JUNIPER RIDGE LANDFILL

Operated By
NEWSME Landfill Operations, LLC

July 30, 2021

Tanya Hovell
Maine Department of Environmental Protection
Bureau of Air Quality
106 Hogan Road
Bangor, Maine 04401

RE: NEWSME Landfill Operations, LLC
DBA Juniper Ridge Landfill (JRL)
(formerly West Old Town Landfill)
Part 70 Air Emission License #A-921-70-B-R and # A-921-70-F-R
Semiannual Reports and Compliance Certifications

Dear Ms. Hovell:

Please find enclosed Juniper Ridge Landfill's semiannual report and certification for the period ending June 30, 2021.

If you should require any additional information regarding the enclosed, please feel free to contact me at (207) 249-8025.

Sincerely,

Jeffrey Pelletier
Environmental Manager
NEWSME Landfill Operations, LLC

Enclosure: Part 70 Air Emission License Semiannual Certification
Semi-Annual Compliance Data Summary
GCCS Report

CC: USEPA Region 1
Toni King, Casella Waste Systems, Inc.
Lou Pizzuti, Bureau of General Services, State of Maine
Wayne Boyd, NEWSME Landfill Operations, LLC

2828 Bennoch Road • Old Town, Maine 04468
Tel.: 207-862-4200, ext. 245 • Fax: 207-862-2839

Semiannual Report
Certification Cover Sheet

Facility Name	NEWSME Landfill Operations, LLC DBA Juniper Ridge Landfill
License Number	A-921-70-B-R (January 1 through January 5, 2021) A-921-70-F-R (January 6 through June 30, 2021)
Period Covered By Certification	January 1 through June 30, 2021
Total Number of Pages Submitted in Certification (including this cover sheet)	73

I certify under penalty of law that, based on information and belief formed after reasonable inquiry, I believe the information included in the attached document is true, complete, and accurate.

Toni M. King

Toni King, P.E.
Region Engineer
NEWSME Landfill Operations, LLC

7/30/2021
Date

PERIODIC MONITORING REPORT FORM

Facility Name Juniper Ridge Landfill **License Number** A-921-70-B-R **From** 1 Jan *(month)* **to** 5 Jan *(month)* 2021 *(year)*

Condition ID	*Emission Source / Control Device*	*Periodic Monitoring Parameter*	*Monitoring Frequency*	*Limit* (From license)	*Summary*
(14)(B)	Subpart WWW Gas Collection and Control System	Design and construct system with no line for gas to bypass control devices	N/A	LFG collection system design criteria	☒ No deviations or exceedances ☒ Continuous compliance
(14)(B)	Subpart WWW Gas Collection and Control System	Operate and maintain system at least 15 years	Every 15 minutes for flow, continuous for presence of flame	No downtime in excess of five days	☒ No deviations or exceedances ☒ Continuous compliance
(14)(B)	Subpart WWW Gas Collection and Control System	Areas of the Landfill where Gas Collection is Required	Monthly	Collect LFG from areas with 5 or more years of waste; and closed areas with 2 or more years	☒ No deviations or exceedances ☒ Continuous compliance
(14)(B)	Subpart WWW Gas Collection and Control System	Wellhead pressure[1]	Monthly (minimum)	Negative pressure	☒ Exceedances resolved within NSPS timeframe ☒ Continuous compliance
(14)(B)	Subpart WWW Gas Collection and Control System	Wellhead LFG temperature, O_2 or N_2[1]	Monthly (minimum)	Temp. < 131°F, N_2 < 20% or O_2 < 5%	☒ Exceedances resolved within NSPS timeframe ☒ Continuous compliance
(14)(B)	Subpart WWW Gas Collection and Control System	Methane concentration above landfill surface[2]	Quarterly (minimum)	[CH4] < 500 ppm	☒ Exceedances resolved within NSPS timeframe ☒ Continuous compliance
(15)(B)(1)	Thiopaq System	Thiopaq Installation and operation	N/A	Operate by June 1, 2015	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Thiopaq System	TRS concentration entering and exiting control equipment	Monthly	1,000 ppmv 12-month rolling average limit, 449 tpy 12-month rolling total	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Flare #4	LFG Flow to flare	Totalized monthly	No limits listed (scf)	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Thiopaq System	LFG flow entering and exiting TRS control equipment	Totalized monthly	No limits listed (scf)	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Thiopaq System	H2S concentration entering and exiting TRS control equipment[2]	Two times/day twice weekly, three days between minimum	No limits listed (ppmv)	☒ No deviations or exceedances ☒ Continuous compliance

Condition ID	*Emission Source / Control Device*	*Periodic Monitoring Parameter*	*Monitoring Frequency*	*Limit* (From license)	*Summary*
(15)(B)(4)	Thiopaq System	Control equipment downtime	As occurs	95% uptime minimum 12-month rolling total	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Thiopaq System	Unscrubbed bypass	As occurs		☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Thiopaq System	Calibration of flow meters	Annually	Once per year minimum	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Landifll	NMOC concentration	Once every five years 12/31/17	No limits listed (ppmv)	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Landifll	Propane fuel use	As occurs	No limits listed (gal)	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)(4)	Flares #2 & #3	Hours of operation (each)	As occurs	100 hours per calendar year	☒ No deviations or exceedances ☒ Continuous compliance

1. This certification is for the period from January 1, 2021 through January 5, 2021, the final period that JRL operated under NSPS Subpart WWW. JRL began operating the GCCS to comply with NSPS Subpart XXX and the updated NESHAP Subpart AAAA on January 6, 2021.

PERIODIC MONITORING REPORT FORM

Facility Name Juniper Ridge Landfill **License Number** A-921-70-F-R **From** 6 Jan *(month)* **to** 30 Jun *(month)* 2021 *(year)*

Specific Conditions	***Emission Source / Control Device***	***Periodic Monitoring Parameter***	***Monitoring Frequency***	***Limit*** (From license)	***Summary***
(14)(A)	Solid Waste Landfill Operate to control TRS	Design with cover materials to control moisture and gas	N/A	LFG collection system design criteria	☒ No deviations or exceedances ☒ Continuous compliance
(14)(B)	Solid Waste Landfill Flares	#2 & #3 shall not operate when #4 is. Hours of operation for #2 & #3	As occurs	100 hours per calendar year for #2 and #3	☒ No deviations or exceedances ☒ Continuous compliance
(14)(C)	Solid Waste Landfill Flare #4	The top of Flare #4 shall be at least 265 feet above sea level at its location on the southeast end of the facility.	N/A	LFG collection system design criteria	☒ No deviations or exceedances ☒ Continuous compliance
(14)(D)	Solid Waste Landfill Flares	Short-term Emission Limits	monthly	lb/hr limits for criteria pollutants and opacity limit	☒ No deviations or exceedances ☒ Continuous compliance
(14)(E)	Solid Waste Landfill Annual Emissions	Tons-per-12-months emissions for SO2, VOC, and HAPs	monthly	Tons-per-12-months limits for SO2, VOC, and HAPs	☒ No deviations or exceedances ☒ Continuous compliance
(15)(A)	Control Technology for sulfur	12-month average concentration of TRS in LFG	monthly	1,000 ppmv	☒ No deviations or exceedances ☒ Continuous compliance
(15)(B)	Control Technology for sulfur	Monthly TRS sampling using DEP-approved test method (e.g., lab analysis of grab samples)	monthly	SO2 lb/hr and tpy limits and the TRS ppmv limit	☒ No deviations or exceedances ☒ Continuous compliance
(15)(C)	Control Technology for sulfur	LFG flow, H2S sampling with tubes, downtime, bypass, propane use, calibration of flow meters	Morning and afternoon two days per week	Used as an operational tool and not for compliance with numerical limits	☒ No deviations or exceedances ☒ Continuous compliance
(15)(D)	Control Technology for sulfur	Compliance Assurance Monitoring (CAM)	Monthly TRS sampling [see (15)(B)] and monthly flow totals	SO2 lb/hr and tpy limits and the TRS ppmv limit	☒ No deviations or exceedances ☒ Continuous compliance
(15)(E)	Control Technology for sulfur	Uptime	Continuous (i.e., every 15-minute) flow readings	95% uptime for all sulfur control equipment on a 12-month rolling total basis	☒ No deviations or exceedances ☒ Continuous compliance
(16)(A)	NSPS Subpart XXX and NESHAP Subpart AAAA	Operate GCCS and route gas to flare or RNG plant	Continuous for LFG flow and flare temperature	Operational Requirement	☒ No deviations or exceedances ☒ Continuous compliance

Specific Conditions	***Emission Source / Control Device***	***Periodic Monitoring Parameter***	***Monitoring Frequency***	***Limit*** (From license)	***Summary***
(16)(B)	Follow Standards from NESHAP Subpart AAAA (i.e., temperature limit = 145 °F)	Wellhead pressure and temperature, methane emissions from landfill surface, operate control system, close valves within an hour of shutdown	Monthly for pressure and temperature, quarterly for methane emissions, continuous for control system operation	Negative pressure or HOV, 145 °F or HOV, 500 ppm methane, one hour to close valves/stop venting after shutdown	☒ No deviations or exceedances ☒ Continuous compliance
(16)(C)	NESHAP Subpart AAAA Monitoring	Wellhead pressure, oxygen, and temperature, enhanced temperature monitoring for exceedances, methane emissions from landfill surface, cover integrity checks, control system flow and flare temperature	Monthly for pressure, oxygen, temperature, and cover integrity, quarterly for methane emissions, continuous for control system flow and flare temperature	Negative pressure or HOV, 145 °F or HOV, 500 ppm methane	☒ No deviations or exceedances ☒ Continuous compliance
(16)(D)	NESHAP Subpart AAAA Notifications and Reports	90 days before expanding into area not covered by design plan, Initial Performance Test for the Flare, Semi-Annual Reports, Electronic submission of reports; Notification within 24 hours for wellhead gas temperature of 170 °F or more.	Semi-Annual reporting and additional one-time reporting	170 °F wellhead temperature requires 24-hour notification to DEP	☒ No deviations or exceedances ☒ Continuous compliance
(16)(E)	NSPS and NESHAP Records	Design Capacity Report and waste acceptance, NESHAP Subpart AAAA startup date (1/6/21), control system flow, flare temperature, GCCS downtimes and startup times, control device failures, maps for existing and planned GCCS, monitoring exceedances, enhance temperature monitoring, email transmissions of 24-hr 170 °F reports, Root cause analysis for exceedances that take more than 15-days to correct, other NESHAP Subpart AAAA monitoring	Continuous for control system flow and flare temperature and additional recordkeeping requirements	Negative pressure or HOV, 145 °F or HOV, 500 ppm methane, 170 °F wellhead temperature requires 24-hour notification to DEP	☒ No deviations or exceedances ☒ Continuous compliance
(17)(A), (B), and (C)	Generator #1 Fuel and Emission Limits	Operate with distillate fuel with sulfur limit of 0.0015% and within emission limits	Fuel deliveries as needed, emissions reported annually	Limits for criteria pollutants	☒ No deviations or exceedances ☒ Continuous compliance
(17)(D)	Generator #1 Visible Emissions	Log startups, operate in accordance with manufacturer's instructions and good air pollution practices, less than 30 minutes to startup	Log each startup date, time, and duration	20% Opacity except for startup	☒ No deviations or exceedances ☒ Continuous compliance

Specific Conditions	***Emission Source / Control Device***	***Periodic Monitoring Parameter***	***Monitoring Frequency***	***Limit*** (From license)	***Summary***
(17)(E)	Generator #1 NESHAP Subpart ZZZZ	a. Change the oil and filter b. Inspect the air cleaner; and c. Inspect the hoses and belts. Use oil analysis program as needed Non-resettable hour meter 100 hour/year for testing 30 minutes for startup	Oil, oil filter, hoses and belts every 500 hours of operation, annually, or as needed. Air cleaner every 1,000 hours of operation, annually, or as needed. Oil analysis as needed.	500 hours for oil, oil filter, hoses and belts, 1,000 hours for air cleaner, 100 hours for testing, 30 minutes for startup.	☒ No deviations or exceedances ☒ Continuous compliance
(18)	Fugitive Emissions	Visible emissions from a fugitive emission source (including stockpiles and roadways)	5-minute block average basis	20% opacity	☒ No deviations or exceedances ☒ Continuous compliance
(19)	Parameter Monitor General Requirements	Follow manufacturer recommendations, continuous monitoring, record reliable data	Every 15 minutes for continuous monitoring, at least 3 reading per hour	98% data reliability	☒ No deviations or exceedances ☒ Continuous compliance
(20)	Compliance Assurance Monitoring (CAM)	Follow CAM Plan for sulfur removal system and coordinate changes to CAM plan with DEP	Continuous monitoring for flow, monthly grab samples for TRS concentrations	SO2 lb/hr and tpy limits	☒ No deviations or exceedances ☒ Continuous compliance
(21)	Semi-Annual Reporting	Submit to the Bureau of Air Quality semiannual reports which are due on January 31st and July 31st	Semi-Annual Reports	N/A	☒ No deviations or exceedances ☒ Continuous compliance
(22)	Annual Compliance Certification	Submit an annual compliance certification to the Department and EPA by January 31st of each year.	Annual Certifications	N/A	☒ No deviations or exceedances ☒ Continuous compliance
(23)	Annual Emission Statements	Fuel records, TRS data, and hours or operation	Annual reports except for Hazardous Air Pollutants which are reported every three years (e.g., 2023, 2026)	Emission Limits in Air License	☒ No deviations or exceedances ☒ Continuous compliance
(24)	General Applicable State Regulations	Open Burning, Emergencies, Ambient Air, Dispersion, and Mercury	N/A	N/A	☒ No deviations or exceedances ☒ Continuous compliance
(25)	Units Containing Ozone Depleting Substances	Standards for recycling and emission reduction pursuant to 40 C.F.R. Part 82, Subpart F, except as provided for motor vehicle air conditioning units in Subpart B. Examples of such units include refrigerators and any size air conditioners that contain CFCs.	N/A	N/A	☒ No deviations or exceedances ☒ Continuous compliance

Specific Conditions	***Emission Source / Control Device***	***Periodic Monitoring Parameter***	***Monitoring Frequency***	***Limit*** (From license)	***Summary***
(26)	Asbestos Abatement	Standard for Asbestos Demolition and Renovation	When undertaking Asbestos abatement activities	N/A	☒ No deviations or exceedances ☒ Continuous compliance
(27)	Expiration of a Part 70 license	JRL shall submit a complete Part 70 renewal application at least six but no more than 18 months prior to the expiration of this air license.	Renewal application due between Nov. 24, 2024 and Nov. 24, 2025	N/A	☒ No deviations or exceedances ☒ Continuous compliance
(28)	New Source Review (NSR)	JRL is subject to NSR requirements summarized in the license even if the license expires.	N/A	N/A	☒ No deviations or exceedances ☒ Continuous compliance

1. This certification is for the period from January 6, 2021 through June 30, 2021. JRL began operating the GCCS to comply with NSPS Subpart XXX and the updated NESHAP Subpart AAAA on January 6, 2021.

Juniper Ridge Landfill

Semi-Annual Compliance Data Summary January 1 to June 30, 2021

Month	Date TRS Sample Taken	TRS Samples Average of 3 samples Total Reduced Sulfur (ppm)		FLOW	Exiting Control Equipment		Total landfill gas flow		Flares #2 & #3 Runtime	Control Equipment Downtime
		Inlet	Outlet	(scfm)	Rolling Average TRS (ppm)	Rolling Total SO2 (tons/yr)*	Bypass (scf)	Scrubbed (scf)	hours	hours
January	01/11/21	16,173	704	2,158	324	47	4,590,900	103,631,976	0	31.1
February	02/19/21	16,438	314	2,681	322	48	819,663	104,322,200	0	5.2
March	03/11/21	15,150	357	2,106	325	50	1,441,985	95,676,163	0	11.5
April	04/07/21	14,747	397	2,062	321	45	374,529	82,747,196	0	4.6
May	05/05/21	16,174	575	2,025	345	48	382,315	91,987,080	0	3.5
June	06/09/21	15,956	747	1,970	376	52	1,138,276	96,231,435	0	9.3

*Includes bypass

Additional Conditions:	Limit
Records of inlet and outlet H2S concentrations are maintained onsite and available upon reuqest	No limit listed
Records of control equipment downtime are maintained onsite and available upon request	No limit listed
Calibration logs of flow meters are maintained on site and available upon request	Once per year

SANBORN HEAD

Building Trust. Engineering Success.

SEMIANNUAL PERIODIC MONITORING REPORT

LANDFILL GAS COLLECTION AND CONTROL SYSTEM

For Period from January 1 through June 30, 2021

Juniper Ridge Landfill

Old Town, Maine

July 2021

SANBORN HEAD

Building Trust. Engineering Success.

Jeffrey Pelletier
Environmental Manager
NEWSME Landfill Operations, LLC
358 Emerson Mill Road
Hampden, Maine 04444

July 30, 2021
File No. 2343.21

Re: NSPS Semiannual Periodic Monitoring Report
Gas Collection and Control System
Juniper Ridge Landfill
Old Town, Maine

Dear Jeff:

On behalf of NEWSME Landfill Operations, LLC (NEWSME), Sanborn, Head & Associates, Inc. (Sanborn Head) prepared the enclosed semiannual periodic monitoring report for the gas collection and control system (GCCS) at the Juniper Ridge Landfill (JRL) in Old Town, Maine as required by Subpart XXX of the New Source Performance Standards (NSPS) and Subpart AAAA of the National Emission Standards for Hazardous Air Pollutants (NESHAP).

Please contact us with any questions.

Sincerely,
SANBORN, HEAD & ASSOCIATES, INC.

Jeffrey J. Doris
Project Manager

David E. Adams, P.E.
Senior Vice President/Principal

JJD/DEA: jjd

Encl. Semiannual Periodic Monitoring Report

cc: Michael DiLeonardi, NEWSME (electronic copy)
Toni King, NEWSME (electronic copy)

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TABLE OF CONTENTS

1.0 INTRODUCTION

On behalf of NEWSME Landfill Operations, LLC (NEWSME), Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this semiannual periodic monitoring report (semiannual report) for the gas collection and control system (GCCS) at the Juniper Ridge Landfill (JRL) in Old Town, Maine. We prepared this report to satisfy the requirements from 40 Code of Federal Regulations (CFR) Part 60 Subpart XXX (the New Source Performance Standards [NSPS] for Municipal Solid Waste [MSW] landfills) and 40 CFR Part 63 Subpart AAAA (the National Emission Standard for Hazardous Air Pollutants [NESHAP] for MSW landfills).

This semiannual report covers the period from January 1 through June 30, 2021.

Prior to January 2021, JRL operated the GCCS to comply with the older NSPS for MSW Landfills, Subpart WWW. Beginning with this reporting period, JRL became subject to NSPS Subpart XXX and the updated compliance provisions in NESHAP Subpart AAAA. Under the new standards, the default landfill gas (LFG) temperature has increased from 131 to 145 degrees Fahrenheit (°F) and there is no longer a threshold for the oxygen (or nitrogen) content of the LFG.

2.0 SITE DESCRIPTION

JRL is owned by the State of Maine and operated by NEWSME. JRL is located on the western side of Interstate 95 in Old Town, Maine, and is accessible from State Route 16 in Alton, Maine. Under the current license, JRL accepts approximately 2,200 tons per day of construction and demolition debris; residues (ash, front-end process residue [FEPR], and over-sized bulky wastes); bypass MSW; water and wastewater treatment plant sludge; and lesser amounts of miscellaneous non-hazardous wastes.

JRL is located on a 780-acre parcel of land, and the licensed footprint of the landfill is approximately 122 acres. Active filling began in Cell 1 at the site in December 1996. Current landfill operations are in Cell 12 and other adjacent cells on top of the landfill. Intermediate and intermediate-final cover has been placed in Cells 1 through 12. The licensed capacity of JRL is approximately 19.63 million cubic yards (15.01 million m^3). With a waste compaction density of approximately 0.86 tons of waste per cubic yard, the estimated capacity on a mass basis is approximately 16.9 million tons (15.3 million Mg).

The JRL GCCS, shown in Figure 1, is designed for active collection of landfill gas (LFG) while maintaining anaerobic conditions within the landfill by limiting air intrusion into the waste. The GCCS is monitored using equipment that measures and records the LFG extraction in standard cubic feet per minute (scfm) and the concentration in LFG of methane, oxygen, carbon dioxide, and balance gas (primarily nitrogen) in percent by volume.

The GCCS is regularly expanded by adding gas extraction points and related infrastructure. LFG is managed in Cells 1 through 12 using nearly horizontal sloped gas collection trenches (GCTs) and/or vertical gas extraction wells. GCTs are temporary collectors installed to collect LFG until vertical wells are installed. Vertical wells are installed as needed, including on the outer slopes of the cells as they are filled to final grades. The vacuum applied at each

extraction location is adjusted as needed with a manually controlled valve on the extraction location wellhead. The active system contains approximately 119 vertical wells and 67 gas collection trenches installed throughout Cells 1 through 12. LFG is also collected from six other connections to the leachate and/or condensate collection systems and to additional horizontal collectors to control odors.

The NSPS and NESHAP do not require gas collection in areas where the waste has been in place less than five years, or less than two years for areas that have reached final grade or have been closed. Although not required by its air license, NSPS Subpart XXX, or NESHAP Subpart AAAA, JRL maintains gas collectors and connections to the leachate system in recently placed waste and uses them as needed to control odors and minimize greenhouse gas emissions. Although these connections are monitored when in use, readings of non-negative pressure are not classified as exceedances of the monitoring standards.

LFG extraction points are connected to common header pipes that convey the gas to a 106.5 million British thermal units per hour (MMBtu/hr) open flare (Flare No. 4), which the Maine Department of Environmental Protection (Maine DEP) approved in November 2008. Open Flares No. 2 and No. 3 are licensed as backup LFG control devices, and do not operate simultaneously with Flare No. 4.

Ahead of the July 1, 2015 license deadline, JRL began operating a Thiopaq® sulfur treatment system to remove total reduced sulfur (TRS) compounds from LFG prior to combustion to reduce emissions of sulfur dioxide (SO_2).

Although JRL has a system to remove sulfur from the gas, it does not have a "Treatment System" as defined in the NESHAP Subpart AAAA, which is a system to filter, de-water, and compress LFG for sale or beneficial use.

3.0 SEMIANNUAL REPORT REQUIREMENTS

The semiannual report is required by 40 CFR Part 63.1981(h)(1) through (8) to contain:

- (1) The number of times that applicable parameters monitored under §63.1958(b), (c), and (d) were exceeded (i.e., limits for wellhead pressure, wellhead temperature, and methane surface emissions) and when the gas collection and control system was not operating under §63.1958(e) (e.g., occasions when one or more valves in the GCCS did not close during a shutdown, and thereby allowed venting of LFG to the atmosphere for an hour or more), including periods of SSM. For each instance, the date, time, and duration of each exceedance must be reported. For sites with a treatment system for a beneficial use project, the number of times the parameters in the site-specific treatment system plan were exceeded must be included.

- (2) Description and duration of periods when the gas stream was diverted from the control device or treatment system through a bypass line.

- (3) Description and duration of periods when the control device or treatment system was not operating.

- (4) Periods when the collection system was not operating.
- (5) The location of each exceedance of the 500-ppm methane concentration as provided in §63.1958(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month. For each location, record the latitude and longitude coordinates of each exceedance using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places.
- (6) The date of installation and the location of each well or collection system expansion added pursuant to §63.1960(a)(3) and (4), (b), and (c)(4).
- (7) For any corrective action analysis for which corrective actions are required in §63.1960(a)(3)(i) or (a)(5) and that take more than 60 days to correct the exceedance, the root cause analysis conducted, including a description of the recommended corrective action(s), the date for corrective action(s) already completed following the positive pressure or high temperature reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.
- (8) The results of any enhanced monitoring for temperature exceedances.

The semi-annual reports also include the results of monthly landfill cover integrity checks.

4.0 GAS COLLECTION AND CONTROL SYSTEM

4.1 Monitoring

The monitoring required for this report includes the monitoring summarized below for gas extraction points and surface emissions. This section also summarizes the GCCS design and operation to prevent venting of LFG to the atmosphere for an hour or more.

4.1.1 Gas Extraction Point Monitoring

The gas collection wellfield is monitored at least monthly to measure LFG concentrations and the temperature and pressure in the affected wellheads. In areas of the landfill where waste has been in place for at least five years, or areas with final grade and waste in place for at least two years, JRL is required to report gas extraction points with recorded exceedances of the pressure limit (negative gauge pressure, except for areas with geomembrane cover) or temperatures greater than 145° F (or approved alternative). Table A-1 in Appendix A presents the exceedances of the pressure and temperature standards that were recorded during the reporting period.

Operating at the default gas temperature (145° F) in NESHAP Subpart AAAA for MSW landfills has not been possible at all JRL wellheads on a consistent basis due to the type of waste disposed at JRL and the corresponding decomposition temperature. To allow for gas collection with waste decomposition temperatures greater than 145° F, JRL has obtained approval from Maine DEP to operate some gas extraction locations at an alternative operating temperature of 150° F. The HOV approvals are included in Appendix A.

