Landfill Gas Monitoring Plan

Halifax County Landfill Facility
Halifax County, North Carolina

Prepared for:

Halifax County, Department of Public Utilities
Halifax, North Carolina

December 2012
REVISED July 2013

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

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Landfill Gas Monitoring Plan

Halifax County Landfill Facility
Littleton, North Carolina

Prepared For:

Halifax County, Department of Public Utilities
Halifax, North Carolina

S+G Project No. Halifax 12-1

Madeline German, P.G.
Project Geologist

Joan A. Smyth, PG
Senior Hydrogeologist

December 2012
REVISED JULY 2013

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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Executive Summary

The Landfill Gas Monitoring Plan (Plan) presents a comprehensive landfill gas (LFG) monitoring program at the Halifax County Landfill Facility (NC Solid Waste Permit 42-04); with the objective to provide clear guidelines and procedures for field personnel when monitoring for landfill gas in the subsurface. The proposed plan presents the rationale for the monitoring program as well as necessary actions required by the Owner to protect and safeguard the area surrounding the landfill and to satisfy North Carolina Solid Waste Management Rules [13B.0544(d)] for monitoring and controlling LFG; ensuring the measured concentration of methane gas does not exceed the lower explosive limit at the facility boundary and 25 percent of the lower explosive limit for methane in facility structures. Landfill gas readings will be collected quarterly and results will be submitted to the Division of Waste Management (Division) if levels exceed the designated limit at the property boundary. The landfill gas monitoring plan is designed to be effective in landfill gas detection to protect the health and safety of North Carolina citizens from asphyxiation and explosive landfill gas hazards while considering site features that may affect the flow of landfill gas.

The existing LFG monitoring network for the Halifax County Landfill includes nine wells (GM-1, GM-2, GM-2R, GM-2B, GM-3, GM-4, GM-4R, GM-5 and GM-5B) for the closed MSW and active Phase 1 C&D Landfill. Two locations (GM-6 and GM-7) are proposed with the future Phase 2 expansion. The perimeter LFG monitoring system is designed with wells located to intercept potential migrating LFG.

Monitoring and reporting of LFG gas concentrations shall be performed in accordance with Division guidance documents. LFG monitoring will be conducted quarterly to insure that landfill gas does not exceed the lower explosive limit (LEL) at the facility property boundary and 25% LEL at facility structures. Exceedances will be reported and actions for the protection of human health will be implemented.

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Halifax County Landfill Facility
Halifax County, North Carolina

Landfill Gas Monitoring Plan

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1.0 INTRODUCTION

1.1 Project Description

The Landfill Gas Monitoring Plan (Plan), prepared by Smith Gardner, Inc. (S+G), presents a comprehensive landfill gas (LFG) monitoring program at the Halifax County Landfill Facility (NC Solid Waste Permit 42-04); with the objective to provide clear guidelines and procedures for field personnel when monitoring for landfill gas in the subsurface. This plan does not address landfill gas collection, or other air quality regulations that may apply to this site, subject to the new source performance standards (NSPS) of the Clean Air Act (CAA).

The proposed plan presents the rationale for the monitoring program as well as necessary actions required by the Owner to protect and safeguard the area surrounding the landfill and to satisfy North Carolina Solid Waste Management Rules [13B.0544(d)] for monitoring and controlling LFG; ensuring the measured concentration of methane gas does not exceed the lower explosive limit at the facility boundary and 25 percent of the lower explosive limit for methane in facility structures. Landfill gas readings will be collected quarterly and results will be submitted to the Division if concentrations exceed the designated limit of 100% of the Lower Explosive Limit (LEL) at the property boundary or exceed 25% of the LEL in any on-site structure. The landfill gas monitoring plan is designed to be effective in landfill gas detection to protect the health and safety of North Carolina citizens from asphyxiation and explosive landfill gas hazards while considering site features that may affect the flow of landfill gas.

The Engineer utilized the best available site data, practices, experience and judgment to develop this plan; however, the program may require modification and maintenance over time to accommodate changing landfill conditions, changing receptors in areas adjacent and around the landfill, or other conditions that cannot be fully anticipated. Maintenance suggestions are also provided to help identify secondary conditions that may require Plan updates. Facility conditions or unforeseen sampling variables that warrant deviation from standard procedure will conform to the Solid Waste Section Landfill Gas Monitoring Document (Guidance Document)[1].

