CORRECTIVE ACTION REPORT
OWL'S DEN LANDFILL
PERMIT NO. 55-02
LINCOLNTON, NORTH CAROLINA

S&ME Project No. 1356-10-033

Prepared for:

North Carolina Department of Environment and Natural Resources
Division of Waste Management – Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Prepared by:

S&ME, Inc.
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August 29, 2012

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NC Department of Environment and Natural Resources
Division of Waste Management – Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

Attention: Ms. Jaclynne Drummond
Compliance Hydrogeologist

Reference: **Corrective Action Report**
Owl's Den Landfill, Permit No. 55-02
Lincolnton, North Carolina
S&ME Project No. 1356-10-033

Dear Ms. Drummond:

S&ME, Inc. (S&ME), on behalf of Lincoln County, submits this Corrective Action Report for the Owl's Den Landfill. This report is in response to the issuance of your letter dated May 20, 2010 titled "October 2009 Semiannual Monitoring of Groundwater, Surface Water, and Methane" requiring Corrective Actions for the above referenced site.

If you should have any questions or need additional information please contact us at (704)-523-4726.

Respectfully submitted,

S&ME, Inc.

Julie R. Petersen, P.G.
Project Manager/Senior Geologist

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cc: Mark Bivins, Solid Waste Manager, Lincoln County (1 copy)

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APPENDICES

1. INTRODUCTION AND BACKGROUND

In May 2010, the North Carolina Department of Environment and Natural Resources (NCDENR) issued a letter requesting that corrective measures be taken for groundwater, surface water, and methane for the site. As part of the corrective measures, NCDENR requested that the following items be conducted:

1. A 1,500-foot receptor survey from the edge of waste of the landfill. The receptor survey was subsequently performed and submitted to NCDENR on June 14, 2010.
2. Preparation and implementation of a Methane Monitoring Plan (MMP). The MMP was submitted on June 18, 2010. NCDENR approved the MMP on July 8, 2010, and it was subsequently implemented.
3. Monthly landfill gas (methane) monitoring. Beginning on June 2, 2010, monthly landfill gas measurements have been collected from the methane monitoring wells on site. Monthly monitoring will continue until NCDENR deems otherwise. A summary of the results is provided in this report.
4. Preparation of a Corrective Action Plan (CAP). A CAP was submitted on July 16, 2010 and subsequently approved by NCDENR on August 31, 2010. The CAP is discussed in more detail below.
5. Preparation of a Phase 2 groundwater assessment plan. As detailed in the CAP, further groundwater assessment at the site will be re-evaluated following two semi-annual monitoring events after completion of the corrective actions.
6. Preparation of a survey plat titled "Notice of Contaminated Site". A survey plat was prepared and submitted to NCDENR on September 17, 2010. The survey plat is currently under review by NCDENR.

In the approved CAP, S&ME proposed the use of three corrective measures to address the methane, groundwater, and surface water issues at the site. The corrective measures included re-grading of the soil cover, installation of passive gas vents, and the installation of a passive gas trench. This report details the implementation of the approved corrective measures, provides an update on the monthly landfill gas monitoring, and provides details and a schedule for status reporting.

2. IMPLEMENTATION OF CORRECTIVE MEASURES

2.1 Corrective Action Measures

2.1.1 Re-Grading of Soil Cover

Due to the differential settlement on site, re-grading of depressed areas of the soil cover was necessary to improve surface water run-off as part of the corrective actions. To prepare for re-grading of the soil cover, Lincoln County bush-hogged within the limits of waste and cleared out the shrubs and trees. Clearing within the limits of waste was completed on June 30, 2010. An aerial survey was flown on July 4, 2010 to provide a topographic map of the site that aided in the identification of areas of settlement, and provided a baseline survey to support development of a grading plan.

Following the results of the aerial survey, S&ME prepared and submitted a grading plan for review and approval by the NCDENR Solid Waste Section on October 1, 2010. The grading plan was subsequently approved by NCDENR on December 3, 2010. Because more than 1 acre was disturbed during grading activities, S&ME also prepared and submitted an Erosion and Sediment Control (E&SC) Plan to the NCDENR Land Quality Section on October 29, 2010. The grading plan was subsequently approved, with revisions, on February 15, 2011.

The purpose of the soil cover grading plan was to promote positive drainage of surface water across the site by targeting locally depressed areas which have formed due to differential settlement and to repair or modify existing stormwater control features on site. The Grading Plan was not intended to be a comprehensive re-grading of the entire soil cover.

S&ME identified four localized areas that required specific grading. The general areas are depicted on the drawings provided in ***Appendix I*** and include an area of steep grades in the central portion of the landfill (Area 1), poorly drained areas in the north and northwestern portions of the landfill (Area 2), exposed waste in the eastern portion of the landfill (Area 3), and the access road along the southern portion of the landfill (Area 4). Location specific areas are provided in more detail below along with corresponding stormwater control repairs and modifications. Photographs taken during re-grading activities are provided in ***Appendix II***.