4.1.2 Landfill Surface Monitoring

Landfill surface monitoring scans were performed in general accordance with NSPS Subpart XXX and NESHAP Subpart AAAA requirements to measure the concentration of methane near the surface of the landfill on March 30, 2021 (Q1-2021 scan) and on June 10, 2021 (Q2-2021 scan).

The surface monitoring protocol requires measuring methane surface concentrations within 5 to 10 centimeters (cm; [about 2 to 4 inches]) of the landfill surface while walking at a normal pace around the perimeter of the landfill and along a serpentine path traversing the landfill at 30-meter (m; approximately 100-foot) intervals.

The walking path for surface monitoring at the JRL is included on Figure B in Appendix B. In addition to monitoring along the path, NSPS and NESHAP require surface monitoring in areas with:

- Visible cracks or holes in the landfill cover;
- Visible erosion or water on the landfill surface;
- Visually observed distressed vegetation; and
- Where gas extraction components protrude through the landfill cover system (i.e., where the boots connect to the wells and the lateral collection system piping).

During surface monitoring, JRL personnel used a flame ionization detector (FID) or equivalent device that complies with the NSPS and NESHAP requirements and that was calibrated according to procedures outlined in United States Environmental Protection Agency (USEPA) Method 21.

There were three locations during the Q1-2021 initial scan and two locations during the Q2-2021 initial scan with recorded exceedances of the methane surface concentration standard of 500 ppm. The exceedances were corrected before the initial follow-up scans and the return to compliance with the 500-ppm standard was confirmed for each location during the one-month follow-up scans.

Surface scan results are presented in Appendix B.

4.1.3 Control Device Operation

The GCCS uses a Supervisory Control and Data Acquisition (SCADA) system to monitor the flare temperature and the LFG flow rate to the flare system. The SCADA system records indicate there were no periods exceeding one hour when the gas collection system was operating while the flare system was not operating.

During flare shutdowns, the system is designed for the blower to shut down also. When the flame goes out on the flare, the temperature monitoring system alerts the control system to turn off the blower system. During the reporting period, the system operated as designed to prevent venting of LFG to the atmosphere for an hour or more, including during periods of startup, shutdown, and malfunction.

4.2 Landfill Gas Diverted from Control Devices

The LFG collection system is not constructed with a bypass line, and correspondingly, during the reporting period, no LFG was diverted from the control system through a bypass line.

4.3 Flare Downtime

A log of flare downtime is presented in Appendix C that provides a description and the duration of periods when the control device was not operating.

4.4 GCCS Downtime

During the reporting period, the JRL flare was the only control device, and therefore, the downtime for the GCCS corresponds to the downtime of the flare presented in Appendix C. When the flare shuts down, the blower system that applies vacuum to the wellfield and delivers gas to the flare is designed to also shut down.

4.5 Landfill Surface Monitoring Exceedance Locations

The results of landfill surface monitoring are summarized above in Section 4.1.2 and presented in Appendix B. The results in Appendix B include the location of each exceedance of the 500-ppm methane concentration standard and the concentration recorded at each exceedance location. For each location, the latitude and longitude are recorded using an instrument with an accuracy of at least four meters and the coordinates are in decimal degrees with at least five decimal places.

4.6 Landfill Gas Collection System Modifications

An updated Landfill Gas Collection and Control System Plan is provided as Figure 1. The figure shows additions to the gas collection system since the GCCS Design Report was submitted in June 2013. JRL installs gas collection trenches in some areas of the landfill as waste is placed, which allows gas collection to begin ahead of the schedule required by the standards. To increase LFG collection, and to reduce odors from LFG, these collectors might be used intermittently as needed at relatively low flow rates before gas generation allows negative pressure to be maintained.

JRL monitors gas collection points as they are added to the system, including those collectors in areas that cannot sustain continuous methane extraction. For the collectors installed in waste earlier than required, non-negative pressure is not recorded as an exceedance.

In addition to monitoring and adjusting gas collection points, JRL completes routine maintenance to improve the quality and quantity of LFG collected from the landfill and to improve monitoring of the LFG collection system. A summary of GCCS improvements completed during the reporting period is included as Table D-1 in Appendix D.

4.7 Exceedances that take more than 60 days to correct

For exceedances that take more than 60 days to correct, this report should include the root cause analysis for the exceedance, including a description of the recommended corrective actions, the date for corrective actions already completed, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.

During the reporting period, there were no exceedances that took more than 60 days to correct.

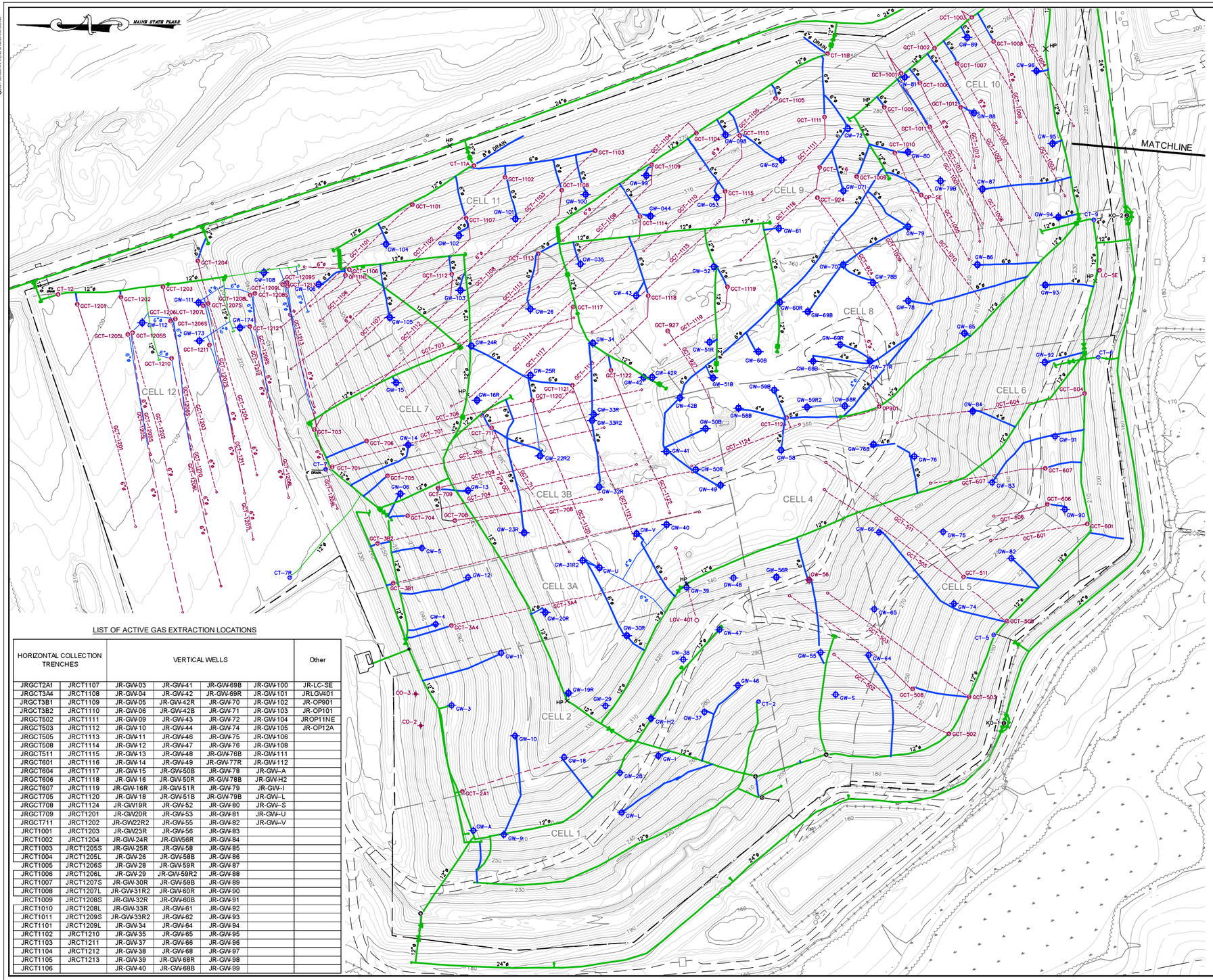
4.8 Enhanced Temperature Monitoring

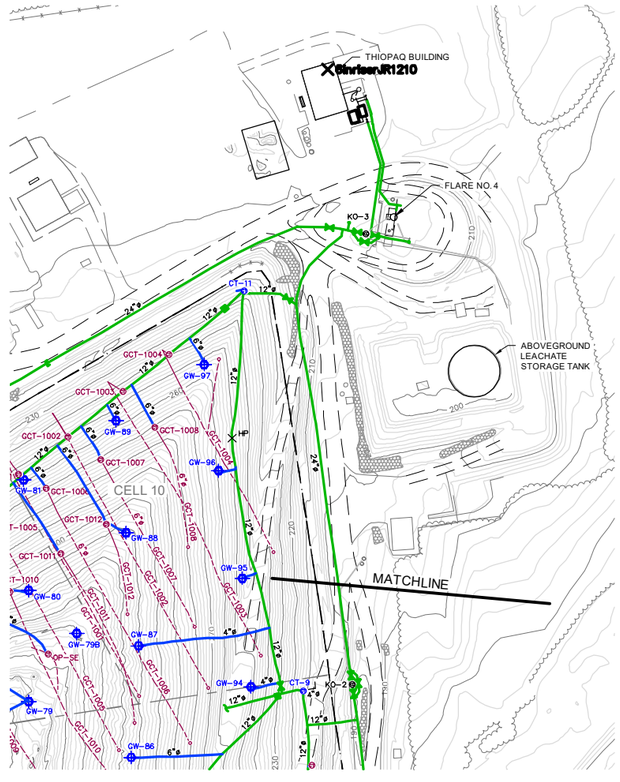
No enhanced monitoring was needed during the reporting period for unresolved temperature exceedances. As shown in Table A-1, the temperature exceedances that occurred during the reporting period were resolved within approximately one week.

4.9 Landfill Cover Integrity

JRL uses geosynthetic membrane cover over large portions of the landfill to increase gas collection efficiency, and JRL performs cover repairs and upgrades over the entire landfill cover system as needed to increase gas collection and reduce odors. During the reporting period, JRL performed monthly cover integrity checks and made repairs as needed and as snow cover allowed.

FIGURES





LIST OF ACTIVE GAS EXTRACTION LOCATIONS

HORIZONTAL COLLECTION TRENCHES		VERTICAL WELLS				Other
JRGCT2A1	JRCT1107	JR-GW-03	JR-GW-41	JR-GW-69B	JR-GW-100	JR-LC-SE
JRGCT3A4	JRCT1108	JR-GW-04	JR-GW-42	JR-GW-69R	JR-GW-101	JRLGV401
JRGCT3B1	JRCT1109	JR-GW-05	JR-GW-42R	JR-GW-70	JR-GW-102	JR-OP901
JRGCT3B2	JRCT1110	JR-GW-06	JR-GW-42B	JR-GW-71	JR-GW-103	JR-OP101
JRGCT502	JRCT1111	JR-GW-09	JR-GW-43	JR-GW-72	JR-GW-104	JROP11NE
JRGCT503	JRCT1112	JR-GW-10	JR-GW-44	JR-GW-74	JR-GW-105	JR-OP12A
JRGCT505	JRCT1113	JR-GW-11	JR-GW-46	JR-GW-75	JR-GW-106	
JRGCT508	JRCT1114	JR-GW-12	JR-GW-47	JR-GW-76	JR-GW-108	
JRGCT511	JRCT1115	JR-GW-13	JR-GW-48	JR-GW-76B	JR-GW-111	
JRGCT601	JRCT1116	JR-GW-14	JR-GW-49	JR-GW-77R	JR-GW-112	
JRGCT604	JRCT1117	JR-GW-15	JR-GW-50B	JR-GW-78	JR-GW--A	
JRGCT606	JRCT1118	JR-GW-16	JR-GW-50R	JR-GW-78B	JR-GW-H2	
JRGCT607	JRCT1119	JR-GW-16R	JR-GW-51R	JR-GW-79	JR-GW--I	
JRGCT705	JRCT1120	JR-GW-18	JR-GW-51B	JR-GW-79B	JR-GW--L	
JRGCT708	JRCT1124	JR-GW19R	JR-GW-52	JR-GW-80	JR-GW--S	
JRGCT709	JRCT1201	JR-GW20R	JR-GW-53	JR-GW-81	JR-GW--U	
JRGCT711	JRCT1202	JR-GW22R2	JR-GW-55	JR-GW-82	JR-GW--V	
JRCT1001	JRCT1203	JR-GW23R	JR-GW-56	JR-GW-83		
JRCT1002	JRCT1204	JR-GW-24R	JR-GW56R	JR-GW-84		
JRCT1003	JRCT1205S	JR-GW-25R	JR-GW-58	JR-GW-85		
JRCT1004	JRCT1205L	JR-GW-26	JR-GW-58B	JR-GW-86		
JRCT1005	JRCT1206S	JR-GW-28	JR-GW-59R	JR-GW-87		
JRCT1006	JRCT1206L	JR-GW-29	JR-GW-59R2	JR-GW-88		
JRCT1007	JRCT1207S	JR-GW-30R	JR-GW-59B	JR-GW-89		
JRCT1008	JRCT1207L	JR-GW31R2	JR-GW-60R	JR-GW-90		
JRCT1009	JRCT1208S	JR-GW-32R	JR-GW-60B	JR-GW-91		
JRCT1010	JRCT1208L	JR-GW-33R	JR-GW-61	JR-GW-92		
JRCT1011	JRCT1209S	JR-GW-33R2	JR-GW-62	JR-GW-93		
JRCT1101	JRCT1209L	JR-GW-34	JR-GW-64	JR-GW-94		
JRCT1102	JRCT1210	JR-GW-35	JR-GW-65	JR-GW-95		
JRCT1103	JRCT1211	JR-GW-37	JR-GW-66	JR-GW-96		
JRCT1104	JRCT1212	JR-GW-38	JR-GW-68	JR-GW-97		
JRCT1105	JRCT1213	JR-GW-39	JR-GW-68R	JR-GW-98		
JRCT1106		JR-GW-40	JR-GW-68B	JR-GW-99		

NOTES:

1. THE EXISTING LANDFILL GAS EXTRACTION SYSTEM INFRASTRUCTURE FEATURES SHOWN ARE BASED ON A COMBINATION OF DESIGN AND AS-BUILT DOCUMENTATION AVAILABLE TO SANBORN, HEAD & ASSOCIATES, INC. (SANBORN HEAD). ACTUAL LOCATIONS OF INDIVIDUAL FEATURES MAY BE DIFFERENT THAN SHOWN.
2. THERE MAY BE RECENTLY INSTALLED LFG SYSTEM INFRASTRUCTURE THAT IS NOT YET SHOWN ON THIS PLAN.
3. ABANDONED LFG SYSTEM INFRASTRUCTURE IS NOT SHOWN FOR CLARITY.
4. THE TOPOGRAPHY SHOWN IS A COMPILATION OF THE FOLLOWING:
   A. PHOTOGRAMMETRIC MAPPING PREPARED BY AERIAL SURVEY & PHOTO, INC. OF NORRIDGEWOCK, MAINE. PHOTO DATE: JUNE 26, 2020.
   B. LOW ALTITUDE PHOTOGRAMMETRIC MAPPING IN THE VICINITY OF CELL 12, DATED AUGUST 31, 2020, BY SEVEE & MAHER ENGINEERS, INC. (SME) OF CUMBERLAND, MAINE.
5. HORIZONTAL DATUM IS MAINE STATE COORDINATE SYSTEM NAD83. VERTICAL DATUM IS NAVD88.

LEGEND (EXISTING):

- 10-FOOT CONTOUR
- 2-FOOT CONTOUR
- LIMIT OF WASTE CONTAINMENT
- CELL LIMIT
- EDGE OF ROAD
- LFG CONVEYANCE PIPE ≥ 12"Ø
- LFG CONVEYANCE PIPE < 12"Ø
- LFG COLLECTION TRENCH
- LIMIT OF MARSH
- FENCE LINE
- ISOLATION VALVE
- ACCESS RISER
- GW-9 LANDFILL GAS EXTRACTION WELL
- GCT-901 COLLECTION TRENCH WELLHEAD
- COLLECTION TRENCH TERMINATION
- PIPE END CAP
- LEACHATE COLLECTION CLEANOUT
- LEACHATE COLLECTION INLET
- CT-7 CONDENSATE TRAP
- RIPRAP

SANBORN HEAD

GRAPHICAL SCALE
120' 60' 0 120' 240'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: O. HERNANDEZ
DESIGNED BY: O. HERNANDEZ
REVIEWED BY: J. DORIS
PROJECT MGR: J. DORIS
PIC: D. ADAMS
DATE: JULY 2021

JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.34

AS-BUILT GAS COLLECTION & CONTROL SYSTEM PLAN

FIGURE: 1

APPENDIX A

GAS EXTRACTION POINT EXCEEDANCES

Table A-1
Gas Extraction Point NSPS Exceedances
Wellfield Monitoring from January 1 through June 30, 2021
Juniper Ridge Landfill
Old Town, Maine

Device Name	Open Date	NSPS Exceedances			Re-Check Deadline			Status
		Type	Value	Duration (days)	5-Day	15-Day	Resolved Date	
JR-GW--U	1/4/2021	Pressure	Initial Static Pressure: 0.01	0			1/4/2021	closed
JR-GW--V	1/4/2021	Pressure	Initial Static Pressure: 0	4			1/8/2021	closed
JR-GW-49	1/4/2021	Pressure	Initial Static Pressure: 0.05	0			1/4/2021	closed
JR-GW-49	1/4/2021	Pressure	Initial Static Pressure: 0.05	0			1/4/2021	closed
JR-GW-58	1/4/2021	Pressure	Initial Static Pressure: 0.03	8	Completed		1/12/2021	closed
JR-GW20R	1/5/2021	Pressure	Initial Static Pressure: 0.02	0			1/5/2021	closed
JR-GW23R	1/5/2021	Pressure	Initial Static Pressure: 0.13	52	Completed	Completed	2/26/2021	closed
JR-GW76B	1/8/2021	Pressure	Initial Static Pressure: 0.02	0			1/8/2021	closed
JR-GW32R	1/8/2021	Pressure	Initial Static Pressure: 0	0			1/8/2021	closed
JR-GW--U	1/8/2021	Pressure	Initial Static Pressure: 0.25	7	Completed		1/15/2021	closed
JR-GW-40	1/8/2021	Pressure	Initial Static Pressure: 0.27	7	Completed		1/15/2021	closed
JR-GW-49	1/8/2021	Pressure	Initial Static Pressure: 0.29	0			1/8/2021	closed
JR-GW-49	1/8/2021	Pressure	Initial Static Pressure: 0.21	3			1/11/2021	closed
JR-GW77R	1/8/2021	Pressure	Initial Static Pressure: 0.3	1			1/9/2021	closed
JR-GW69B	1/8/2021	Pressure	Initial Static Pressure: 0.32	0			1/8/2021	closed
JR-GW69B	1/11/2021	Pressure	Initial Static Pressure: 0.02	0			1/11/2021	closed
JR-GW32R	1/11/2021	Pressure	Initial Static Pressure: 0.24	0			1/11/2021	closed
JR-GW--V	1/11/2021	Pressure	Initial Static Pressure: 0.65	4			1/15/2021	closed
JR-GW69B	1/12/2021	Pressure	Initial Static Pressure: 0.36	0			1/12/2021	closed
JR-GW69B	1/12/2021	Pressure	Initial Static Pressure: 0.36	0			1/12/2021	closed
JRCT1119	1/12/2021	Pressure	Initial Static Pressure: 0.25	0			1/12/2021	closed
JRCT1119	1/12/2021	Pressure	Initial Static Pressure: 0.25	0			1/12/2021	closed
JRCT1124	1/12/2021	Pressure	Initial Static Pressure: 0.57	45	Completed	Completed	2/26/2021	closed
JR-GW-52	1/15/2021	Pressure	Initial Static Pressure: 0.03	0			1/15/2021	closed
JR-GW--V	1/16/2021	Pressure	Initial Static Pressure: 0.05	0			1/16/2021	closed
JR-GW-40	1/16/2021	Pressure	Initial Static Pressure: 0.11	0			1/16/2021	closed
JR-GW60R	1/16/2021	Pressure	Initial Static Pressure: 0.03	0			1/16/2021	closed
JR-GW-52	1/16/2021	Pressure	Initial Static Pressure: 0	0			1/16/2021	closed
GW-33R-2	1/19/2021	Pressure	Initial Static Pressure: 0.02	0			1/19/2021	closed
JR-GW77R	1/19/2021	Pressure	Initial Static Pressure: 0.06	0			1/19/2021	closed
JR-GW77R	1/19/2021	Pressure	Initial Static Pressure: 0.02	0			1/19/2021	closed
JR-GW76B	1/19/2021	Pressure	Initial Static Pressure: 0.1	0			1/19/2021	closed
JR-GW25R	1/21/2021	Pressure	Initial Static Pressure: 0.01	0			1/21/2021	closed
JR-GW24R	1/22/2021	Pressure	Initial Static Pressure: 0.03	0			1/22/2021	closed
JR-GW-26	1/22/2021	Pressure	Initial Static Pressure: 0	0			1/22/2021	closed
JR-GW-52	1/25/2021	Pressure	Initial Static Pressure: 0.01	0			1/25/2021	closed
GW-43	1/25/2021	Pressure	Initial Static Pressure: 0.08	0			1/25/2021	closed
JR-GW24R	1/25/2021	Pressure	Initial Static Pressure: 0.1	0			1/25/2021	closed
JRGW59R2	1/27/2021	Pressure	Initial Static Pressure: 0	0			1/27/2021	closed
GW-33R-2	1/27/2021	Pressure	Initial Static Pressure: 0	0			1/27/2021	closed
JR-GW76B	1/27/2021	Pressure	Initial Static Pressure: 0.03	0			1/27/2021	closed
JRGW59R2	2/3/2021	Pressure	Initial Static Pressure: 0.01	0			2/3/2021	closed
JR-GW-40	2/3/2021	Pressure	Initial Static Pressure: 0.02	0			2/3/2021	closed
JR-GW76B	2/4/2021	Pressure	Initial Static Pressure: 0.02	11	Completed		2/15/2021	closed
JR-GW-79	2/4/2021	Temperature	Initial Gas Temperature: 150.1	0			2/4/2021	closed
JR-GW--U	2/4/2021	Pressure	Initial Static Pressure: 0.02	0			2/4/2021	closed
JR-GW16R	2/4/2021	Pressure	Initial Static Pressure: 0.05	20	Completed	Completed	2/24/2021	closed
GW-43	2/4/2021	Pressure	Initial Static Pressure: 0.11	0			2/4/2021	closed
JR-GW-87	2/5/2021	Pressure	Initial Static Pressure: 13.63	0			2/5/2021	closed
JR-GW77R	2/10/2021	Pressure	Initial Static Pressure: 0.06	0			2/10/2021	closed
JR-GW-40	2/14/2021	Pressure	Initial Static Pressure: 0	0			2/14/2021	closed
JR-GW-40	2/15/2021	Temperature	Initial Gas Temperature: 145.2	3			2/18/2021	closed
JR-GW-26	2/18/2021	Temperature	Initial Gas Temperature: 149.7	8	Completed		2/26/2021	closed
JR-GW-40	2/24/2021	Temperature	Initial Gas Temperature: 146.4	2			2/26/2021	closed
JR-GW77R	3/3/2021	Pressure	Initial Static Pressure: 0.09	0			3/3/2021	closed
JR-OP901	3/3/2021	Pressure	Initial Static Pressure: 0.22	0			3/3/2021	closed
JR-GW76B	3/3/2021	Pressure	Initial Static Pressure: 0.23	0			3/3/2021	closed
JRGW59R2	3/3/2021	Pressure	Initial Static Pressure: 0.24	0			3/3/2021	closed
JRCT1124	3/3/2021	Pressure	Initial Static Pressure: 0.13	2			3/5/2021	closed
JR-GW-58	3/3/2021	Pressure	Initial Static Pressure: 0.2	0			3/3/2021	closed

Table A-1
Gas Extraction Point NSPS Exceedances
Wellfield Monitoring from January 1 through June 30, 2021
Juniper Ridge Landfill
Old Town, Maine