Uncontrolled LFG migration can result in property loss, injury, vegetative damage and intolerable odors. Landfill monitoring includes exposure to explosive gases. Operational and/or monitoring staff should be specifically trained in the management and response for situations such as fire or explosion and possess awareness of changing conditions around these sites.

1.2 Contact Information

In case of emergency, or if questions arise during implementation, please contact the following

[1] Landfill Gas Monitoring Guidance, November 2010.

1.2.1 Owner

Halifax County Department of Public Utilites
P.O. Box 70
Halifax, North Carolina 27839
Phone: (252) 586-7516
Fax: (252) 586-2685

Mr. Larry Garriss – Solid Waste Manager
Email: solidwaste@embarqmail.com

1.2.2 Engineer

Smith Gardner, Inc.
14 N. Boylan Avenue
Raleigh, North Carolina 27603
Phone: (919) 828-0577

Ms. Joan A. Smyth, P.G., Senior Hydrogeologist
email: joan@rsgengineers.com
Mr. Pieter K. Scheer, P.E., Project Manager
Email: pieter@rsgengineers.com

1.2.3 Solid Waste Regulatory Agency

North Carolina Department of Environment and Natural Resources
Division of Waste Management:

Raleigh Central Office (RCO)
217 W Jones Street
Raleigh, North Carolina 27603
Phone: (919) 707-8200

Ms. Mary Whaley
Email: mary.whaley@ncdenr.gov

1.3 Existing Site Conditions

The monitored area includes the closed MSW landfill the active Phase 1 C&D landfill and the proposed C&D Phase 2 landfill as well as facility structures.

1.3.1 Topography

The landfill is located on approximately 237 acres owned by Halifax County. The permitted facility boundary site is bound on the north by SR 1417 and to all other directions by private property. Existing ground surface elevations in the Phase 2

area generally range from El. 280 feet amsl[2] to El. 320 feet amsl. The facility location is provided on **Figure 1**.

1.3.2 Adjacent Areas

The facility is located approximately twelve miles south of Roanoke Rapids, NC and one mile north of the intersection of NC 48 and SR 1001 at Aurelian Springs in the Butterwood Township. Access to the site is from SR 1417, which connects to SR 1418 to the north and SR 1001 to the south. Both these roads connect to NC 48 and serve as the primary waste transportation routes. Access roads are paved. The surrounding area is primarily undeveloped property and agricultural.

1.3.3 Site Geology

A review of historical literature and available geologic mapping indicates that the proposed landfill site situated on the eastern edge of the Eastern Piedmont Physiographic Province, just west of the Coastal Plain overlap. Western Halifax County is underlain by an assemblage of felsic to intermediate crystalline igneous and metamorphic rocks of early to late Paleozoic age.

Eastern Piedmont rocks exhibit a northeast strike and gently dip eastward resulting from regional metamorphism and folding that produced a broad plunging anticline. The area was simultaneously intruded by a number of felsic (granite) plutons. The rock formation underlying the subject site is a granitic pluton, identified as the Butterwood Creek intrusive.

Granite outcrops were observed along the creek bottom north of the study area, south of the ash monofill site. The granite exhibits a coarse porphyritic texture, with one- to two-inch diameter potassic feldspar crystals embedded in a fine matrix of feldspar, quartz, mica and accessory minerals. The outcrops exhibit surficial exfoliation (near horizontal convex fracturing) and differential weathering along widely spaced, steeply dipping joint sets, resulting in rounded surface exposures. The joint surfaces are generally too weathered to obtain reliable strike and dip measurements. There were no rock outcrops observed in the planned C&D landfill footprint. Nor was bedrock encountered during drilling which extended to a maximum depth of 50 feet below grade.

Site stratigraphy is based more on the in-situ weathering pattern than actual depositional units. The upper soils are stiff, reddish-orange clayey silt and silty clay, extending to depths of 10 to 15 feet below ground surface (bgs). These soils are moist and often exhibit mottling. Occasional dark brown iron and/or manganese staining along joint surfaces, noted in the boring logs, indicate water movement through the soils.

[2] feet amsl = feet above mean sea level

The near-surface soils re-underlain by pink-white and gray sandy silt that exhibits a relic texture derived from the parent bedrock (saprolite), resembling the nearby granite outcrops. These soils grade with depth to a deeper coarse silty sand, often containing angular quartz or feldspar gravel and fresh mica, and eventually transition into weathered rock and bedrock.

