

Prepared for



Waste Management Disposal Services of Massachusetts
4 Liberty Lane West
Hampton, NH 03842

**POST-CLOSURE MONITORING & MAINTENANCE
PLAN**

TITCOMB PIT LANDFILL

Amesbury, MA

Prepared by

Geosyntec 
consultants

engineers | scientists | innovators

289 Great Road, Suite 105
Acton, Massachusetts 01720

May 2015
BE0150D
Revision 1

TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	Terms of Reference.....	1
1.2	Purpose.....	1
2.	BACKGROUND	2
3.	OPERATION & MAINTENANCE RESPONSIBILITY AND CONTACT INFORMATION.....	3
4.	HEALTH AND SAFETY.....	3
5.	CAP MAINTENANCE	4
5.1	Introduction.....	4
5.2	Inspection.....	4
5.3	Maintenance or Repairs	5
5.3.1	Mowing	5
5.3.2	Removal of Undesirable Vegetation	5
5.3.3	Repair of Stressed Vegetation	5
5.3.4	Burrow Repair and Vector Removal.....	6
5.3.5	Erosion Repair.....	6
5.4	Schedule.....	6
6.	MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM	6
6.1	Introduction.....	6
6.2	Inspections	7
6.3	Maintenance or Repairs	7
6.4	Schedule.....	8
7.	GROUNDWATER MONITORING AND WELL MAINTENANCE	8
7.1	Introduction.....	8
7.2	Inspections	8
7.3	Maintenance or Repairs	8
7.4	Well Abandonment.....	9
7.5	Groundwater Monitoring.....	9
7.6	Schedule.....	9
8.	LFG MONITORING AND LFG MANAGEMENT SYSTEM MAINTENANCE	10
8.1	Introduction.....	10
8.2	Inspections	10
8.3	Maintenance.....	10
8.4	LFG Monitoring.....	11

- 8.5 LFG Evaluation..... 11
- 8.6 Schedule..... 11
- 9. MAINTENANCE OF FENCES AND BENCHMARKS..... 12
 - 9.1 Introduction..... 12
 - 9.2 Inspections 12
 - 9.3 Maintenance..... 12
 - 9.4 Schedule..... 12
- 10. REPORTING AND RECORD KEEPING 12
 - 10.1 Introduction..... 12
 - 10.2 Record Keeping Elements 12
 - 10.2.1 Correspondence Files 13
 - 10.2.2 Monitoring/Analytical Record Keeping 13
 - 10.2.3 Inspection/Maintenance and Records..... 13
 - 10.3 Reporting Requirements 14
 - 10.3.1 Environmental Monitoring Result Reporting Requirements 14
 - 10.3.2 Post-Closure Monitoring and Maintenance Reporting Requirements 14
 - 10.4 Emergency Response/Reporting..... 15

FIGURES

Figure 1. Groundwater Monitoring Wells

Figure 2. Post-Closure Monitoring and Maintenance Site Plan

TABLES

Table 1. Landfill Monitoring, Inspection, Maintenance, and Reporting Summary

Table 2. Project Contact List

Table 3. Summary of Groundwater Sampling Parameters

FORMS

Site Inspection Form (Example)

Landfill Gas Monitoring Form

Groundwater Sampling Records

Maintenance and Repair Form

Record of Correspondence

ATTACHMENTS

Attachment A – Original Groundwater Monitoring Well/Landfill Gas Monitoring Well / Landfill Gas Vent Construction Logs

Attachment B – Route to Hospital Route

1. INTRODUCTION

1.1 Terms of Reference

This revised Post-Closure Monitoring and Maintenance Plan (PCMM Plan) was prepared by Geosyntec Consultants, Inc. (Geosyntec), on behalf of Waste Management Disposal Services of Massachusetts, Inc. (WMDSM) for the post-closure care of the Titcomb Pit Landfill (the Landfill). The PCMM Plan is being submitted pursuant to 310 CMR 19.142.

1.2 Purpose

The purpose of this PCMM Plan is to provide a manual for PCMM Contractor(s) to implement the post-closure long term operations, maintenance, monitoring, and inspection activities to be performed at the Landfill. The PCMM Plan (i) describes site features and operations, (ii) provides recommended frequencies of routine site maintenance, monitoring, and inspections, and (iii) provides forms to be used by field PCMM personnel for documentation and reporting. Monitoring, inspection, and maintenance of the cap, stormwater management system, groundwater monitoring system, and landfill gas (LFG) monitoring system are addressed; Table 1 presents summary of landfill monitoring, inspection, and maintenance activities and frequencies.

The PCMM procedures described herein are pursuant to the requirements of 310 CMR 19.142 for post-closure care of landfills as presented below. *Italics* indicate wording taken directly from the referenced document.

During the post-closure period the operator shall perform the following activities on any closed portion of the facility:

- (a) take corrective actions to remediate and/or mitigate conditions that would compromise the integrity and purpose for the final cover;*
- (b) maintain the integrity of the liner system (Not Applicable) and the final cover system;*
- (c) collect leachate from and monitor and maintain leachate collection system(s) (Not Applicable);*
- (d) monitor and maintain the environmental monitoring systems for surface water (Not Applicable), ground water, and air quality;*
- (e) maintain access roads;*
- (f) maintain landfill gas control systems;*
- (g) protect and maintain surveyed benchmarks; and*
- (h) have the landfill inspected by a third-party consulting Massachusetts registered Professional Engineer, or other qualified professional approved by the Department, experienced in solid waste management, in accordance with the post-closure plan.*

The remainder of this PCMM Plan is organized as follows:

- Section 2 presents background information of the Landfill and closure activities;

- Section 3 presents PCMM responsibility and contact information;
- Section 4 presents the health and safety requirements for the PCMM work;
- Sections 5 through 9 describe PCMM procedures and schedules for monitoring, inspection, and maintenance of the landfill final closure cap, stormwater management system, groundwater monitoring wells, and the LFG management system; and monitoring requirements for groundwater, LFG, and maintenance of fence and benchmarks; and
- Section 10 presents PCMM reporting and record keeping procedures.

2. BACKGROUND

The Landfill is a municipal solid waste (MSW) and construction and demolition (C&D) debris disposal facility bordered by Hunt Road to the northwest, South Martin Road to the southwest, Route 150 to the northeast and an auto recycling facility to the southeast. The Landfill property is approximately 17.9 acres and is currently owned by the City of Amesbury.

Between 1969 and 1971, prior to the Site being operated as a landfill, the property served as a sand and gravel borrow source during the construction of nearby Interstate 495. In 1971, the Landfill began accepting C&D debris. Between 1974 and 1979, the Landfill accepted MSW and sewage sludge. The Landfill ceased operation in 1979 and was capped with cover soil and vegetated but without Massachusetts Department of Environmental Protection (MassDEP) approval. In 2008, WMDSM entered into an Administrative Consent Order (ACO-NE-08-4003), dated 24 July 2008, to close the landfill.