JR-GW-40	3/3/2021	Pressure	Initial Static Pressure: 0.07	2			3/5/2021	closed
JR-GW16R	3/3/2021	Pressure	Initial Static Pressure: 0.04	5	Completed		3/8/2021	closed
JR-GW-16	3/3/2021	Pressure	Initial Static Pressure: 0	0			3/3/2021	closed
JRCT1124	3/10/2021	Pressure	Initial Static Pressure: 0	0			3/10/2021	closed
JRCT1119	3/13/2021	Pressure	Initial Static Pressure: 0	0			3/13/2021	closed
GW-33R-2	3/13/2021	Pressure	Initial Static Pressure: 0.18	0			3/13/2021	closed
JR-GW-49	3/13/2021	Pressure	Initial Static Pressure: 0.02	0			3/13/2021	closed
JR-GW-40	3/13/2021	Pressure	Initial Static Pressure: 0.02	0			3/13/2021	closed
JR-GW-58	3/16/2021	Pressure	Initial Static Pressure: 0.05	0			3/16/2021	closed
JRGW59R2	3/16/2021	Pressure	Initial Static Pressure: 0	0			3/16/2021	closed
JR-GW77R	3/16/2021	Pressure	Initial Static Pressure: 0.14	0			3/16/2021	closed
JR-GW59B	3/16/2021	Pressure	Initial Static Pressure: 0	0			3/16/2021	closed
JR-GW60B	3/16/2021	Pressure	Initial Static Pressure: 0.06	0			3/16/2021	closed
JR-GW16R	3/16/2021	Pressure	Initial Static Pressure: 0.12	0			3/16/2021	closed
JR-GW-26	3/16/2021	Pressure	Initial Static Pressure: 0.04	0			3/16/2021	closed
JR-GW-34	3/16/2021	Pressure	Initial Static Pressure: 0.02	0			3/16/2021	closed
JRCT1119	3/16/2021	Pressure	Initial Static Pressure: 0.06	0			3/16/2021	closed
JR-GW76B	3/16/2021	Pressure	Initial Static Pressure: 0.07	0			3/16/2021	closed
GW-33R-2	3/22/2021	Pressure	Initial Static Pressure: 0	0			3/22/2021	closed
JR-GW77R	3/24/2021	Pressure	Initial Static Pressure: 0	0			3/24/2021	closed
JR-GW68R	3/24/2021	Pressure	Initial Static Pressure: 0.01	0			3/24/2021	closed
JRCT1124	3/24/2021	Pressure	Initial Static Pressure: 0.01	0			3/24/2021	closed
JR-GW--U	3/24/2021	Pressure	Initial Static Pressure: 0.14	0			3/24/2021	closed
JR-GW69B	3/24/2021	Pressure	Initial Static Pressure: 0.1	3			3/27/2021	closed
JR-GW77R	4/7/2021	Pressure	Initial Static Pressure: 0.12	0			4/7/2021	closed
JR-GW-26	4/8/2021	Pressure	Initial Static Pressure: 0.07	11	Completed		4/19/2021	closed
JR-GW--U	4/12/2021	Pressure	Initial Static Pressure: 0.08	0			4/12/2021	closed
JR-GW-40	4/19/2021	Pressure	Initial Static Pressure: 0.02	0			4/19/2021	closed
JR-GW--U	4/19/2021	Pressure	Initial Static Pressure: 0.02	0			4/19/2021	closed
JR-GW16R	4/19/2021	Pressure	Initial Static Pressure: 0.03	0			4/19/2021	closed
JR-GW-40	4/27/2021	Pressure	Initial Static Pressure: 0.05	0			4/27/2021	closed
JR-GW16R	4/28/2021	Pressure	Initial Static Pressure: 0.03	0			4/28/2021	closed
JR-GW23R	4/28/2021	Pressure	Initial Static Pressure: 0.03	0			4/28/2021	closed
GW-33R-2	5/4/2021	Pressure	Initial Static Pressure: 0.01	0			5/4/2021	closed
JR-GW16R	5/4/2021	Pressure	Initial Static Pressure: 0.03	0			5/4/2021	closed
JR-GW-70	5/4/2021	Pressure	Initial Static Pressure: 0.09	0			5/4/2021	closed
JR-GW79B	5/7/2021	Temperature	Initial Gas Temperature: 148.5	0			5/7/2021	closed
JR-GW76B	5/14/2021	Pressure	Initial Static Pressure: 0	0			5/14/2021	closed
JR-GW-58	5/14/2021	Pressure	Initial Static Pressure: 0.08	0			5/14/2021	closed
JR-GW-49	5/14/2021	Pressure	Initial Static Pressure: 0.15	0			5/14/2021	closed
JR-GW-40	5/14/2021	Pressure	Initial Static Pressure: 0.03	0			5/14/2021	closed
JR-GW--V	5/14/2021	Pressure	Initial Static Pressure: 0	0			5/14/2021	closed
JR-GW--V	5/14/2021	Pressure	Initial Static Pressure: 0.15	13	Completed		5/27/2021	closed
JR-GW-79	5/18/2021	Temperature	Initial Gas Temperature: 151.4	0			5/18/2021	closed
JR-GW-70	5/19/2021	Pressure	Initial Static Pressure: 0	0			5/19/2021	closed
JR-GW77R	5/23/2021	Pressure	Initial Static Pressure: 0.01	0			5/23/2021	closed
JR-GW76B	6/1/2021	Pressure	Initial Static Pressure: 0.01	0			6/1/2021	closed
JR-GW-58	6/1/2021	Pressure	Initial Static Pressure: 0	0			6/1/2021	closed
JRCT1113	6/3/2021	Pressure	Initial Static Pressure: 0.01	5	Completed		6/8/2021	closed
JR-GW-16	6/4/2021	Pressure	Initial Static Pressure: 0.02	0			6/4/2021	closed

Notes:

1. Pressure is measured in inches of water, oxygen in percent by volume, and temperature in degrees Fahrenheit.
2. Exceedances noted during the reporting period were closed during this reporting period.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNOR

MELANIE LOYZIM
COMMISSIONER

April 15, 2021

Jeffrey Pelletier
NEWSME Landfill Operations, LLC
358 Emerson Mill Rd
Hampden, ME 04444

RE: Update to Gas Collectors with Higher Operating Values (HOVs)

Dear Mr. Pelletier,

This letter is in response to a letter dated April 5, 2021, submitted on behalf of NEWSME Landfill Operations, LLC (NEWSME) by Sanborn Head and Associates, Inc. regarding the Juniper Ridge Landfill (JRL) operated by NEWSME and located in Old Town, Maine. This letter addressed updating this list of landfill gas collectors with higher operating values (HOVs).

On January 6, 2021, JRL became subject to the operational standards contained in *Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014*, 40 C.F.R. Part 60, Subpart XXX, and *National Emission Standards for Hazardous Air Pollutants (NESHAP): Municipal Solid Waste Landfills*, 40 C.F.R. Part 63, Subpart AAAA. As a landfill with a design capacity greater than 2.5 million cubic meters and a non-methane organic compound (NMOC) emission rate greater than 34 megagrams per year, NEWSME is required to install and operate a collection and control system (GCCS) at JRL pursuant to the requirements of 40 C.F.R. Part 60, Subpart XXX.

Pursuant to 40 C.F.R. § 60.762(b)(2)(iv) and 40 C.F.R. § 63.1958(c), NEWSME must operate each interior wellhead in the collection system with a landfill gas temperature less than 145 °F. However, NEWSME may establish a higher operating temperature value for a particular well(s) by submitting a request to the Department demonstrating that the elevated temperature neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens.

NEWSME previously requested, and the Department approved, a temperature HOV of 150 °F for the following landfill gas collectors.

Previous Temperature HOVs			
JRGCT508	JRGCT919	JR-GW-31R	JR-GW-75
JRGCT511	JR-GW-13	JR-GW-33R	JR-GW-76
JRGCT704	JR-GW-19R	JR-GW-51	JR-GW-77R
JRGCT706	JR-GW-20R	JR-GW-59R	JR-GW-79
JRGCT711	JR-GW-23R	JR-GW-60	
JRGCT916	JR-GW-30R	JR-GW-70	

NEWSME has since removed the following collectors from the site's GCCS: JRGCT704, JRGCT916, JRGCT919, JR-GW31R, JR-GW-51, and JR-GW-60.

On January 14, 2021, NEWSME replaced collector JR-GW-51 (which had an approved temperature HOV) with collector JR-GW51R. The replacement collector was installed adjacent to the removed collector with the purpose of collecting the gas generated in the same area. In accordance with 40 C.F.R. § 63.1958(c)(2), NEWSME has requested a temperature HOV of 150ºF for the replacement landfill gas collector, JR-GW-51R.

Supporting data provided for the request included temperature, oxygen, and methane levels for the new landfill gas collector from January 2021 through March 2021. The oxygen levels for the new landfill gas collector listed above has averaged well below 5% and methane levels were consistently above 40%.

Based on the supporting information presented by NEWSME, it appears that the methanogenic process is still at an anaerobic phase at the higher landfill gas temperatures and no evidence of subsurface landfill fire is present at the site. Therefore, Maine DEP approves NEWSME's request for an operating temperature HOV of 150ºF for landfill gas collector JR-GW-51R. Following is an updated list of landfill gas collectors with approved HOVs of 150 °F.

Current Temperature HOVs			
JRGCT508	JR-GW-19R	JR-GW-51R	JR-GW-77R
JRGCT511	JR-GW-20R	JR-GW-59R	JR-GW-79
JRGCT706	JR-GW-23R	JR-GW-70	
JRGCT711	JR-GW-30R	JR-GW-75	
JR-GW-13	JR-GW-33R	JR-GW-76	

If you have any questions about this matter, please contact me at (207) 287-2229 or lynn.muzzey@maine.gov.

Sincerely,

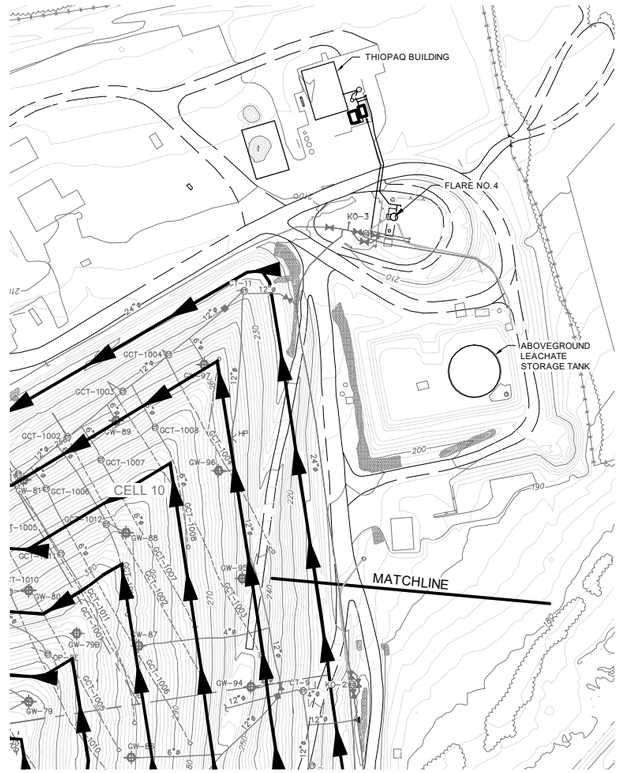
Lynn Muzzey, P.E.
Air Licensing Section

cc: Jeffery Doris [Sanborn Head]
Tanya Hovell [Maine DEP]
Kathy Tarbuck [Maine DEP]

APPENDIX B

LANDFILL SURFACE MONITORING

MAINE STATE PLANE



NOTES:

1. THIS DRAWING WAS PREPARED TO DEPICT THE LOCATION OF THE SURFACE MONITORING PATH RELATIVE TO EXISTING LANDFILL GAS COLLECTION SYSTEM INFRASTRUCTURE.
2. THE EXISTING LANDFILL GAS EXTRACTION SYSTEM INFRASTRUCTURE FEATURES SHOWN ARE BASED ON A COMBINATION OF DESIGN AND AS-BUILT DOCUMENTATION AVAILABLE TO SANBORN, HEAD & ASSOCIATES, INC. (SANBORN HEAD). ACTUAL LOCATIONS OF INDIVIDUAL FEATURES MAY BE DIFFERENT THAN SHOWN.
3. THERE MAY BE RECENTLY INSTALLED LFG SYSTEM INFRASTRUCTURE THAT IS NOT YET SHOWN ON THIS PLAN.
4. ABANDONED LFG SYSTEM INFRASTRUCTURE IS NOT SHOWN FOR CLARITY.
5. TOPOGRAPHY AND SITE FEATURES SHOWN ARE BASED ON PHOTOGRAMMETRIC MAPPING PREPARED BY AERIAL SURVEY & PHOTO, INC. OF NORRIDGEWOCK, MAINE. PHOTO DATE: JUNE 24, 2021. HORIZONTAL DATUM IS MAINE STATE COORDINATE SYSTEM, EAST ZONE, NAD83. VERTICAL DATUM IS BRASS PLUG AT PUMP STATION (APPROX .3 FEET HIGHER THAN NAVD 88).

LEGEND (EXISTING):

190	10-FOOT CONTOUR	GW-9	LANDFILL GAS EXTRACTION WELL
	2-FOOT CONTOUR	GCT-901	COLLECTION TRENCH WELLHEAD
	LIMIT OF WASTE CONTAINMENT		COLLECTION TRENCH TERMINATION
	CELL LIMIT		PIPE END CAP
	EDGE OF ROAD		LEACHATE COLLECTION CLEANOUT
	LFG CONVEYANCE PIPE		LEACHATE COLLECTION INLET
	LFG COLLECTION TRENCH	CT-7	CONDENSATE TRAP
	LIMIT OF MARSH		RIPRAP
	FENCE LINE		SURFACE MONITORING PATH
	ISOLATION VALVE		
	ACCESS RISER		

SANBORN HEAD

GRAPHICAL SCALE
120' 60' 0 120' 240'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: O. HERNANDEZ
DESIGNED BY: O. HERNANDEZ
REVIEWED BY: R. CLAY
PROJECT MGR: J. DORIS
PIC: D. ADAMS
DATE: JULY 2021

JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2343.21

SURFACE MONITORING PLAN

FIGURE: B

Table B-1
1st Quarter Surface Emissions Monitoring
Juniper Ridge Landfill
Old Town, Maine

Name	Latitude	Longitude	Initial Reading Date	Initial Reading	Initial Reading Notes	First Rescan Date	First Rescan Reading	First Rescan Notes	Second Rescan Date	Second Rescan Reading	Second Rescan Notes	Status
Q1-2021-01	44.97743	-68.71937	03/30/21	670 ppm	Ripped liner	04/09/21	2 ppm	Repaired liner/liner fusion	04/29/21	1 ppm	Liner Fusion	closed
Q1-2021-02	44.97701	-68.71985	03/30/21	4,030 ppm	Ripped liner	04/09/21	150 ppm	Repaired liner, added sandbags and spray foam. May need to fuse liner	04/29/21	18 ppm	Liner repair/fusion	closed
Q1-2021-03	44.98169	-68.72177	03/30/21	586 ppm	Below Cell 11 and 12	04/09/21	365 ppm	Increased vacuum, may increase vacuum further	04/29/21	328 ppm	Liner was repaired near area and vacuum was increased	closed

Notes:

1. The initial surface scan performed by Juniper Ridge Landfill (JRL) personnel on the date noted above detected the listed "Initial Reading" exceedance(s) of the methane concentration limit of 500 ppm.

Juniper Ridge Landfill

Q1-2021 Surface Emisssions Monitoring

Color Legend

Symbol Legend

- Gas Well
- Other
- Condensate Trap
- Horizontal
- Cleanout
- Flare

SEM

Inital Scan

3rd Rescan

1st Rescan

2nd Rescan

< 200 | 200 < 500 | > 500

A radius of influence of 100 ft. is depicted at each device.

Reporting Period:
Jan. 1, 2021 to Apr. 1, 2021

Map Generated On: 07/19/2021

SEM: 03/30/2021 - 04/29/2021

SANBORN HEAD
LANDFILL GAS MANAGEMENT SUITE™

200 ft

Table B-2
2nd Quarter Surface Emissions Monitoring
Juniper Ridge Landfill
Old Town, Maine

Name	Latitude	Longitude	Initial Reading Date	Initial Reading	Initial Reading Notes	First Rescan Date	First Rescan Reading	First Rescan Notes	Second Rescan Date	Second Rescan Reading	Second Rescan Notes	Status
Q2-2021-01	44.97901	-68.72565	06/10/21	20,492 ppm	Ripped Liner	06/18/21	102 ppm	Repaired liner	07/08/21	12 ppm	Liner Repair	closed
Q2-2021-02	44.97908	-68.72101	06/10/21	19,036 ppm	GW-53 Ripped Liner	06/18/21	30 ppm	Repaired liner	07/08/21	18 ppm	Liner Repair	closed

Notes:

1. The initial surface scan performed by Juniper Ridge Landfill (JRL) personnel on the date noted above detected the listed "Initial Reading" exceedance(s) of the methane concentration limit of 500 ppm.

Juniper Ridge Landfill

Q2-2021 Surface Emisssions Monitoring

Color Legend

Symbol Legend

- Gas Well
- Other
- Condensate Trap
- Horizontal
- Cleanout
- Flare

SEM

< 200	200 < 500	> 500

A radius of influence of 100 ft. is depicted at each device.

Reporting Period:
Apr. 1, 2021 to Jul. 1, 2021

Map Generated On: 07/19/2021

SEM: 03/30/2021 - 07/08/2021

SANBORN HEAD
LANDFILL GAS MANAGEMENT SUITE™

APPENDIX C

CONTROL SYSTEM SUMMARY

Table C-1
Control System Operating Status Summary

Juniper Ridge Landfill
Old Town, Maine

Date	Aprroximate Time of Shutdown	Approximate Time of Restart	Notes
1/7/2021	10:59am	11:09am	power outage
1/7/2021	11:20am	11:30am	power outage
1/7/2021	12:23pm	12:31pm	power outage
1/7/2021	1:49pm	2:06pm	power outage
1/7/2021	3:28pm	3:39pm	power outage
1/8/2021	7:30am	7:52am	power outage
1/9/2021	7:46am	8:01am	flame arrestor cleaning
1/16/2021	4:26pm	4:38pm	power outage
1/16/2021	5:31pm	5:42pm	power outage
1/28/2021	9:46am	9:55am	flare starved during bypass switching
2/12/82021	7:33am	7:40am	power outage
2/13/2021	12:26 PM	12:37pm	power outage
2/15/2021	8:44 AM	9:10am	flame arrestor cleaning
2/15/2021	11:42 AM	11:53am	air introduction into the gas flow during maintenance extinguished flame
3/2/2021	3:26 AM	3:36am	power outage
3/2/2021	11:30 AM	11:44am	power outage
3/18/2021	9:15 AM	9:28am	programmable logic controller (plc) troubleshooting
3/23/2021	10:13 AM	10:30am	pipe construction
4/4/2021	8:04 PM	8:28pm	power outage
4/5/2021	4:12 PM	4:22PM	programing error
4/9/2021	9:20 AM	9:46am	flame arrestor cleaning
4/11/2021	10:32 AM	10:44am	power outage
4/19/2021	10:56 AM	11:06am	plc failure
4/21/2021	10:48 PM	10:57 PM	power outage
4/26/2021	2:13 AM	2:24 AM	power outage
5/7/2021	11:25 AM	11:41 AM	flare knockout pot float switch failure
5/13/2021	12:44 PM	1:24 PM	shutdown for header repair
5/16/2021	2:41 PM	2:45 PM	power outage
5/17/2021	8:06 AM	8:49 AM	flare knockout pot float switch replacement
5/17/2021	1:29 PM	1:44 PM	wellfield testing
5/24/2021	9:51 AM	10:10 AM	flare skid blower issues
5/27/2021	10:22 AM	10:32 AM	power outage
5/29/2021	7:03 AM	7:11 AM	power outage
6/1/2021	11:15 AM	11:30 AM	plc troubleshooting
6/2/2021	5:36 AM	5:47 AM	power bump
6/7/2021	8:40 AM	9:33 AM	plant shutdown knockout pot 3 pump replacement
6/7/2021	12:15 PM	12:41 PM	plant shutdown flame arrestor cleaning
6/7/2021	2:21 PM	2:44 PM	plant shutdown correction of vacuum
6/7/2021	5:03 PM	5:12 PM	power outage
6/9/2021	6:16 AM	11:01 AM	plant shutdown knockout pot 3 pump wiring replacement
6/14/2021	6:29 AM	5:54 AM	blower 2 faulted shut plant down
6/15/2021	3:40 AM	4:22 AM	power outage
6/15/2021	7:36 AM	7:45 AM	power outage
6/23/2021	6:29 AM	6:37 AM	power outage
6/23/2021	11:15 AM	11:40 AM	power outage
6/28/2021	4:02 PM	4:19 PM	foam over plant shutdown
6/30/2021	9:07 AM	10:38 AM	header pipe repair

Notes:

1. During the reporting period, the flare at Juniper Ridge Landfill (JRL) operated except for the times shown.

APPENDIX D

ACTIONS TAKEN TO IMPROVE THE QUALITY AND QUANTITY OF GAS COLLECTED

Table D-1
Actions to Improve the Quality and Quantity of Gas Collected

Juniper Ridge Landfill
Old Town, Maine

Improvement Number	Recommended Improvements	Date Recommended	Anticipated Completion Date	Status	Date Completed	Performed By
828	Restored vacuum to GW-42	01-04-2021	01-25-2021	Completed	01-08-2021	Pipe Crew
829	Restored vacuum to GW-50B	01-04-2021	01-25-2021	Completed	01-11-2021	Pipe Crew
830	Restored vacuum to GW-41	01-04-2021	01-25-2021	Completed	01-12-2021	Pipe Crew
831	Restored vacuum to GW-50R	01-04-2021	01-25-2021	Completed	01-12-2021	Pipe Crew
832	Restored vacuum to GW-58	01-04-2021	01-25-2021	Completed	01-13-2021	Pipe Crew
833	Restore vacuum to 31R	01-04-2021	01-25-2021	Completed	01-14-2021	Pipe Crew
834	Restore vacuum to GW-V	01-04-2021	01-25-2021	Completed	01-14-2021	Pipe Crew
835	Restore vacuum to GW-40	01-04-2021	01-25-2021	Completed	01-14-2021	Pipe Crew
836	Drilled and installed wellhead GW-60R	01-04-2020	02-01-2021	Completed	01-12-2021	Driller and Pipe Crew
837	Drilled and installed wellhead GW-51R	01-04-2020	02-01-2021	Completed	01-13-2021	Driller and Pipe Crew
838	Drilled and installed wellhead on 52	01-04-2020	02-01-2021	Completed	01-13-2021	Driller and Pipe Crew
839	Drilled and installed wellhead on 61	01-04-2020	02-01-2021	Completed	01-14-2021	Driller and Pipe Crew
840	Drilled and installed GW-42R	01-04-2020	02-04-2020	Completed	01-15-2021	Driller and Pipe Crew
841	Drilled and installed GW-43	01-04-2020	02-04-2020	Completed	01-15-2021	Driller and Pipe Crew
842	Drilled and installed GW-16R	01-04-2020	02-04-2020	Completed	01-18-2021	Driller and Pipe Crew
843	Drilled and installed GW-33R2	01-04-2020	02-04-2020	Completed	01-18-2021	Driller and Pipe Crew
844	Drilled and installed wellhead on GW-25R	01-04-2020	02-04-2020	Completed	01-19-2021	Driller and Pipe Crew
845	Drilled and installed GW-34	01-04-2020	02-04-2020	Completed	01-20-2021	Driller and Pipe Crew
846	Drilled and installed GW-26	01-04-2020	02-04-2020	Completed	01-20-2021	Driller and Pipe Crew
847	Drilled and installed wellhead on GW-24R	01-04-2020	02-04-2020	Completed	01-21-2021	Driller and Pipe Crew
848	Drilled and Installed GW-22R2	01-04-2020	02-04-2020	Completed	01-22-2021	Driller and Pipe Crew
849	Drilled and installed GW-31R2	01-04-2020	02-04-2020	Completed	01-22-2021	Driller and Pipe Crew
850	Drilled and installed GW-59R2	01-04-2020	02-04-2020	Completed	01-25-2021	Driller and Pipe Crew
851	Drilled and installed GW-68R	01-04-2020	02-04-2020	Completed	01-26-2021	Driller and Pipe Crew
852	Drilled and installed GW-108	01-04-2020	02-04-2020	Completed	01-26-2021	Driller and Pipe Crew
853	Drilled and installed GW-111	01-04-2020	02-04-2020	Completed	01-26-2021	Driller and Pipe Crew
854	Drilled and installed GW-112	01-04-2020	02-04-2020	Completed	01-26-2021	Driller and Pipe Crew
855	Repair tears in liner near intesections of S road and W road.	01-20-2021	01-20-2021	Completed	01-20-2021	Mike Dileonardi
856	Repair tears in liner near intesections of S road and W road.	01-27-2021	01-27-2021	Completed	01-27-2021	Mike Dileonardi
857	Discontinued GW-24	01-26-2021	01-26-2021	Completed	01-26-2021	Mike Dileonardi
858	Discontinued GW-25	01-26-2021	01-26-2021	Completed	01-26-2021	Mike Dileonardi
859	Discontinued GW-31R	01-26-2021	01-26-2021	Completed	01-26-2021	Mike Dileonardi
860	Discontinued GW-60	01-26-2021	01-26-2021	Completed	01-26-2021	Mike Dileonardi
861	Discontinued GW22R	01-27-2021	01-27-2021	Completed	01-27-2021	Mike Dileonardi
862	Restored vacuum to GW-40, GW-V, GW-U and GW-31R2	02-01-2021	02-03-2021	Completed	02-03-2021	Pipe Crew
863	Restored vacuum to GW-77R, GW-59R, GW-68R2	02-01-2021	02-03-2021	Completed	02-03-2021	Pipe Crew
864	Restored vacuum to GW-33R and GW-50B	02-01-2021	02-04-2021	Completed	02-04-2021	Pipe Crew
865	Installed GCT1207S	02-01-2021	02-28-2021	Completed	02-12-2021	Pipe Crew
866	Installed GCT1207L	02-01-2021	02-28-2021	Completed	02-12-2021	Pipe Crew
867	Installed GCT1208	02-01-2021	02-28-2021	Completed	02-11-2021	Pipe Crew
868	Vacuum restore GW-U	02-12-2021	02-19-2021	Completed	02-14-2021	Pipe Crew
869	Completed GCT1207	02-01-2021	02-28-2021	Completed	02-17-2021	Pipe Crew
870	Restored vacuum to 59R2	02-12-2021	02-19-2021	Completed	02-18-2021	Pipe Crew
871	Installed GCT1206S	02-01-2021	02-28-2021	Completed	02-24-2021	Pipe Crew
872	Installed GCT1206L	02-01-2021	02-28-2021	Completed	02-24-2021	Pipe Crew
873	Installed 80 ft of 12in header on NE end	02-01-2021	02-28-2021	Completed	02-25-2021	Pipe Crew
874	2/25 Installed vacuum to 1205	02-01-2021	02-28-2021	Completed	02-25-2021	Pipe Crew
875	2/26 Installed vac lines to 1206	02-01-2021	02-28-2021	Completed	02-26-2021	Pipe Crew
876	Extended GCT1117 and GCT1118	02-23-2021	03-18-2021	Completed	02-24-2021	Rob
877	Place additional soil cover around penetrations at wells GW24R, GW25R, GW26, GW33R, GW42R, GW43, GCT926, GCT1117, GCT1118, GCT1121, GCT1122	02-18-2021	03-18-2021	Completed	02-26-2021	Thornton's + Mike Dileonardi
878	Install horizontal odor pipe JR-OP11A	02-15-2021	03-18-2021	Completed	03-08-2021	Pipe Crew
879	Install horizontal odor pipe JR-OP11B	02-15-2021	03-18-2021	Completed	03-09-2021	Pipe Crew
880	Repaired kanaflex vacuum hose on GW--W, covered in snow and crushed.	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
881	Discontinued GW-86B	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
882	Discontinued GCT-1123	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
883	Discontinued GW--W	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
884	Replaced Well GCT-604	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
885	LCSE - Re-positioned Well Head	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
886	Shortened GW-96	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi

