our next report will cover the first quarter of 2019. Please feel free to contact us with any questions or concerns.

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ATTACHMENT 2

Terminal 5 Landfill Gas Collection and Treatment System

Monthly Monitoring Results Tables

Fourth Quarter 2018

Terminal 5 / RA-3 Landfill Gas Treatment System

Monitoring Results July 2017 - December 2018

Parameter: PRESSURE (negative)
(Gauge - inches of water.)

	Monitoring Location																				
Date	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*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*	*VP-1*	*VP-2*	*VP-3*	*VP-4*
26-Dec-18	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
11-Dec-18	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.24**	**0**	**0.1**	**0**	**0**	**0**	**0**	**0**	**0**
30-Nov-18	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.03**	**0**	**0.52**	**0**	**0**	**0**	**0**	**0**	**0**
20-Nov-18	**0**	**0**	**0**	**0**	**0**	**0**	**0.01**	**0**	**0**	**0**	**0**	**0**	**0.1**	**0**	**0**	**0**	**0**	--	--	--	--
02-Nov-18	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	--	--	--	--
08-Oct-18	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	--	--	--	--
21-Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
07-Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
30-Jul-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
13-Jul-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
29-Jun-18	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0	0	0	0	--	--	--	--
15-Jun-18	0	0	0	0	0	0	0	0	0	0	0	0.05	0	0	0	0	0	--	--	--	--
01-Jun-18	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.001	--	--	--	--
11-May-18	0	0	0	0	0	1.41	0.43	0	0	0	0	0	0	0	0	0	0	--	--	--	--
26-Apr-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
06-Apr-18	0	0	0	0	0	0	0	0	0	0	0	0	--	0	0	0	0	--	--	--	--
07-Mar-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
21-Feb-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
05-Feb-18	0	0	1.0	0	0	0	0.08	0	0	0	0	0	0	0	0	0	0	--	--	--	--
24-Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
09-Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
27-Dec-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
12-Dec-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
27-Nov-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
11-Nov-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
28-Oct-17	*0*	*0*	*0*	*0*	*0.02*	*0.01*	*0*	*0*	*0*	*0*	*0*	*0*	--	*0*	*0*	*0*	*0*	--	--	--	--
13-Oct-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
27-Sep-17	*0*	*0*	*0*	*0*	*0.02*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.04*	*0.02*	*0.04*	*0*	--	--	--	--
16-Sep-17	*0*	*0*	*0*	*0*	*0.02*	*0.01*	*0*	*0*	*0*	*0.02*	*0.02*	*0*	*0.02*	*0.01*	*0.01*	*0*	*0*	--	--	--	--
30-Aug-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
17-Aug-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
24-Jul-17	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
# Readings	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*30*	*32*	*32*	*32*	*32*	*3*	*3*	*3*	*3*
Min. value	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Max. value	*0*	*0*	*1*	*0*	*0.02*	*1.41*	*0.43*	*0.00*	*0.00*	*0.02*	*0.02*	*0.30*	*0.24*	*0.04*	*0.52*	*0*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
AVERAGE	***0***	***0***	***0***	***0***	***0.00***	***0.04***	***0.02***	***0.00***	***0.00***	***0.00***	***0.00***	***0.01***	***0.02***	***0.00***	***0***	***0***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Location	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*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*	*VP-1*	*VP-2*	*VP-3*	*VP-4*

Terminal 5 / RA-3 Landfill Gas Treatment System

Monitoring Results July 2017 - December 2018

Parameter: METHANE
(LMS-40 instrument field measurement - percent by volume.)