The final closure was completed in two Phases. Phase I involved receiving grading and shaping material in accordance with MassDEP's policy COMM-097-001 "*Reuse and Disposal of Contaminated Soils at Massachusetts Landfills*", dated 15 August 1997 that was placed and compacted to achieve final closure grades. Phase II involved installation of a multi-layer composite final closure cap.

Historically, methane concentrations exceeding 25 percent of the lower explosion limit (LEL) have been detected beyond the Site property line along South Martin Road. Initially monitoring took place using temporary probes (i.e., bar-hole punch method) located around the landfill perimeter. Six permanent LFG monitoring couplets were installed at MassDEP's request in November 2010 with an additional six installed as part of the Phase II construction. As part of a revised Corrective Action Design (CAD), a 12-ft deep geomembrane lined, gravel filled trench (referred to as an enhanced anchor trench) was constructed. A row of vertical wells were installed adjacent to the trench through the landfill and extended to a clayey silt layer or sufficiently below the average seasonal low ground water level. Should monitoring results show consistent elevated readings along South Martin Road, an active system consisting of a blower connected to the header and adjacent vertical wells, can be installed to apply a vacuum to help control lateral gas migration.

To complete the final closure activities at the Landfill, the MassDEP has approved the following submittals:

- Corrective Action Alternatives Assessment (CAAA) (BWP SW24, Transmittal No. W101355), approved 25 April 2007;
- Comprehensive Site Assessment (CSA) (Transmittal No. W066010), approved 28 July 2008;
- CAD (BWP SW25, Transmittal No. W102250), approved 13 May 2008;
- Minor Modifications of the CAD (BWP SW22, Transmittal No. X007670) approved 20 August 2008; and
- Revised CAD Landfill Closure (BWP SW11, Transmittal No. X241717 / X239329), approved 2 March 2012.

During construction of Phase II, the following additional submittals were made under BWP SW 45 – *Alternative Review* at the request of the MassDEP:

- On 20 August 2012, Transmittal No. X252855 application decreased the minimum protective cover/drainage soil hydraulic conductivity along with a corresponding increase in the number of panel pipes for drainage of the protective cover/drainage material. The application was verbally approved on the same day it was submitted.
- On 28 August 2012, Transmittal No. X252936 application was submitted to eliminate the need for a perimeter chain link fence with the exception of around the stormwater basin. The application was amended via emails on 25 October 2012 and 30 October 2012 to include wooden stockade fencing along the South Martin Road and Hunt Road portions of the Landfill. Approval of the application was made by the MassDEP in a letter dated 1 November 2012.

Details of the final closure activities and construction are presented in “*Construction Quality Assurance Final Report – Revised Corrective Action Design Landfill Closure – Phase II, Former Titcomb Pit Landfill, Amesbury, MA,*” prepared by Geosyntec dated February 2013 and submitted to MassDEP.

The MassDEP approved the PCMM Plan on April 13, 2015 (Transmittal No. X257831) with conditions, which are incorporated in this version of the PCMM Plan.

3. OPERATION & MAINTENANCE RESPONSIBILITY AND CONTACT INFORMATION

The project contact list is presented in Table 2 and includes the key contacts Owner (City of Amesbury) and PCMM Operator (WMDSM). Changes to the contact list will periodically be provided as necessary to MassDEP.

4. HEALTH AND SAFETY

Public safety guidelines and local, state, and federal safety requirements shall be followed during maintenance activities described in this PCMM Plan. Public safety shall take priority over maintenance activities. Safety protocols shall include, but not be limited to, the following:

- PCMM Operator shall have a site specific safety plan for work performed at the Site;
- PCMM Operator shall have all required personal protective equipment (PPE) during maintenance activities; and
- PCMM Operator shall be aware of potential landfill gas sources and monitor, as needed.

The route to a local hospital from the Landfill is presented in Attachment B.

5. CAP MAINTENANCE

5.1 Introduction

The purpose of the landfill cap system is to minimize infiltration of surface water into the Landfill and limit human and environmental exposure to waste within the Landfill. This Section provides a description of the post-closure cap inspection and maintenance activities. Refer to Figure 2 for the lateral limits and final grades of cap. The PCMM activities for the stormwater management system and the LFG control system are discussed separately in Sections 6 and 8, respectively.

The multi-layer composite final closure cap consists of the following components (from top to bottom):

- 8-in. thick vegetative support layer, having a minimum organic content of 8 percent;
- 12-in. thick drainage/protective cover layer, having a minimum hydraulic conductivity of 5×10^{-3} cm/sec (note that a portion of the western closure used material having a minimum hydraulic conductivity of 1×10^{-2} cm/sec);
- 40-mil thick high density polyethylene (HDPE) geomembrane cap (both smooth and textured geomembrane liner were used);
- 6-in. thick gas vent layer, having a minimum hydraulic conductivity of 1×10^{-3} cm/sec; and
- Subgrade with varying thickness prepared during Phase I construction.

5.2 Inspection

The purpose of cap inspections is to identify problems with the final cover system that have occurred, and to provide early warning of future problems that may occur if preemptive maintenance or repair activities are not undertaken. Inspection of the final grade surfaces of the landfill cap will include observations and photographs pertaining to:

- differential settlement;
- soft or slumped areas;
- erosion gullies;
- surface water ponding;
- drainage sufficiency towards and within stormwater diversion berms and swales;

- vegetation sufficiency and maintenance;
- presence of wind-blown debris;
- signs of unauthorized use (e.g., all-terrain vehicle); and
- evidence of animal burrowing or other destructive activity.

The items to be inspected are shown on the inspection sheets presented in the Forms section attached to this document. Each item on the inspection sheets will be observed, checked off, and any recommended maintenance or repair is to be noted with an assessment of the urgency warranted for repairs. The location and description of any problem areas shall be photographed and clearly noted on the inspection sheets. Photographs will be obtained from a standard set of locations facing the same direction for each inspection to track conditions over time. A site plan (Figure 2) with a grid may be provided with each inspection form to assist in locating the inspection notes and site features. The inspection shall be performed by an independent Massachusetts registered Professional Engineer, or a qualified professional directly under the supervision of that engineer, as required by 310 CMR 19.142(5) (h).

5.3 Maintenance or Repairs

5.3.1 Mowing

Mowing will be performed on established grassy areas. Mowing will be completed to control excessive vegetative growth and to facilitate observations during inspections. The decision of whether or not to mow should be based on vegetation height and coverage. The mower blade should be set to a height of approximately 6 to 8 inches. Recently reseeded/repared areas should not be mowed for six weeks after planting. Care should be taken while mowing in areas of sparse vegetation to avoid damage to the existing grass.

