



# Final Design Landfill Gas Migration Control System

Former Mazzaro-McKees Rocks Landfill  
Kennedy Twp., Allegheny County, PA  
LRP No.: 5-2-128-1749

Pennsylvania Department of Environmental Protection  
IRRSC-7 #5-180

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## Quality information

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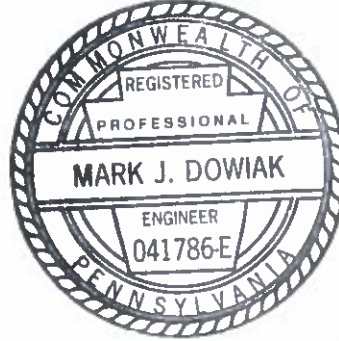
## Professional Engineer Seal

In accordance with Title 49 PA Code, Chapter 37 (State Registration Board for Professional Engineers, Land Surveyors and Geologists), this Report has been prepared by myself or by others under my direction, and is hereby approved by the undersigned Professional Engineer in the Commonwealth of Pennsylvania. I am certifying that the information contained herein is accurate. I further certify I am licensed to practice in the Commonwealth of Pennsylvania and that it is within my professional expertise to verify the correctness of the information.

Signed

Mark Dowiak

Mark Dowiak, P.E.  
PE 041786E



Date

3/16/20

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# 1. Objectives

Amentum (formerly AECOM Energy and Construction [E&C]) has prepared this Final Design of the Landfill Gas Migration Control System for the Pennsylvania Department of Environmental Protection (PADEP) under Work Requisition Order No. 5-180, pursuant to the Interim Response and Remediation Services Contract (IRRSC-7) Program.

This Final Design presents the location, orientation, construction sequencing, details, construction work plan components, a performance monitoring plan, and an implementation schedule for the landfill gas (LFG) collection trenches planned for installation at the Mazzaro-McKees Rocks Landfill (Site), located at 1953 McKees Rocks Rd in Kennedy Township, PA. The LFG collection trenches will be installed on the Mazzaro-McKees Rocks Landfill property, specifically Allegheny County Tax Parcel Number 108-A-125, which is currently occupied by the Vietmeier Golf Center, a driving range and miniature golf course.

The basis for this Final Design was included in the Pre-Design Investigation Report (AECOM E&C, 2020) and specifically addresses LFG migration at the northern and western boundaries of the Site. The objective of the Landfill Gas Migration Control System is to mitigate off-site LFG migration by installing passive LFG collection trenches along these site boundaries. The trenches are designed to passively collect and discharge LFG on-site thereby decreasing and/or eliminating the presently occurring off-site LFG migration.

In accordance with the PADEP's Scope of Work issued for Assignment IRRSC-7 #5-180, the objectives of this Landfill Gas Migration Control System include:

- *Prevent the off-site lateral migration of LFG (primarily methane) at the northern and western property boundaries, with a goal of fully intercepting LFG to the extent practicable.*
- *Achieve the project-specific and defined Applicable or Relevant and Appropriate Requirement (ARAR) as 5% methane (100% of the LEL) as a target compliance criteria downgradient of the LFG collection trenches.*
- *Monitor the performance of the passive LFG collection trenches and identify phased upgrade options should the target compliance criteria not be met.*

The Final Design for the LFG collection system is not considered a final remedial response for the Site nor is it intended to address LFG that may exist in other areas of the Site.

## 2. Remedial Design

This section outlines the major components of the interim response remedial measure. Detailed plans and work specifications for construction are contained in the attached drawings which are referenced herein.

### 2.1 Site Access and Support Zone

Site access will be from two points intersecting McKees Rocks Road. The existing site entrance will be the primary access point for heavy equipment and other construction-related vehicles. This entrance will be used to access the construction support zone, laydown area and a potential soil borrow area.

The off-site access road intersecting McKees Rocks Road at the north of the site, near the existing shopping plaza, will be used for off-site hauling of site-generated wastes. The current access roads will be improved as necessary to provide a stabilized construction entrance to minimize the tracking of sediment onto the public road. The northeast off-site area will include a laydown storage area for staging IDW waste and a potential soil borrow area.

Initial site activities will involve a baseline site reconnaissance, setup of the support zone and installation of E&S controls. The baseline site reconnaissance will document the pre-construction site conditions of the golf center building and include the associated structures and utilities. Amentum will also collect landfill gas (LFG) readings from locations determined by the PADEP. The baseline documentation will include photos, measurements, LFG readings and notes describing the condition.