Table D-1
Actions to Improve the Quality and Quantity of Gas Collected

Juniper Ridge Landfill
Old Town, Maine

Improvement Number	Recommended Improvements	Date Recommended	Anticipated Completion Date	Status	Date Completed	Performed By
887	Shortened GW-76B	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
888	Shortened GW-103	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
889	GW-35 Re-positioned Well Head	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
890	GW-104 Re-positioned Well Head	03-23-2021	03-23-2021	Completed	03-23-2021	Mike Dileonardi
891	GW-47 Replaced Complete Well & Kanaflex	03-29-2021	03-29-2021	Completed	03-29-2021	Mike Dileonardi
892	GW--L Replaced Complete Well & Kanaflex	03-29-2021	03-29-2021	Completed	03-29-2021	Mike Dileonardi
893	(GCT)JR-1209S Installed	04-05-2021	04-05-2021	Completed	04-05-2021	Pipe Crew
894	(GCT)JR-1209L Installed	04-05-2021	04-05-2021	Completed	04-05-2021	Pipe Crew
895	Repositioned well head - GCT1205S	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
896	Repositioned well head - GCT1205L	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
897	Repositioned well head - GCT1206S	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
898	Repositioned well head - GCT1206L	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
899	Repositioned well head - GCT1209S	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
900	Repositioned well head - GCT1209L	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
901	Repositioned well head GW108	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
902	Repositioned well head GW111	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
903	Repositioned well head OP12A	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
904	Replaced well head 1209L(bad valve)	04-06-2021	04-06-2021	Completed	04-06-2021	Mike Dileonardi
905	Extended 1206 S+L, extended 12" North header	04-07-2021	04-07-2021	Completed	04-07-2021	Pipe Crew
906	Extended 1207 S+L, extended 12" South header	04-12-2021	04-12-2021	Completed	04-12-2021	Pipe Crew
907	Shortened GCT1120	04-14-2021	04-14-2021	Completed	04-14-2021	Mike Dileonardi
908	Replaced LGV401	04-14-2021	04-14-2021	Completed	04-14-2021	Mike Dileonardi
909	Removed GCT401A	04-14-2021	04-14-2021	Completed	04-14-2021	Mike Dileonardi
910	Capped GW-7	04-20-2021	04-20-2021	Completed	04-20-2021	Pipe Crew
911	Replaced Sample Ports GCT1119	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
912	Replaced Sample Ports GW-10	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
913	Replaced Sample Ports GW-09	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
914	Replaced Sample Ports GW-H2	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
915	Replaced Sample Ports GW-104	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
916	Replaced Sample Ports GW-51R	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
917	Replaced Sample Ports LGV401	04-21-2021	04-21-2021	Completed	04-21-2021	Mike Dileonardi
918	Replaced well head GCT-511	04-22-2021	04-22-2021	Completed	04-22-2021	Mike Dileonardi
919	Repaired well head GW-19R	04-22-2021	04-22-2021	Completed	04-22-2021	Mike Dileonardi
920	Cleaned well head GW-23R	04-22-2021	04-22-2021	Completed	04-22-2021	Mike Dileonardi
921	Replaced Sample Port LCSE	04-22-2021	04-22-2021	Completed	04-22-2021	Mike Dileonardi
922	Replaced Sample Temperature Port GCT1109	04-22-2021	04-22-2021	Completed	04-22-2021	Mike Dileonardi
923	Capped GW-26 Vacuum line	04-23-2021	04-23-2021	Completed	04-23-2021	Pipe Crew
924	Extended GW 113, discontinued OP11A and OP11B	04-26-2021	04-26-2021	Completed	04-26-2021	Pipe Crew
925	Replaced Sample Port GCT1112	04-27-2021	04-27-2021	Completed	04-27-2021	Mike Dileonardi
926	Replaced Sample Port GCT1103	04-27-2021	04-27-2021	Completed	04-27-2021	Mike Dileonardi
927	Replaced Sample Port GW--U	04-27-2021	04-27-2021	Completed	04-27-2021	Mike Dileonardi
928	Replaced Sample Temperature Port GCT1108	04-27-2021	04-27-2021	Completed	04-27-2021	Mike Dileonardi
929	Extended GW-112	05-01-2021	05-01-2021	Completed	05-01-2021	Pipe Crew
930	Extended GW-106	05-01-2021	05-01-2021	Completed	05-01-2021	Pipe Crew
931	Placed Well Head on GCT-1210	05-24-2021	05-24-2021	Completed	05-24-2021	Pipe Crew
932	Added a Y on GCT-1205 S&L Vac Line	05-24-2021	05-24-2021	Completed	05-24-2021	Pipe Crew
933	Capped GCT-706	05-27-2021	05-27-2021	Completed	05-27-2021	Pipe Crew
934	Jumped Vac Line	05-27-2021	05-27-2021	Completed	05-27-2021	Pipe Crew
935	Restored Vac GW-38/GW-31/GW-U/GW-V/GW-40	05-27-2021	05-27-2021	Completed	05-27-2021	Pipe Crew
936	Restored Vaccum to GW16 & GW16R	06-23-2021	06-23-2021	Completed	06-23-2021	Pipe Crew
937	Restored Vacuum to GCT-711	06-23-2021	06-23-2021	Completed	06-23-2021	Pipe Crew
938	Restored Vacuum to GW-19R	06-23-2021	06-23-2021	Completed	06-23-2021	Pipe Crew
939	Extended GW-105	06-23-2021	06-23-2021	Completed	06-23-2021	Pipe Crew
940	Moved Vacuum line to GW-22R	06-23-2021	06-23-2021	Completed	06-23-2021	Pipe Crew
941	Replaced WellHead GW-51B	06-25-2021	06-25-2021	Completed	06-25-2021	Mike Dileonardi
942	Replaced Well Head GW-33R	06-25-2021	06-25-2021	Completed	06-25-2021	Mike Dileonardi
943	Replaced Kanaflex GW-44	06-25-2021	06-25-2021	Completed	06-25-2021	Mike Dileonardi
944	Extended GW-83	06-25-2021	06-25-2021	Completed	06-25-2021	Pipe Crew
945	Replaced Kanaflex GW-41	06-25-2021	06-25-2021	Completed	06-25-2021	Mike Dileonardi
946	Shortened GW-76B	06-28-2021	06-28-2021	Completed	06-28-2021	Mike Dileonardi

APPENDIX E

INITIAL PERFORMANCE TEST

SANBORN HEAD

Building Trust. Engineering Success.

NSPS SUBPART XXX AND NESHAP SUBPART AAAA INITIAL PERFORMANCE TEST REPORT

JUNIPER RIDGE LANDFILL

Old Town, Maine

Prepared for NEWSME Landfill Operations, LLC
File No. 2343.21
July 2021

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

On behalf of NEWSME Landfill Operations, LLC (NEWSME), the operator of the Juniper Ridge Landfill (JRL) in Old Town, Maine, Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this Initial Performance Test Report as required by 40 CFR Part 60.762, 60.18, 60.8, and 63.7. The initial performance test was completed within 180 days of commencement of operation of the gas collection and control system (GCCS) in compliance with 40 CFR Subpart XXX (i.e., within 180 days after January 6, 2021) on June 29, 2021. Blue Granite Environmental Consultants, LLC (BGEC) performed the test in accordance with the methods specified in the Initial Performance Test Notification and Protocol letter, dated June 2, 2021, submitted to the Maine Department of Environmental Protection (Maine DEP).

The intent of the test is to verify that the 106.5 MMBtu/hr[1] open flare (Flare No. 4) meets the general control device and work practice requirements of 40 CFR Part 60.18. Because stack testing of open flares is not feasible, the United States Environmental Protection Agency (USEPA) specifies that the methods contained in 40 CFR Part 60.18 may be used as described in the following sections to verify compliance.

2.0 FACILITY INFORMATION

Owner:	State of Maine, Bureau of General Services 77 State House Station Augusta, Maine 04333-0077
Operator:	NEWSME Landfill Operations, LLC (NEWSME)
Responsible Official:	Toni King, P.E. NEWSME 25 Freedom Parkway, Suite 1 Hermon, Maine 04401 Toni.King@Casella.com
Site Address:	2828 Bennoch Road Old Town, Maine 04468-4214

JRL is owned by the State of Maine and operated by NEWSME. JRL is located on the western side of Interstate 95 in Old Town, Maine, and is accessible from State Route 16 in Alton, Maine. Under the current license, JRL accepts approximately 2,200 tons per day of construction and demolition debris; residues (ash, front-end process residue [FEPR], and over-sized bulky wastes); bypass MSW; water and wastewater treatment plant sludge; and lesser amounts of miscellaneous non-hazardous wastes.

JRL is located on a 780-acre parcel of land, and the licensed footprint of the landfill is approximately 122 acres. Active filling began in Cell 1 at the site in December 1996. Current landfill operations are in Cell 12 and other adjacent cells on top of the landfill. Intermediate

[1] Million British thermal units per hour

and intermediate-final cover has been placed in Cells 1 through 12. The licensed capacity of JRL is approximately 19.63 million cubic yards (15.01 million m^3). With a waste compaction density of approximately 0.86 tons of waste per cubic yard, the estimated capacity on a mass basis is approximately 16.9 million tons (15.3 million Mg).

The JRL GCCS, shown in Figure 1, is designed for active collection of landfill gas (LFG) while maintaining anaerobic conditions within the landfill by limiting air intrusion into the waste. The GCCS is monitored using equipment that measures and records the LFG extraction in standard cubic feet per minute (scfm) and the concentration in LFG of methane, oxygen, carbon dioxide, and balance gas (primarily nitrogen) in percent by volume.

The GCCS is regularly expanded by adding gas extraction points and related infrastructure. LFG is managed in Cells 1 through 12 using nearly horizontal sloped gas collection trenches (GCTs) and/or vertical gas extraction wells. GCTs are temporary collectors installed to collect LFG until vertical wells are installed. Vertical wells are installed as needed, including on the outer slopes of the cells as they are filled to final grades. The vacuum applied at each extraction location is adjusted as needed with a manually controlled valve on the extraction location wellhead. The active system contains approximately 119 vertical wells and 67 gas collection trenches installed throughout Cells 1 through 12. LFG is also collected from six other connections to the leachate and/or condensate collection systems and to additional horizontal collectors to control odors.

The NSPS does not require gas collection in areas where the waste has been in place less than five years, or less than two years for areas that have reached final grade or have been closed. Although not required by its air license or NSPS Subpart XXX, JRL maintains gas collectors and connections to the leachate system in recently placed waste and uses them as needed to control odors and minimize greenhouse gas emissions. Although these connections are monitored when in use, readings of non-negative pressure are not classified as NSPS exceedances of the monitoring standards.

LFG extraction points are connected to common header pipes that convey the gas to a 106.5 MMBtu/hr open flare (Flare No. 4), which the Maine Department of Environmental Protection (Maine DEP) approved in November 2008. Open Flares No. 2 and No. 3 are licensed as backup LFG control devices, and do not operate simultaneously with Flare No. 4.

Ahead of the July 1, 2015 license deadline, JRL began operating a Thiopaq® sulfur treatment system to remove total reduced sulfur (TRS) compounds from LFG prior to combustion to reduce emissions of sulfur dioxide (SO_2).

Although JRL has a system to remove sulfur from the gas, it does not have a "Treatment System" as defined in the NESHAP Subpart AAAA, which is a system to filter, de-water, and compress LFG for sale or beneficial use.

3.0 40 CFR PART 60.757 REPORT REQUIREMENTS

To comply with 40 CFR Part 60.757(g), Sanborn Head has included the following information as part of this Report:

- **A diagram of the collection system showing collection system positioning including wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of areas excluded from collection and the proposed sites for the future collection system expansion:**

  - Figures are included in this report for the as-built gas collection system (GCCS Existing Conditions Plan) and for the future full build-out of the landfill (Landfill Gas System Expansion Drawings). There are no areas of JRL excluded from collection.

- **The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based:**

  - The GCCS infrastructure for each cell was designed and constructed in multiple stages, with a combination of vertical wells and horizontal trenches installed every 40 to 50 feet of vertical waste placement. Vertical wells were designed with the assumption of a 100-foot radius of influence for each well. The gas collection trenches (GCTs) are assumed to have an elliptical radius of influence with a vertical radius of 20 feet, and horizontal reach of 100 feet. The GCTs at the site have been installed at a conservative spacing of approximately 100 feet, which creates a greater density than required by the assumed radius of influence. The GCCS is intended to provide sufficient collection coverage to meet the New Source Performance Standard (NSPS) surface emissions monitoring requirements. The adequacy of the design is evaluated during surface emissions monitoring, including identifying areas that require additional control measures based on monitoring results.

    See Appendix A for LFG Collection Rate projections. The system has been sized to handle the maximum expected gas collection rate. LFG collection rate estimates were based on modeling using LandGEM.

    LandGEM uses the first-order decay equation identified in 40 CFR Part 60.765 to estimated uncontrolled gas emissions from landfills. The equation is a function of waste acceptance rates, the methane generation rate constant (k), and methane generation potential (L_o). LandGEM allows the user to select default parameters defined in NSPS for MSW landfills or in the USEPA's "Compilation of Air Pollutant Emission Factors, AP-42." Alternatively, site-specific or other user-defined data may be input.

    Appendix A contains the waste acceptance rates used for LandGEM modeling and a summary of the LandGEM results. LFG projections indicate a maximum LFG collection rate of less than the capacity of the primary flare, Flare No. 4, of 3,550 scfm. The blower and combustion system have been sized to handle the maximum projected LFG collection rate.

- **The documentation of the presence of asbestos or non-degradable material for each area from which collection wells have been excluded based on the presence of asbestos or non-degradable material;**

- There are no areas from which collection wells have been excluded based on the presence of asbestos or non-degradable material.

- **The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on non-productivity and the calculations of gas generation flow rate for each excluded area;**

  - There are no areas from which collection wells have been excluded based on non-productivity.

- **The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and**

  - The blower and combustion systems are designed to handle a flow rate in excess of the maximum projected LFG collection rate. See Appendix A for a summary of LFG collection rate estimates from LandGEM modeling.

- **The provisions for the control of off-site migration.**

  - As described above, the gas collection system has been sufficiently sized to capture the maximum gas estimated to be generated by the landfill. The system is operated to reduce greenhouse gas emissions, reduce nuisance odor, and limit subsurface gas migration. There is a perimeter monitoring program for the facility. The gas collection system has been designed to meet NSPS criteria. Generally, the design is based on guidance included in Municipal Solid Waste Landfills, Volume 1: Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills (USEPA, February 1999; EPA-453R/96-004).

4.0 TEST RESULTS

BGEC completed the test in accordance with 40 CFR Part 60.18. Test results are summarized below.

4.1 Visible Emission Evaluation

In accordance with 40 CFR Part 60.18(c)(1), the open flare is designed to emit no visible emissions as determined by Method 22 of 40 CFR Part 60 Appendix A, except for periods not to exceed a total of five minutes during any two consecutive hours. Therefore, as approved by the USEPA, an observer who was trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (i.e., condensing water vapor) on the visibility of emissions performed the Method 22 visible emission evaluation on the flare for a period of approximately two hours during the test. BGEC completed a USEPA Method 22 Observation Form during the test. See Appendix B for a copy of the form. BGEC noted no visible emissions at the flare during the two-hour observation period.

4.2 Flare Flame Monitoring

In accordance with 40 CFR Part 60.18(c)(2), the flare must be operated with a flame present at all times and shall be monitored using a thermocouple or other equivalent device to detect the presence of the flame. The flare is equipped with main flame thermocouples and pilot thermocouples. BGEC verified the operation of these devices during the test. See Appendix C for flare temperature readings recorded at five-minute intervals during the test period.

4.3 Heat Content

In accordance with 40 CFR Part 60.18(c)(3)(ii), the non-assisted open flare must be operated with an LFG net heating value of 200 Btu/scf[2] or greater. BGEC measured the methane concentration in the LFG during the day of the test using a GEM-2000 LFG monitor, or similar instrument, calibrated in accordance with the manufacturer recommendations. Sanborn Head estimated the net heating value of the LFG using the concentration of methane in the LFG and the heat content of methane (1,005 Btu/scf).

The average measured methane content of the LFG during the test was 40.2 percent. See Appendix D for the Landfill Gas Flow Measurements Field Data Sheet. Sanborn Head estimated the net heating value of the LFG to be 404 Btu/scf (40.2 percent of 1,005 Btu/scf). The net heating value of the LFG exceeds the 200 Btu/scf minimum value required; therefore, the flare meets the requirements of 40 CFR Part 60.18(c)(3)(ii).

4.4 Flare Stack Exit Velocity

In accordance with 40 CFR Part 60.18(f), Sanborn Head estimated the maximum allowable stack exit velocity for the flare and compared it to the velocity measured by BGEC during the test. Sanborn Head calculated the maximum allowable stack exit velocity based on the method specified in 40 CFR Part 60.18(f)(5). Sample calculations are included in Appendix D.

Sanborn Head calculated the actual exit velocity of the flare by dividing the LFG volumetric flow rate delivered to the flare stack by the unobstructed (free) cross-sectional area of the flare tip (approximately 12-inch inside diameter for the flare). BGEC measured the LFG flow rate using a pitot tube at a port upstream of the flare, at least 10 diameters downstream and five diameters upstream of any disturbance in the flow path. The traverse points were located at approximately 1-inch intervals within the blower discharge pipe. See Appendix D for the Landfill Gas Flow Measurements Field Data Sheet and Landfill Gas Flow Rate Calculations.

The average actual exit velocity for the flare along with the calculated maximum allowable exit velocity are summarized below. Sample calculations are provided in Appendix D.

[2] British thermal units per standard cubic feet

Device	Maximum Allowable Stack Exit Velocity (ft/sec)	Average Actual Exit Velocity (ft/sec)
Flare #4 (106.5 MMBtu/hr)	79	40

The average actual exit velocity of the flare was below the maximum allowable stack exit velocity calculated and therefore meets the requirements of 40 CFR Part 60.18(c)(4)(iii).

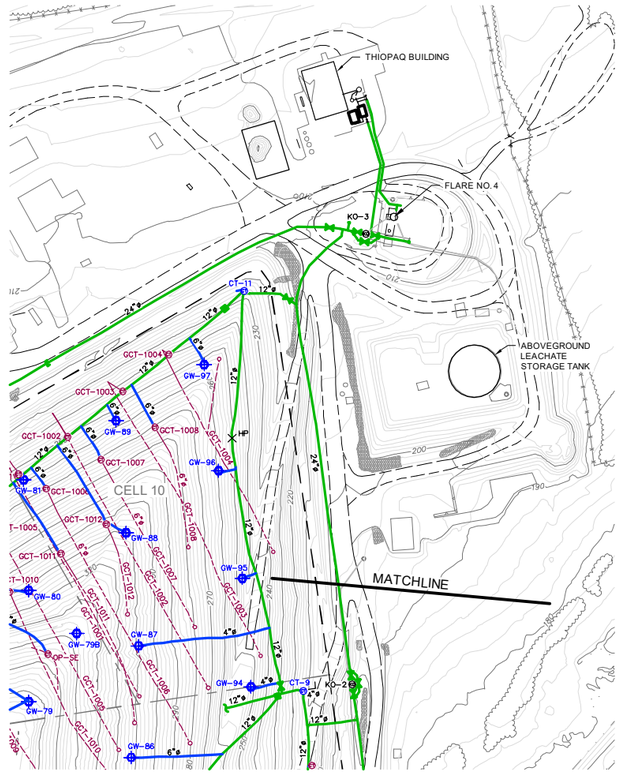
P:\2300s\2343.21\Source Files\Initial Performance\Report\20210730 JRL Performance Test Rpt.docx

FIGURES

MAINE STATE PLANE

CELL 12
CELL 11
CELL 10
CELL 9
CELL 8
CELL 7
CELL 6
CELL 5
CELL 4
CELL 3A
CELL 3B
CELL 2
CELL 1

MATCHLINE



LIST OF ACTIVE GAS EXTRACTION LOCATIONS

HORIZONTAL COLLECTION TRENCHES		VERTICAL WELLS				Other
JRGCT2A1	JRCT1107	JR-GW-03	JR-GW-41	JR-GW-69B	JR-GW-100	JR-LC-SE
JRGCT3A4	JRCT1108	JR-GW-04	JR-GW-42	JR-GW-69R	JR-GW-101	JRLGVA01
JRGCT3B1	JRCT1109	JR-GW-05	JR-GW-42R	JR-GW-70	JR-GW-102	JR-OP901
JRGCT3B2	JRCT1110	JR-GW-06	JR-GW-42B	JR-GW-71	JR-GW-103	JR-OP101
JRGCT502	JRCT1111	JR-GW-09	JR-GW-43	JR-GW-72	JR-GW-104	JROP11NE
JRGCT503	JRCT1112	JR-GW-10	JR-GW-44	JR-GW-74	JR-GW-105	JR-OP12A
JRGCT505	JRCT1113	JR-GW-11	JR-GW-46	JR-GW-75	JR-GW-106	
JRGCT508	JRCT1114	JR-GW-12	JR-GW-47	JR-GW-76	JR-GW-108	
JRGCT511	JRCT1115	JR-GW-13	JR-GW-48	JR-GW-76B	JR-GW-111	
JRGCT601	JRCT1116	JR-GW-14	JR-GW-49	JR-GW-77R	JR-GW-112	
JRGCT604	JRCT1117	JR-GW-15	JR-GW-50B	JR-GW-78	JR-GW--A	
JRGCT606	JRCT1118	JR-GW-16	JR-GW-50R	JR-GW-78B	JR-GW-H2	
JRGCT607	JRCT1119	JR-GW-16R	JR-GW-51R	JR-GW-79	JR-GW--I	
JRGCT705	JRCT1120	JR-GW-18	JR-GW-51B	JR-GW-79B	JR-GW--L	
JRGCT708	JRCT1124	JR-GW19R	JR-GW-52	JR-GW-80	JR-GW--S	
JRGCT709	JRCT1201	JR-GW20R	JR-GW-53	JR-GW-81	JR-GW--U	
JRGCT711	JRCT1202	JR-GW22R2	JR-GW-55	JR-GW-82	JR-GW--V	
JRCT1001	JRCT1203	JR-GW23R	JR-GW-56	JR-GW-83		
JRCT1002	JRCT1204	JR-GW-24R	JR-GW56R	JR-GW-84		
JRCT1003	JRCT1205S	JR-GW-25R	JR-GW-58	JR-GW-85		
JRCT1004	JRCT1205L	JR-GW-26	JR-GW-58B	JR-GW-86		
JRCT1005	JRCT1206S	JR-GW-28	JR-GW-59R	JR-GW-87		
JRCT1006	JRCT1206L	JR-GW-29	JR-GW-59R2	JR-GW-88		
JRCT1007	JRCT1207S	JR-GW-30R	JR-GW-59B	JR-GW-89		
JRCT1008	JRCT1207L	JR-GW31R2	JR-GW-60R	JR-GW-90		
JRCT1009	JRCT1208S	JR-GW-32R	JR-GW-60B	JR-GW-91		
JRCT1010	JRCT1208L	JR-GW-33R	JR-GW-61	JR-GW-92		
JRCT1011	JRCT1209S	JR-GW-33R2	JR-GW-62	JR-GW-93		
JRCT1101	JRCT1209L	JR-GW-34	JR-GW-64	JR-GW-94		
JRCT1102	JRCT1210	JR-GW-35	JR-GW-65	JR-GW-95		
JRCT1103	JRCT1211	JR-GW-37	JR-GW-66	JR-GW-96		
JRCT1104	JRCT1212	JR-GW-38	JR-GW-68	JR-GW-97		
JRCT1105	JRCT1213	JR-GW-39	JR-GW-68R	JR-GW-98		
JRCT1106		JR-GW-40	JR-GW-68B	JR-GW-99		

NOTES:

1. THE EXISTING LANDFILL GAS EXTRACTION SYSTEM INFRASTRUCTURE FEATURES SHOWN ARE BASED ON A COMBINATION OF DESIGN AND AS-BUILT DOCUMENTATION AVAILABLE TO SANBORN, HEAD & ASSOCIATES, INC. (SANBORN HEAD). ACTUAL LOCATIONS OF INDIVIDUAL FEATURES MAY BE DIFFERENT THAN SHOWN.
2. THERE MAY BE RECENTLY INSTALLED LFG SYSTEM INFRASTRUCTURE THAT IS NOT YET SHOWN ON THIS PLAN.
3. ABANDONED LFG SYSTEM INFRASTRUCTURE IS NOT SHOWN FOR CLARITY.
4. TOPOGRAPHY AND SITE FEATURES SHOWN ARE BASED ON PHOTOGRAMMETRIC MAPPING PREPARED BY AERIAL SURVEY & PHOTO, INC. OF NORRIDGEWOCK, MAINE. PHOTO DATE: JUNE 24, 2021. HORIZONTAL DATUM IS MAINE STATE COORDINATE SYSTEM, EAST ZONE, NAD83. VERTICAL DATUM IS BRASS PLUG AT PUMP STATION (APPROX .3 FEET HIGHER THAN NAVD 88).
5. HORIZONTAL DATUM IS MAINE STATE COORDINATE SYSTEM NAD83. VERTICAL DATUM IS NAVD88.