No unusual geologic features or conditions, including seismic hazards or unstable areas, were identified during site visits. Rock outcrops are present along the unnamed tributary to the north of the C&D site, but none were observed within the proposed landfill footprint. The soils appear similar to those observed at the ash monofill and lined landfill sites.

1.3.4 Local Groundwater Regime

Groundwater in the upper-most aquifer generally flows through unconsolidated sediments northwest toward an unnamed tributary of Brewers Creek. Recharge occurs over most of the site from the non-saturated surface soils; however, some downward recharge occurs into the deeper, widely spaced bedrock fractures. Discharge primarily occurs along the perennial stream existing at the north side of the site. These conditions are considered typical of this area. There are no obvious confining layers.

2.0 MONITORING PROGRAM

2.1 Perimeter Monitoring Network

2.1.1 Existing Network

The existing LFG monitoring network for the Halifax County Landfill includes nine wells (GM-1, GM-2, GM-2R, GM-2B, GM-3, GM-4, GM-4R, GM-5 and GM-5B) for the closed MSW and active Phase 1 C&D Landfill. The perimeter LFG monitoring system is designed to intercept potential migrating LFG.

GM-1 is located east of the active C&D unit over the unlined MSW. GM-2, GM-2R and GM-2B form a line in the southeastern corner of the closed MSW in the vicinity of MW-16A. GM-3 is located approximately 100 feet south of the closed MSW. GM-4 and GM-4R are located on the western side of the active C&D over MSW near MW-6S and MW-6D. GM-5 and GM-5B are located approximately 150 and 275 feet, respectively, north of the C&D over closed, unlined MSW. Landfill gas monitoring locations are shown on **Figure 2**.

2.1.2 Site Features

The landfill property is bounded to the north by an unnamed tributary of Bear Swamp Creek. The animal waste disposal and borrow area are located between the existing unlinedMSW landfill with C&D landfill located on top, and the proposed Phase 2 C&D landfill unit. The location of surface water bodies, as well as unlined landfill cells must be considered when evaluating potential landfill gas monitoring points.

2.1.3 Proposed Network

Based on existing site conditions, including unnamed tributaries and the animal waste disposal area, two new landfill gas monitoring wells are proposed for Phase 2. The table below summarizes the proposed landfill gas wells.

LFG Monitoring Well	Screened Interval	Total Depth
GM-6	TBD	TBD
GM-7	TBD	TBD

The proposed monitoring wells are shown on **Figure 2**. Monitoring location details for the entire network are presented on **Table 1**.

2.1.4 Structure and Ambient Sampling

The scalehouse, located at the facility entrance, is monitored quarterly in accordance with the NCDENR LFG Guidance Document.

2.1.5 Well Placement Limitations

The LFG monitoring well locations were determined by the surrounding area condition, soil type, waste location and nearby water bodies. The C&D Area 2 is bound on the north by the unnamed tributary of Brewers Creek creating a natural barrier to landfill gas migration. The existing C&D over closed unlined MSW and animal waste disposal area are located to the west of Area 2. Landfill gas monitoring wells are proposed slightly inside the facility perimeter boundary south and east of the proposed C&D Area 2 Landfill.

2.1.6 LFG Monitoring Well Construction

The additional monitoring wells are proposed to be installed to approximately groundwater depth, estimated from nearby groundwater monitoring wells. Wells will be screened with 2-inch diameter PVC 10-slot screen from the total well depth to between 5 feet and 10 feet below grade. Each well will be completed with solid PVC riser pipe, a landfill gas monitoring well cap fitted with a stopcock valve or quick connect fitting and and locking outer steel casing.

2.2 Monitoring and Reporting

Monitoring and reporting of LFG gas concentrations shall be performed in accordance with guidance by the Division of Waste Management document "Methane Monitoring Guidance" (www.wastenotnc.org/swhome/met_mon.html) and as outlined below.

2.2.1 Frequency

LFG monitoring will be conducted quarterly to insure that landfill gas does not exceed the lower explosive limit (LEL) at the facility property boundary and 25% LEL at facility structures. Modifications to monitoring frequency can be obtained through the Division.

If methane readings exceed the specified limits, protection of human health is the primary objective. Within seven days the landfill gas levels detected will be recorded in the log with the steps taken to protect human health. Within 60 days a remediation plan that describes the nature and extent of the problem as well as the proposed solution will be implemented, a copy of the plan will be recorded in the log and the Division will be notified.