Date	Monitoring Location																				
	SG-302	SG-303	SG-304	SG-329	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	VP-1	VP-2	VP-3	VP-4
26-Dec-18	0	0	0	0	22.5	40.0	57.0	64.0	65.0	65.0	59.0	0	5.7	67.0	35.0	9.7	12.5	0	2.2	0	0
11-Dec-18	0	0.3	0	0	60.0	49.0	68.0	69.0	60.0	68.0	59.0	52.0	65.0	65.0	57.0	37.0	18.0	0	3.0	0	0.7
30-Nov-18	0	0	0	0	33.0	48.0	66.0	68.0	66.0	66.0	57.0	33.0	50.0	65.0	45.0	44.0	20.0	0	2.9	0	2.1
20-Nov-18	0	0	0	11	43.0	52.0	68.0	69.0	69.0	69.0	59.0	46.0	66.0	68.0	53.0	15.0	20.0	--	--	--	--
02-Nov-18	0	0	0	0	10.5	24.5	48.0	47.0	57.0	58.0	46.5	21.5	47.0	58.0	35.5	3.8	11.0	--	--	--	--
08-Oct-18	0	0	0	0	32.5	49.0	66.0	66.0	66.0	67.0	59.0	40.0	63.0	63.0	46.0	16.0	22.0	--	--	--	--
21-Sep-18	0	0	0	0	37.0	51.0	67.0	67.0	68.0	69.0	61.0	42.0	63.0	63.0	46.0	17.5	19.5	--	--	--	--
07-Sep-18	0	0	0	0	40.0	51.0	66.0	67.0	68.0	69.0	61.0	33.0	61.0	63.0	44.5	10.5	17.5	--	--	--	--
30-Jul-18	0	0	0	0	41.0	51.0	65.0	66.0	68.0	70.0	57.0	28.5	59.0	60.0	43.0	5.2	19.0	--	--	--	--
13-Jul-18	0	0	0	0	40.0	48.0	64.0	65.0	66.0	68.0	56.0	20.5	55.0	59.0	0	12.5	29.5	--	--	--	--
29-Jun-18	0	0	0	0	41.0	44.5	60.0	64.0	65.0	69.0	56.0	8.0	55.0	59.0	9.4	8.5	27.5	--	--	--	--
15-Jun-18	0	0	0	0	38.0	50.0	64.0	63.0	65.0	66.0	54.0	27.5	59.0	60.0	15.0	10.5	28.0	--	--	--	--
01-Jun-18	0	0	0	0	20.0	3.9	0	27.5	25.0	57.0	52.0	0.7	57.0	58.0	30.0	4.0	28.0	--	--	--	--
11-May-18	0	0	0	0	24.0	4.7	59.0	60.0	66.0	68.0	50.0	6.6	57.0	60.0	39.0	2.5	25.5	--	--	--	--
26-Apr-18	0	0	0	0	34.0	50.0	62.0	61.0	63.0	65.0	52.0	0	59.0	60.0	43.5	38.0	21.0	--	--	--	--
06-Apr-18	0	0	0	0	36.0	53.0	62.0	62.0	63.0	64.0	51.0	45.5	--	59.0	44.0	41.0	22.0	--	--	--	--
07-Mar-18	0	0	0	0	30.5	48.0	60.0	59.0	61.0	62.0	50.0	43.5	49.0	58.0	36.0	31.0	19.0	--	--	--	--
21-Feb-18	0	0	0	0	21.0	43.5	58.0	65.0	59.0	60.0	52.0	23.0	59.0	64.0	31.0	10.0	22.0	--	--	--	--
05-Feb-18	0	0	0	0	25.0	45.0	46.0	60.0	60.0	61.0	54.0	17.5	50.0	60.0	37.5	5.7	24.5	--	--	--	--
24-Jan-18	0	0	0	0	36.0	46.0	59.0	60.0	60.0	61.0	54.0	34.5	59.0	60.0	40.5	31.5	23.0	--	--	--	--
09-Jan-18	0	0	0	0	40.5	2.7	54.0	56.0	59.0	60.0	51.0	17.0	52.0	60.0	37.0	14.5	25.5	--	--	--	--
27-Dec-17	0	0	0	0	28.0	40.0	64.0	62.0	61.0	62.0	52.0	25.5	63.0	64.0	41.0	5.4	24.5	--	--	--	--
12-Dec-17	0	0	0	0	31.0	31.0	66.0	62.0	62.0	64.0	51.0	27.0	64.0	65.0	43.0	22.0	25.5	--	--	--	--
27-Nov-17	0	0	0	0	13.5	9.0	51.0	18.0	45.0	50.0	43.5	4.8	45.0	59.0	26.0	3.0	33.0	--	--	--	--
11-Nov-17	0	0	0	0	41.0	43.0	60.0	60.0	60.0	61.0	50.0	17.0	57.0	62.0	44.0	7.1	32.0	--	--	--	--
28-Oct-17	0	0	0	0	44.0	47.0	59.0	58.0	61.0	61.0	49.0	40.5	--	60.0	42.0	17.0	26.0	--	--	--	--
13-Oct-17	0	0	0	0	25.0	0.5	10.5	6.7	16.5	33.0	27.0	0.9	38.0	52.0	23.5	6.2	35.0	--	--	--	--
27-Sep-17	0	0	0	0	52.0	46.5	60.0	60.0	59.0	64.0	56.0	16.0	60.0	65.0	43.5	12.5	37.5	--	--	--	--
16-Sep-17	0	0	0	0	50.0	48.5	61.0	57.0	60.0	61.0	55.0	40.0	56.0	59.0	39.0	30.0	35.0	--	--	--	--
30-Aug-17	0	0	0	0	39.0	43.0	58.0	56.0	61.0	59.0	55.0	14.5	55.0	56.0	33.0	9.9	37.0	--	--	--	--
17-Aug-17	0	0	0	0	36.0	36.5	54.0	54.0	60.0	61.0	56.0	6.4	55.0	57.0	34.0	6.5	36.0	--	--	--	--
24-Jul-17	0	0	0	0	45.0	49.0	55.0	53.0	57.0	58.0	52.0	31.0	51.0	53.0	39.0	13.5	28.0	--	--	--	--
# Readings	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	32	32	3	3	3	3
Min. value	0	0	0	0	10.5	0.5	0.0	7	16.5	33.0	27	0	5.7	52.0	0.0	3	11	0	2	0	0
Max. value	0	0	0	11	60.0	53.0	68.0	69.0	69.0	70.0	61.0	52.0	66.0	68.0	57.0	44.0	37.5	0.0	3.0	0.0	2.1
AVERAGE	**0**	**0**	**0**	**0**	**34.7**	**39.0**	**56.8**	**57.3**	**59.4**	**62.4**	**53.0**	**23.9**	**54.5**	**60.7**	**36.7**	**15.7**	**25.1**	**0.0**	**2.7**	**0.0**	**0.9**
Location	SG-302	SG-303	SG-304	SG-329	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	VP-1	VP-2	VP-3	VP-4

Terminal 5 / RA-3 Landfill Gas Treatment System

Monitoring Results July 2017 - December 2018

Parameter: CARBON DIOXIDE
(LMS-40 instrument field measurement - percent by volume.)