LEGEND (EXISTING):

- 190 — 10-FOOT CONTOUR
- 2-FOOT CONTOUR
- LIMIT OF WASTE CONTAINMENT
- CELL LIMIT
- EDGE OF ROAD
- LFG CONVEYANCE PIPE ≧ 12"Ø
- LFG CONVEYANCE PIPE < 12"Ø
- LFG COLLECTION TRENCH
- LIMIT OF MARSH
- FENCE LINE
- ISOLATION VALVE
- ACCESS RISER
- GW–9 — LANDFILL GAS EXTRACTION WELL
- GCT–901 — COLLECTION TRENCH WELLHEAD
- COLLECTION TRENCH TERMINATION
- PIPE END CAP
- LEACHATE COLLECTION CLEANOUT
- LEACHATE COLLECTION INLET
- CT–7 — CONDENSATE TRAP
- RIPRAP

SANBORN HEAD

GRAPHICAL SCALE
120' 60' 0 120' 240'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: O. HERNANDEZ
DESIGNED BY: O. HERNANDEZ
REVIEWED BY: J. DORIS
PROJECT MGR: J. DORIS
PIC: D. ADAMS
DATE: JULY 2021

JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

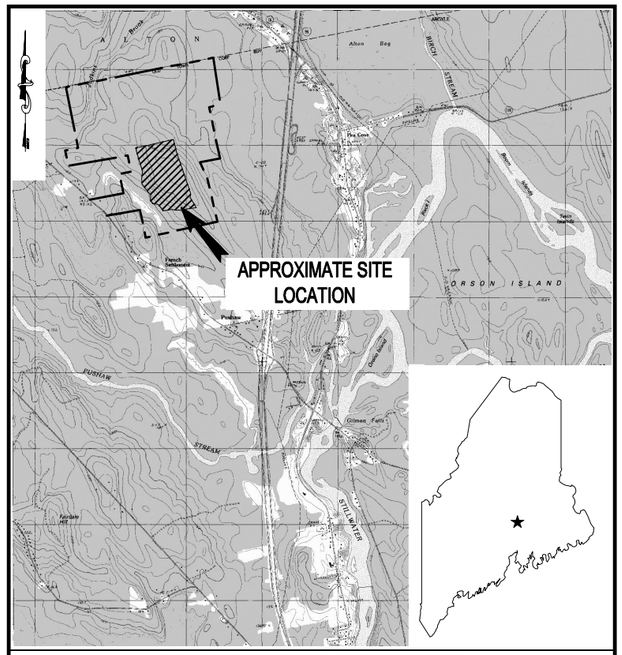
PROJECT NUMBER: 2343.21

AS-BUILT GAS COLLECTION & CONTROL SYSTEM PLAN

FIGURE: 1

LANDFILL GAS SYSTEM EXPANSION DRAWINGS

JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE
JUNE 2015
(REVISED FEBRUARY 2016)



FROM: USGS TOPOGRAPHIC MAP- OLD TOWN, MAINE (1988)

LOCUS PLAN
SCALE: 1"=1000'

SHEET INDEX

STATE OF MAINE
Eric S. Steinhauser
10809
PROFESSIONAL ENGINEER

REVISION TABLE			
⚠	02/25/16	REVISED BASED ON MEDEP COMMENTS.	RLC
NO.	DATE	DESCRIPTION	BY

PREPARED FOR:

NEWSME LANDFILL OPERATIONS, LLC

JUNIPER RIDGE LANDFILL

OLD TOWN, MAINE

PREPARED BY:

SANBORN HEAD

20 FOUNDRY STREET, CONCORD, NEW HAMPSHIRE 03301
(603) 229-1900 FAX (603) 229-1919

PROJ.# 2536.27 "LANDFILL GAS SYSTEM EXPANSION DRAWINGS, JUNIPER RIDGE LANDFILL, OLD TOWN, MAINE" REVISED FEBRUARY 2016.

IMAGES: S:\DOMAIN\2536\27\Graphics Files\CAD\LFG Master Plot\VR - Cover.dwg
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PLOT DATE: 2-25-16
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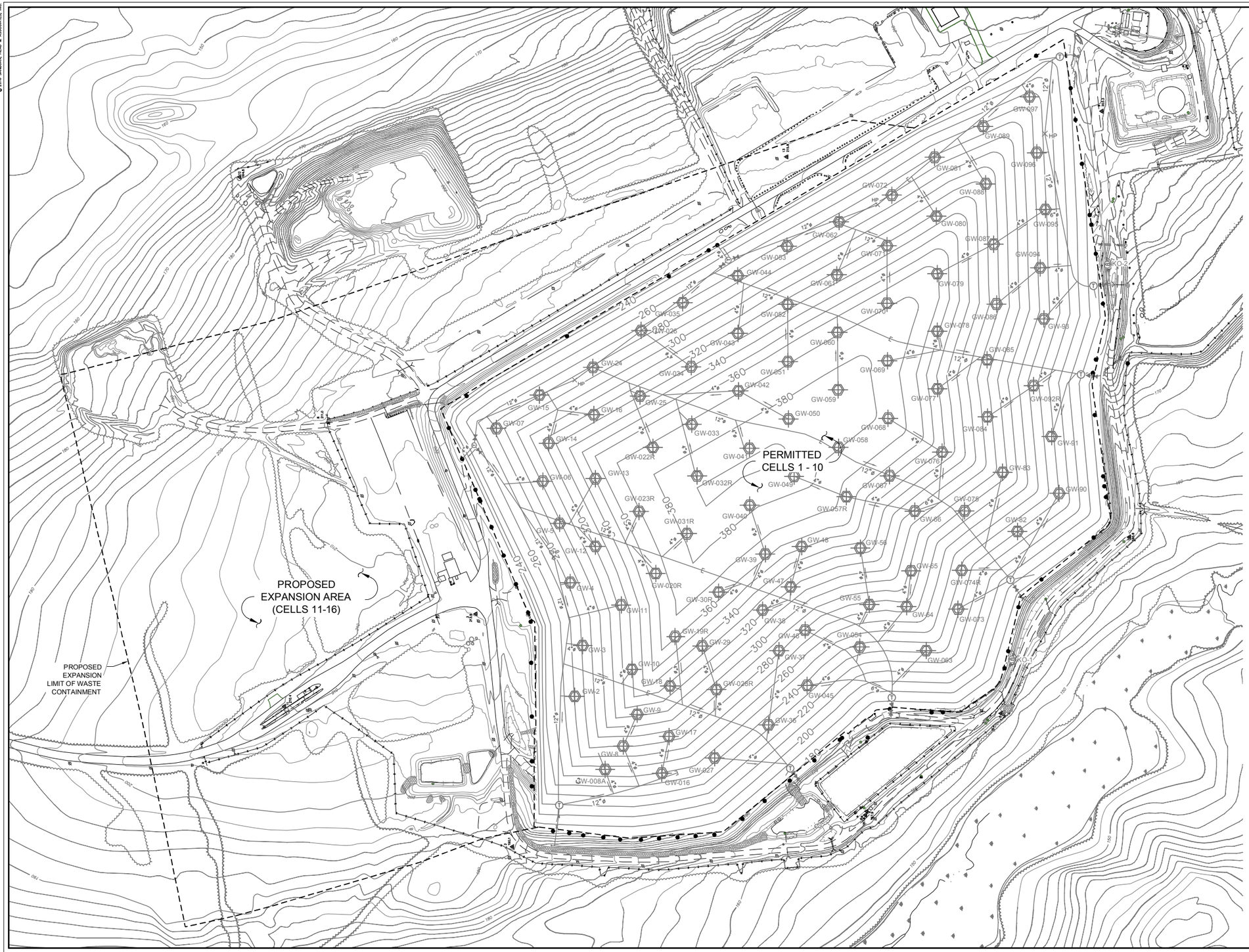


NOTES:

1. THE TOPOGRAPHY AND SITE FEATURES SHOWN OUTSIDE THE LIMIT OF WASTE CONTAINMENT WERE PREPARED BY AERIAL SURVEY & PHOTO INC., OF NORRIDGEWOCK, MAINE. PHOTO DATE JULY 31, 2014. VERTICAL DATUM: BRASS PLUG AT PUMP STATION. HORIZONTAL DATUM: MAINE STATE COORDINATES EAST ZONE NAD 83. GROUND CONTROL BY PLISGA & DAY LAND SURVEYORS, BANGOR, MAINE.
3. THE GRADES SHOWN INSIDE THE LIMIT OF WASTE CONTAINMENT ARE PERMITTED FINAL GRADES FOR CELLS 1 - 10 OF THE JUNIPER RIDGE LANDFILL (JRL), AND WERE PROVIDED TO SANBORN HEAD BY SEVEE & MAHER ENGINEERS, INC. OF CUMBERLAND, MAINE.
4. THIS DRAWING SHOWS THE LANDFILL GAS (LFG) SYSTEM DESIGN FOR CELLS 1-10 PRIOR TO THE PROPOSED EXPANSION FOR CELLS 11-16. THIS IS NOT AN AS-BUILT DRAWING. EXISTING GRADES AND ACTUAL LOCATIONS OF LFG SYSTEM INFRASTRUCTURE MAY BE DIFFERENT THAN SHOWN AT THE TIME OF CONSTRUCTION OF THE EXPANSION. AN UPDATED LFG SYSTEM AS-BUILT DRAWING SHOULD BE USED DURING CONSTRUCTION.

LEGEND:

- 180 — 10 FOOT CONTOUR
- 2 FOOT CONTOUR
- GW-11 — VERTICAL LFG WELL
- GW-19R — REPLACEMENT VERTICAL LFG WELL
- 12"ø — LFG CONVEYANCE PIPE (SIZE AND SLOPE DIRECTION)
- T — CONDENSATE TRAP
- CONTROL VALVE
- KO KO-1 — CONDENSATE KNOCKOUT
- LEACHATE COLLECTION CLEANOUT
- VERTICAL RISER
- EDGE OF ROAD
- HP — HIGH POINT
- TEMPORARY PIPE TERMINATION
- LIMIT OF WASTE CONTAINMENT

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
1	02/25/16	ADDED THIS SHEET.	RLC

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

CELLS 1 - 10
PROJECTED DEVELOPMENT PLAN

SHEET NUMBER: 1 OF 14

NOTES:

1. ⚠ SEE SHEET 1 FOR ADDITIONAL NOTES.
2. PROPOSED EXPANSION GRADES SHOWN WERE PROVIDED TO SANBORN HEAD BY SEVEE & MAHER, (SME) INC. OF CUMBERLAND, MAINE.
3. ACTUAL GRADES MAY DIFFER FROM GRADES SHOWN ON DRAWINGS AT THE TIME OF CONSTRUCTION.
4. THE EXISTING LANDFILL GAS EXTRACTION SYSTEM INFRASTRUCTURE FEATURES SHOWN ARE BASED ON A COMBINATION OF DESIGN AND AS-BUILT DOCUMENTATION AVAILABLE TO SANBORN, HEAD & ASSOCIATES, INC. (SANBORN HEAD). ACTUAL LOCATIONS OF INDIVIDUAL FEATURES MAY BE DIFFERENT THAN SHOWN.
5. THE LOCATIONS OF MANY OF THE LANDFILL DESIGN COMPONENTS SHOWN ON THIS PLAN, SUCH AS LEACHATE CLEANOUTS, STORMWATER MANAGEMENT FEATURES, AND UTILITIES, ARE BASED ON PROPOSED LOCATIONS PROVIDED TO SANBORN HEAD BY SEVEE & MAHER ENGINEERS, INC. OF CUMBERLAND, MAINE.
6. THIS PLAN IS INTENDED TO ILLUSTRATE THE PROPOSED LAYOUT OF THE LANDFILL GAS (LFG) EXTRACTION SYSTEM. ACTUAL LOCATION OF WELLS, PIPE, AND VALVES MAY CHANGE DEPENDING ON SITE CONDITIONS AND CONSTRAINTS DURING CONSTRUCTION.
7. ⚠ SOLID LANDFILL GAS CONVEYANCE PIPE LOCATED INSIDE THE LIMIT OF WASTE CONTAINMENT SHALL BE INSTALLED AT A MINIMUM SLOPE OF 5 PERCENT. PERFORATED LANDFILL GAS COLLECTION TRENCHES SHALL BE INSTALLED AT A MINIMUM SLOPE OF 2 PERCENT.
8. HDPE PIPE AND FITTINGS SHALL BE SDR-17.
9. ⚠ EXISTING VERTICAL LFG WELLS SHALL BE REPLACED OR EXTENDED AS NECESSARY PRIOR TO INSTALLATION OF FINAL CAP SYSTEM

LEGEND:

EXISTING		PROPOSED
180	10 FOOT CONTOUR	370
	2 FOOT CONTOUR	
GW-11	VERTICAL LFG WELL	GW-35
GW-19R	REPLACEMENT VERTICAL LFG WELL ⚠	
12"ø	LFG CONVEYANCE PIPE (SIZE AND SLOPE DIRECTION)	12"ø
T	CONDENSATE TRAP	T
	CONTROL VALVE	
KO-1	CONDENSATE KNOCKOUT	KO-4
	LEACHATE COLLECTION CLEANOUT	
	VERTICAL RISER	
	LIMIT OF WASTE CONTAINMENT	
	CELL LIMIT	
	EDGE OF ROAD	
HP	HIGH POINT	HP
	RIPRAP-LINED DOWNCHUTE	
	TEMPORARY PIPE TERMINATION	

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
⚠	02/25/16	REVISED BASED ON MEDEP COMMENTS.	RLC

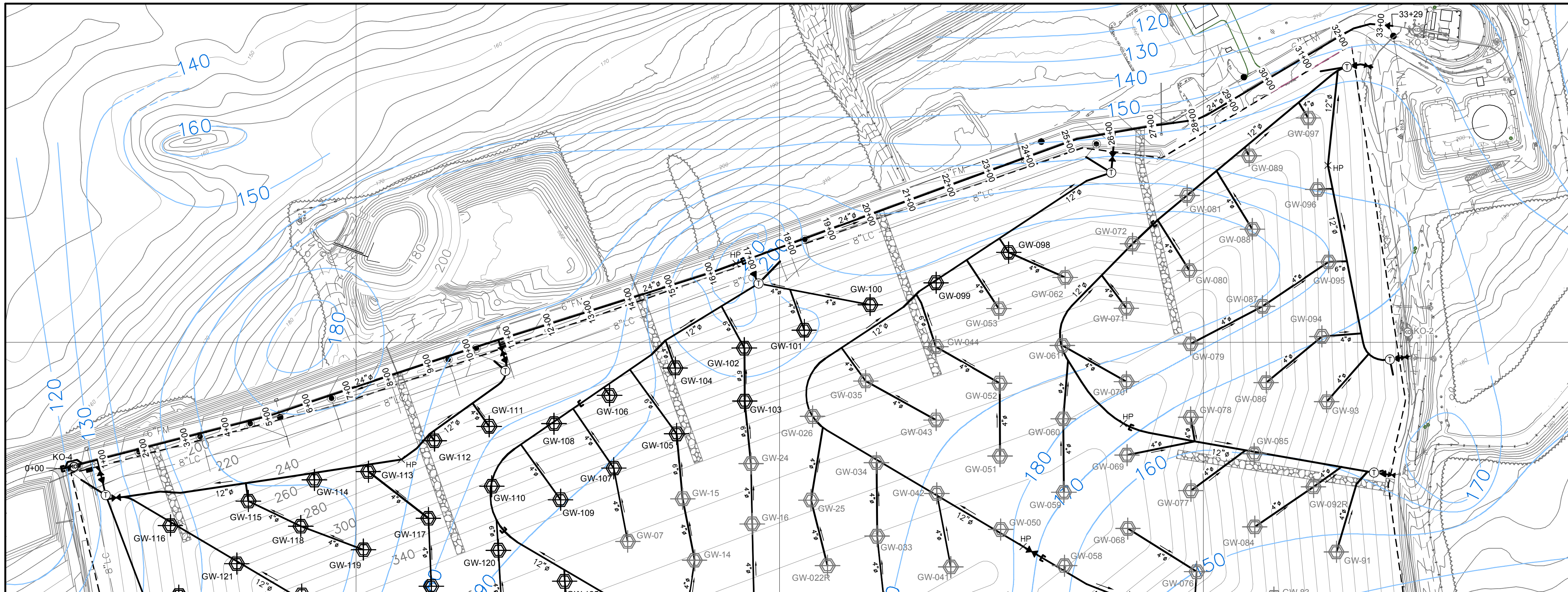
DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

LANDFILL GAS EXTRACTION SYSTEM PLAN

SHEET NUMBER: 2 OF 14

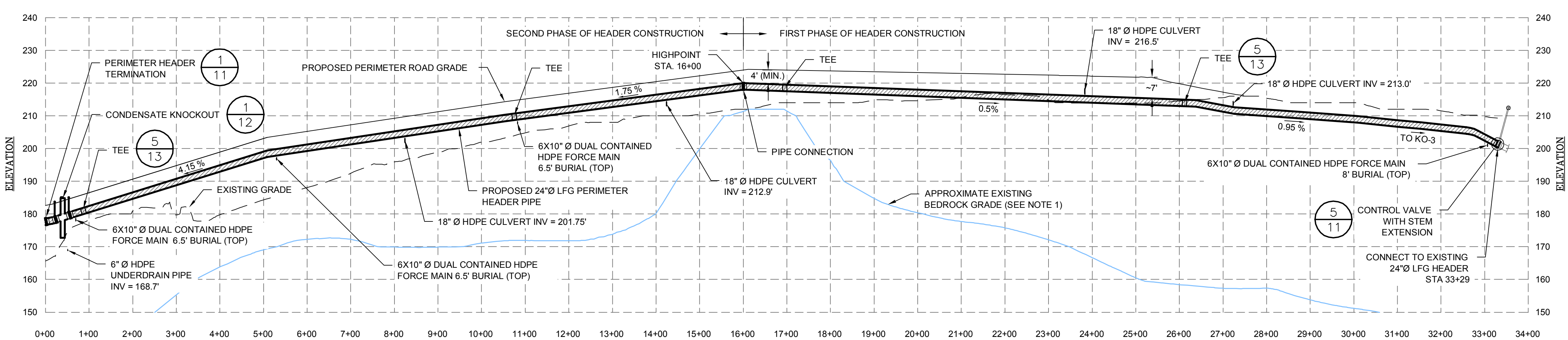


PLAN

NOT TO SCALE

GRAPHICAL SCALE

150' 75' 0' 150' 300'



PROFILE

NOT TO SCALE

VERTICAL SCALE

20' 10' 0' 20' 40'

150' 75' 0' 150' 300'

HORIZONTAL SCALE

NOTE:

1. EXISTING BEDROCK CONTOURS WERE PROVIDED TO SANBORN HEAD BY SME ON NOVEMBER 14, 2014. THESE GRADES ARE PRELIMINARY AND SHOULD BE CONSIDERED APPROXIMATE.
2. FORCE MAIN AND CULVERT CROSSINGS SHOWN ON PROFILE WERE PROVIDED BY SME ON APRIL 6, 2015.

210 BEDROCK CONTOUR

SANBORN HEAD

SCALE AS NOTED

STATE OF MAINE Eric S. Steinhauser 10809 PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN

JUNIPER RIDGE LANDFILL

OLD TOWN, MAINE

PERIMETER LFG HEADER PIPE PROFILE

PROJECT NUMBER: 2536.27

SHEET NUMBER: 3 OF 14

NOTES:

1. SHEETS 4 THRU 9 OF THIS DRAWING SET SHOW THE SEQUENTIAL CONSTRUCTION OF THE LANDFILL GAS SYSTEM FOR CELLS 11-16. ACTUAL LOCATIONS OF INDIVIDUAL FEATURES AND TIMING OF INSTALLATION MAY CHANGE DUE TO FUTURE PLANNING OR CONSTRAINTS DURING CONSTRUCTION.
2. GAS COLLECTION TRENCHES WILL BE INSTALLED AS FILLING PROGRESSES IN EACH CELL AND ARE NOT SHOWN FOR CLARITY. GAS COLLECTION TRENCHES ARE INTENDED TO BE A TEMPORARY MEASURE OF GAS COLLECTION UNTIL FINAL GRADES ARE REACHED AND VERTICAL WELLS ARE INSTALLED.
3. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND.

= AREA EXPECTED TO REACH FINAL GRADE

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
1	02/25/16	REVISED BASED ON MEDEP COMMENTS.	RLC

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

CELL 11 LFG INFRASTRUCTURE DEVELOPMENT PLAN

SHEET NUMBER: 4 OF 14

NOTES:

1. SHEETS 4 THRU 9 OF THIS DRAWING SET SHOW THE SEQUENTIAL CONSTRUCTION OF THE LANDFILL GAS SYSTEM FOR CELLS 11-16. ACTUAL LOCATIONS OF INDIVIDUAL FEATURES AND TIMING OF INSTALLATION MAY CHANGE DUE TO FUTURE PLANNING OR CONSTRAINTS DURING CONSTRUCTION.
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3. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND.