2.2.2 Personnel

LFG monitoring will be performed by personnel trained in LFG hazards and explosive gas meter use. A designated landfill technician will be assigned to regular LFG monitoring duty.

2.2.3 Equipment

Halifax County will utilize a landfill gas instrument that meets the Division Landfill Gas Monitoring Guidance requirements for methane, oxygen and carbon

dioxide. Calibration will occur prior to instrument use and in compliance with manufacturer's specifications.

2.2.4 Procedures

Prior to each monitoring event, portable methane field instruments will be calibrated with a known calibration standard in accordance with manufacturer's recommendations. The equipment used calibration procedure and results for each sampling event will be indicated on the landfill gas sampling data sheet and will be included in the sampling report. An example data form is provided in **Appendix A**.

The following steps outline the procedure for the LFG well monitoring:

- Check calibration date on the meter and calibrate according to manufacturers instructions; allowing equipment to warm up properly prior to use, per manufacturers direction.
- Purge sample tube for one minute before sampling.
- Connect instrument tubing to sample port on the monitoring well without removing the cap.
- Open the valve and record the stabilized reading. A stabilized reading will not vary more than 0.5 percent by volume on the instrument's scale. Recorded readings will include the oxygen concentration, at two percent per volume or less to indicate air is not being drawn into the system providing false readings, and barometric pressure.
- Record data on the monitoring log form provided in **Appendix A.**
- Turn off the valve and disconnect the tubing.
- If less than 50% LEL, move to next LFG monitoring well.

If deviation from the prescribed plan is warranted, sample integrity and adherence to the Guidance Document will be priority. Modifications will be noted on the sampling log.

If explosive gas concentrations **equal to or greater than 50%** of the LEL in a LFG monitoring well, personnel should implement the Precautionary Action Plan located in **Section 2.2.5**.

IF EXPLOSIVE GAS CONCENTRATIONS EQUAL TO OR GREATER THAN 100% OF THE LEL IN A LFG MONITORING WELLS, THE FOLLOWING ACTIONS SHALL BE IMPLEMENTED BY PERSONNEL:

(1) Recalibrate monitoring equipment and confirm results.
(2) If results are confirmed, **IMMEDIATELY** contact the Solid Waste Manager.
(3) Implement the Compliance Action Plan located in **Section 3.2**.

2.2.5 Precautionary Action Plan

If explosive gas concentrations are **equal to or greater than 50%** of the LEL in a LFG monitoring well, personnel should perform the following additional steps at those locations:

- Measure gas pressure in the well head (in inches of water) using magnehelic gauge or other appropriate metering device.
- Record at least one additional gas concentration measurement, inside well just below the top of casing.
- Evaluate surrounding area for potential receptors to or signs of LFG migration. LFG can stress vegetation and can kill trees and grass by root asphyxiation. Note stressed/dead vegetation areas on the monitoring form.

Monitoring should be conducted in this manner for wells with concentrations equal to or greater than 50% LEL during monitoring events. Detailed procedure descriptions, actions performed and relevant sampling information should be recorded, kept in the operating record and reported to the Solid Waste Manager and Engineer for further evaluation.

2.2.6 Record Keeping

Readings will be documented on the LFG monitoring log form provided in **Appendix A**. The Landfill Gas Monitoring Report Form will contain the facility name, permit number, type of landfill gas monitoring instrument used, instrument calibration date, landfill gas monitoring event date, sample collector name, instrument pump rate, ambient air temperature, and general weather conditions. For each well the sampler will record the well location or well identification, barometric pressure, time pumped (sec), time reading collected, % LEL, % methane by volume, % oxygen, % carbon dioxide and notes, observations or comments relative to the sampling event.

Completed forms will be reviewed and initialed by the County Solid Waste Manager following each monitoring event and placed in the landfill operating records. Landfill gas monitoring logs will remain on file in the landfill office and/or the Halifax County Public Works Building at 26 N King Street, Halifax, North Carolina 27839. These readings should be available for review by NCDENR and EPA personnel on request. If readings above 100% LEL are measured at the property boundary, a copy of the LFG monitoring form and an Environmental Data Reporting Form shall be submitted to NCDENR with the implemented action.