Mowing may be accomplished using a commercial or industrial use riding-mower. Mowing in limited access areas (i.e., in close proximity of fences, gas management system components, stormwater diversion berms, ripped areas, etc.) may require a hand-operated (walk-behind) mower or other equipment capable of safely cutting vegetation along structures without causing damage. Heavy mowing equipment should not be used during conditions (wet or soft) that will result in ruts or damage to the vegetation.

5.3.2 Removal of Undesirable Vegetation

Removal or other control of undesirable vegetation from the Landfill will be performed in conjunction with mowing. Undesirable vegetation includes trees, brush, and other vegetation that could damage the cap or negatively impact the desired vegetation. Species that develop seed heads should be removed prior to release of seed whenever possible. Additional mowing or cutting may be conducted to control undesired species. Control by use of herbicides should be minimized or avoided if possible.

5.3.3 Repair of Stressed Vegetation

Repair of stressed vegetation shall be conducted promptly where there is any obvious loss or distressed vegetation that will likely result in soil erosion and future maintenance problems if not

repaired. Repairs will be conducted in the spring or fall to coincide with optimum grass planting seasons when possible. Repairs to the topsoil and grass seed and planting will follow the final design specifications or approved alternatives, including those for mulch. Fertilizers shall be slow release, low-nitrogen types (< 10 percent), and shall not be used within 25-ft of a resource area.

5.3.4 Burrow Repair and Vector Removal

If evidence of burrowing is observed during inspection, an animal control service may be contracted to remove the vectors from the site. Removal methods will not include methods that may damage the cap system (e.g., firearm discharge). After removal of the vectors the burrow holes will be inspected to assess the damage to cap components. The cap will be repaired per the original design.

5.3.5 Erosion Repair

Observed erosion of the landfill cap will be repaired promptly. The repairs should be conducted to coincide with optimum spring or fall grass planting seasons whenever possible. The eroded soil, including topsoil and mulch, will be replaced in accordance with the final design specifications or approved alternatives.

5.4 Schedule

Cap inspections will be conducted semi-annually through 2015 and annually thereafter. In accordance with Decision and Permit Condition No. 12 of the MassDEP's approval of the PCMM Plan, dated 13 April 2015, an application with the MassDEP after January 1, 2020, for MassDEP review and approval for a reduction of the third-party inspection frequency to the minimal biennial (once every two years) schedule may be filed pursuant to 310 CMR 19.018.

One inspection should be scheduled in the early spring (shortly after winter thaw). Contingency inspections may be performed after major rain events.

Mowing will be performed as needed, when the grass is tall enough to fold over on itself, and at a minimum of once per year concurrently with removal of undesirable vegetation. All other maintenance items will be performed on an as needed basis.

6. MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM

6.1 Introduction

The stormwater management system is presented in Figure 2. The stormwater management system includes a high permeability drainage layer with panel pipes on top of the geomembrane cap to convey stormwater from the cap to perimeter swales. Perimeter swales on the portion of the property bordering South Martin Road and the junk yard (southeastern side of site) convey stormwater to a sedimentation basin with an outlet pipe to the local storm sewer via an existing catch basin. The stormwater swale along the Hunt Road portion of the Landfill conveys stormwater to the local storm sewer via the same existing catch basin.

6.2 Inspections

The following items will be monitored: (1) the drainage diversion berms on 3% and 5% slope areas, (2) riprap downchute and rock check dam around the inlet of the basin, (3) perimeter swales and energy dissipation pad at the northeast corner of the site, (4) energy dissipation pipe at the inlet of the basin, (5) the basin, (6) the basin outfall structure, (7) the basin outlet pipe/trench, riprap outlet protection, (8) emergency spillway, (9) drainage/protective cover layer stormwater collection header energy dissipation pipe, and (10) catch basin and stone lined ditch at the northeast corner of the Site (junction of the Hunt Road and Route 150) for the signs of:

- excessive vegetation growth that could impede flow;
- swale/diversion berm erosion;
- soft or slumped slope areas;
- excessive ponding of water;
- accumulation of sediments;
- clogging of outlet pipes;
- integrity of channel lining (i.e., grass and riprap inlet and outlet protection); and
- debris or any other objects that could obstruct flow.

The location and description of any problem areas will be photographed and clearly noted on the field forms and in the inspection report. Each item on the inspection sheet will be observed, checked off, and any recommended maintenance or repair will be noted with an assessment of the urgency warranted for repairs. Photographs will be obtained to document observations during each inspection.

6.3 Maintenance or Repairs

Maintenance for vegetated drainage diversions and swales will include mowing per Section 5.3.1 for mowing on the cap and repair of erosion per Section 5.3.5 for repair of erosion on the cap, except that erosion control matting will be installed in the bottom of the diversion or swale and will extend at least 10 ft beyond the repaired areas in all directions.

Stormwater features that have riprap protection (downchutes, energy dissipation at outlets, rock check dam, etc.) will be repaired with similar or larger riprap. Prior to replacement of riprap, dislocated geosynthetics, if any, under the riprap will be re-positioned, anchored, or replaced as necessary. If riprap continues to become dislodged, alternate methods for anchoring the materials will be utilized to maintain riprap position.

Excessive sediment or debris buildup in stormwater features will be removed on an as needed basis and at the minimum frequency presented in Section 6.4. Grass and riprap lined swales will be repaired as described above after removal of sediment and/or debris. The stormwater basin will be mucked out to the original design base elevation and then restored to the design condition (e.g., vegetated or rip rap). Extreme care with independent spotters will be used when removing materials from the benches, swales, downchutes, or stormwater basin to ensure the geosynthetic components of the closure system are not damaged.

6.4 Schedule

Inspection and maintenance of the stormwater management system will be performed concurrently with inspection and maintenance of the landfill cap.

If, upon inspection, sediment is observed in stormwater features, it will be removed on an as needed basis. Sediment from the on-site basin shall be removed when accumulation reaches Elevation 76. Not less than sixty days prior to the intended date for the treatment (dewatering and stabilization) or placement of sediment or material removed from the stormwater control system (swales, basin, etc.) the MassDEP will be notified in writing. If the MassDEP requires, an application for MassDEP review and approval for the proposed activity will be submitted. Alternatively, such material may be temporarily stockpiled and removed from the Site during maintenance of the stormwater control system. Best management practices to prevent the occurrence of nuisance conditions and damages to the Landfill's cap, stormwater control system, and appurtenances thereto will be implemented.

7. GROUNDWATER MONITORING AND WELL MAINTENANCE

7.1 Introduction

Groundwater monitoring wells shall be maintained as set forth in 310 CMR 19.133. The groundwater monitoring network includes groundwater monitoring wells shown in in Figure 1. The network will be periodically inspected to ensure that the wells are functioning properly.