= AREA EXPECTED TO REACH FINAL GRADE

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

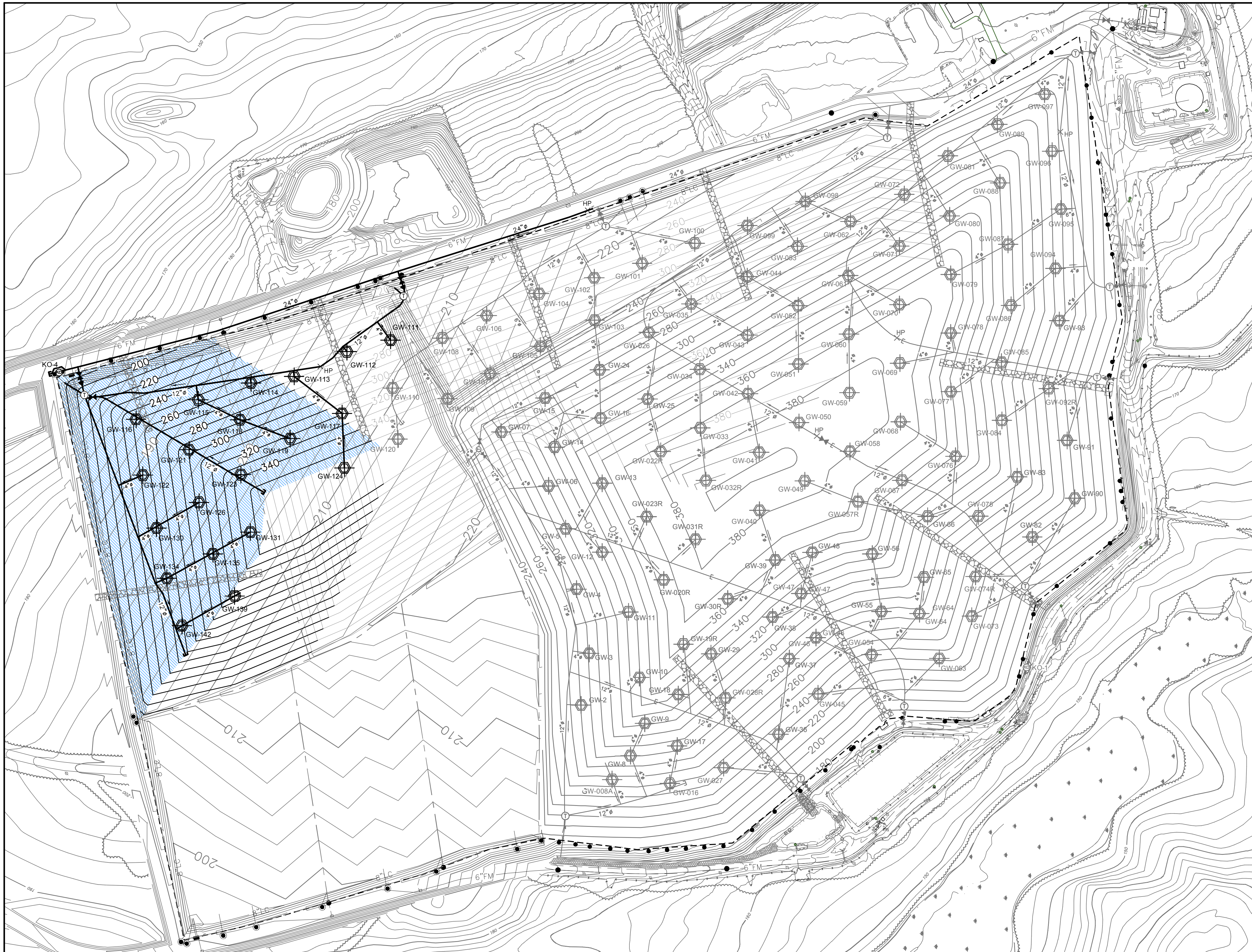
DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

CELL 12 LFG INFRASTRUCTURE DEVELOPMENT PLAN

SHEET NUMBER: 5 OF 14



NOTES:

1. SHEETS 4 THRU 9 OF THIS DRAWING SET SHOW THE SEQUENTIAL CONSTRUCTION OF THE LANDFILL GAS SYSTEM FOR CELLS 11-16. ACTUAL LOCATIONS OF INDIVIDUAL FEATURES AND TIMING OF INSTALLATION MAY CHANGE DUE TO FUTURE PLANNING OR CONSTRAINTS DURING CONSTRUCTION.

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3. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND.

[hatched area] = AREA EXPECTED TO REACH FINAL GRADE

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

CELL 13 LFG INFRASTRUCTURE DEVELOPMENT PLAN

PROJECT NUMBER: 2536.27

SHEET NUMBER: 6 OF 14

NOTES:

1. SHEETS 4 THRU 9 OF THIS DRAWING SET SHOW THE SEQUENTIAL CONSTRUCTION OF THE LANDFILL GAS SYSTEM FOR CELLS 11-16. ACTUAL LOCATIONS OF INDIVIDUAL FEATURES AND TIMING OF INSTALLATION MAY CHANGE DUE TO FUTURE PLANNING OR CONSTRAINTS DURING CONSTRUCTION.
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3. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND.

= AREA EXPECTED TO REACH FINAL GRADE

⚠ EXISTING VERTICAL LFG WELLS SHALL BE REPLACED OR EXTENDED AS NECESSARY PRIOR TO INSTALLATION OF FINAL CAP SYSTEM

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
⚠	02/25/16	REVISED BASED ON MEDEP COMMENTS.	RLC

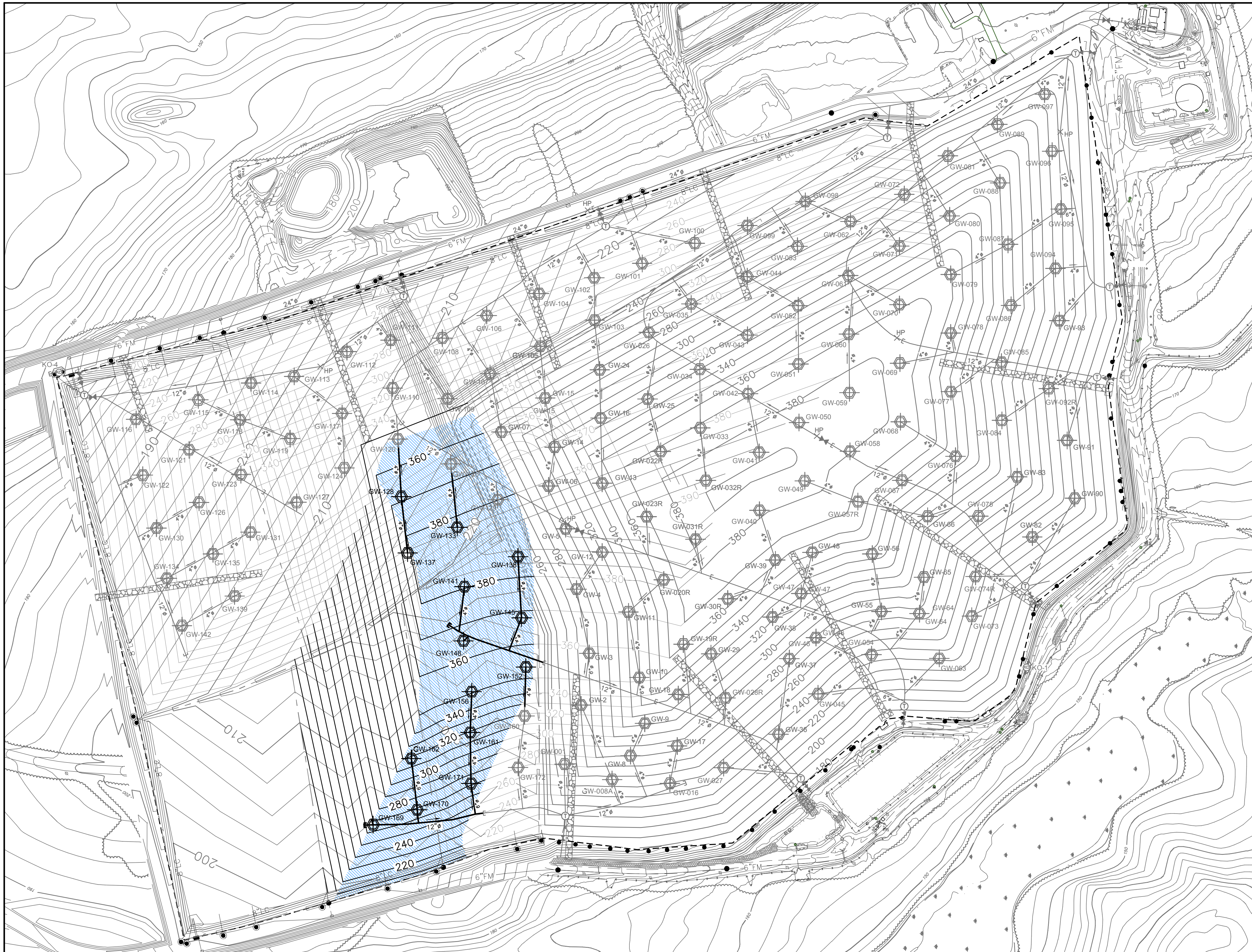
DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

CELL 14 LFG INFRASTRUCTURE DEVELOPMENT PLAN

SHEET NUMBER: 7 OF 14



NOTES:

1. SHEETS 4 THRU 9 OF THIS DRAWING SET SHOW THE SEQUENTIAL CONSTRUCTION OF THE LANDFILL GAS SYSTEM FOR CELLS 11-16. ACTUAL LOCATIONS OF INDIVIDUAL FEATURES AND TIMING OF INSTALLATION MAY CHANGE DUE TO FUTURE PLANNING OR CONSTRAINTS DURING CONSTRUCTION.
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3. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES AND LEGEND.

= AREA EXPECTED TO REACH FINAL GRADE

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LAYOUT: 08
CTB FILE: SHA Standard.ctb
PLOT DATE: 2-25-16

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

CELL 15 LFG INFRASTRUCTURE DEVELOPMENT PLAN

PROJECT NUMBER: 2536.27

SHEET NUMBER: 8 OF 14

NOTES:

1. SHEETS 4 THRU 9 OF THIS DRAWING SET SHOW THE SEQUENTIAL CONSTRUCTION OF THE LANDFILL GAS SYSTEM FOR CELLS 11-16. ACTUAL LOCATIONS OF INDIVIDUAL FEATURES AND TIMING OF INSTALLATION MAY CHANGE DUE TO FUTURE PLANNING OR CONSTRAINTS DURING CONSTRUCTION.
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= AREA EXPECTED TO REACH FINAL GRADE

SANBORN HEAD

GRAPHICAL SCALE
150' 75' 0' 150' 300'

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

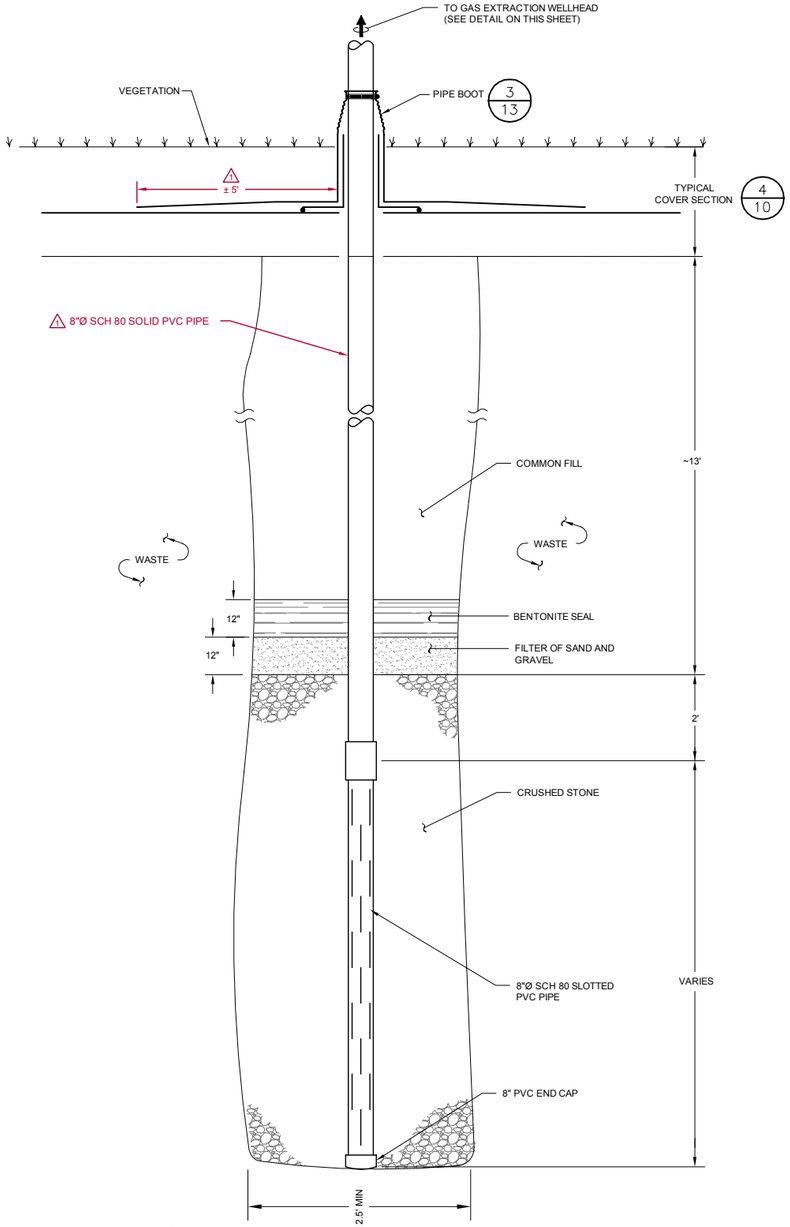
DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

CELL 16 LFG INFRASTRUCTURE DEVELOPMENT PLAN

SHEET NUMBER: 9 OF 14



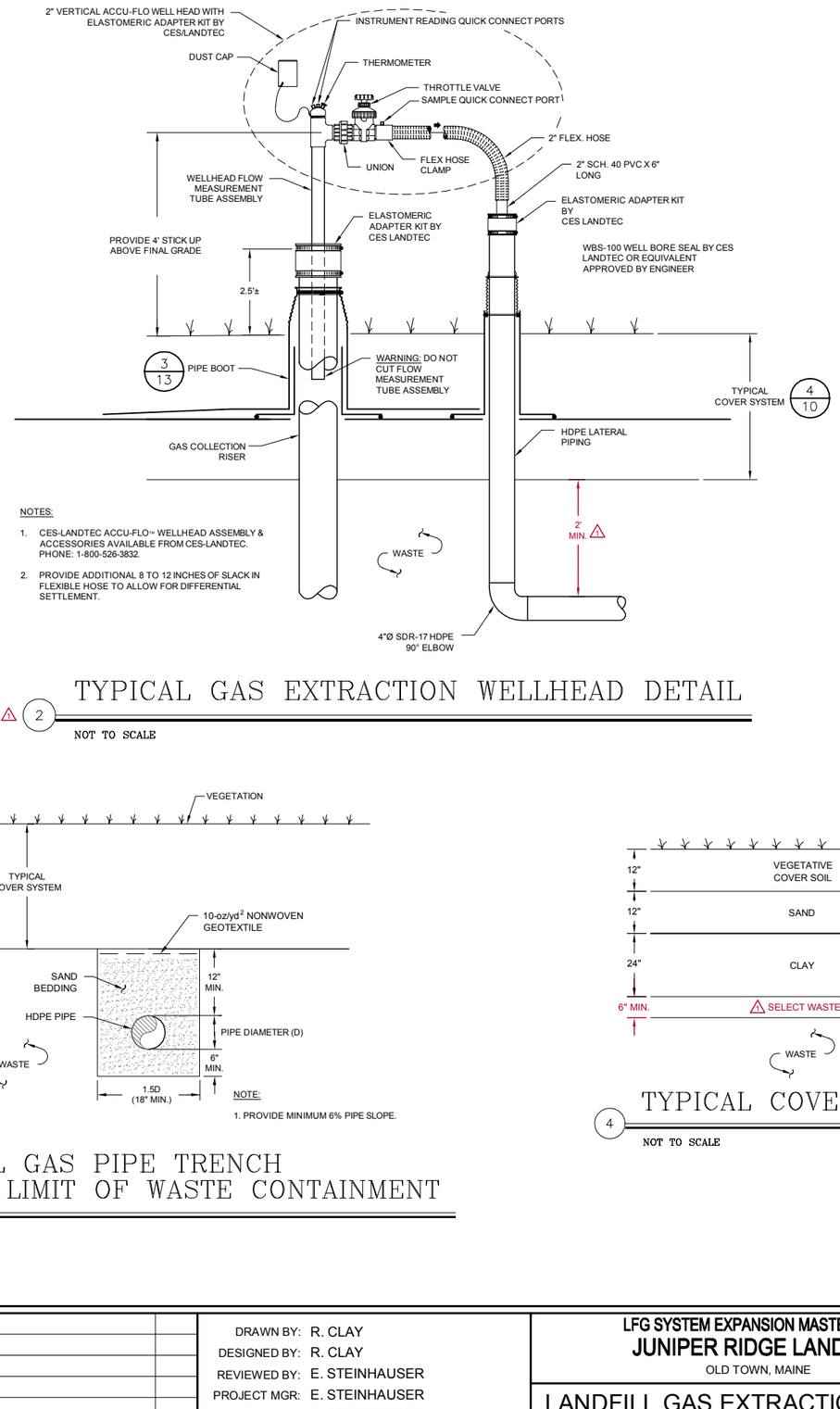
NOTES:

1. PIPE PERFORATED WITH SLOTS 1/8" TO 1/4" WIDE BY 8" LONG. FOUR SLOTS PER ROW SPACED 90° APART, WITH ADJACENT ROWS OFFSET BY 45°.
2. BOTTOM OF WELL IS DESIGNED TO BE 15 FEET ABOVE PRIMARY LINER SAND. REFER TO WELL SCHEDULE FOR ELEVATIONS.

TYPICAL GAS EXTRACTION WELL DETAIL

1

NOT TO SCALE



NOTES:

1. CES-LANDTEC ACCU-FLO™ WELLHEAD ASSEMBLY & ACCESSORIES AVAILABLE FROM CES-LANDTEC. PHONE: 1-800-526-3832.
2. PROVIDE ADDITIONAL 8 TO 12 INCHES OF SLACK IN FLEXIBLE HOSE TO ALLOW FOR DIFFERENTIAL SETTLEMENT.

TYPICAL GAS EXTRACTION WELLHEAD DETAIL

2

NOT TO SCALE

TYPICAL GAS PIPE TRENCH WITHIN LIMIT OF WASTE CONTAINMENT

3

NOT TO SCALE

TYPICAL COVER SYSTEM

4

NOT TO SCALE

SANBORN HEAD

SCALE AS NOTED

STATE OF MAINE
Eric
S.
Steinhauser
10809
REGISTERED
PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
1	02/25/16	REVISED BASED ON MEDEP COMMENTS.	RLC

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

LANDFILL GAS EXTRACTION SYSTEM DETAILS

SHEET NUMBER: 10 OF 14

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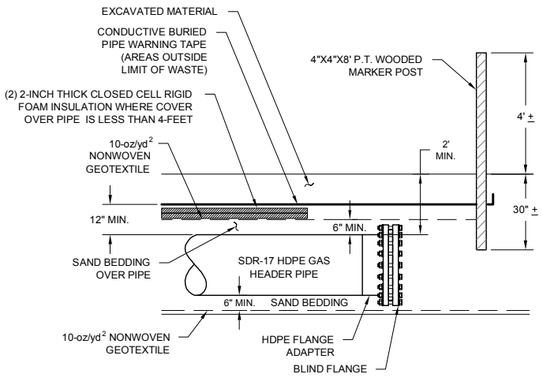
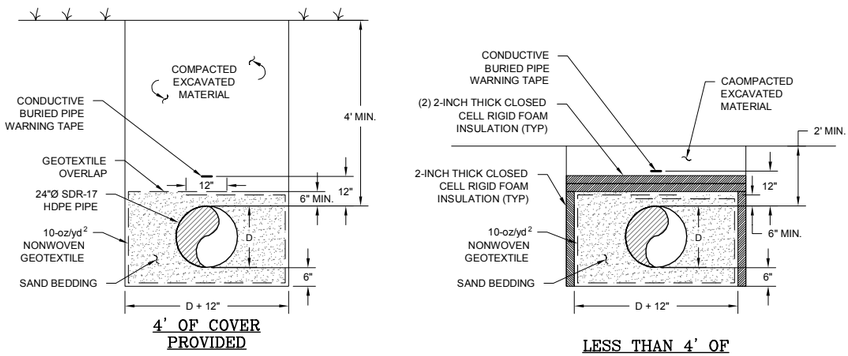


TEMPORARY PERIMETER LFG HEADER TERMINATION

1

NOT TO SCALE



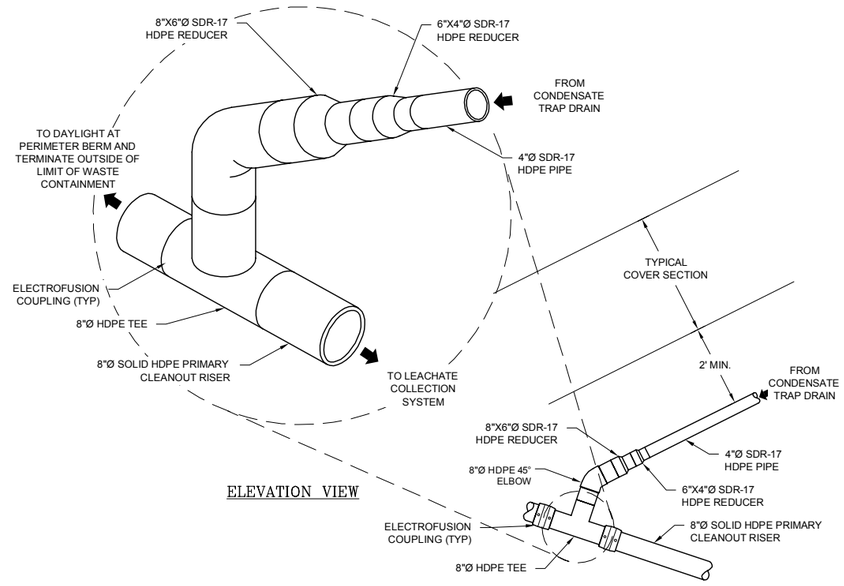
4' OF COVER PROVIDED

LESS THAN 4' OF COVER PROVIDED

TYPICAL GAS HEADER PIPE TRENCH OUTSIDE LIMIT OF WASTE

2

NOT TO SCALE

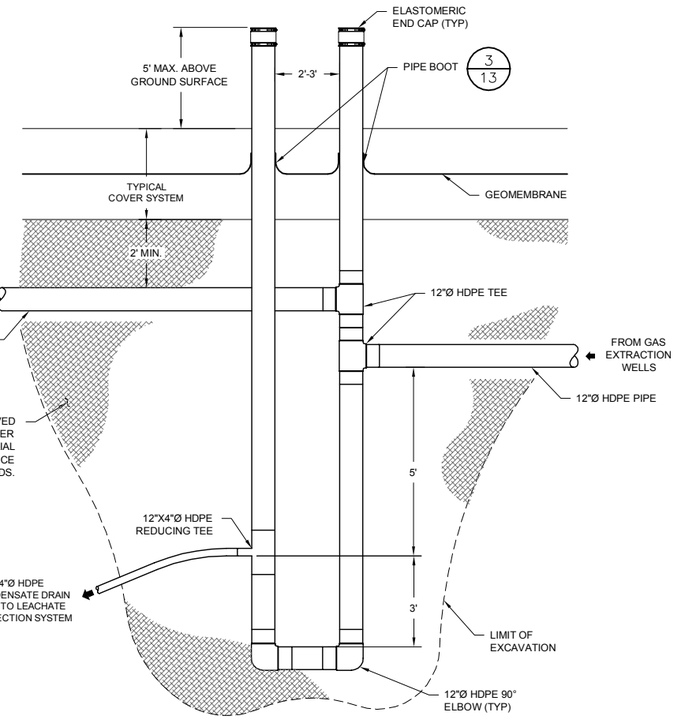


ELEVATION VIEW

TYPICAL CLEANOUT TIE-IN DETAIL

3

NOT TO SCALE



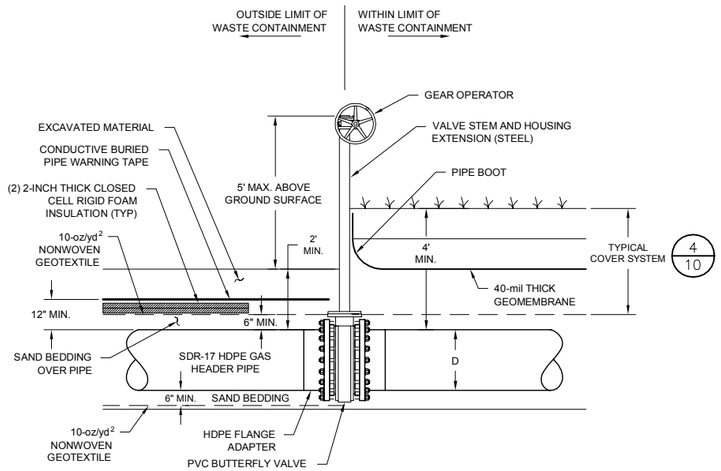
NOTES:

1. TIRE DERIVED AGGREGATE SHALL CONFORM TO THE REQUIREMENTS OF ASTM D 6270.

TYPICAL CONDENSATE TRAP

4

NOT TO SCALE



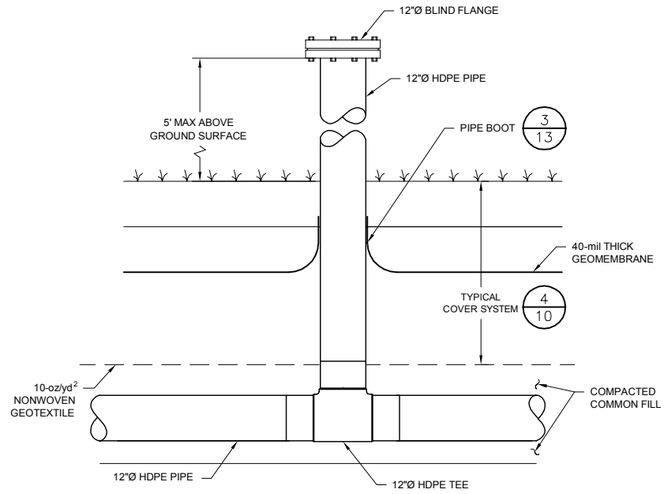
NOTE:

1. FLANGE BACKUP RINGS AND FASTENERS SHALL BE TYPE 316 STAINLESS STEEL.
2. PROTECT BELOW GRADE BOLTS AND FLANGES BY COVERING WITH A 6-MIL THICK POLYETHYLENE WRAP. DUCT TAPE WRAP TO HDPE PIPE.