2.2.7 Sampling Reports

The facility name, permit number, landfill gas monitoring instrument type, calibration date, landfill gas monitoring event date, sample collector name,

instrumentation pump rate, ambient air temperature and general weather conditions will be included at the top of landfill gas documentation. For each well the time pumped in seconds, barometric pressure, time stabilized reading collected, %LEL, % methane by volume, % oxygen, % carbon dioxide and observations or comments will be documented.

Documentation will be recorded on the Landfill Gas Monitoring Report Logs provided by NC Division of Waste Management – Solid Waste Section or logs established in the same fashion. An example log is included in **Appendix A**.

2.3 Maintenance

Periodic maintenance and site observations shall be conducted routinely to address monitoring program components (at a minimum):

- Maintain access to monitoring well and gas well locations.
- Observe landfill cover conditions, potential erosion areas, landfill seeps, odors, etc.
- Monitoring well maintenance: operational locks, steel casing and concrete pad conditions, etc.

Note deficiencies on the monitoring forms and report to the Solid Waste Manager for repair or replacement as necessary.

3.0 CONTINGENCY PLAN

3.1 Introduction

In the event explosive gas concentrations exceed the Division allowable limit (>100% LEL at the property boundary), a contingency plan is recommended and warranted. The contingency plan includes the specific step by step actions that should be implemented to protect human health and the environment.

3.2 Compliance Action Plan

If explosive gas concentrations **equal to or greater than 100%** of the LEL in a LFG monitoring well, the following actions shall be enacted by Halifax County:

3.2.1 Immediate Action Plan

The Solid Waste Manager will ensure the protection of human health and safety as follows:

1) Determine nearby potential receptors.
2) If warranted, check the LFG concentrations in structures near the high LFG concentration well.
3) If the LFG concentration in structures is greater than 25% evacuate the area.
4) Contact the County Fire Marshal.
5) Verbally notify the County Manager.
6) If the well with the explosive gas concentration above 100% LEL is located at the property boundary, verbally notify the Waste Management Specialist.
7) Investigate and identify the potential source(s) and conduit(s) for LFG migration that may have caused the excessive readings (i.e. the path that the LFG is taking to the monitoring location).
8) Identify the LFG extent using additional wells, bar hole punch sampling methodology or other applicable alternative method.
9) As appropriate, begin remedy procedures to control LFG levels in building(s) surrounding the landfill site.

3.2.2 Reporting and Documentation

Following the **Immediate Action Plan**, within seven days the County must put the methane levels and a description of actions performed to protect human health in the operating record. Within sixty days a remediation plan describing the problem nature, extent and proposed remedy, shall be implemented and a copy will be kept in the operating record. The division will also be notified the plan has been implemented.

3.2.3 Remediation Plan

In the event the prolonged explosive gas concentrations exist and as identified during the **Immediate Action Plan**, the County shall prepare and implement a Remediation Plan to mitigate landfill gas migration off property. Extensions may be granted by the Division of Waste Management on written request and depending on severity of the situation.

FIGURES

Landfill Gas Monitoring Plan
Halifax County Landfill Facility
Halifax County, North Carolina