	Monitoring Location																				
Date	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*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*	*VP-1*	*VP-2*	*VP-3*	*VP-4*
26-Dec-18	**2.6**	**4.5**	**2.9**	**1.9**	**7.1**	**14.0**	**4.0**	**4.7**	**4.7**	**5.7**	**1.3**	**6.4**	**7.7**	**5.8**	**9.1**	**9.3**	**4.6**	**8.0**	**0**	**0**	**0**
11-Dec-18	**2.6**	**0.3**	**3.3**	**2.2**	**3.3**	**15.0**	**2.9**	**0**	**3.3**	**3.6**	**0.9**	**3.8**	**3.0**	**2.4**	**5.1**	**7.0**	**5.5**	**3.9**	**0**	**0**	**0.6**
30-Nov-18	**2.0**	**3.2**	**3.8**	**2.6**	**5.1**	**18.0**	**3.9**	**0**	**3.8**	**4.0**	**1.7**	**9.5**	**7.8**	**5.2**	**10.0**	**8.5**	**4.8**	**4.0**	**0**	**0**	**0.3**
20-Nov-18	**2.4**	**3.4**	**2.4**	**3.5**	**5.2**	**18.0**	**3.5**	**0**	**3.8**	**4.2**	**0.9**	**8.5**	**4.5**	**3.8**	**10.0**	**8.6**	**5.0**	**--**	**--**	**--**	**--**
02-Nov-18	**2.2**	**3.0**	**3.4**	**0**	**9.2**	**6.7**	**4.0**	**3.7**	**7.7**	**9.3**	**3.8**	**13.5**	**10.0**	**8.8**	**10.5**	**10.0**	**6.0**	**--**	**--**	**--**	**--**
08-Oct-18	**2.1**	**3.8**	**3.5**	**2.1**	**7.2**	**19.0**	**3.9**	**0**	**4.2**	**4.7**	**2.3**	**10.0**	**4.4**	**4.0**	**10.0**	**11.0**	**5.7**	**--**	**--**	**--**	**--**
21-Sep-18	2.0	4.0	3.6	2.1	6.6	18.0	3.8	0	4.0	4.4	2.4	10.0	4.4	3.9	9.3	12.0	5.7	--	--	--	--
07-Sep-18	1.7	4.1	2.0	2.0	6.6	19.0	3.0	0.1	3.6	4.1	2.3	13.0	4.2	3.7	9.5	13.0	6.2	--	--	--	--
30-Jul-18	1.6	1.9	3.8	1.8	6.6	20.0	3.5	0.2	4.0	4.1	2.1	14.0	4.4	4.0	11.0	12.0	5.4	--	--	--	--
13-Jul-18	2.1	3.2	2.1	1.5	7.1	20.0	4.0	0.2	4.6	4.5	1.9	2.0	4.4	4.1	0	9.9	5.6	--	--	--	--
29-Jun-18	2.4	2.9	2.1	1.5	6.6	18.0	4.1	0.4	4.3	5.1	2.1	8.7	5.6	4.5	3.4	9.8	5.7	--	--	--	--
15-Jun-18	2.4	2.3	2.1	1.5	6.4	21.0	3.4	0	3.9	4.1	1.8	5.8	4.4	3.8	4.2	8.9	4.9	--	--	--	--
01-Jun-18	2.4	2.0	1.9	0.3	8.1	0.7	0	2.6	2.3	4.8	4.5	2.2	6.3	5.9	9.5	9.9	5.5	--	--	--	--
11-May-18	0.1	0.6	1.8	0.7	7.1	0.7	4.5	0.7	5.5	6.1	1.1	6.4	5.6	5.0	11.0	8.9	5.1	--	--	--	--
26-Apr-18	1.4	2.1	0.8	1.0	4.7	21.0	3.2	0	3.6	3.9	0.7	2.0	4.1	3.6	6.4	6.0	4.8	--	--	--	--
06-Apr-18	1.7	2.0	2.1	1.6	4.5	19.0	3.4	0	3.5	4.1	0.7	4.6	--	3.3	6.6	5.8	4.5	--	--	--	--
07-Mar-18	1.3	2.0	1.9	1.2	4.3	17.0	3.9	0	4.4	4.1	0.7	3.8	5.5	3.9	4.0	5.4	4.8	--	--	--	--
21-Feb-18	1.1	1.5	2.0	1.5	5.8	16.0	5.8	0	5.5	6.0	0.8	5.0	5.9	4.7	6.7	7.5	4.8	--	--	--	--
05-Feb-18	0.6	0	0.4	1.8	5.6	16.0	3.7	4.6	4.6	4.8	1.0	6.8	7.1	5.3	8.5	7.1	4.6	--	--	--	--
24-Jan-18	0.5	2.2	2.9	1.8	4.3	16.0	4.3	0.3	4.2	4.9	0.8	2.1	4.9	4.7	7.0	6.0	4.6	--	--	--	--
09-Jan-18	1.2	3.1	2.5	1.8	5.1	1.3	4.2	4.4	6.6	6.5	0.9	7.3	7.5	6.1	8.1	6.4	4.5	--	--	--	--
27-Dec-17	*1.5*	*3.1*	*3.4*	*1.8*	*5.7*	*15.0*	*4.6*	*0*	*5.2*	*5.9*	*1.0*	*7.5*	*6.0*	*5.3*	*8.1*	*7.2*	*4.9*	--	--	--	--
12-Dec-17	*2.4*	*3.4*	*3.2*	*1.5*	*5.7*	*12.0*	*4.0*	*0.1*	*4.9*	*4.9*	*0.0*	*6.2*	*6.0*	*4.8*	*8.1*	*6.5*	*5.3*	--	--	--	--
27-Nov-17	*2.1*	*3.6*	*3.7*	*1.9*	*8.1*	*1.1*	*8.4*	*2.9*	*6.6*	*9.9*	*2.6*	*6.9*	*9.5*	*8.5*	*9.6*	*7.3*	*5.7*	--	--	--	--
11-Nov-17	*2.0*	*3.7*	*3.4*	*2.3*	*6.0*	*16.0*	*5.4*	*1.0*	*6.1*	*6.7*	*1.6*	*6.6*	*6.9*	*5.3*	*10.0*	*8.3*	*5.4*	--	--	--	--
28-Oct-17	*2.0*	*4.0*	*3.6*	*1.9*	*5.0*	*17.0*	*4.7*	*0*	*5.8*	*5.6*	*1.1*	*5.0*	--	*4.7*	*12.0*	*9.4*	*6.1*	--	--	--	--
13-Oct-17	*1.7*	*2.9*	*3.5*	*2.1*	*8.1*	*0.1*	*1.0*	*0.9*	*2.1*	*3.8*	*2.6*	*7.3*	*9.8*	*8.7*	*9.9*	*12.0*	*6.1*	--	--	--	--
27-Sep-17	*1.4*	*3.5*	*3.1*	*1.7*	*6.8*	*17.0*	*5.2*	*0*	*5.5*	*6.1*	*2.2*	*12.0*	*5.4*	*4.5*	*10.0*	*9.8*	*5.3*	--	--	--	--
16-Sep-17	*1.6*	*4.1*	*1.9*	*2.0*	*6.8*	*16.0*	*5.0*	*0*	*5.6*	*5.5*	*2.0*	*10.0*	*4.7*	*4.1*	*9.3*	*11.0*	*6.1*	--	--	--	--
30-Aug-17	*1.6*	*3.9*	*2.0*	*1.9*	*8.1*	*17.0*	*5.6*	*3.9*	*6.4*	*6.4*	*2.1*	*13.0*	*6.1*	*5.2*	*11.5*	*12.0*	*6.6*	--	--	--	--
17-Aug-17	*1.7*	*4.0*	*1.9*	*1.8*	*7.6*	*14.0*	*5.8*	*1.2*	*6.9*	*7.2*	*2.1*	*12.0*	*6.1*	*5.2*	*12.0*	*12.0*	*6.5*	--	--	--	--
24-Jul-17	*1.5*	*3.2*	*2.9*	*1.6*	*7.0*	*17.0*	*5.6*	*0.1*	*6.1*	*6.4*	*1.6*	*8.4*	*5.2*	*4.5*	*13.0*	*9.7*	*5.3*	--	--	--	--
# Readings	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*30*	*32*	*32*	*32*	*32*	*3*	*3*	*3*	*3*
Min. value	*0.1*	*0.0*	*0*	*0.0*	*3.3*	*0.1*	*0.0*	*0.0*	*2.1*	*3.6*	*0.0*	*2.0*	*3.0*	*2.4*	*0.0*	*5.4*	*4.5*	*3.9*	*0.0*	*0.0*	*0.0*
Max. value	*2.6*	*4.5*	*3.8*	*3.5*	*9.2*	*21.0*	*8.4*	*4.7*	*7.7*	*9.9*	*4.5*	*14.0*	*10.0*	*8.8*	*13.0*	*13.0*	*6.6*	*8.0*	*0.0*	*0.0*	*0.6*
AVERAGE	***1.7***	***2.9***	***2.6***	***1.7***	***6.3***	***14.3***	***4.1***	***1.0***	***4.8***	***5.4***	***1.7***	***7.5***	***5.9***	***4.9***	***8.5***	***9.0***	***5.4***	***5.3***	***0.0***	***0.0***	***0.3***
Location	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*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*	*VP-1*	*VP-2*	*VP-3*	*VP-4*

Terminal 5 / RA-3 Landfill Gas Treatment System

Monitoring Results July 2017 - December 2018

Parameter: OXYGEN
(LMS-40 instrument field measurement - percent by volume.)