CONTROL VALVE DETAIL (TYP)

5

NOT TO SCALE



VERTICAL RISER DETAIL (TYP)

6

NOT TO SCALE

SANBORN HEAD

SCALE AS NOTED

STATE OF MAINE Eric S. Steinhauser 10809 REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

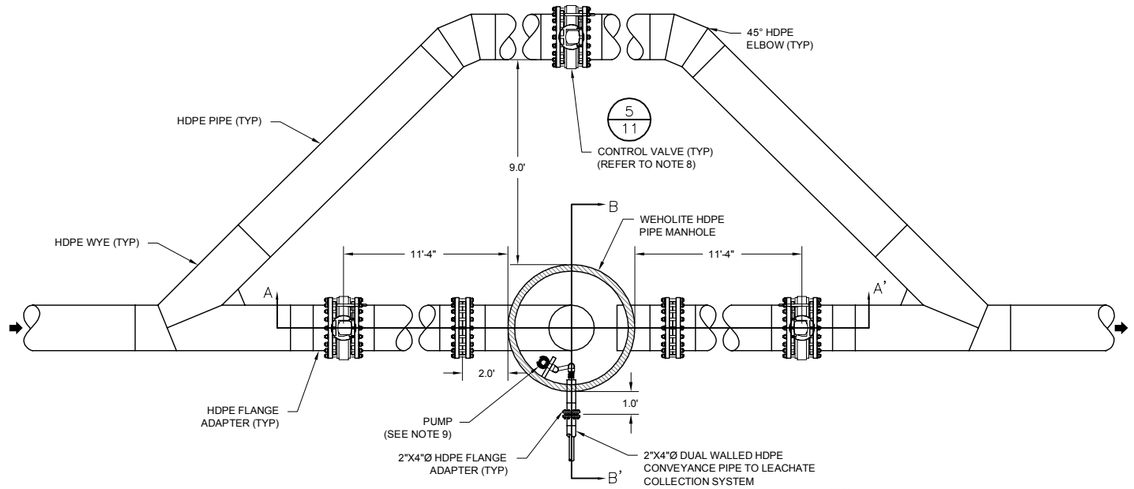
DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

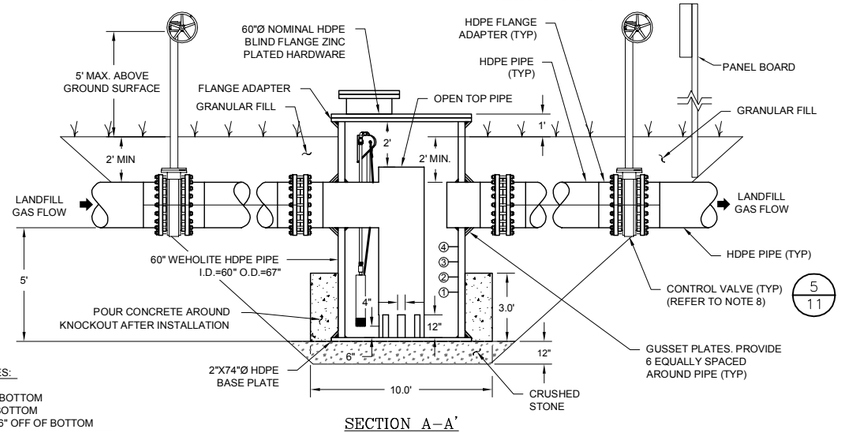
LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

LANDFILL GAS EXTRACTION SYSTEM DETAILS

SHEET NUMBER: 11 OF 14

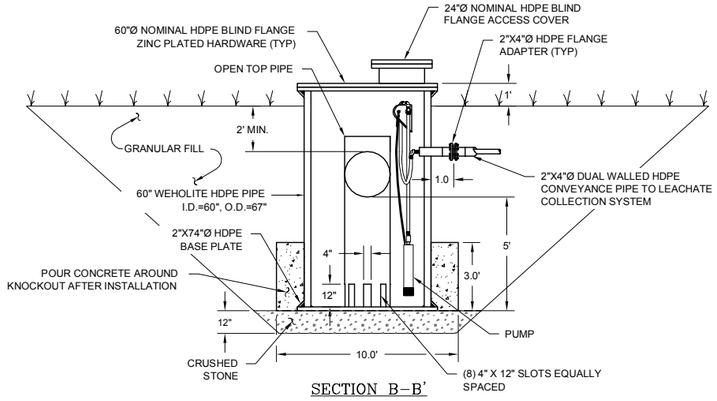




LIQUID LEVEL CONTROL NOTES:

① PUMP OFF - 18" OFF OF BOTTOM
② PUMP ON - 30" OFF OF BOTTOM
③ HIGH WATER ALARM - 36" OFF OF BOTTOM
④ HIGH HIGH WATER ALARM - 42" OFF OF BOTTOM

SECTION A–A'



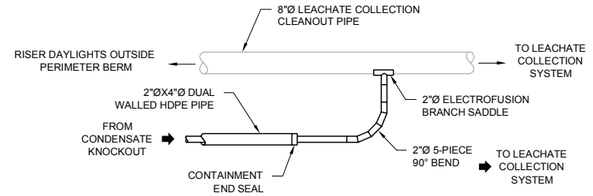
SECTION B–B'

1 CONDENSATE KNOCKOUT DETAIL

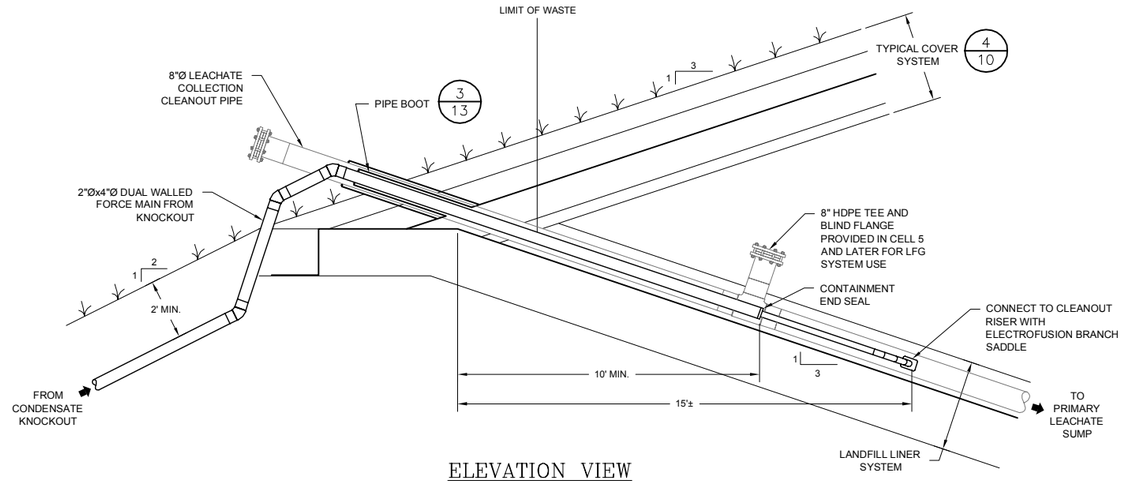
NOT TO SCALE

NOTES:

1. REFER TO PREVIOUS SHEETS FOR ADDITIONAL NOTES.
2. ALL HDPE PIPE AND FITTINGS SHALL BE SDR-17 UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL FOLLOW EXCAVATION PRACTICES AND REGULATIONS APPROVED BY OSHA REQUIREMENTS FOR PROTECTIVE SYSTEMS. - 1926.652.
4. CONDENSATE KNOCKOUT SHALL HAVE AN OSHA APPROVED CONFINED SPACE SIGN ATTACHED TO THE TOP OF THE COVER. SIGN SHALL BE 14" WIDE BY 10" HIGH, AND SHALL HAVE UV-RESISTANT PAINT ON AN ALUMINUM BASE. SIGN SHALL READ "DANGER CONFINED SPACE, HAZARDOUS ATMOSPHERE, ENTER BY PERMIT ONLY."
5. CONDENSATE PUMP SHALL BE GOULDS PUMP MODEL 1SC51C-1, AS SPECIFIED BY NEWSME LANDFILL OPERATIONS, LLC. OR EQUIVALENT.
6. CONTRACTOR SHALL INSTALL PUMP CONTROLS, ASSOCIATED CONTROL WIRING, AND ELECTRICAL POWER AS NEEDED TO OPERATE THE PUMP AND PROVIDE NECESSARY ALARMS.
7. CONDENSATE KNOCKOUT IS A CLASS 1 DIVISION 1 GROUP D CLASSIFIED SPACE. PROVIDE EXPLOSION-PROOF OR INTRINSICALLY-SAFE ELECTRICAL EQUIPMENT. PROVIDE CONDUIT SEALS ON ALL ELECTRICAL CONDUIT.
8. PROTECT BELOW GRADE BOLTS AND FLANGES BY COVERING WITH A 6-MIL THICK POLYETHYLENE WRAP. DUCT TAPE WRAP TO HDPE PIPE.



PLAN VIEW



ELEVATION VIEW

2 KNOCKOUT FORCE MAIN CONNECTION DETAIL

NOT TO SCALE

SANBORN HEAD

SCALE AS NOTED

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
1	02/25/16	REMOVED NOTE 9.	RLC

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

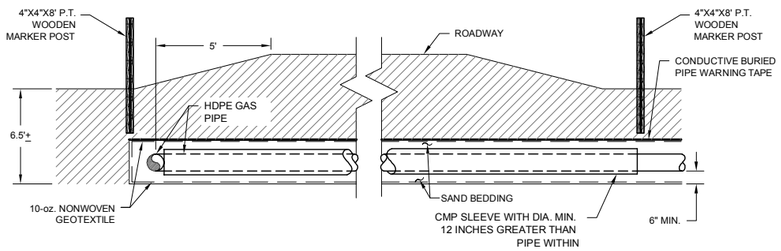
PROJECT NUMBER: 2536.27

LANDFILL GAS EXTRACTION SYSTEM DETAILS

SHEET NUMBER: 12 OF 14

NOTE:

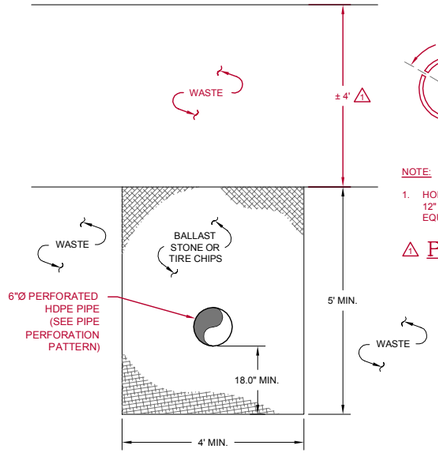
1. THESE DRAWINGS DO NOT SHOW ALL INTERIM LANDFILL ACCESS ROADS WHICH MAY BE CONSTRUCTED DURING FILLING OPERATIONS. THIS DETAIL APPLIES WHEN ROAD CROSSING CONDITIONS ARE PRESENT.

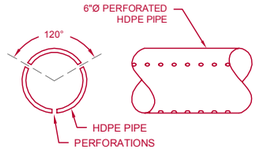


GAS PIPE ROAD CROSSING SLEEVE DETAIL

1

NOT TO SCALE





NOTE:

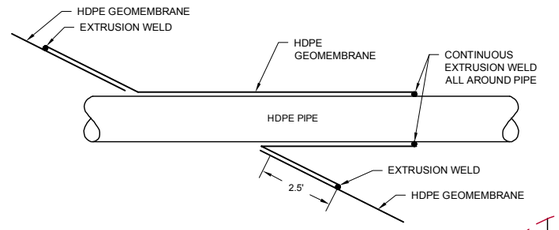
1. HOLES SHALL BE 1/2"Ø DRILLED HOLES SPACED 12" APART ALONG THE LENGTH OF THE PIPE OR EQUIVALENT APPROVED BY OWNER.

⚠ PIPE PERFORATION PATTERN

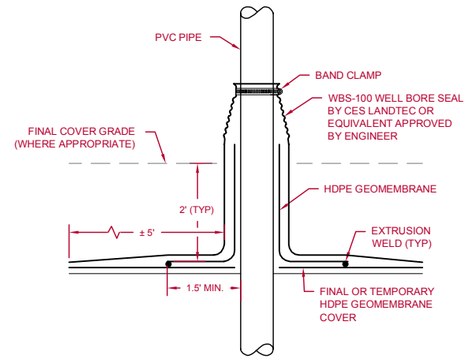
TYPICAL GAS COLLECTION TRENCH SECTION

⚠ 2

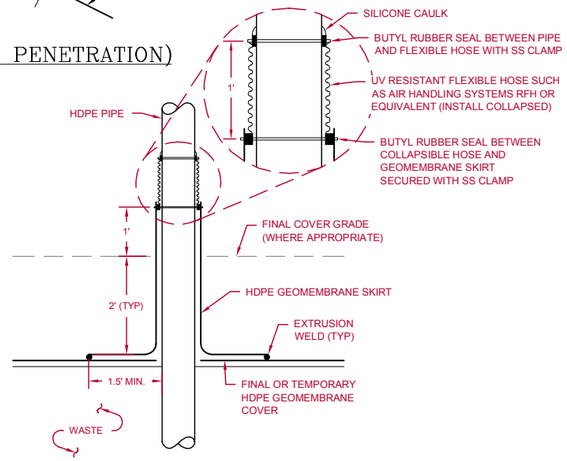
NOT TO SCALE



HDPE PIPE (SIDE PENETRATION)



PVC PIPE (RISER)

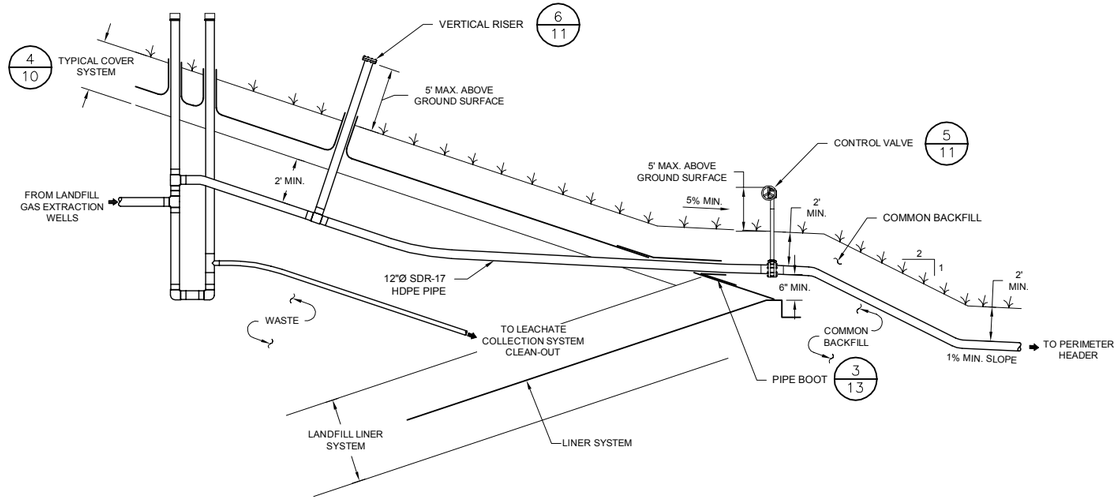


HDPE PIPE (RISER)

TYPICAL PIPE BOOT DETAIL

⚠ 3

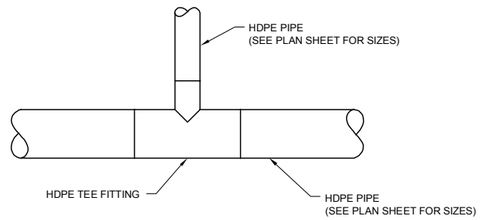
NOT TO SCALE



CAP PENETRATION DETAIL

4

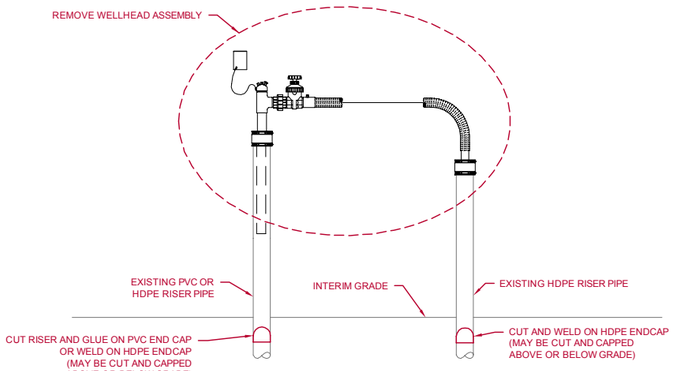
NOT TO SCALE



"TEE" CONNECTION DETAIL

5

NOT TO SCALE



LFG WELL DECOMMISIONING

⚠ 6

NOT TO SCALE

SANBORN HEAD

SCALE AS NOTED

STATE OF MAINE
Eric S. Steinhauser
10809
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY
⚠	02/25/16	REVISED BASED ON MEDEP COMMENTS.	RLC

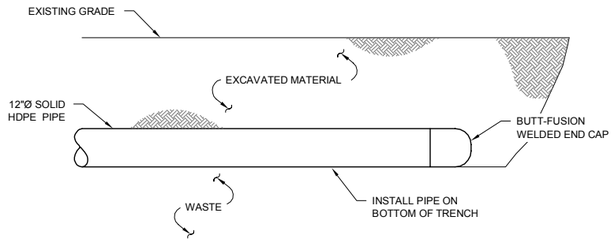
DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

LANDFILL GAS EXTRACTION SYSTEM DETAILS

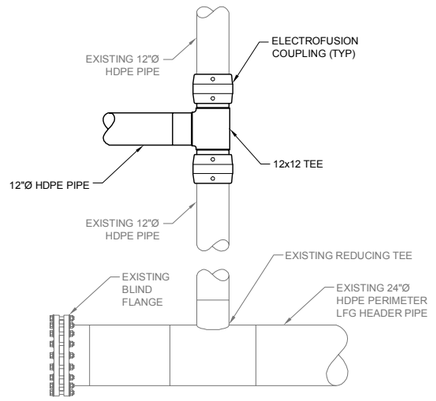
SHEET NUMBER: 13 OF 14



TEMPORARY LFG PIPE TERMINATION

1

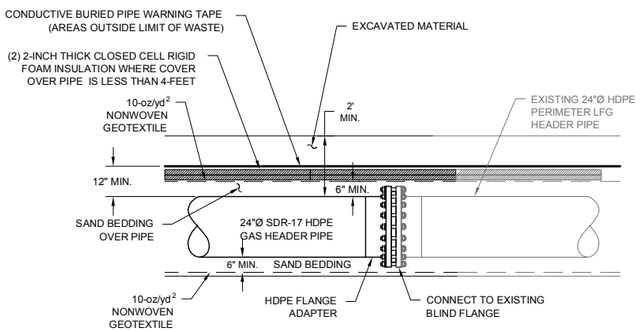
NOT TO SCALE



WEST LFG CONVEYANCE PIPE CONNECTION DETAIL

2

NOT TO SCALE



PERIMETER LFG CONVEYANCE PIPE CONNECTION DETAIL

3

NOT TO SCALE

LANDFILL GAS EXTRACTION WELL SCHEDULE

WELL DESIGNATION	NORTHING	EASTING	BOTTOM OF WASTE (FT)	TOP OF EXISTING WASTE (FT)	TOTAL WELL DEPTH (FT)	BOTTOM OF WELL SCREEN (FT)	TOP OF WELL SCREEN (FT)	SCREEN LENGTH (FT)	TOP OF CASING ELEV. (FT)
GW-001	479171.1	925548.7	203.1	271.3	53.2	218.1	256.3	38.2	274.3
GW-006A	479030.7	925503.0	196.1	256.9	45.7	211.1	241.9	30.7	259.9
GW-016	478859.9	925491.7	188.5	249.4	45.9	203.5	234.4	30.9	252.4
GW-020R	478878.2	926093.3	209.3	381.1	156.8	224.3	366.1	141.8	384.1
GW-022R	478887.0	926473.0	213.6	381.7	153.1	228.6	366.7	138.1	384.7
GW-023R	478928.7	926280.1	212.5	388.2	160.6	227.5	373.2	145.6	391.2
GW-026	478922.2	926825.3	217.1	349.1	116.9	232.1	334.1	101.9	352.1
GW-027	478701.0	925538.0	183.2	243.4	45.3	198.2	228.4	30.3	246.4
GW-028R	478695.3	925744.2	194.6	294.2	84.6	209.6	279.2	69.6	297.2
GW-031R	478784.3	926213.2	208.6	387.7	164.1	223.6	372.7	149.1	390.7
GW-032R	478753.5	926387.1	210.9	388.0	162.1	225.9	373.0	147.1	391.0
GW-033	478769.9	926542.9	214.8	380.4	150.6	229.8	365.4	135.6	383.4
GW-034	478771.5	926716.1	214.3	364.4	136.1	229.3	349.4	120.1	367.4
GW-035	478796.8	926909.2	217.6	339.1	106.8	232.6	324.1	91.6	342.1
GW-040	478595.2	926299.0	205.3	381.9	161.6	220.3	366.9	146.6	384.9
GW-041	478596.0	926470.3	209.4	387.5	163.2	224.4	372.5	148.2	390.5
GW-042	478629.0	926643.7	212.0	376.0	149.0	227.0	361.0	134.0	379.0
GW-043	478630.6	926816.9	213.5	359.6	131.1	228.5	344.6	116.1	362.6
GW-044	478631.1	926990.1	215.3	332.2	101.8	230.3	317.2	86.8	335.2
GW-045	478421.8	925756.4	177.0	237.0	45.0	192.0	222.0	30.0	240.0
GW-049	478461.3	926386.1	206.7	384.7	164.0	220.7	369.7	149.0	387.7
GW-050	478478.2	926558.5	214.0	383.1	154.1	229.0	368.1	139.1	386.1
GW-051	478479.8	926731.7	210.8	372.7	146.8	225.8	357.7	131.8	375.7
GW-052	478480.9	926903.9	214.7	356.4	126.7	229.7	341.4	111.7	359.4
GW-053	478482.6	927079.8	214.5	320.6	91.1	229.5	305.6	76.1	323.6
GW-054	478263.7	925872.0	178.7	237.0	45.2	191.7	222.0	30.2	240.0
GW-057R	478304.0	926324.8	198.4	365.8	154.4	211.4	350.8	139.4	368.8
GW-058	478327.4	926473.3	202.0	380.0	163.0	217.0	365.0	148.0	383.0
GW-059	478329.1	926648.5	209.0	380.5	156.5	224.0	365.5	141.5	383.5
GW-060	478330.7	926819.7	209.7	369.4	144.7	224.7	354.4	129.7	372.4
GW-061	478332.7	926992.9	211.8	353.0	126.1	226.8	338.0	111.1	356.0
GW-062	478326.0	927153.1	213.2	315.0	86.8	228.2	300.0	71.8	318.0
GW-063	478063.7	925861.2	170.3	231.9	46.6	185.3	216.9	31.6	234.9
GW-067	478173.5	926387.8	195.8	352.2	141.4	210.8	337.2	126.4	355.2
GW-068	478178.0	926560.9	201.2	375.9	159.7	216.2	360.9	144.7	378.9
GW-069	478180.1	926734.1	203.8	374.7	155.9	218.8	359.7	140.9	377.7
GW-070	478181.3	926907.3	207.5	367.8	145.1	222.5	352.8	130.1	370.8
GW-071	478181.5	927080.5	210.5	345.0	119.4	225.5	330.0	104.4	348.0
GW-072	478167.1	927233.0	212.3	293.9	66.6	227.3	278.9	51.6	296.9
GW-073	477967.4	925965.9	171.0	231.8	45.8	186.0	216.8	30.8	234.8
GW-074R	477956.4	926103.4	173.9	239.0	50.1	188.9	224.0	35.1	242.0
GW-075	477947.9	926282.0	180.2	278.1	82.9	195.2	263.1	67.9	281.1
GW-076	478015.5	926458.8	189.9	338.7	133.9	204.9	323.7	118.9	341.7
GW-077	478029.5	926650.0	196.6	340.9	129.3	211.6	325.9	114.3	343.9
GW-078	478029.8	926823.2	201.3	351.6	135.2	216.3	336.6	120.2	354.6
GW-079	478030.1	926996.4	205.9	360.0	139.1	220.9	345.0	124.1	363.0
GW-080	478033.0	927169.6	209.4	322.7	96.2	224.4	307.7	83.2	325.7
GW-081	478038.0	927348.9	216.1	271.7	40.6	231.1	256.7	25.6	274.7
GW-084	477878.6	926584.9	186.9	294.4	92.5	201.9	279.4	77.5	297.4
GW-085	477879.7	926736.9	193.1	295.4	87.2	208.1	280.4	72.2	298.4
GW-086	477851.7	926905.1	197.1	303.0	91.0	212.1	288.0	76.0	306.0
GW-087	477860.0	927085.1	202.7	304.0	86.4	217.7	289.0	71.4	307.0
GW-088	477884.2	927267.3	208.5	306.3	82.8	223.5	291.3	67.8	309.3
GW-089	477891.8	927440.3	211.8	262.8	36.0	226.8	247.8	21.0	265.8
GW-092R	477740.0	926659.1	184.4	245.0	45.7	199.4	230.0	30.7	248.0
GW-094	477720.1	927014.1	196.6	257.9	48.3	211.6	242.9	31.3	260.9
GW-095	477704.4	927189.8	201.7	251.1	34.4	216.7	236.1	19.4	254.1
GW-096	477730.2	927361.0	207.7	257.0	34.2	222.7	242.0	19.2	260.0
GW-097	477752.2	927529.6	211.3	250.9	24.7	226.3	235.9	9.7	253.9
GW-098	478459.4	927212.4	220.9	281.5	45.8	235.9	268.5	30.6	284.5
GW-099	478630.8	927140.8	223.9	284.9	46.0	238.9	269.9	31.0	287.9
GW-100	478786.2	927088.7	222.6	283.9	46.3	237.6	268.9	31.3	286.9
GW-101	478941.9	927028.9	221.8	285.4	48.6	236.8	270.4	33.6	288.4
GW-102	479083.5	926968.5	221.0	282.9	46.8	236.0	267.9	31.8	285.9
GW-103	479082.4	926861.4	225.4	322.1	81.7	240.4	307.1	66.7	325.1
GW-104	479246.4	926939.8	217.0	278.4	46.4	232.0	263.4	31.4	281.4
GW-105	479243.1	926784.1	222.7	327.4	88.7	237.7	312.4	74.7	330.4
GW-106	479401.5	926874.9	213.8	280.5	51.7	228.8	265.5	36.7	283.5
GW-107	479391.3	926703.4	221.5	336.2	96.7	236.5	320.2	83.7	338.2
GW-108	479532.6	926808.3	211.0	285.9	59.9	226.0	270.9	44.9	288.9
GW-109	479517.1	926628.7	221.8	343.8	107.0	236.8	328.8	92.0	346.8
GW-110	479679.4	926860.7	209.0	314.1	90.0	224.0	299.1	75.0	317.1
GW-111	479685.6	926802.0	206.1	269.6	48.4	221.1	254.6	33.4	272.6