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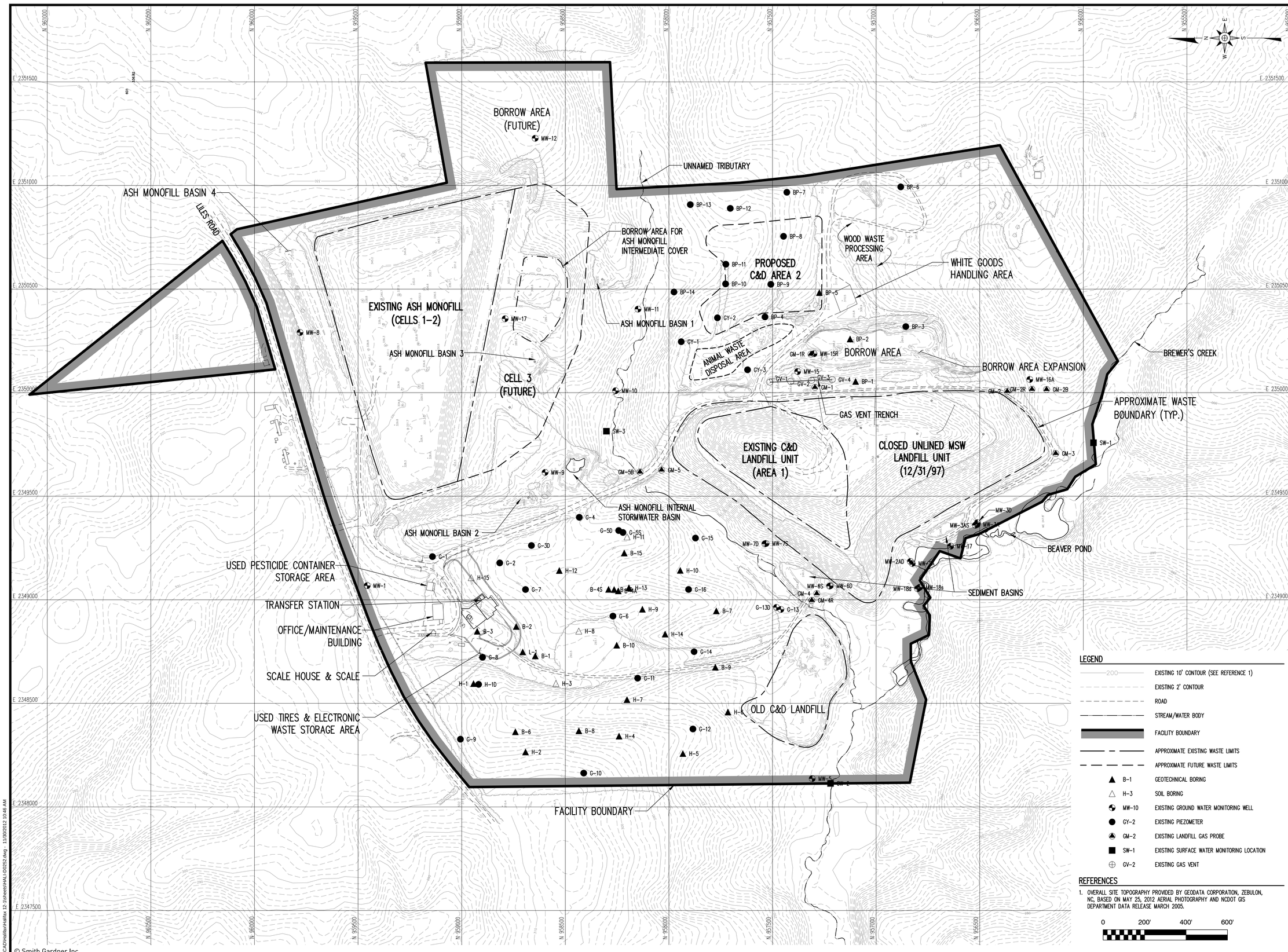

LEGEND

200	EXISTING 10' CONTOUR (SEE REFERENCE 1)
	EXISTING 2' CONTOUR
	ROAD
	STREAM/WATER BODY
	FACILITY BOUNDARY
	APPROXIMATE EXISTING WASTE LIMITS
	APPROXIMATE FUTURE WASTE LIMITS
B-1	GEOTECHNICAL BORING
H-3	SOIL BORING
MW-10	EXISTING GROUND WATER MONITORING WELL
GY-2	EXISTING PIEZOMETER
GM-2	EXISTING LANDFILL GAS PROBE
SW-1	EXISTING SURFACE WATER MONITORING LOCATION
GV-2	EXISTING GAS VENT

REFERENCES

1. OVERALL SITE TOPOGRAPHY PROVIDED BY GEODATA CORPORATION, ZEBULON, NC, BASED ON MAY 25, 2012 AERIAL PHOTOGRAPHY AND NCDOT GIS DEPARTMENT DATA RELEASE MARCH 2005.

0 200' 400' 600'

PREPARED FOR:

HALIFAX COUNTY NORTH CAROLINA DEPARTMENT OF PUBLIC UTILITIES

PREPARED BY:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+ GARDNER ENGINEERS

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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PROJECT TITLE:

HALIFAX COUNTY C&D LANDFILL AREA 2 DESIGN HYDROGEOLOGIC REPORT

DRAWING TITLE:

SITE MAP

DESIGNED: JAS	PROJECT NO: HALIFAX 12-1
DRAWN: JAL	SCALE:
APPROVED:	DATE: OCT. 2012
FILENAME: HALI-D0252	
SHEET NUMBER:	DRAWING NUMBER: **FIG. 1**