Site infrastructure within the work areas will be removed/demolished to provide work access. This may include utility pole relocation, mini-golf area removal/demolition and other features, as necessary. Amentum will attempt to minimize site demolition and site preparation activities and will coordinate this work with the property owners and tenants. See Drawing C-1.

The PADEP will obtain concurrence from the landowner and tenant for handling of utilities, site access, waste staging, soil borrow areas, etc.

### 2.2 LFG Collection Trenches

Two (2) landfill gas (LFG) collection trenches are planned for construction and are described as the north and west trenches. Both are initially planned as passive systems that are designed to be retrofitted in the future to active systems if necessary, based on performance monitoring results. The proposed collection trenches depths and alignments are based on a number of variables including LFG extent, waste fill depths, Pittsburgh Coal workings, depth(s) to rock, and construction constraints. The trench locations are presented on Drawings C-3 and C-4.

The "middle section" of the site in the northwest area, between the north and west collection trenches, is not proposed for an LFG collection system because of the historically limited LFG migration and the lack of offsite receptors in this area.

The LFG collection trench depths are proposed to correspond to the approximate depth of the base of the Pittsburgh Coal seam or top of underclay, if present. In some locations beyond the buried coal outcrop, the depth will be lower and correspond to the top of rock.

On the west boundary of the Site, the remnant highwall is mostly not present since the Pittsburgh Coal strip mining highwall is further north nearer the northern end of the proposed west trench. Coal in the area of the west trench location appears to have been largely removed. The proposed trench depth in this area will be to the top of rock, which corresponds to the base of the former Pittsburgh Coal.

The trenches will include the installation of perforated 4-inch diameter piping within the trench backfill, spaced at 100 feet. These pipes (gas vent wells) will be installed vertically within the trench backfill

and will be terminated above the ground surface with a passive vented outlet. The vent pipes are planned to be installed during trench construction, however, if determined to be infeasible, they may be installed via conventional drilling methods following trench backfilling.

Trench backfill will consist of clean coarse aggregate PADOT 2A to approximately 4 feet below existing grade. Soil from an onsite borrow will be used to fill the remaining trench volume. If needed, clean fill may be imported from a PADEP- approved off site borrow.

Each trench will include an impermeable cap installed near ground surface which consists of a 40-mil LLDPE membrane covering a minimum 6 feet width centered over the backfilled trench.

LFG collection trench details are presented on Drawing C-5.

### 2.2.1 North Trench

The north LFG collection trench will be offset from the north property boundary approximately 50 feet to correspond with the toe of the remnant highwall. Based upon the assessment of the bottom of the coal stratum elevation and the top of rock elevation in the north trench area, the anticipated base of the trench will be installed to an approximate elevation of 1,122 feet in order to provide for LFG collection at the base of the coal stratum and the full thickness of the LFW materials. Additionally, in order to account for the orientation of the highwall, which is noted to trend to the south at both ends of the proposed north trench, the trench will include a southward shift at the eastern end of the trench to provide for LFG recovery / capture.

The terminus points for the north trench will correspond to the highwall location on the west end and the extent of LFG migration on the east end. The terminus points for the trench may be adjusted to increase or decrease the trench length based upon site conditions and at the direction of the PADEP.

It is noted that this target elevation for the base of the north trench will likely not be maintained over the entirety of the proposed trench alignment based upon the encountered depth to competent rock and/or coal stratum during the Pre-Design Investigation as well as the observed highwall benching evidenced within the completed test pit program.

### 2.2.2 West Trench

The west LFG collection trench alignment is planned for installation parallel to and offset from the west property boundary approximately 50 feet. This offset is required to bypass the remnant bedrock "mound" present near existing Vent 10. The offset will also enable maintaining the entire gas vent and monitoring network on the western boundary.

Based upon the assessment of the bottom of the coal stratum elevation and the top of rock elevation in the western trench area, the anticipated base of the trench will be installed to an approximate elevation of 1,122 feet at the northern end of the trench and approximately 1,118 feet elevation at the southern end of the trench, in order to provide for LFG collection at the base of the coal stratum and the full thickness of the LFW materials. The northern terminus point of the west trench will correspond to the highwall location on the north end and the southern terminus was selected at a location immediately south of the southernmost existing passive vent, Vent-25. The terminus points for the trench may be adjusted to increase or decrease the trench length based upon site conditions and at the direction of the PADEP. As noted, the Pre-Design Investigation revealed LFW materials and associated methane levels in excess of the target compliance criteria extending south of the investigative area.