	Monitoring Location																				
Date	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*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*	*VP-1*	*VP-2*	*VP-3*	*VP-4*
26-Dec-18	13.8	14.2	13.7	13.7	0	0	0	0	0	0	0	0	0	0	0	0	0	4.0	0	8.2	8.2
11-Dec-18	14.6	8.6	14.3	14.1	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	9.4	0	8.3	0
30-Nov-18	15.5	14.7	15.4	13.7	0	0	0	0	0	0	0	0	0	0	0	0	0	8.8	0.2	9.7	0
20-Nov-18	15.8	16.4	16.6	8.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
02-Nov-18	16.1	17.0	16.0	20.6	0.8	1.5	0.3	0	0.1	0	0.5	2.3	0	0.1	0.4	0	4.9	--	--	--	--
08-Oct-18	16.0	16.4	17.1	16.4	0	0	0	0	0	0	0	0	0	0	0	0	0.7	--	--	--	--
21-Sep-18	16.7	16.1	16.8	17.4	0	0.1	0	0	0	0	0	0.1	0	0	0	0.1	0	--	--	--	--
07-Sep-18	17.8	16.2	18.7	17.6	0.3	0.3	0.2	0	0.1	0	0.1	0.3	0.1	0.1	0.2	0.3	0.8	--	--	--	--
30-Jul-18	19.1	18.8	16.0	17.4	0	0	0	0	0	0	0.1	0	0	0	0	0	0	--	--	--	--
13-Jul-18	17.1	16.5	2.2	18.2	0	0	0	0	0	0	0	0.6	0	0	21.0	0	0	--	--	--	--
29-Jun-18	16.5	16.7	18.5	19.1	0	1.4	0	0	0	0	0	5.4	0	0	15.7	0	0.3	--	--	--	--
15-Jun-18	16.3	17.4	18.3	18.9	0	0	0	0	0	0	0	0.2	0	0	13.0	0	0	--	--	--	--
01-Jun-18	15.9	17.8	18.3	20.4	0.1	18.7	21.1	3.0	6.0	0.2	0.2	12.9	0	0	2.6	0	0	--	--	--	--
11-May-18	20.3	19.6	17.5	19.5	0	17.8	0	0	0	0	0	8.6	0	0	0	0	0	--	--	--	--
26-Apr-18	13.5	17.0	18.8	19.5	0	0	0	0	0	0	0	16.5	0	0	0	0	0	--	--	--	--
06-Apr-18	14.7	17.4	15.5	17.5	0	0	0	0	0	0	0	0	--	0	0	0	0	--	--	--	--
07-Mar-18	14.0	16.8	16.1	18.0	0.3	0	0	0.3	0.3	0.3	0.3	0	0.6	0	3.0	0	0.2	--	--	--	--
21-Feb-18	13.4	17.1	16.0	16.7	0.4	0	0	0	1.1	0	0	2.3	0	0	5.1	0	0	--	--	--	--
05-Feb-18	12.6	20.7	20.2	14.9	1.4	1.8	2.0	0	0	0	0.1	2.0	0.9	0.6	2.1	0	0	--	--	--	--
24-Jan-18	13.5	17.3	13.9	14.9	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
09-Jan-18	14.6	16.0	14.9	15.2	0	19.5	0	0	0	0	0	2.9	0	0	0	0	0	--	--	--	--
27-Dec-17	*14.5*	*16.9*	*13.8*	*15.8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
12-Dec-17	*14.3*	*15.4*	*14.4*	*16.1*	*0*	*0.4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
27-Nov-17	*15.2*	*15.5*	*13.5*	*16.3*	*0.8*	*16.0*	*0*	*13.4*	*3.1*	*0*	*0*	*5.8*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
11-Nov-17	*16.5*	*14.9*	*16.1*	*15.7*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
28-Oct-17	*16.3*	*15.3*	*15.7*	*17.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	*0*	*0*	*0*	*0*	--	--	--	--
13-Oct-17	*17.6*	*17.3*	*16.8*	*17.3*	*0.2*	*20.2*	*11.3*	*15.4*	*8.9*	*6.5*	*8.9*	*9.2*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
27-Sep-17	*17.4*	*16.0*	*16.6*	*18.02*	*0*	*0.1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.01*	--	--	--	--
16-Sep-17	*17.7*	*15.8*	*18.8*	*18.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
30-Aug-17	*17.8*	*16.1*	*18.6*	*18.3*	*0.1*	*1.1*	*0*	*0*	*0*	*0*	*0*	*0.9*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
17-Aug-17	*17.4*	*16.1*	*18.9*	*18.6*	*0.6*	*2.6*	*0*	*0*	*0*	*0*	*0*	*3.0*	*0*	*0*	*0*	*0*	*0*	--	--	--	--
24-Jul-17	*17.8*	*16.2*	*17.2*	*19.0*	*0.2*	*0.3*	*0.2*	*0*	*0.1*	*0*	*1.3*	*0.9*	*1.0*	*5.3*	*2.2*	*1.5*	*1.2*	--	--	--	--
# Readings	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*32*	*30*	*32*	*32*	*32*	*32*	*3*	*3*	*3*	*3*
Min. value	*12.6*	*8.6*	*2.2*	*8.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*4*	*0*	*8*	*0*
Max. value	*20.3*	*20.7*	*20.2*	*20.6*	*1.4*	*20.2*	*21.1*	*15.4*	*8.9*	*6.5*	*8.9*	*16.5*	*1.0*	*5.3*	*21.0*	*1.5*	*4.9*	*9.4*	*0.2*	*9.7*	*8.2*
AVERAGE	***15.9***	***16.4***	***16.1***	***16.9***	***0.2***	***3.2***	***1.1***	***1.0***	***0.6***	***0.2***	***0.4***	***2.3***	***0.1***	***0.2***	***2.0***	***0.1***	***0.3***	***7.4***	***0.1***	***8.7***	***2.7***
Location	*SG-302*	*SG-303*	*SG-304*	*SG-329*	*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*	*VP-1*	*VP-2*	*VP-3*	*VP-4*

Terminal 5 / RA-3 Landfill Gas Treatment System

Monitoring Results July 2017 - December 2018

Parameter: TEMPERATURE
degrees Fahrenheit (est.)