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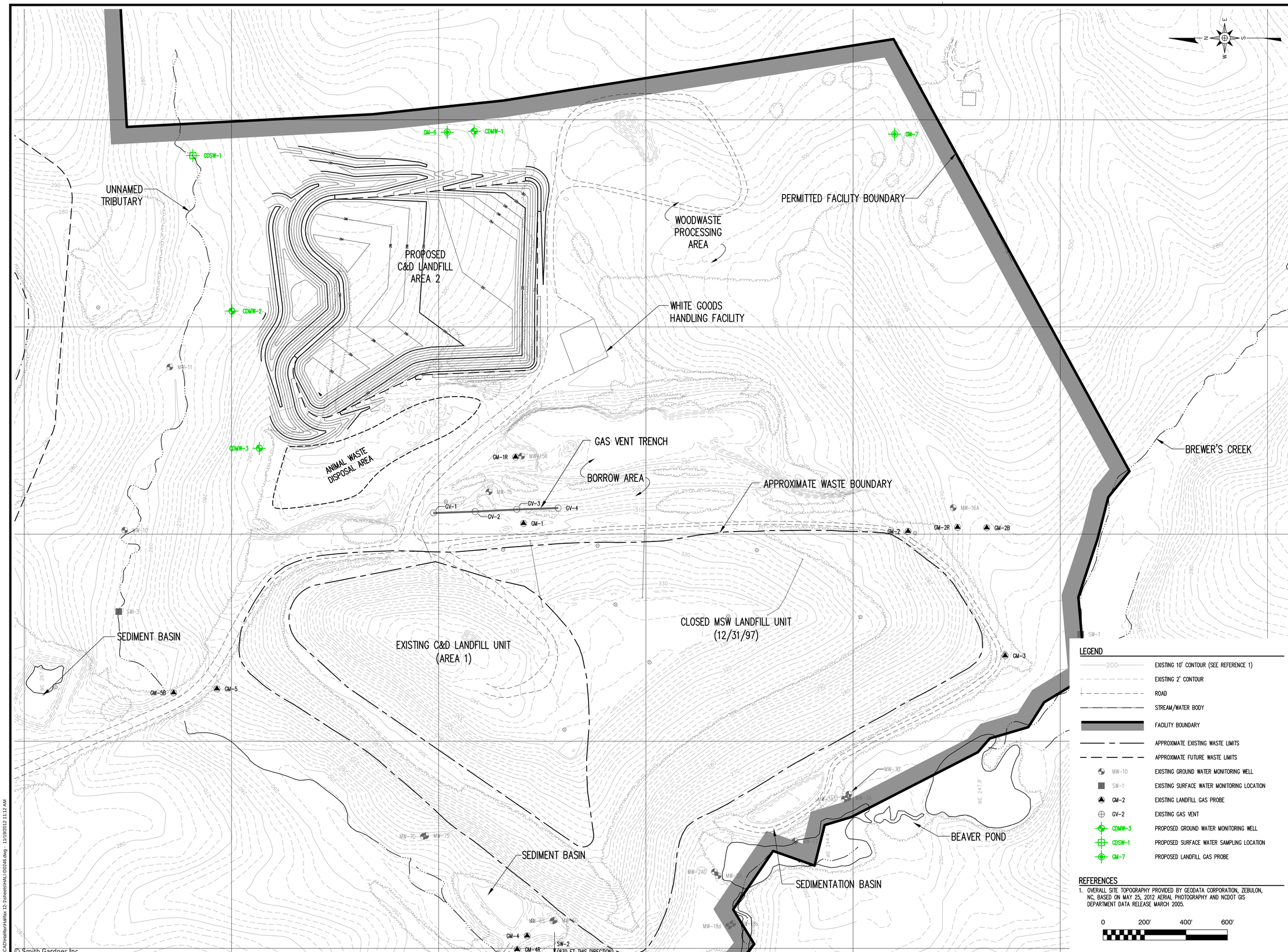

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PREPARED FOR:

DEPARTMENT OF PUBLIC WORKS

PREPARED BY:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+ GARDNER ENGINEERS

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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LEGEND

- 200 — EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- ROAD
- STREAM/WATER BODY
- FACILITY BOUNDARY
- APPROXIMATE EXISTING WASTE LIMITS
- APPROXIMATE FUTURE WASTE LIMITS
- MW-10 — EXISTING GROUND WATER MONITORING WELL
- SW-1 — EXISTING SURFACE WATER MONITORING LOCATION
- GM-2 — EXISTING LANDFILL GAS PROBE
- GV-2 — EXISTING GAS VENT
- CDMW-3 — PROPOSED GROUND WATER MONITORING WELL
- CDSW-1 — PROPOSED SURFACE WATER SAMPLING LOCATION
- GM-7 — PROPOSED LANDFILL GAS PROBE

REFERENCES

1. OVERALL SITE TOPOGRAPHY PROVIDED BY GEODATA CORPORATION, ZEBULON, NC, BASED ON MAY 25, 2012 AERIAL PHOTOGRAPHY AND NCDOT GIS DEPARTMENT DATA RELEASE MARCH 2005.