To accommodate potential future upgrades, the trenches include the installation of perforated 4-inch diameter piping within the trench backfill, spaced at 100 feet. These pipes will be installed vertically within the trench backfill and will be terminated above the ground surface with a vented outlet. The vent pipes are planned to be installed during trench construction, however, if determined to be infeasible, they may be installed via conventional drilling methods following trench backfilling. This



option permits the vertical collection piping to be retrofitted to connect to an active gas collection system via the installation of a header manifold that is envisioned to provide for optimized LFG extraction from specific vertical vents.

## 2.3 Site-Generated Waste Management

The solid wastes generated during remedial construction will be managed in accordance with applicable PADEP regulations to assure protection of public health and the environment. Anticipated waste materials include:

- Non-hazardous construction debris and miscellaneous solid wastes, including clearing and grubbing,
- Demolition debris (clean)
- Trench excavation spoils,

Trench spoils are expected to be non-hazardous waste consistent with previous investigations.

Wastewaters may also be generated as a result of equipment decontamination and spoils/trench dewatering.

Solid wastes will be managed primarily by offsite disposal. Trench spoils and other contaminated debris will be hauled away from the trench area as generated during construction and staged on site. A waste staging area will be constructed on the eastern parcel of the site to temporarily store materials prior to loading into trucks for offsite disposal.

The waste staging area will be constructed with side berms, graded to promote drainage in one direction and continuously underlain with an impervious membrane.

Clearing and grubbing materials and clean debris will be staged in a separate location near the waste staging area.

The current plan anticipates that all equipment decontamination will not require water. Waste material adhering to equipment surfaces will be removed by scraping. The waste will be placed in the waste staging area. In the event water is used, a decontamination pad will be constructed to contain the water. Decontamination water will be collected and staged in 55-gallon drums and will be temporarily stored onsite pending chemical analyses and acceptance for offsite disposal.

Water generated during dewatering activities which require pumping will be directed through to a sedimentation bag prior to discharge to the ground surface. Waste spoils containing free water will be staged alongside the trench to allow the water to drain back into the trench prior to transport and staging.

Drawing C-1 displays the approximate locations for the waste staging areas.

## 2.4 Erosion and Sedimentation Controls

Pa. Code Title 25 Chapter 102.4 (b) requires the "implementation and maintenance of E&S Best Management Practices (BMPs) to minimize the potential for accelerated erosion and sedimentation, including those activities which disturb less than 5,000 square feet (464.5 square meters)" [102(b)(1)]. It also requires that "a person proposing earth disturbance activities shall develop and implement a written E&S Plan under this chapter if one or more of the following criteria apply [102.4(b)(2)]:

1. The earth disturbance activity will result in a total earth disturbance of 5,000 square feet (464.5 square meters) or more,

2. The person proposing the earth disturbance activities is required to develop an E&S Plan under this chapter or under other Department regulations, or
3. The earth disturbance activity, because of its proximity to existing drainage features or patterns, has the potential to discharge to a water classified as a High Quality or Exceptional Value water under Chapter 93 (relating to water quality standards).

The Site disturbance area is estimated to be < 1 acre and would be subject to PADEP Chapter 102 E&S requirements. The local watercourse is Chartiers Creek which is connected to the Site by unnamed tributaries. This stream is not classified as a High Quality or Exceptional Value waterway.

An E&S Plan will be prepared as part of the Remedial Construction Work Plan (RCWP) and will address the following:

- Construction activities and sequence of E&S controls,
- Access road and support zone description,
- Temporary measures, including sediment barriers, dust controls and runoff management details,
- Soil stabilization measures, including aggregates, geotextiles and seeding
- Maintenance and construction closeout

## 3. Remedial Construction Work Plan

In accordance with the PADEP Scope of Work, a Remedial Construction Work Plan (RCWP) will be prepared under the PADEP established Phase II portion of the project. The Work Plan will include the following components:

### 3.1 Construction Schedule

The Initial site activities will involve setup of the support zone and installation of E&S controls. Site infrastructure within the work areas will be removed/demolished to provide work access. This may include utility pole relocation. Mini-golf area removal/demolition and other features as necessary. Amentum will attempt to minimize site demolition and damage to facilities and will coordinate this work with the property owners and tenants.