7.2 Inspections

Inspection of monitoring wells will be conducted during groundwater monitoring events to identify potential problems that could affect the integrity of groundwater data obtained. The following will be inspected:

- the protective casing will be checked for: misalignment that could interfere with access to the well casing and/or well cap; excessive corrosion of casing, hinge and/or locking clasp; structural integrity; visibility of identification label number; and excessive settlement that could interfere with accessibility to the well casing;
- locks will be checked to ensure that they function properly;
- surface seals will be inspected for excessive settling and cracking. If the seal is no longer performing the intended purpose, the seal will be repaired; and
- the depth will be measured to check for evidence of blockage or vandalism.

An inspection form will be completed for each well.

7.3 Maintenance or Repairs

Regularly scheduled maintenance of the groundwater monitoring wells is not required. However, repairs will be scheduled as soon as practical after identification and documentation of a problem that could result in compromised water levels or analytical water quality data. Such components include covers, casing, or locks that could allow for unauthorized access to the well.

If necessary, well replacement will be done per the original construction. Original well construction logs can be found in Attachment A. Well replacement will be performed prior to the next groundwater monitoring event.

7.4 Well Abandonment

Temporary wells or wells that have been structurally damaged or replaced and are no longer useful may be decommissioned. Guidance on the abandonment of monitoring wells is provided by the Commonwealth of Massachusetts [MassDEP, Standard References for Monitoring Wells, Section 4.6, January 1999] and will be followed in the field by a licensed drilling subcontractor or other qualified personnel. The personnel performing the work will provide documentation detailing the well abandonment.

7.5 Groundwater Monitoring

Groundwater samples will be collected at two downgradient monitoring wells (TSMW-4R and TSMW-8), two crossgradient wells (MW-2 and MW-4), and one upgradient monitoring well (MW-6). Groundwater monitoring will be performed in accordance with 310 CMR 19.132(1); summary of monitoring parameters are provided in Table 3. Monitoring wells will be gauged for groundwater elevation prior to purging and sample collection. The groundwater elevation data will be reported in a tabular format that includes, but is not limited to: (i) the actual measured depth to the groundwater; (ii) the elevation of the elevation datum; (iii) the calculated groundwater elevation; and (iv) a summary of the condition of each well.

Samples for laboratory analysis will be collected in accordance with standard U.S. Environmental Protection Agency (EPA) field protocols. The samples will be collected using a pump or bailer. Groundwater samples collected for dissolved metals will be filtered in the field using a 0.45-micron filter immediately following collection. The samples will be placed in bottles that have been preserved using nitric acid. Laboratory samples will be transferred to coolers with ice and a laboratory chain of custody will accompany the samples to the laboratory. Sample analysis will comply with 310 CMR 40.0017 *Environmental Sample Collection and Analysis* and 310 CMR 40.0191 *Response Action Performance Standards of the Massachusetts Contingency Plan*. Analytical data will be collected to meet the general requirements of Presumptive Certainty. The QA/QC protocols for data usability and data representativeness will be considered during the collection and review of the data.

7.6 Schedule

Groundwater monitoring wells will be inspected during groundwater monitoring events.

Groundwater monitoring will be conducted semiannually. One sampling event should be scheduled in October of each groundwater monitoring year. In the event a sample exceeds state or federal drinking water standards (Maximum Contaminant Levels (MCLs)), or other applicable remedial standards (GW-3) the sampling round will be repeated within 60 days of the prior date of sample collection. If subsequent measurements indicate an exceedance of the MCLs testing will continue semiannually.

It will be determined annually whether any new environmental assessment reports including, but not limited to, any Downgradient Property Status (“DPS”) notifications have been submitted to

MassDEP for any properties adjacent to the Landfill pursuant to the Massachusetts Contingency Plan (MCP). The reports, if any, will be reviewed and the impact, if any, on the Comprehensive Site Assessment conducted at the Landfill will be determined.

8. LFG MONITORING AND LFG MANAGEMENT SYSTEM MAINTENANCE

8.1 Introduction

This Section summarizes the PCMM for the LFG management system and LFG monitoring. The components of the LFG management system include an enhanced anchor trench, gas vents, LFG collection trench, and gas monitoring wells (probes). The enhanced anchor trench was installed along South Martin Road to stop LFG subsurface migration laterally offsite. The enhanced anchor trench was designed to vent LFG passively via vertical vents and be converted to an active gas extraction system by connecting to a blower, if necessary. A total of 31 gas vents were installed at a frequency of slightly more than one per half acre to prevent LFG buildup under the cap. The LFG gas collection trench was constructed for the replacement of GV-2, GV-5, GV-6, GV-29, GV-30, and GV-31 in the event of the beneficial use of the Site. Gas monitoring probes (GMW-1S through GMW-15) were installed outside the limit of the landfill cap for LFG compliance monitoring.

The system currently operates passively by creating preferential flow paths for lateral and upward flow of LFG.

8.2 Inspections

Inspection of the LFG management system will include visual observation of gas vents (GV-1 through GV-31), enhanced anchor trench (including nine vertical vents), LFG collection trenches, 21 gas monitoring probes (GMW-1S through GMW-15), and landfill surface for sign of:

- settling or tilting at gas vents and probes;
- bulges in the cover materials resulting from possible gas buildup;
- differential settlement of the cap;
- differential settlement along the alignment of the gas collector pipe;
- obstructions of vent and probe pipes;
- vandalism from un-authorized parties; and
- visible damage to the well pipe boots.

Description of odor, including identification of potential odor sources, will be recorded and reported.

8.3 Maintenance

LFG monitoring wells shall be maintained as set forth in 310 CMR 19.133. Regularly scheduled maintenance of the passive LFG venting is not required. However, repairs of LFG system

components observed to be damaged or not functioning correctly will be repaired per the construction drawings.

For repair of gas vents requiring removal of soil and the geosynthetic components of the cap:

- soils will be well compacted as replaced around the vent pipes;
- breaches in the geomembrane will be welded and repaired per the geomembrane installation specifications; and
- new geomembrane pipe boots may be required.

Differential settlement resulting in isolated pockets of landfill gas may be addressed by either installing a new gas vent near the impacted area, or the area beneath the geomembrane cap must be regraded to facilitate gas flow towards an existing gas vent well. Such repairs will be performed per the construction drawings or as approved by a registered Professional Engineer in Massachusetts.

8.4 LFG Monitoring

LFG monitoring will be conducted at 21 LFG monitoring locations (GMW-1S through GMW-15). The probes will be monitored for percent methane, oxygen, hydrogen, and total non-methane volatile organic compounds (TNMVOCs). Methane, oxygen, and hydrogen sulfide concentrations will be measured using a LandTec GEM 2000+, or equivalent, and TNMVOCs measurements will be taken using a MiniRAE 2000, or equivalent. Initial and steady state readings will be taken for each parameter. Weather conditions, including atmospheric pressure, temperature, humidity, precipitation, etc., will be recorded during each LFG monitoring event.