Date	Monitoring Location												
	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
26-Dec-18	47.1	50.7	--	51.6	47.8	50.0	50.0	50.9	48.3	49.7	44.3	48.0	44.4
11-Dec-18	48.2	50.7	48.4	53.0	47.1	51.8	51.4	55.0	46.5	51.8	48.2	51.4	50.1
30-Nov-18	51.8	54.9	54.1	55.9	52.6	54.3	53.6	57.0	51.4	55.7	54.1	50.7	52.1
20-Nov-18	48.7	52.3	47.1	55.5	52.0	52.7	51.4	58.0	49.9	55.4	54.3	51.6	50.7
02-Nov-18	62	65	63	65	62	66	63	61	63	66	62	60	62
08-Oct-18	68	72	69	68	64	61	65	65	65	66	66	63	55
21-Sep-18	74	71	73	73	70	73	69	70	71	75	76	70	71
07-Sep-18	84	89	82	71	81	81	80	74	92	89	81	81	78
30-Jul-18	84.1	93.7	91.0	78.8	79.8	80.9	79.1	75.0	88.3	87.4	89.8	78.2	81.1
13-Jul-18	83.0	86.0	88.7	79.0	86.0	78.0	75.5	69.8	91.0	81.0	82.4	73.0	75.3
29-Jun-18	73.0	79.0	74.0	83.0	68.0	72.0	70.0	65.0	82.0	77.0	76.0	65.0	68.0
15-Jun-18	74.7	81.3	85.3	69.8	81.4	71.6	71.7	73.7	89.0	71.3	71.8	70.5	71.0
01-Jun-18	67.9	73.7	72.3	66.0	66.0	65.6	64.9	66.2	60.9	70.0	65.0	70.3	70.0
11-May-18	66.0	70.3	68.7	62.9	63.1	62.6	60.7	73.9	67.0	66.2	69.4	64.2	66.2
26-Apr-18	60	69	69	64	65	71	78	74	82	80	78	72	78
06-Apr-18	64	65	63	63	58	60	59	63	--	73	69	65	63
07-Mar-18	53	55	54	59	59	51	55	56	51	51	58	51	59
21-Feb-18	52	53	51	52	56	56	49	50	49	51	50	50	51
05-Feb-18	58	59	59	60	59	60	59	59	61	58	58	51	58
24-Jan-18	55	56	51	58	51	58	56	58	53	53	53	54	54
09-Jan-18	55	55	52	59	54	51	56	58	54	54	55	51	55
27-Dec-17	*51*	*50*	*52*	*53*	*53*	*53*	*53*	*48*	*50*	*50*	*50*	*49*	*49*
12-Dec-17	*46*	*54*	*49*	*51*	*49*	*48*	*53*	*54*	*57*	*52*	*50*	*47*	*48*
27-Nov-17	*48*	*61*	*53*	*63*	*60*	*60*	*60*	*61*	*51*	*56*	*58*	*53*	*51*
11-Nov-17	*58*	*48*	*51*	*58*	*61*	*60*	*59*	*61*	*54*	*56*	*58*	*58*	*58*
28-Oct-17	*65*	*61*	*61*	*67*	*69*	*70*	*55*	*58*	--	*62*	*72*	*66*	*63*
13-Oct-17	*69*	*71*	*67*	*69*	*61*	*62*	*62*	*68*	*59*	*63*	*61*	*63*	*60*
27-Sep-17	*75*	*82*	*75*	*75*	*72*	*73*	*71*	*74*	*72*	*73*	*75*	*73*	*73*
16-Sep-17	*78*	*88*	*80*	*78*	*71*	*80*	*78*	*78*	*82*	*82*	*86*	*78*	*82*
30-Aug-17	*82*	*86*	*85*	*81*	*80*	*80*	*86*	*73*	*83*	*80*	*81*	*82*	*81*
17-Aug-17	*80*	*83*	*88*	*84*	*80*	*83*	*83*	*71*	*84*	*89*	*80*	*81*	*81*
24-Jul-17	*85*	*82*	*85*	*80*	*80*	*86*	*80*	*83*	*88*	*85*	*85*	*79*	*79*
# Readings	***32***	***32***	***31***	***32***	***32***	***32***	***32***	***32***	***30***	***32***	***32***	***32***	***32***
Min. value	***46***	***48***	***47***	***51***	***47***	***48***	***49***	***48***	***47***	***50***	***44***	***47***	***44***
Max. value	***85***	***94***	***91***	***84***	***86***	***86***	***86***	***83***	***92***	***89***	***90***	***82***	***82***
AVERAGE	***65***	***68***	***67***	***66***	***64***	***65***	***64***	***64***	***67***	***67***	***66***	***63***	***64***
Location	***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***

ATTACHMENT 3

Semiannual Inspection of T-5 Ecology-Lead Sites

2018 Year-End Inspection

Fourth Quarter 2018

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

Name of Inspector: Warren Hansen, PE/Abby Hawley, EIT
Date (D/M/Y): 1/9/2019, 1/11/2019
Title: Civil Engineer/Environmental Engineer
Employer: Windward Environmental LLC

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

1. Interview site personnel. 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. Summarize information obtained from site personnel interviews in the space below along with the name, job title, and daytime telephone number of the interviewee(s).

   This inspection was conducted on January 9 and 11, 2019. Limited 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 (adjacent to the West Waterway), although some equipment was being stored in the former Lockheed Yard II (Remediation Area 5 [RA-5]). Gate and access security to the terminal continues to be maintained; a guard continues to control access at the terminal entrance.

   This 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), the former Salmon Bay Steel North property (RA-2), and RA-3. RA-5 was also inspected, at the client's request. The inspection focused on previously identified issues as well as any new problems. No interviews were conducted as part of this inspection, as there are currently no tenants within the expanded portion of the terminal.