The general sequence of construction is planned as follows:

- Setup support facilities (e.g. Office trailer, sanitation, electric, etc.)
- Install erosion and sedimentation control measures,
- Install waste staging areas,
- Clear and grade west LFG collection trench alignment,
- Construct west LFG collection trench,
- Clear, demo and grade north LFG trench alignment,
- Install LFG north barrier wall,
- Construct north LFG collection trench,

Total construction time is estimated at 12-16 weeks. Actual trench excavation is estimated to be 15 working days based on 50 feet per day production for trench and/or barrier installation.

A detailed construction schedule (Suretrak®) will be submitted with the RCWP.

It is recommended that trench excavation be accomplished during the cold weather season to minimize LFG and odor releases. Ideal completion of excavation activities would be by mid-April.

### 3.2 Health and Safety Plan

The Health and Safety Plan (HASP) will provide procedures to protect site workers and limit the impact to public. The Worker safety will be addressed during construction to assure compliance with applicable OSHA and PADEP standards, including OSHA 29 CFR 1910 General Industry Standards, 29 CFR 1926 Construction Safety and 29 CFR 1910 HAZWOPER Standards. In addition, procedures will be defined to limit unintentional access to the site and provide for measure to evaluate and document offsite migration of atmospheric dust LFG and odor.

Previous site investigations have indicated that hazardous substance releases from excavated waste materials and open excavations have been minimal and have not exceeded action levels as required for respiratory protection upgrades (Level C).

The existing Amentum HASP will be updated as necessary for the construction activities and it will be submitted with the RCWP.

### 3.3 Waste Management Plan

The solid wastes generated during remedial construction will be managed in accordance with applicable PADEP regulations to assure protection of public health and the environment. Anticipated waste materials include:

- Non-hazardous construction debris and miscellaneous solid wastes,
- Trench excavation spoils,
- Decontamination wastewaters,

Trench spoils are expected to non-hazardous waste consistent with previous investigations.

- Baker (2014) collected representative investigative-derived waste (IDW) samples from their waste roll-off box and reported that the analytical results indicated that the IDW was non-hazardous. Republic Services subsequently approved the IDW for disposal at their landfill in Ohio based on these results. Amentum collected samples of the IDW generated during the additional Pre-Design Investigation which were analyzed for Toxicity characteristic leaching procedure (TCLP) analysis of VOCs, semi-volatile organic compounds, RCRA metals and Ignitability, reactive cyanide, reactive sulfide, and pH. The analysis confirmed the waste to be non-hazardous.

Trench excavation spoils will be generated during construction of the LFG collection trench and the LFG barrier trench. Approximately 2000 cy of material is estimated for potential off-site disposal, however, it is anticipated that a portion of the excavated materials will be returned to the ground to limit disposal volumes. Waste will be staged prior to disposal. The staging area will be constructed with berms and will be covered with a synthetic liner. The waste will be covered at the end of each work shift.

Spoils will be sampled and analyzed for RCRA characteristics to confirm the non-hazardous conditions and provide waste stream certifications for off-site disposal, as necessary. Amentum will consult with PADEP Waste Management Chemist Robert Popichak to confirm the waste characterization and reporting process and to obtain approval for the waste management tasks. His approval is needed ahead of waste characterization sampling.

Clean spoil (soil cover) materials are anticipated from west trench excavation in the area of thicker cover soils. These materials will be sampled and if acceptable will be reused as cover atop the collection trench based on analytical confirmation.

### 3.4 Quality Assurance / Quality Control Plan

A Remedial Construction Quality Assurance/Quality Control Plan will be prepared as part of the RCWP and will include the following:

- Purpose and Scope
- CQA Roles, Responsibilities, and Qualification
- Construction Meetings
- General Construction Documentation and Submittals
- Excavations
- Aggregates
- Geomembranes
- Geotextiles

- Piping
- Surface Water and E&S Control Facilities
- Construction Certification Report

The Construction Certification Report (CCR) will be prepared after completion and final inspections of all construction activities and will be certified by a PA licensed professional engineer.

## 3.5 Erosion and Sedimentation Control Plan

An erosion and Sedimentation Control (E&S) Plan will be prepared and submitted as part of the RCWP for PADEP approval and will include the following:

- Site Description
- Proposed earth disturbing activities
- Temporary erosion and sedimentation control measures, proposed locations and installation details
- Permanent erosion and sedimentation control measures (seeding).