If methane concentration exceeds of 25% of the Lower Explosive Limit (LEL) at any LFG monitoring probe, the extent of LFG migration will be monitored by driving three foot deep bar hole probes into the soil 5-ft from the LFG monitoring probe(s) in the direction perpendicularly away from the site property line (not over the geomembrane cap). The bar hole probe monitoring will be repeated until no methane is detected.

Should combustible gas concentrations greater than 25% of the LEL continue to be observed at the property line (including, but limited to, South Hunt Road and South Martin Road), or greater than ten percent (10%) within any utility, structure, etc., MassDEP reserves the right to require modification and/or replacement of the gas venting system as may be deemed applicable.

8.5 LFG Evaluation

WMDSM will conduct an evaluation of the landfill gas vent system including the gas concentrations observed (per Section 8.4) and ambient air impacts.

8.6 Schedule

Inspection and maintenance of the LFG management system will be performed concurrently with inspection and maintenance of the landfill cap and stormwater management system.

LFG monitoring will be conducted bimonthly. One LFG monitoring event should be scheduled in October of each year.

Evaluation of the LFG gas vent system will be performed and submit to the MassDEP on or before September 1, 2015 pursuant to the PCMM Plan approval, dated 13 April 2015.

9. MAINTENANCE OF FENCES AND BENCHMARKS

9.1 Introduction

To restrict access, a chain link fence was installed around the stormwater basin. A wooden fence was constructed along the part of the perimeter of the Site and tied into natural barriers to deter trespassers. The site survey control is tied to the Massachusetts State Grid System. The benchmarks used for the site are shown on Figure 2.

9.2 Inspections

Inspection of the fences and benchmarks will include visual observation for sign of:

- damages; and
- differential settlement; and
- trespassing, only for fences.

9.3 Maintenance

Repairs of the fences observed to be damaged or not functioning correctly will be repaired per the construction drawings.

9.4 Schedule

Inspection and maintenance of the fences and benchmarks will be performed concurrently with inspection and maintenance of the landfill cap and stormwater management system.

10. REPORTING AND RECORD KEEPING

10.1 Introduction

This Section of the PCMM Plan provides a description of the requirements for reporting and record keeping for PCMM activities and how implementation of the PCMM Plan will be verified, documented, and reported.

10.2 Record Keeping Elements

During the post-closure period, a copy of records will be stored using a web-based digital folder and standard filing methods which will allow for access by PCMM and regulatory personnel. A list of project records to be maintained during the post-closure period is provided below:

- Site plan showing major features of the landfill closure;
- PCMM Plan that includes inspection checklists and maintenance/monitoring forms; and

- Project records to be updated during the post-closure period including: (i) Correspondence Files; (ii) Monitoring/Analytical records; and (iii) Inspection/Maintenance records. These are described in subsequent Sections.

10.2.1 Correspondence Files

This includes post-closure period correspondence files with the MassDEP, consultants, and contractors. These documents will be updated and filed on an as needed basis.

PCMM personnel will maintain signed inspection sheets and operation logs to verify that PCMM activities have been carried out in accordance with this PCMM Plan. PCMM personnel will maintain a web-based digital folder containing a complete file of the PCMM Plan, previous PCMM inspection records, and other pertinent forms and documents.

10.2.2 Monitoring/Analytical Record Keeping

Monitoring forms and records of analytical testing will be maintained by WMDSM. Laboratory information, such as test data sheets, QA/QC, etc., will be kept by the laboratory and will be stored in the web-based digital folder.

10.2.3 Inspection/Maintenance and Records

The inspection sheets will be completed by inspection personnel during site visits and signed before leaving the Landfill.

Records of miscellaneous maintenance will include the following information:

- maintenance record number, using a system such as “M-year-month-day” (“M” designates a “maintenance” record sheet);
- date of maintenance;
- PCMM personnel responsible at the site;
- feature maintained, including specific location;
- reference to applicable drawings and specifications;
- equipment and/or personnel/contractors utilized;
- pertinent materials or equipment tests;
- copies of invoices/receipts; and
- signatures of the PCMM personnel responsible for the maintenance.

PCMM personnel will be responsible for photographing the site during all site inspections. Photographic documentation will serve as a record of site conditions, problems, and mitigation activities. The photographs will be stored in electronic format in the web-based digital folder. A log describing each photograph will be stored with the photographs.

10.3 Reporting Requirements

10.3.1 Environmental Monitoring Result Reporting Requirements

Environmental monitoring results for groundwater and LFG will be submitted to the MassDEP within 60 days after the date of sample collection per 310 CMR 19.132. The results will be summarized in tables with a discussion of the measurements and trends and:

- 1. site plans or maps showing sampling locations, distribution of contaminants and groundwater flow direction;*
- 2. a letter report briefly summarizing the data and identifying any issues of concern;*
- 3. all field Quality Assurance/Quality Control information; and*
- 4. chain of custody forms.*

If the concentrations of any parameters do not meet the requirements in 310 CMR 19.132, PCMM Operator will notify the MassDEP within 14 days of the findings and collect, analyze, and submit to the MassDEP another round of samples within 60 days of the prior date of sample collection.

10.3.2 Post-Closure Monitoring and Maintenance Reporting Requirements

PCMM reports will be submitted to the MassDEP biennially (i.e., once per two years): if the MassDEP approves a waiver of post-closure period, submission of PCMM reports to the MassDEP is not required thereafter.

The biennial PCMM reports to MassDEP will include the following:

- a narrative summary of the PCMM activities completed, including frequency of inspections, monitoring, and maintenance;
- a summary of environmental monitoring results for groundwater and LFG and a comparison to performance standards, if any environmental monitoring is conducted;
- a description of conditions or problems noted during the inspection and/or monitoring period which are or may be affecting the performance of the geosynthetics cap;
- a summary of corrective actions conducted as part of the monitoring and/or inspection period during the reporting period; and
- a summary of corrective actions that may be required over the upcoming year.

PCMM reports of the stormwater management system will continue to be submitted to the City of Amesbury Conservation Commission (ConCom) by December 1st of each year during the post-closure period as required by Perpetual Conditions (DEP File Number 002-0939).

The annual report PCMM reports to the ConCom will include the following:

- a narrative summary of the PCMM activities completed, including inspections, monitoring, and maintenance;

- a summary of environmental monitoring results for groundwater and LFG and a comparison to performance standards, if any environmental monitoring is conducted; and
- a summary of corrective actions that occurred over the last year for the annual report to the Amesbury ConCom and a summary of those that may be required over the upcoming year.

The PCMM reports will be for December of the previous reporting year through November of the reporting year.

Electronic version PCMM Reports will be submitted to the MassDEP and Amesbury ConCom by email; hard copy version PCMM Reports will be submitted to the Amesbury ConCom only upon request. The contact information is provided on Table 2.

Any damaged groundwater or LFG monitoring well(s) will be reported to MassDEP within 14 days of observation of the damage.