LANDFILL GAS EXTRACTION WELL SCHEDULE

WELL DESIGNATION	NORTHING	EASTING	BOTTOM OF WASTE (FT)	TOP OF EXISTING WASTE (FT)	TOTAL WELL DEPTH (FT)	BOTTOM OF WELL SCREEN (FT)	TOP OF WELL SCREEN (FT)	SCREEN LENGTH (FT)	TOP OF CASING ELEV. (FT)
GW-112	479614.8	926768.1	203.2	264.1	45.9	218.2	249.1	30.9	267.1
GW-113	479970.9	926895.1	200.0	287.4	52.4	215.0	252.4	37.4	270.4
GW-114	480098.0	926675.4	198.5	257.8	48.3	211.5	242.8	31.3	260.8
GW-115	480253.9	926825.6	192.2	254.1	46.9	207.2	239.1	31.9	257.1
GW-116	480438.0	926567.9	186.2	249.0	47.8	201.2	234.0	32.8	252.0
GW-117	479829.0	926585.2	206.0	319.0	98.0	221.0	304.0	83.0	322.0
GW-118	480130.3	926586.5	197.8	287.5	75.0	212.8	272.5	60.0	290.5
GW-119	479982.2	926510.9	203.0	323.0	105.1	218.0	308.0	90.1	326.0
GW-120	479663.7	926509.6	212.5	352.4	124.9	227.5	337.4	109.9	355.4
GW-121	480281.2	926478.0	194.3	295.9	86.6	209.3	280.9	71.6	298.9
GW-122	480417.9	926402.8	191.2	252.4	46.1	206.2	237.4	31.1	255.4
GW-123	480127.8	926404.4	200.6	338.1	122.5	215.6	323.1	107.5	341.1
GW-124	479822.2	926424.4	209.3	354.5	130.2	224.3	339.5	115.2	357.5
GW-125	479507.4	926436.3	217.8	365.0	132.5	232.6	350.0	117.5	368.0
GW-126	480251.9	926322.4	198.4	303.1	89.8	213.4	288.1	74.8	306.1
GW-127	479963.3	926322.7	206.8	358.7	136.9	221.8	343.7	121.9	361.7
GW-128	479654.0	926339.8	214.8	368.6	138.7	229.8	353.6	123.7	371.6
GW-129	479368.9	926330.6	219.7	379.9	145.1	234.7	364.9	130.1	382.9
GW-130	480377.6	926246.4	195.9	258.0	47.0	210.9	243.0	32.0	261.0
GW-131	480099.9	926234.5	204.5	348.3	128.8	219.5	333.3	113.8	351.3
GW-132	479610.3	926234.3	213.1	372.5	144.4	228.1	357.5	129.4	375.5
GW-133	479488.4	926248.7	219.1	381.6	147.5	234.1	366.6	132.5	384.6
GW-134	480347.0	926098.0	199.7	260.8	46.1	214.7	245.8	31.1	263.8
GW-135	480210.8	926170.1	202.5	309.2	91.8	217.5	294.2	76.8	312.2
GW-136	479979.6	926132.6	210.3	358.7	133.3	225.3	343.7	118.3	361.7
GW-137	479635.0	926172.9	217.0	382.0	150.0	232.0	367.0	135.0	385.0
GW-138	479308.9	926161.6	219.6	383.0	148.5	234.6	368.0	133.5	386.0
GW-139	480146.5	926045.6	206.6	324.4	102.8	221.6	309.4	87.8	327.4
GW-140	479789.5	926075.3	215.2	376.7	146.4	230.2	361.7	131.4	379.7
GW-141	479467.3	926073.2	221.0	380.3	144.3	236.0	365.3	129.3	383.3
GW-142	480302.2	925958.1	203.6	268.7	50.0	218.6	253.7	35.0	271.7
GW-143	479956.4	925978.3	213.4	358.7	130.3	228.4	343.7	115.3	361.7
GW-144	479635.4	925981.6	219.6	377.6	143.0	234.6	362.6	128.0	380.6
GW-145	479298.3	925980.7	218.8	368.0	134.2	233.8	353.0	119.2	371.0
GW-146	480116.8	925882.5	211.1	326.2	100.1	226.1	311.2	85.1	329.2
GW-147	479796.3	925890.5	217.1	372.0	140.0	232.1	357.0	125.0	375.0
GW-148	479469.9	925913.1	217.2	365.4	133.2	232.2	350.4	118.2	368.4
GW-149	480261.9	925796.2	207.7	273.9	51.2	222.7	258.9	36.2	276.9
GW-150	479945.9	925798.4	213.4	356.9	128.5	228.4	341.9	113.5	359.9
GW-151	479833.7	925823.4	212.9	363.1	135.2	227.9	348.1	120.2	366.1
GW-152	479285.6	925835.4	215.1	353.4	123.3	230.1	338.4	108.3	356.4
GW-153	480099.6	925705.7	212.2	320.9	93.6	227.2	305.9	78.6	323.9
GW-154	480205.6	925618.7	206.3	279.4	56.1	223.3	264.4	41.1	282.4
GW-155	479787.3	925702.6	211.1	357.1	131.0	228.1	342.1	116.0	360.1
GW-156	479445.8	925782.8	212.9	350.5	122.6	227.9	335.5	107.6	353.5
GW-157	479618.4	925688.2	209.9	350.4	125.5	224.9	335.4	110.5	353.4
GW-158	479935.4	925623.3	209.1	350.9	126.9	224.1	335.9	111.9	353.9
GW-159	480086.8	925535.4	208.4	310.8	87.3	223.4	295.8	72.3	313.8
GW-160	479289.6	925691.2	211.1	318.4	92.3	226.1	303.4	77.3	321.4
GW-161	479449.9	925642.2	210.6	319.0	93.4	225.6	304.0	78.4	322.0
GW-162	479624.3	925565.0	207.6	317.9	95.3	222.6	302.9	80.3	320.9
GW-163	479777.3	925514.4	207.2	316.8	94.5	222.2	301.8	79.5	319.8
GW-164	479939.8	925461.4	205.7	313.8	93.2	220.7	298.8	78.2	316.8
GW-165	480194.7	925443.5	204.6	288.2	48.6	219.6	253.2	33.6	271.2
GW-166	480063.5	925381.7	205.2	298.4	78.2	220.2	283.4	63.2	301.4
GW-167	480154.6	925257.7	200.8	262.9	47.1	215.8	247.9	32.1	265.9
GW-168	479923.1	925313.5	202.2	284.8	47.6	217.2	249.8	32.6	267.8
GW-169	479737.1	925389.4	203.7	266.6	47.9	218.7	251.6	32.9	269.6
GW-170	479606.9	925413.5	204.4	288.4	49.0	219.4	253.4	34.0	271.4
GW-171	479447.5	925491.2	207.5	271.8	49.1	222.5	256.6	34.1	274.6
GW-172	479308.8	925538.8	207.2	270.5	48.3	222.2	255.5	33.3	273.5

NOTES:

1. LFG WELLS GW-001 THROUGH GW-097 WERE TAKEN FROM PREVIOUS LFG DESIGN DRAWINGS PREPARED BY SANBORN HEAD IN OCTOBER 2003 AND REVISED IN SEPTEMBER 2010. WELLS ALREADY INSTALLED AT THE SITE ACCOUNT FOR GAPS IN NUMBERING.
2. LFG EXTRACTION WELLS SHALL BE INSTALLED WITHIN ONE FOOT OF LISTED LOCATIONS
3. A TEMPORARY BENCHMARK WITH ELEVATION SHALL BE ESTABLISHED AT EACH WELL PRIOR TO DRILLING.
4. 15 FEET OF SOLID RISER IS TO BE PROVIDED BELOW INTERMEDIATE COVER GRADES. THE INTENT IS TO PROVIDE 3 FEET OF STICK UP ABOVE FILL GRADES.
5. ELEVATIONS SHALL BE CONFIRMED AGAINST AS-BUILT TOP OF PRIMARY SAND GRADES AND FILL GRADES PRIOR TO CONSTRUCTION.

SANBORN HEAD

SCALE AS NOTED

STATE OF MAINE — Eric S. Steinhauser — 10809 — REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	DESCRIPTION	BY

DRAWN BY: R. CLAY
DESIGNED BY: R. CLAY
REVIEWED BY: E. STEINHAUSER
PROJECT MGR: E. STEINHAUSER
PIC: E. STEINHAUSER
DATE: JUNE 2015

LFG SYSTEM EXPANSION MASTER PLAN
JUNIPER RIDGE LANDFILL
OLD TOWN, MAINE

PROJECT NUMBER: 2536.27

LANDFILL GAS EXTRACTION SYSTEM DETAILS

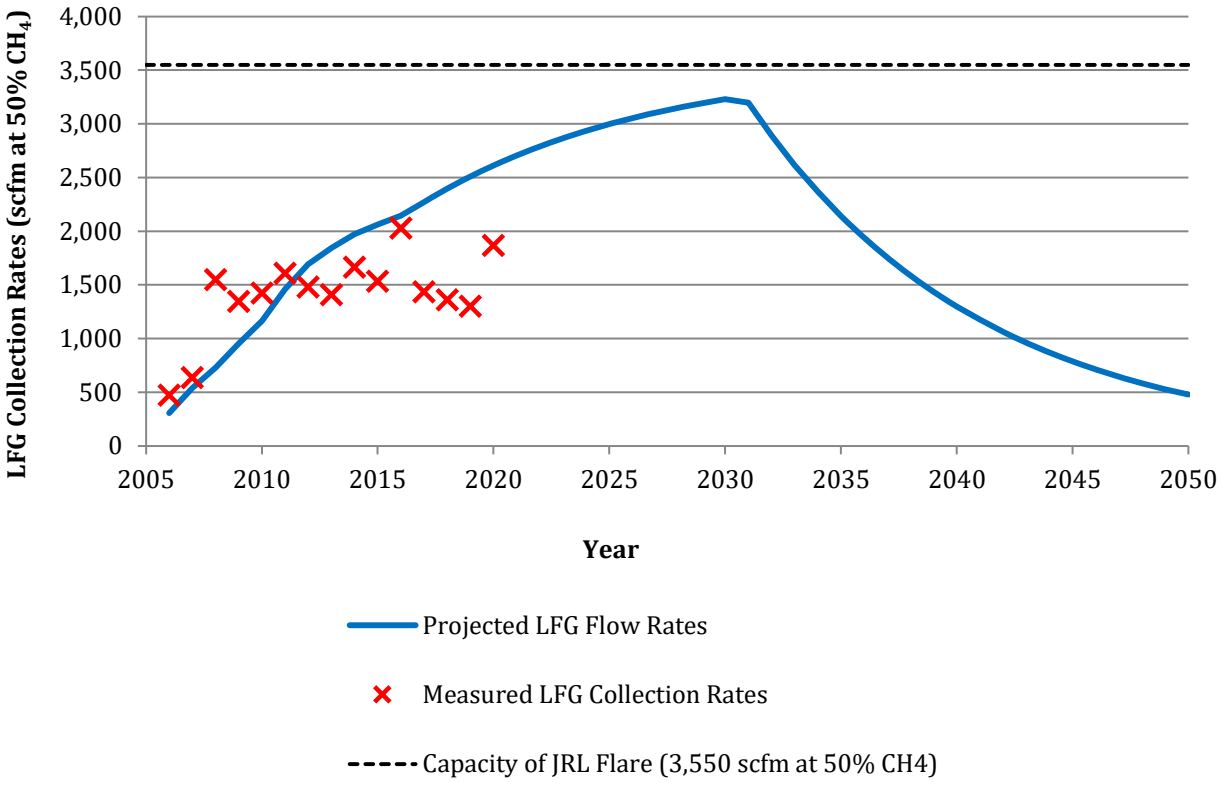
SHEET NUMBER: 14 OF 14

APPENDIX A

LANDFILL GAS COLLECTION RATE

Landfill Gas Projections

Juniper Ridge Landfill
Old Town, Maine



Notes:

1. The JRL design capacity is approximately 19,630,000 cubic yards, with projected operation through approximately 2030. Modeling is based on assuming future waste acceptance of 700,000 tons per year with a compaction density of 0.86 tons per cubic yard, and assuming nondegradable waste, such as ash, contaminated soil, and a portion of the construction and demolition debris (C&D), of approximately 50 percent.

2. Modeling was performed using the U. S. EPA's LandGEM assuming the degradable waste has methane generation potential, Lo, of 100 Mg/m^3, assuming a methane generation rate constant, k, of 0.1/year, and assuming 85 percent collection efficiency.

3. The measured LFG collection rate for 2021 is through June.

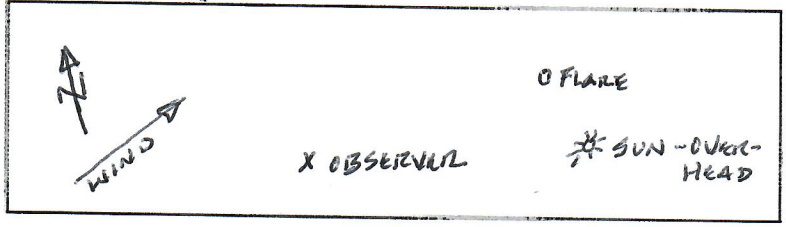
APPENDIX B

USEPA METHOD 22 OBSERVATION FORM

FUGITIVE OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Company CASELLA Location JRL Company Rep. MIKE DILEONARDI	Observer RJB Affiliation BGEC Date 6/29/2021
Sky Conditions PARTLY CLOUDY Precipitation NONE	Wind Direction W/SW Wind Speed 10
Industry SOLID WASTE	Process Unit FLARE

Sketch process unit: indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS	Clock Time	Observation period duration, min:sec	Accumulated emission time, min:sec
Begin Observation	1134	60:00	0:00
	1234	60:00	0:00
End Observation	1334	120:00	0:00

Figure 22-1

APPENDIX C

FLARE TEMPERATURE DATA

Casella JRL
Flare Flow and Temp Data
June 29, 2021

Time	JRL Flare #4	
	Flow	Temp
	SCFM	°F
11:34 AM	2,360	1,320
11:44 AM	2,356	1,318
11:54 AM	2,356	1,324
12:04 PM	2,361	1,323
12:14 PM	2,361	1,300
12:24 PM	2,371	1,314
12:34 PM	2,375	1,312
12:44 PM	2,379	1,317
12:54 PM	2,372	1,317
1:04 PM	2,363	1,324
1:14 PM	2,376	1,254
1:24 PM	2,381	1,355
1:34 PM	2,401	1,249

APPENDIX D

LANDFILL GAS FLOW MEASUREMENTS FIELD DATA SHEET AND SAMPLE CALCULATIONS

Landfill Gas Flow Measurements Field Data

Inner Diameter of Blower Discharge Pipe (in)	11.94	11.94				
Date	29-Jun-21	29-Jun-21				
Time	11:34:00 AM	13:40:00 PM				
Pre-Measurement Meter Reading (scfm)	2,360	2,400				
Post-Measurement Meter Reading (scfm)	2,362	2,401				
Barometric Pressure (in Hg)	29.81	29.77				
LFG Temperature (F)	101.81	104.41				
Static Pressure (in H_2O)	8.4	8.3				
Methane Content (%)	40.1	40.3				
Carbon Dioxide Content (%)	36.3	36.1				
Oxygen Content (%)	0.8	0.8				
Balance Gas (%)	22.8	22.9				
Differential Pressure Readings in Blower Discharge Pipe (in H_2O)						
1"	0.49	0.48				
2"	0.71	0.73				
3"	0.79	0.80				
4"	0.87	0.88				
5"	0.93	0.94				
6"	0.72	0.78				
7"	0.83	0.87				
8"	0.82	0.84				
9"	0.80	0.80				
10"	0.72	0.72				
11"	0.46	0.47				
Average Differential Pressure (in H_2O)	**0.7400**	**0.7555**				

Landfill Gas Flow Rate Calculation

Date of Measurement	29-Jun-21	29-Jun-21
Inside Diameter of Blower Discharge Pipe (in)	11.94	11.94
Area of cross section (ft^2)	0.7773	0.7773
Pitot Tube Coefficient, Cp	0.99	0.99
Velocity Equation Constant, Kp	85.49	85.49
Average differential pressure of LFG in blower discharge pipe, dP (in H_20)	0.7400	0.756
Gas Temperature, Ts (F)	101.81	104.41
Absolute Gas Temperature, Ts (R)	561.81	564.41
Static pressure in blower discharge pipe, Pg (in H_2O)	8.4	8.3
Static pressure in blower discharge pipe, Pg (in Hg)	0.617	0.610
Barometric pressure, Pbar (in Hg)	29.81	29.77
Absolute stack gas pressure, Ps (in Hg)	30.427	30.38
Molecular weight of stack gas, Ms (lb/lb-mol)*	29.028	29.00
Average stack gas velocity, Vs (ft/s)	58.07	58.88
Volumetric Flow, Qact (cfm)	2,708	2,746
Volumetric Flow, Qstd (scfm)**	2,549	2,569
Methane Content (%)	40.1	40.3
Qstd (Volumetric Flow at 50 % methane)* **	**2,044**	**2,071**
Heat Input Rate (MMBtu/hr)	**61.3**	**62.1**

* Assume wet LFG contains 6.5 % water vapor (based on water content of saturated natural gas at 100 F and 14.7 psia)

** Standard conditions are corrected to 60 degrees F and 29.92 in Hg.

*** Standard conditions corrected to 50 % methane content.

Calculation Formulas

Vs = Kp*Cp*(sqrt dP) * sqrt (Ts/(Ps*Ms))

Qact = Vs * A * 60

Qstd = Qact * Tstd/ Ts * Ps/Pstd

Conversions and constants

13.609 in H_2O/in Hg

Tstd = 520 Degrees Rankine

Pstd = 29.92 in Hg

PURPOSE: Demonstrate the methods used to estimate maximum and actual flare stack exit velocities, landfill gas (LFG) flow rate based on pitot-tube measurements, and LFG heating value.

GIVEN: Flow meter reading, LFG methane concentration, and pitot-tube measurements; see the landfill gas flow measurement field data sheet.

CALCULATION:

1. Calculate the average LFG heating value in Btu/scf using the average methane content during the test of 40.2%:

$$\frac{40.2 \text{ scf } CH_4}{100 \text{ scf LFG}} \times \frac{1{,}005 \text{ Btu}}{\text{scf } CH_4} = 404 \text{ Btu/scf}$$

2. Estimate the maximum allowable stack exit velocity for the flare based on 40 CFR 60.18:

$Log_{10}(V_{max}) = (H_T + 28.8)/31.7$

Where: V_{max} = Maximum allowable velocity, m/sec

H_T = the landfill gas heating value, MJ/m^3

$$H_T = \frac{40.2 \text{ scf } CH_4}{100 \text{ scf LFG}} \times \frac{1{,}005 \text{ Btu}}{\text{scf } CH_4} \times \frac{1 \text{ MJ}}{947.82 \text{ Btu}} \times \frac{35.315 \text{ scf LFG}}{m^3 \text{ LFG}} = 15.05 \frac{MJ}{m^3}$$

$Log_{10}(V_{max}) = (15.05 + 28.8)/31.7 = 1.38$

$V_{max} = 24.2$ m/sec = 79 ft/sec

3. The following data from the first of the two flare pitot tube measurements is used as an example to estimate the actual LFG stack exit velocity:

- Blower Discharge Pipe diameter = 11.94 inches (i.e., cross-sectional area = 0.7773 ft^2)
- Barometric pressure (Pbar) = 29.81 in Hg
- LFG temperature (Ts) = 101.81° F (i.e., 561.81° R)
- LFG composition: 40.1% CH_4, 36.3% CO_2, 0.8% O_2, and 22.8% balance
  - Therefore, the approximate molecular weight (Ms) of the LFG is = 29.028 lb/lbmol [(0.401 × 16 lb CH_4/lbmol) + (0.363 × 44 lb CO_2/lbmol) + (0.008 × 32 lb O_2/lbmol) + (0.228 × 28 lb N_2/lbmol)].
- LFG static pressure (Pg) = 8.4 in H_2O (i.e., 0.617 in Hg)
  - Absolute pressure (Ps) = Pbar + Pg = 29.81 in Hg + 0.617 in Hg = 30.427 in Hg
- Average differential pressure from pitot-tube traverse (dP) = 0.74 in H_2O

Perform the calculation using the equation developed for the type of pitot-tube used at the site (i.e., an L-shaped pitot tube), which includes the built-in constants Kp (85.49) and Cp (0.99):

$$\text{LFG velocity} = \text{Kp} \times \text{Cp} \times \sqrt{\text{dP in } H_2O} \times \sqrt{\text{Ts° R}/(\text{Ps in Hg} \times \text{Ms})}$$

$$\text{LFG velocity} = 85.49 \times 0.99 \times \sqrt{0.74 \text{ in } H_2O} \times \sqrt{561.81 \text{ ° R}/(30.427 \text{ in Hg} \times 29.028 \text{ lb/lbmol})}$$
$$= 58.07 \text{ ft/s}$$

$$\text{LFG flow rate (non-standard, uncorrected), Qact} = 58.07 \frac{\text{ft}}{\text{s}} \times 0.7773 \text{ ft}^2 \times 60 \frac{\text{s}}{\text{min}}$$
$$= 2{,}708.3 \text{ ft}^3/\text{min}$$

Convert the flow rate into standard cubic feet per minute (scfm) based on standard conditions of 60° F (520° R) and 29.92 in Hg:

$$\text{LFG flow rate (uncorrected), Qstd} = 2{,}708.3 \frac{\text{ft}^3}{\text{min}} \times \frac{520° \text{ R}}{561.81° \text{ R}} \times \frac{30.427 \text{ in Hg}}{29.92 \text{ in Hg}} = 2{,}549.2 \text{ scfm}$$

Use the volumetric flow rate delivered to the flare stack and the flare diameter (14 inches, i.e., cross-sectional area = 1.069 ft^2) to calculate the actual exit velocity of the flare:

$$\text{LFG actual exit velocity} = \frac{\text{Qstd}}{\text{Cross Sectional Area of Stack}}$$

$$\text{LFG actual exit velocity} = \frac{2{,}549.2 \text{ scfm}}{1.069 \text{ ft}^2} \times \frac{1 \text{ min}}{60 \text{ sec}} = \mathbf{39.7} \ \frac{\mathbf{ft}}{\mathbf{sec}}$$