## 3.6 Performance Monitoring Plan

As stipulated in the PADEP Scope of Work, the Prompt Interim Response action related to LFG emanating from the Mazzaro-McKees Rocks Landfill HSCA Site includes the application of PA Title 25, Chapter 273 regulations for combustible gas monitoring, off-site migration and mitigation at permitted municipal waste landfill sites as the primary standard. Under these stipulated requirements, combustible gas levels may not equal or exceed the LEL at the boundaries of the Site, or 25 percent of the LEL within a structure within the Site. If they do exceed these levels, then gas management methods are to be applied. It is noted however that the golf center building is not included in the Design, as defined in the PADEP-approved Work Plan (AECOM E&C, 2019) and the Pre-Design Investigation Report (AECOM E&C, 2020). This standard will be applied for any potential future upgrades or modifications to the LFG collection trenches or any potential future structures directly associated with the LFG collection trenches.

Further remedial actions for LFG specific to the Golf Center building were deemed to be infeasible due to structural integrity issues with the building. The property owner and tenant have been notified to this effect on multiple occasions by the PADEP. The two existing vents, SVPs and gas monitor related to the Golf Center building may be retained in the future, at the discretion of the PADEP.

The following sub-sections present the generalized components and details for the performance vapor monitoring plan for the LFG collection trenches. The scope and frequency may vary depending on conditions and/or direction from the PADEP and may follow an iterative revision process to maximize efficiency and data utility

### 3.6.1 Plan Details

The Performance Monitoring Plan (PMP) included in this Final Design includes vapor monitoring at both existing vapor monitoring locations and vapor monitoring locations planned for installation. **Drawing C-3** provides the locations of the existing and planned vapor monitoring network for the north LFG Collection Trench.

The northern LFG Collection Trench performance monitoring network will consist of existing monitoring locations and planned supplemental monitoring locations. **Drawing C-3** presents these vapor monitoring locations that will comprise the north LFG Collection Trench vapor monitoring network of the PMP.

The west LFG Collection Trench performance monitoring network (**Drawing C-4**) will consist of existing monitoring locations and planned monitoring locations. **Drawing C-4** presents these vapor monitoring locations that will comprise the west LFG Collection Trench vapor monitoring network of the PMP.

Additionally, a portion of the existing landfill vent system as well as the vent system installed within the LFG collection trenches will be incorporated into the vapor monitoring network of the PMP as general monitoring data. A select sub-set of the in-trench vents will be fitted with sampling ports to permit vapor monitoring and measurement data collection.

Following the installation of the LFG collection trenches, the existing vapor monitoring locations that will comprise the performance monitoring networks for both the north and west LFG collection trenches will be upgraded with protective casing and surface concrete seals.

The planned vapor monitoring locations (VPN-1 through VPN-3 and VPW-1 through VPW-3) will be installed utilizing conventional drilling techniques, consistent with the installation of the vapor monitoring locations installed during the Pre-Design Investigation. A schematic of the vapor monitoring location completion is provided as Detail 5 on **Drawing C-5** herein and includes the surface completion details that will be included within the existing vapor monitoring network that will comprise the performance monitoring network for the LFG collection trenches.

### 3.6.2 Monitoring Program Details

The vapor monitoring program for performance monitoring of the effectiveness of the LFG collection trenches will employ the use of a Landtec GEM 2000 landfill gas meter (or equivalent) to obtain field measurements of methane, carbon dioxide, oxygen, barometric pressure and pressures.

The majority of the overall vapor monitoring network will consist of data collection at multiple vapor monitoring locations. Select vapor monitoring locations will serve as specific performance vapor monitoring locations (i.e. compliance locations) and the vapor monitoring results of these performance monitoring locations will serve as the compliance monitoring network for the PMP.

For the north LFG collection trench, the compliance monitoring network will consist of the following monitoring locations:

- Existing monitoring locations - TMW-1, TVP-4, TVP-6, TVP-5
- Newly installed locations - VPN-1, VPN-2, and VPN-3

For the west LFG collection trench, the compliance monitoring network will consist of the following monitoring locations:

- Existing monitoring locations - TVP-3, TMW-3, TMW-4, TVP-2, TVP-1
- Newly installed locations - VPW-1, VPW-2, and VWN-3

**Table 1** presents the vapor monitoring network for the Performance Monitoring Plan (PMP) developed for the Site and highlights the specific vapor monitoring locations that comprise the compliance monitoring network. As noted, additional and/or supplemental vapor monitoring is anticipated to be collected and appropriate location identifications will be recorded. **Table 1** is limited to listing the compliance monitoring network as it is unclear which existing vapor monitoring locations will be incorporated into the supplemental monitoring network following construction.