PCMM Operator will report exceedances of methane to the MassDEP as follows:

- **2-hour notification:** when methane is detected above 10% of LEL (Low Explosive Limit) in any building, structure, or utility; and
- **24-hour notification:** when methane is detected above 25% LEL at any property boundary or beyond.

10.4 Emergency Response/Reporting

The following are considered specific PCMM emergencies that require response/reporting:

- **Fire** – the Amesbury Fire Department shall be immediately notified by telephoning 911.
- **Personal injury** – the Emergency Medical Services shall be immediately notified by telephoning 911.
- **Trespassing** – the Amesbury Police shall be immediately notified by calling 911.

All emergencies will be reported to MassDEP and Amesbury ConCom by email or telephone within 24 hours of occurrence or the earliest practically possible. The following are the relevant contact persons:

- **MassDEP:** John Carrigan (Tel: 978.694.3299)
- **City of Amesbury:** John Lopez (Tel: 978.388.8110 Ext 317)

Written summaries of emergency responses will be included in the annual report. The emergency response summaries will:

- identify the nature of the emergency;
- indicate who was notified, including how and when;
- provide any insight on how the emergency could have been avoided; and
- identify corrective measures.

FIGURES



C:\GIS\Projects\BEO150_Titcomb_Pit_LF_Amesbury_MA\Project\1501_MWwells_PostClosure_NA.mxd

Legend

-  Monitoring Well Location
 -  Truck Wash Station
 -  Former Service Station
 -  Site Boundary
 -  Property Line
- 200 100 0 200 Feet
- 

Imagery Source: Esri, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

**Groundwater Monitoring Wells
Post-Closure Monitoring and Maintenance Plan**

Titcomb Pit Landfill
Amesbury, Massachusetts



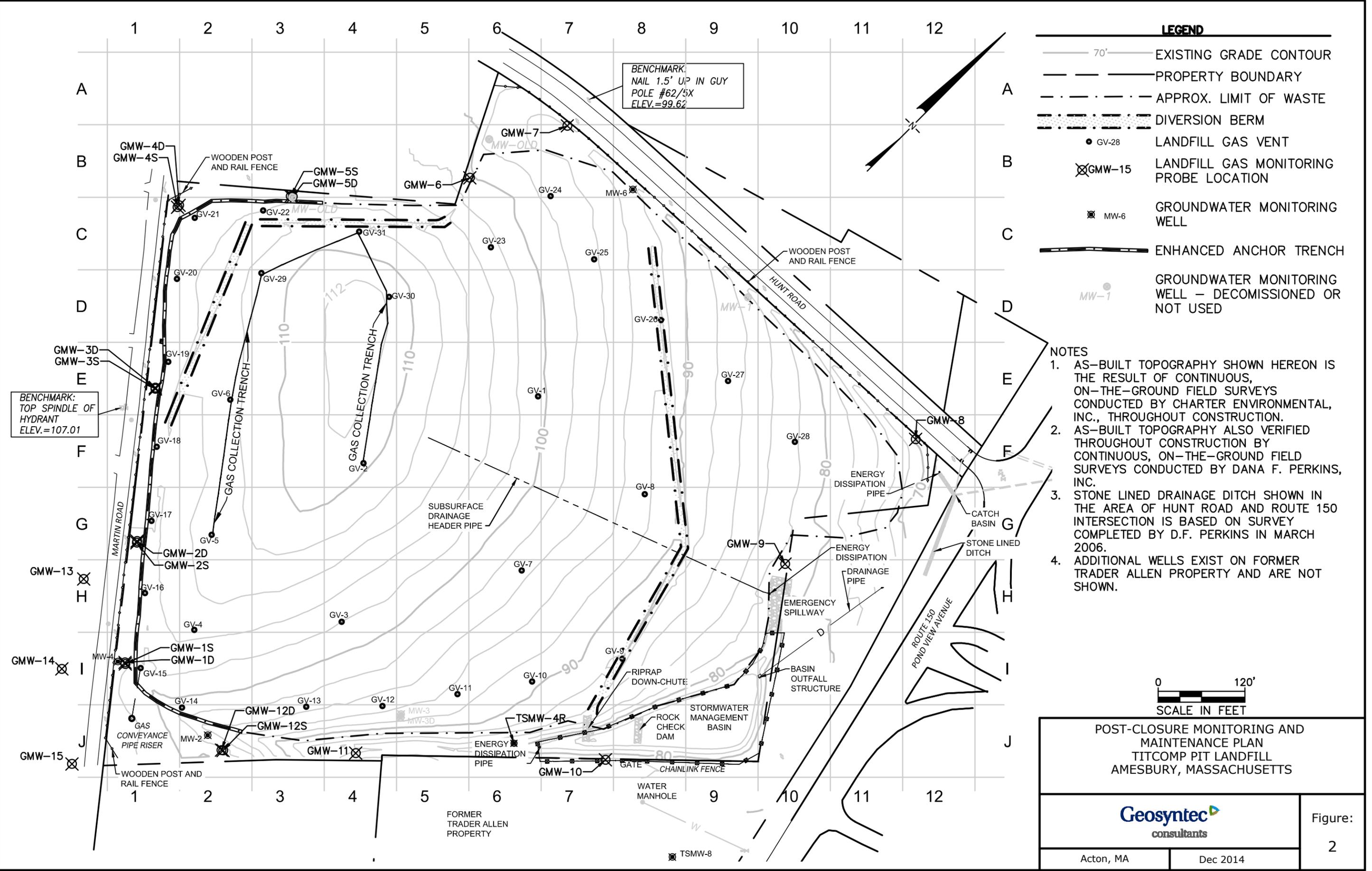
Figure

1

ACTON, MASSACHUSETTS

Dec 2014

T:\PROJECTS\CADD\TITCOMP PIT LANDFILL\DRAWINGS\ASBUILT 2014\TITCOMP PIT LANDFILL -PCMMP 2014.11



BENCHMARK:
NAIL 1.5' UP IN GUY
POLE #62/5X
ELEV.=99.62

BENCHMARK:
TOP SPINDLE OF
HYDRANT
ELEV.=107.01

LEGEND

- 70' EXISTING GRADE CONTOUR
- PROPERTY BOUNDARY
- APPROX. LIMIT OF WASTE
- DIVERSION BERM
- GV-28 LANDFILL GAS VENT
- GMW-15 LANDFILL GAS MONITORING PROBE LOCATION
- MW-6 GROUNDWATER MONITORING WELL
- ENHANCED ANCHOR TRENCH
- GROUNDWATER MONITORING WELL - DECOMMISSIONED OR NOT USED

NOTES

1. AS-BUILT TOPOGRAPHY SHOWN HEREON IS THE RESULT OF CONTINUOUS, ON-THE-GROUND FIELD SURVEYS CONDUCTED BY CHARTER ENVIRONMENTAL, INC., THROUGHOUT CONSTRUCTION.
2. AS-BUILT TOPOGRAPHY ALSO VERIFIED THROUGHOUT CONSTRUCTION BY CONTINUOUS, ON-THE-GROUND FIELD SURVEYS CONDUCTED BY DANA F. PERKINS, INC.
3. STONE LINED DRAINAGE DITCH SHOWN IN THE AREA OF HUNT ROAD AND ROUTE 150 INTERSECTION IS BASED ON SURVEY COMPLETED BY D.F. PERKINS IN MARCH 2006.
4. ADDITIONAL WELLS EXIST ON FORMER TRADER ALLEN PROPERTY AND ARE NOT SHOWN.