   Repairs to the localized settling (approximately 115 × 40 ft) at RA-3 adjacent to the rails in the south portion of the terminal were made in 2016 (noted in the 2017 reports [2017 mid-year report: map note 1 in Attachment 1; 2017 end-of-year report: photos 1 and 2 in Attachment 2]); the majority of these repairs continue to be in good condition. However, settlement appears to be continuing. A hole approximately 8-10 in. deep has opened up along the west boundary of the area (Attachment 1: map note 1; Attachment 2: photo 1). Cracking was also observed along the west side of this area. The hole should be filled and patched, and cracks should be sealed.

   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. No new holes in the fence were observed.

   Vegetation—including butterfly bushes (*Buddleia davidii*)—is prevalent near the terminal entrance (RA-2; Attachment 1: map notes 2 and 3) and throughout the terminal in rail tracks

and switch pits. Vegetation overgrowth is an issue that requires ongoing maintenance, particularly during the current period of reduced activity at the terminal. It is recommended that the vegetation in RA-2 and RA-3 be removed before it damages the pavement cap system. Removal should include the removing plant roots within and below the pavement followed by pavement patching.

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. Summarize inspection observations in spaces below.

   The pavements, ballast covers, fencing, and surface features associated with the stormwater drainage systems were examined during this inspection.

   Five areas of pavement mounding with cracks wider than ¼ in. were observed in RA-2 and RA-3:

   1. Map note 4 (RA-2): The impacted area is approximately 10 × 10 ft (photo 2). The cracks are approximately as wide as 2 in. and as deep as 4 in. (photo 3).
   2. Map note 5 (RA-2): This impacted area is approximately 15 × 3 ft and the cracks are approximately as wide as 2 in. and as deep as 4 in. (photos 4 and 5).
   3. Map note 6 (RA-3): This area is approximately 5 × 3 ft, with cracks as wide as approximately 1 in. and as deep as approximately 3 in. (photos 6 and 7).
   4. Map note 7 (RA-2): The impacted area is approximately 25 × 6 ft (photo 8). The cracks are approximately as wide as 2 in. and as deep as 5 in. (photo 9).
   5. Map note 8 (RA-2): This area includes cracking over an area of approximately 15 × 5 ft and mounding over an area of approximately 5 × 5 ft (photo 10). The cracks are as wide as approximately 3 in (photo 11). This is the first time this condition has been observed at this location.

   These conditions are localized and do not compromise the overall cap performance. However, these mounding areas are in traffic areas and should be addressed before a new tenant occupies the terminal. The cause of the mounding in the five areas (possibly buried piles or old foundations) should be determined and, if possible, removed, and the cracked areas should be repaired. Near-term (i.e., temporary) sealing of the cracks should also be done to prevent further deterioration in these four locations.

   A hole in the pavement approximately 2 × 2 ft and approximately 4 ft deep was observed near the northeast corner of RA-5 at the shoreline where the West Waterway enters Elliott Bay (map note 9; photo 12). Pavement cracking was observed in the vicinity of the hole and is probably attributable to undermining of material by wave action. The Port was

immediately notified of this hole, the cause of which should be verified and corrected. The area appeared to be barricaded; Ecology blocks were observed around the area.

Five cracks wider than ¼ in. that penetrate the cap surface were observed in RA-3 and should be cleaned and sealed:

1. Map note 10 (RA-3): This crack is located northwest of the area of settlement in RA-3. It runs east to west; the pavement on the north side of the crack is slightly higher than the pavement on the south side, indicating some degree of recent settlement in this area. The crack is as wide as approximately 1.25 in. and is approximately 21-25 yards in length (photo 13). The crack was observed to have been previously sealed but the seal is no longer sufficient and should be replaced.
2. Map note 11 (RA-3): This crack is located southeast of the area of settlement in RA-3. It runs east/west, is as wide as approximately 2 in. in some places and as deep s as approximately 6 to 8 in (photo 14). The pavement surrounding this crack is not level. The crack has previously been sealed but the sealant is failing in some areas and should be replaced.
3. Map note 12 (RA-3): This crack extends approximately 340 ft south from the southwest corner of the area of settlement in RA-3 (photo 15). It is as wide as approximately 1 in.
4. Map note 13 (RA-3): This crack extends approximately 450 ft south from the southeast corner of the area of settlement in RA-3 (photo 16). Moss and grass growth are present in some parts of the crack. The northernmost 150 ft were observed to be in better condition than the southern 300 ft.
5. Map note 14 (RA-3): This crack is located south of the area of settlement in RA-3. It extends east/west and is as wide as approximately 2 in (photo 17).

During the inspection, the ballast covers appeared to be in good condition. The Burlington Northern Santa Fe (BNSF) access road was inspected and several potholes (map notes 15 and 16) were observed. These potholes were a few inches deep. These potholes should be checked during the next inspection, and BNSF should be notified if their condition worsens. Other areas of the access road were in good condition and showed evidence of continued maintenance (presumably by BNSF).

Vegetation has been cleared from the western side of the consolidated landfill, on both sides of the drainage swale. Vegetation had been cleared from the eastern side of the landfill before the 2017 end-of-year inspection. Vegetation has been removed from along the southern fence since the 2018 mid-year inspection. There were no signs of erosion or exposure of the underlying consolidated landfill liner during this inspection. Three locations were observed on the eastern side of the landfill from which vegetation had been completely cleared and loose dirt/sand had been placed (map notes 17, 18, and 19). A representative photo of these three areas is included in Attachment 2 (photo 18). These areas have the potential to erode; they should be inspected during future inspections (if not more often). There was no visual evidence that the underlying liner was exposed.

The catch basin located near the southeast corner of the consolidated landfill area observed to be obstructed by organic debris during the 2018 mid-year inspection has been cleared.

The landfill cover area east of Harbor Avenue SW and outside of the fenced consolidated landfill area was checked for signs of erosion. A downed tree was observed; however the surrounding soil was not significantly disturbed and the underlying landfill liner was not exposed. Two tents were observed near the Harbor Avenue SW side of the former landfill fence. No erosion was observed is 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.

   The hole in the pavement with adjacent cracking at the area of settlement in RA-3 should be addressed as described in Section 1. The hole in the pavement near the northeast corner of RA-5 should also be addressed; the Port was notified of this hole following the inspection. The five localized areas of pavement mounding and cracking located in RA-2 and RA-3 and the five cracks located in RA-3 should be addressed as described in Section 2.