The vapor monitoring network for the PMP is limited to on-site monitoring locations and as such, most will be located within LFW materials between the LFG collection trenches and the property boundaries. As noted, the LFG collection trenches are designed to function in a passive mode, however, the system may be upgraded to semi-active or active based upon the results of the PMP. Specifically, the vapor monitoring results of the PMP will determine if upgrade triggers are met.

Should an upgrade trigger be met, as described below, the initial response will be the installation of rotary vents to the passive vent piping installed within the respective LFG collection trench(es) and the PMP will continue. This initial upgrade will convert the passive LFG collection system to a semi-active system. Further upgrade triggers will constitute an active LFG collection system and would include mechanical blowers. Any material system upgrades may (likely) require approval from the Allegheny County Health Department, for which Amentum will support the Department with necessary documentation, data transmittal, LandGEM or similar evaluations.

The Lower Explosive Limit (LEL) and the Upper Explosive Limit (UEL) of methane are approximately 5% and 15% (by volume) respectively. As noted, the LEL for methane is the applied performance criteria for the LFG collection trenches. Standard landfill vapor monitoring trigger levels for landfill gas emissions is commonly applied at 1% volume methane (or 20% LEL) for monitoring locations outside of LFW materials. The PMP for the Site is limited to an on-site monitoring network, therefore, the proposed trigger for upgrades of the passive LFG collection trenches will be set at 2.5% methane (or 50%) LEL.

The proposed monitoring frequency for the overall PMP is monthly for the compliance vapor monitoring network.

For a trigger upgrade to be implemented, the compliance monitoring network shall report one of the following for each LFG collection trench:

- North LFG Collection Trench
  - ✓ A majority of the compliance monitoring network (four locations) report methane >2.5% for three (3) successive monitoring events.
  - ✓ A single location of the compliance monitoring network reports methane >2.5% for three (3) successive monitoring events.
  - ✓ All of the individual compliance monitoring network (seven locations) report methane >2.5% during any single monitoring event.
- West LFG Collection Trench
  - ✓ A majority of the compliance monitoring network (five locations) report methane >2.5% for three (3) successive monitoring events.
  - ✓ A single location of the compliance monitoring network reports methane >2.5% for three (3) successive monitoring events.
  - ✓ All of the individual compliance monitoring network (eight locations) report methane >2.5% during any single monitoring event.

Other considerations for triggered upgrades to the passive LFG collection trench system may include methane concentrations within the trench vents, methane levels within the existing gas vent system, or off-site methane detections. Additionally, trigger upgrades resulting from localized compliance monitoring network locations (i.e. limited number or confined area) may warrant limited and localized upgrades to the passive LFG collection trench system.

## 4. Community Relations

In accordance with the PADEP Scope of Work, Amentum will assist PADEP by providing support for the community relation activities to be conducted as part of this response action. Support may include: participation at public meetings, preparation of informational flyers, and/or providing answers to questions received from concerned citizens or local government officials as authorized by the PADEP. Support activities will be described in the RCWP and will be conducted on an as needed basis as requested by PADEP.



## Tables

**Table 1. Performance Monitoring Program - Vapor Monitoring Details**

Monitoring Location	Date	Time	Methane (%) <sup>1</sup>	Carbon Dioxide (%) <sup>1</sup>	Oxygen (%) <sup>1</sup>	Barometric Pressure (in. Hg) <sup>1</sup>	Relative Pressure (in. Hg) <sup>1</sup>	LEL (%) <sup>1</sup>	Temperature (°F)	Comment
Northern LFG Collection Trench Vapor Monitoring Network										
TMW-1										
VPN-1										
TVP-5										
TMW-2										
VPN-2										
VPN-3										
TVP-3										
Western LFG Collection Trench Vapor Monitoring Network										
TVP-3										
TMW-3										
VPN-1										
VPN-2										
TMW-4										
TVP-2										
VPN-3										
TVP-1										

Notes:  
<sup>1</sup> Landfill gas measurements collected using a Landtec GEM2000Plus or equivalent  
 Shaded locations represent Compliance Monitoring Network  
 % - Percent  
 ppm - Parts per million  
 NA - Not applicable  
 The lower explosive limit of methane is 5%. The upper explosive limit of methane is 15%  
 nm - Not measured

## Drawings