0 200' 400' 600'

PROJECT TITLE:

HALIFAX COUNTY, NORTH CAROLINA C&D LANDFILL - AREA 2 LANDFILL GAS MONITORING REPORT

DRAWING TITLE:

PROPOSED LANDFILL GAS MONITORING NETWORK

DESIGNED: JAS	PROJECT NO: HALIFAX 12-1
DRAWN: JAL	SCALE: AS SHOWN
APPROVED:	DATE: OCT. 2012
FILENAME: HALI-D0246	
SHEET NUMBER:	DRAWING NUMBER: FIG. 2

TABLES

Landfill Gas Monitoring Plan
Halifax County Landfill Facility
Halifax County, North Carolina

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SMITH+GARDNER

Table 1

Monitoring Location Summary

By: MG
Date: 7/19/2013

Monitoring Location	Northing	Easting	Status
GM-1	957295.38	2350025.65	existing
GM-2	956367.43	2350006.59	existing
GM-2R	956248.04	2350016.23	existing
GM-3	956133.06	2349706.12	existing
GM-4	957286.55	2349030.01	existing
GM-4R	957310.62	2348997.21	existing
GM-5	958035.17	2349626.32	existing
GM-6	TBD	TBD	proposed
GM-7	TBD	TBD	proposed
Scalehouse	NA	NA	existing

TBD = To Be Determined
NA = Not Available

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Appendix A

Landfill Gas Reporting Form

Landfill Gas Monitoring Plan
Halifax County Landfill Facility
Halifax County, North Carolina

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NC Division of Waste Management - Solid Waste Section

Landfill Gas Monitoring Data Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Facility Name: _____ Permit Number: _____

Date of Sampling: _____ NC Landfill Rule (.0500 or .1600): _____

Name and Position of Sample Collector: _____

Type and Serial Number of Gas Meter: _____ Calibration Date of Gas Meter: _____

Date and Time of Field Calibration: _____

Type of Field Calibration Gas (15/15 or 35/50): _____ Expiration Date of Field Calibration Gas Canister: _____

Pump Rate of Gas Meter: _____

Ambient Air Temperature: _____ Barometric Pressure: _____ General Weather Conditions: _____

Instructions: Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume can be converted to % LEL as follows: % methane by volume = % LEL/20

Location or LFG Well ID	Sample Tube Purge	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes

If your facility has more gas monitoring locations than there is room on this form, please attach additional sheets listing the same information as contained on this form.

Certification
To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

_____ _____
SIGNATURE TITLE

DENR USE ONLY: ☐ Paper Report ☐ Electronic Data - Email CD (data loaded: Yes / No) Doc/Event #:

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: _____ Phone: _____

E-mail: _____

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☐ Detection Monitoring ☐ Assessment Monitoring ☐ Corrective Action

Type of data submitted: (Check all that apply)

☐ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☐ Surface water monitoring data
☐ Methane gas monitoring data
☐ Corrective action data (specify) _____
☐ Other(specify) _____

Notification attached?

☐ No. No groundwater or surface water standards were exceeded.
☐ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Facility Representative Name (Print) Title (Area Code) Telephone Number

Affix NC Licensed/ Professional Geologist Seal

Signature Date

Facility Representative Address

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009

LFG MONITORING TRAINING LOG
(This log must be completed annually)

HALIFAX COUNTY LANDFILL
HALIFAX, NORTH CAROLINA
NC SOLID WASTE PERMIT NO. 42-04

INSTRUCTOR INFORMATION:

Name(s): _____

Company: _____

Address: _____

_____

TRAINING INFORMATION:

Date(s) (MM/DD/YYYY): _____

Program Content: _____

_____

Instrument Type(s): _____

ATTENDANCE:

Name	Title	Training Date	Trainee Signature	Instructor Initials

Instructor Signature: _____ Date: _____

Halifax County Representative Signature: _____ Date: _____

Note: This form should be maintained in the landfill operating record.

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