0 120'
SCALE IN FEET

POST-CLOSURE MONITORING AND MAINTENANCE PLAN TITCOMP PIT LANDFILL AMESBURY, MASSACHUSETTS	
	Figure: 2
Acton, MA	Dec 2014

TABLES

**TABLE 1. LANDFILL MONITORING, INSPECTION, MAINTENANCE, AND REPORTING SUMMARY
Titcomb Pit Landfill**

ITEM	ACTIVITY	LOCATION	FREQUENCY
Landfill Cover System	<u>Inspections</u> See Site Inspection Form for inspection requirements <u>Maintenance</u> Mowing Surface repairs	<ul style="list-style-type: none"> • Landfill final cover 	<u>Inspections</u> <u>Post-Construction, Year 1, 2, & 3</u> <ul style="list-style-type: none"> • Semi-annually through 2015, • Annually thereafter (a revision of the inspection to a biennial basis will need to be requested and approved by MassDEP), and • After major rainstorms <u>Maintenance</u> <ul style="list-style-type: none"> • Mowing as needed at a minimum once a year • Surface repairs as needed <u>Reporting</u> <ul style="list-style-type: none"> • Summarize in biennial report for MassDEP • Summarize in ConCom report (File No. 002-0939)
Storm Water System	<u>Inspections</u> See Site Inspection Form for inspection requirements <u>Maintenance</u> Remove sediment Cut vegetation Repair erosion Repair vegetative cover	<ul style="list-style-type: none"> • Diversion berms • Riprap down-chutes • Rock check dam • Perimeter swales • Basin • Outfall structure • Outlet pipe/trench • Outlet protection • Emergency spillway • Drainage layer storm water collection header pipe and level spreader with energy dissipation pad • Catch basin and stone lined ditch at the northeast corner of the Site (junction of the Hunt Rd and Route 150) 	<u>Inspections</u> Concurrently with inspection of landfill cover system <u>Maintenance</u> As needed Basin Elevation maintained at Elevation 76 or less <u>Reporting</u> <ul style="list-style-type: none"> • Summarize in biennial report for MassDEP • Summarize in ConCom report (File No. 002-0939)
Fences and Benchmarks	<u>Inspections</u> <u>See Site Inspection Form for inspection requirements</u> <u>Maintenance</u>	<ul style="list-style-type: none"> • Wooden perimeter fence • Chain link fence around basin • Benchmark #1 by S. Martin Rd • Benchmark #2 by Hunt Rd 	<u>Inspections</u> <u>Concurrently with inspection of landfill cover system</u> <u>Maintenance</u> As needed <u>Reporting</u> <ul style="list-style-type: none"> • Summarize results in biennial report for MassDEP • Summarize in ConCom report (File No. 002-0939)

TABLE 1. LANDFILL MONITORING, INSPECTION, MAINTENANCE, AND REPORTING SUMMARY (CONTINUED)
Titcomb Pit Landfill

ITEM	ACTIVITY	LOCATION	FREQUENCY
Groundwater Monitoring System	<p><u>Inspections</u> See Site Inspection Form for inspection requirements</p> <p><u>Maintenance</u></p> <p><u>Monitoring</u> groundwater sampling and analytical testing</p>	<ul style="list-style-type: none"> • MW-2 • MW-4 • MW-6 • TSMW-4R • TSMW-8 <p>Note, additional groundwater monitoring wells are present onsite but they are not part of this post-closure monitoring and maintenance program.</p>	<p><u>Inspections</u> During annual groundwater monitoring</p> <p><u>Maintenance</u> As needed</p> <p><u>Monitoring</u> Semiannually. After four consecutive rounds of measurements below applicable groundwater standards, WMDSM intends to apply for a reduction in monitoring constituents and frequency.</p> <p><u>Reporting</u></p> <ul style="list-style-type: none"> • Letter report 60 days after sample collection. • Notification of exceedance within 14 days. • Summarize results in biennial report for MassDEP • Summarize in ConCom report (File No. 002-0939)
Landfill Gas System	<p><u>Inspections</u> See Site Inspection Form for inspection requirements</p> <p><u>Maintenance</u></p> <p><u>Monitoring</u> field measurements of LFG</p>	<ul style="list-style-type: none"> • Gas vents (GV-1 thru 31) • Gas monitoring probes (GMW-1S thru 15) • Enhanced anchor trench including nine vertical vents and conveyance pipe riser • Horizontal gas collector 	<p><u>Inspections</u> Concurrently with inspection of landfill cover system</p> <p><u>Maintenance</u> As needed</p> <p><u>Monitoring</u> • Bimonthly</p> <p><u>Reporting</u></p> <ul style="list-style-type: none"> • Letter report 60 days after sample collection. • Notification of exceedance within 14 days • Summarize results in biennial report for MassDEP • Summarize in ConCom report (File No. 002-0939) • 2-hour notification when methane is detected above 10% of LEL in any building, structure, or utility • 24-hour notification: when methane is detected above 25% LEL at any property boundary or beyond

TABLE 2. PROJECT CONTACT LIST
Titcomb Pit Landfill – Post-Closure

<u>Titcomb Pit Landfill:</u> 23 Martin Road, Amesbury, Massachusetts 01913	
<u>Commonwealth of Massachusetts Department of Environmental Protection NERO</u> 205B Lowell Street Wilmington, MA 01887	John Carrigan Tel: (978) 694-3299 john.carrigan@state.ma.us
<u>City of Amesbury</u> 62 Friend Street Amesbury, MA 01913	John Lopez (Conservation Commission Agent) Tel: (978) 388-8110 Ext 317 conservation@amesburyma.gov Peter Manor (Engineer) (978) 388-8116 Ext 3 manorp@amesburyma.gov
<u>Waste Management Disposal Services of Massachusetts</u> 4 Liberty Lane West Hampton, NH 03842	Mark DeVine Tel: (603) 929-5436 mdevine@wm.com
<u>Geosyntec Consultants, Inc.</u> 289 Great Road, Suite 105 Acton, MA 01720	David Bonnett Tel: (978) 263-9588 dbonnett@geosyntec.com Youngmin Cho Tel: (978) 206-5797 ycho@geosyntec.com
<u>Weston and Sampson, Inc.</u> 5 Centennial Drive Peabody, MA 01960	Duane Himes (978) 532-1900 himesd@wseinc.com