RAILROAD TRACK AREA
Ballast covering ties, shoulders as designed: ___Y__
Ballast rutted or uneven, requiring regrading: ___N__
Repair Type/Location: _____

PAVEMENT AREA
Open cracks and/or ruts: None _____ Repair needed __X__
Surface Drainage (ponding): None __X__ Repair needed ____
Repair Type/Location: See Sections 1, 2, and 3 for information on a hole in RA-3, a hole in RA-5, five areas in RA-2 and RA-3 where cracks are present in areas of pavement mounding, and five cracks in RA-3 requiring repair.

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: none

SITE SECURITY
Signs, fence & gates in place Yes __X__ Repair needed _____
Repair Type/Location: none

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 __X__NO

No erosion was observed during this inspection. See Section 2 for information on three areas of the landfill covered with loose soil.

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

No ponding was observed during this inspection.

SUMMARY OF RECOMMENDATIONS

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

Condition Noted	Map (Attachment 1) reference	Recommendation
Hole in pavement with adjacent cracking at area of settlement in RA-3	1	Excavate observed location of subsurface erosion (i.e., hole in pavement). Repair as needed. Seal cracks.
Vegetation growth near terminal entrance, RA-2	2, 3	Remove vegetation from these location and from throughout RA-2 and RA-3 during maintenance. Check during future inspections.
Pavement mounding with cracks wider than ¼ in., RA-2	4	Evaluate and repair prior to new tenant occupancy. Clean and seal cracks. Check during future inspections.
Pavement mounding with cracks wider than ¼ in., RA-2	5	Evaluate and repair prior to new tenant occupancy. Clean and seal cracks. Check during future inspections.
Pavement mounding with cracks wider than ¼ in., RA-3	6	Evaluate and repair prior to new tenant occupancy. Clean and seal cracks. Check during future inspections.
Elongated pavement mounding with cracks wider than ¼ in., RA-2	7	Evaluate and repair prior to new tenant occupancy. Clean and seal cracks. Check during future inspections.

Condition Noted	Map (Attachment 1) reference	Recommendation
Pavement mounding with cracks wider than ¼ in., RA-2	8	Evaluate and repair prior to new tenant occupancy. Clean and seal cracks. Check during future inspections.
Hole approximately 2 × 2 ft and 4 ft deep near northeast corner of RA-5	9	Evaluate cause of damage and correct. Fill hole and restore pavement.
Crack wider than ¼ in. located north of area of settlement, RA-3	10	Clean and seal crack. Remove and replace failing sealant as necessary.
Crack wider than ¼ in. extending east/west, located south of area of settlement, RA-3	11	Clean and seal crack. Remove and replace failing sealant as necessary.
Crack wider than ¼ in. extending south from southwest corner of area of settlement, RA-3	12	Clean and seal crack.
Crack wider than ¼ in. extending south from southeast corner of area of settlement, RA-3	13	Clean and seal crack.
Crack wider than ¼ in. extending east/west, located south of area of settlement, RA-3	14	Clean and seal crack.
Potholes in BNSF access road	15, 16	Monitor. Request BNSF to repair as needed.
Area of cleared vegetation covered with loose soil, east slope of consolidated landfill, RA-3	17, 18, 19	Monitor.

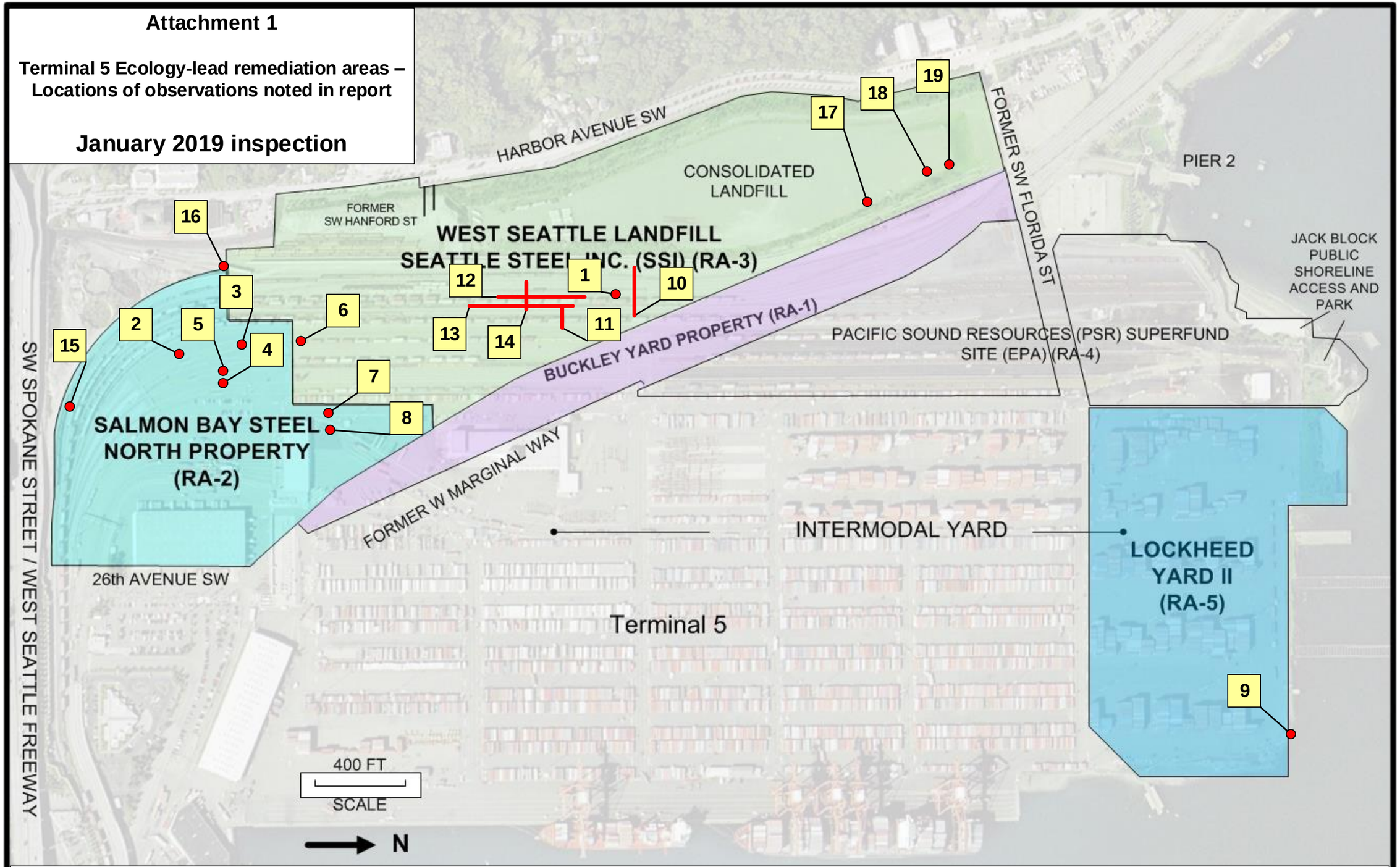
List attachments below:

- Attachment 1: Terminal 5 Ecology-lead remediation areas - Locations of observations noted in report (map)
- Attachment 2: Select Inspection Photographs

Attachment 1

Terminal 5 Ecology-lead remediation areas – Locations of observations noted in report

January 2019 inspection



Notes:

1. Hole in pavement with adjacent cracking
2, 3. Vegetation growth near terminal entrance
4. Pavement mounding with cracks wider than ¼ in.
5. Pavement mounding with cracks wider than ¼ in.
6. Pavement mounding with cracks wider than ¼ in.
7. Pavement mounding with cracks wider than ¼ in.
8. Pavement mounding with cracks wider than ¼ in.
9. Hole approximately 2 × 2 ft and 4 ft deep
10. Crack wider than ¼ in.
11. Crack wider than ¼ in. extending east/west
12. Crack wider than ¼ in.
13. Crack wider than ¼ in.
14. Crack wider than ¼ in.
15, 16. Potholes in BNSF access road
17, 18, 19. Area of cleared vegetation covered with loose soil

TERMINAL 5 EXPANSION (SOUTHWEST HARBOR PROJECT) – ECOLOGY-LEAD CONSENT DECREE REMEDIATION AREAS

Attachment 2: Select Inspection Photographs

Photo 1. Hole on west side of pavement settlement area: RA-3 (map note 1)

Photo 2. Mound in pavement with cracks as wide as 2 in.: RA-2 (map note 4)

Photo 3. Close-up of mound in pavement with cracks as wide as 2 in.: RA-2 (map note 4)

Photo 4. Mound in pavement with cracks as wide as 2 in.: RA-2 (map note 5)

Photo 5. Close-up of mound in pavement with cracks as wide as 2 in.: RA-2 (map note 5)

Photo 6. Mound in pavement with cracks as wide as 1 in.: RA-3 (map note 6)

Photo 7. Mound in pavement with cracks as wide as 1 in.: RA-3 (map note 6)

Photo 8. Elongated mound in pavement with cracks as wide as 2 in.: RA-2 (map note 7)

Photo 9. Close up of elongated mound in pavement with cracks as wide as 2 in.: RA-2 (map note 7)

Photo 10. Mound in pavement with cracks as wide as 3 in.: RA-2 (map note 8)

Photo 11. Close-up of mound in pavement with cracks as wide as 3 in.: RA-2 (map note 8)

Photo 12. Hole and cracking in pavement near northeast corner of site: RA-5 (map note 9)

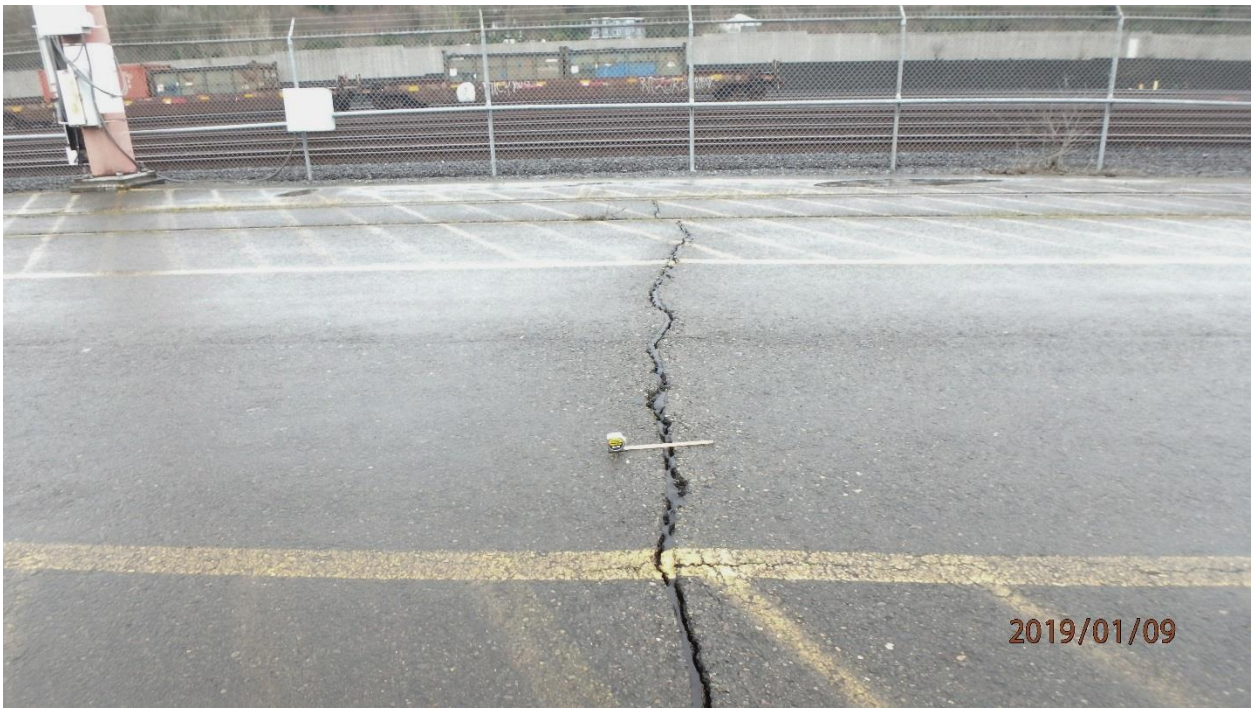


Photo 13. Crack as wide as 1.25 in.: RA-3 (map note 10)

Photo 14. Crack as wide as 2 in.: RA-3 (map note 11)

Photo 15. Crack as wide as 1 in.: RA-3 (map note 12)

Photo 16. Crack as wide as 1 in.: RA-3 (map note 13)

Photo 17. Crack as wide as 2 in.: RA-3 (map note 14)

Photo 18. Representative photo of three areas on east landfill slope, cleared of vegetation and covered with loose soil: RA-3 (map notes 17, 18, and 19)