**Table 3: Groundwater Sampling Parameters
Post-Closure Monitoring - Titcomb Pit Landfill
Amesbury, Massachusetts**

Indicator Parameters	Inorganic Parameters	Organic Parameters⁽¹⁾
pH (in situ)	Arsenic	EPA Method 8260 organics
Alkalinity	Barium	Methyl ethyl ketone
Temperature (in situ)	Cadmium	Methyl isobutyl ketone
Specific Conductance (in situ)	Chromium	Acetone
Nitrate Nitrogen (as Nitrogen)	Copper	1,4-Dioxane
Total Dissolved Solids	Cyanide	
Chloride	Lead	
Calcium	Mercury	
Sodium	Selenium	
Iron	Silver	
Manganese	Zinc	
Sulfate		
Chemical Oxygen Demand		
Dissolved Oxygen		

Notes:

- (1) The downgradient wells TSMW-4R and TSMW-8 are in the proximity to the former Trader Allen’s Truck Stop (MassDEP Release Tracking Number 3-00303914), which may affect the groundwater quality of the downgradient wells.
- (2) Summarize and report all laboratory data to MassDEP in a tabular format. If the concentration of an analyte is below the Practical Quantification Limit (“PQL”) for the analytical method, the results for that analyte will be reported as less than the stated PQL number (such as, “<5 µg/l”), not as non-detect (“ND”), below detection limit (“BDL”), or zero.

FORMS

Similar representative forms may be substituted where applicable.

SITE INSPECTION FORM
Titcomb Pit Landfill – Amesbury, Massachusetts

Inspector Name: _____ **Time / Date:** _____

Signature: _____ **Weather Conditions:** _____

Description	Corrective Action Needed?	Location/Description
<p>Landfill Cover System</p> <p><u>General Conditions</u></p> <ul style="list-style-type: none"> • Signs of differential settlement • Signs of slope sliding • Signs of cracking • Displaced soils • Animal burrows <p><u>Erosion Conditions</u></p> <ul style="list-style-type: none"> • Erosion of cover materials <p><u>Vegetation Conditions</u></p> <ul style="list-style-type: none"> • Grass cover • Overgrowth of trees / brush • Areas of stressed vegetation <p><u>LFG Vent Area Conditions</u></p> <ul style="list-style-type: none"> • Settlement in immediate area • Drainage around vents area 	<p>Yes / No / NA</p>	
<p>Stormwater Management System</p> <p><u>General Conditions</u></p> <ul style="list-style-type: none"> • Areas of soil erosion • Settlement • Structural integrity • Sedimentation deposits • Obstructions/blockage <p><u>Management System Condition</u></p> <ul style="list-style-type: none"> • Diversion berms (3% and 5% slopes) • Riprap down-chute • Rock check dam • Perimeter swales • Energy dissipation pad at the northeast corner of the site • Basin • Energy dissipation pipe at the inlet of basin • Basin outfall structure • Basin outlet pipe/trench 	<p>Yes / No / NA</p>	

Description	Corrective Action Needed?	Location/Description
<ul style="list-style-type: none"> • Basin outlet protection • Emergency spillway • Drainage layer storm water collection header energy dissipation pipe • Catch basin and stone lined ditch at the northeast corner of the Site (conjunction of the Hunt Rd and Route 150) 	<p>Yes / No / NA</p>	
<p>Groundwater Monitoring Wells (MW-2, MW-4, MW-6, TSMW-4R, and TSMW-8)</p> <ul style="list-style-type: none"> • Locking cap • Protective casing • Concrete collar • Signs of damage to monitoring well 	<p>Yes / No / NA</p>	
<p>Landfill Gas Collection System</p> <ul style="list-style-type: none"> • Signs of slumping/settlement • Vector disturbances • Signs of damage to gas vents (GV-1 through GV-31) • Signs of damage to enhanced anchor trench including nine vertical vents and conveyance pipe riser • Signs of damage to horizontal gas collector trench 	<p>Yes / No / NA</p>	
<p>Gas Monitoring Wells (Probes) (GMW-1S and 1D, GMW-2S and 2D, GMW-3S and 3D, GMW-4S and 4D, GMW-5S and 5D, GMW-6, GMW-7, GMW-8, GMW-9, GMW-10, GMW-11, GMW-12S and 12D, GMW-13, GMW-14, and GMW-15)</p> <ul style="list-style-type: none"> • Locking cap • Protective casing • Concrete collar • Signs of damage to monitoring probe 	<p>Yes / No / NA</p>	

Description	Corrective Action Needed?	Location/Description
Fences and Benchmarks <ul style="list-style-type: none"> • Main entrance gates functioning • Locks / fence <ul style="list-style-type: none"> – Perimeter wooden fence – Chain link fence around basin 	Yes / No / NA Yes / No / NA Yes / No / NA	
<ul style="list-style-type: none"> • Signs of trespass (fences) • Signs of damages 	Yes / No / NA	
Comments:		

Titcomb Pit Landfill - Landfill Gas Monitoring Form

Location: 23 Martin Road, Amesbury, MA	General On-site Weather Conditions:					
Project Number and Name:	Time	Relative Humid. (%)	Bar. Pressure (Hg)	Temp. (°F)	Static Pressure (-)	Comment
Date:						
Compliance Inspector (name, firm):						
General Ground Conditions:						

Field Testing Equipment (type, model number, serial number)

		Initial Condition						Steady-State Condition								
Location	Time	O ₂ (%)	H ₂ S (ppm)	CO ₂ (ppm)	TNMVOCs (ppm)	CH ₄		Purge Volume	O ₂ (%)	H ₂ S (ppm)	CO ₂ (ppm)	TNMVOCs (ppm)	CH ₄		Comment	
						(% Vol)	(% LEL)						(% Vol)	(% LEL)		

Signature: _____

Page _____ of _____

Notes:
 ppm = part per million; LEL = Low Explosive Limit (5% Vol)
 TNMVOCs = Total Non-Methane Volatile Organic Compounds

Titcomb Pit Landfill - Landfill Gas Monitoring Form

Initial Condition								Steady-State Condition							
Location	Time	O ₂ (%)	H ₂ S (ppm)	CO ₂ (ppm)	TNMVOCS (ppm)	CH ₄		Purge Volume	O ₂ (%)	H ₂ S (ppm)	CO ₂ (ppm)	TNMVOCS (ppm)	CH ₄		Comment
						(% Vol)	(% LEL)						(% Vol)	(% LEL)	

Signature: _____
 Date: _____

Page _____ of _____

Notes:
 ppm = part per million; LEL = Low Explosive Limit (5% Vol)
 TNMVOCS = Total Non-Methane Volatile Organic Compounds

MAINTENANCE AND REPAIR FORM
Titcomb Pit Landfill – Amesbury Massachusetts

Date	Description of Maintenance	Inspector	Location

Operator

Date