2.1.1.1 Area 1

A localized area of steeply sloping grades was identified in the central portion of the landfill in the vicinity of a suspected "non-disposal" area. S&ME proposed re-grading this area as detailed on the Grading Plan, ***Drawing 1*** in ***Appendix I*** to promote positive drainage across the site and decrease the likelihood of erosion on the slope face.

During re-grading of this area, landfilled waste was not encountered in the suspected "non-disposal" area, which verified the assumptions made from the historical site drawings. In-place soils, borrow soils and investigative derived waste (IDW) from the passive gas vent installation were used to re-grade the area to the elevations shown on ***Drawing 3***, Grading Plan As-Builts, in ***Appendix I***.

In an effort to minimize the amount of soil required to re-grade the cover, waste generated during installation of the passive gas vents and trench was re-buried in the waste area. Initially, the cover soils in the repair area were removed and stockpiled. Waste was then placed in compacted lifts until the desired grade was achieved, followed by re-placement of the cover soils.

2.1.1.2 Area 2, Perimeter Grass-Lined Ditches, Channel Breaks, and Rip Rap Outlet Aprons

Poorly drained areas existed in the northern and northwestern portions of the landfill. These areas historically exhibited signs of poor drainage including ponded water. S&ME

proposed drainage improvements at the down slope perimeter of these areas including new drainage pathways and diversions in the perimeter channel.

Due to the localized extent of the poorly draining areas, S&ME recommended that the localized poorly draining areas be filled and graded as a "field fit" to improve drainage. These areas received borrow material from the soil stockpile and were re-graded to the elevations shown on ***Drawing 3***, Grading Plan As-Builts, in ***Appendix I***.

To control the stormwater flow within the perimeter grass-lined ditches, periodic channel breaks were installed. Rip rap outlet aprons were also installed downstream of channel breaks to decrease flow velocity and depth before discharging to the receiving area. The channel breaks and rip rap aprons were constructed in accordance with the designs shown on ***Drawings 1 and 2*** in ***Appendix I***. "As-Builts" of this area are shown on ***Drawing 3*** in ***Appendix I***.

2.1.1.3 Area 3, Rip Rap Channel, and Sediment Basin

Exposed waste on the eastern portion of the landfill had been uncovered by erosion caused by concentrated stormwater flow. S&ME provided recommendations to reduce concentrated stormwater flow in this area by cleaning out and repairing the rip rap channel, as well as extending the channel and constructing an outlet apron as detailed on ***Drawing 1*** in ***Appendix I***. Repairs and modifications to the rip rap channel and outlet apron were performed in accordance with the approved specifications detailed on ***Drawing 2*** in ***Appendix I***.

The newly extended rip rap channel terminates at an existing stormwater detention basin. Based on our previous visual observations, the riser pipe and outlet pipe appeared to be in working condition and were not clogged, the plunge pool was in good condition, and the downstream area appeared stable. S&ME did not recommend modifications or repairs to the basin. However, the basin was reconditioned by removing trees and shrubs within the basin, as well as constructing a rock ring inlet protector for the riser pipe. "As-Builts" of this area are shown on ***Drawing 3*** in ***Appendix I***.

2.1.1.4 Area 4

Sections of the access road along the southern portion of the landfill were exhibiting erosion rills caused by concentrated stormwater flow. A ditch exists on the north side of the access road to the west; however, the ditch diminishes towards the east and stormwater was allowed to flow over the road causing erosion. Repair of the road included re-grading the road to drain to the south with a maximum 2 percent slope. "As-Builts" of this area are shown on ***Drawing 3*** in ***Appendix I***.

2.1.1.5 Slope Breaks

Slope breaks consisting of soil berms were observed on the eastern portion of the landfill. The slope breaks appeared washed out and eroded in areas and were generally discontinuous. The slope breaks were repaired and reconditioned to the elevations shown on ***Drawing 3***, Grading Plan As-Builts, in ***Appendix I***.

2.1.2 Passive Gas Vents

The purpose of the passive gas vents is to vent methane into the atmosphere within localized areas of the waste mass. The effectiveness and radius of influence of passive gas vents is dependant on the environmental conditions of the landfill and vent design, and the intent of these passive vents is not to provide a wide scale collection and control system, but rather to supplement the other proposed corrective measures.

The passive gas vents were constructed as shown on ***Drawing 4*** in ***Appendix I***. The vents were installed using a bucket auger drill rig capable of creating a 36-inch diameter borehole through the soil cover and waste. Because the depth to waste was not known, borings were advanced through the waste and into residual soils (approximately 2 feet). The borehole was then backfilled with bentonite within the residual material.

The vent screen was constructed of 6-inch diameter perforated high density polyethylene (HDPE) that typically extended from 2 feet above the bentonite seal to 5 to 10 feet below land surface. The vent casing was constructed of 6-inch diameter non-perforated HDPE pipe that typically extended from 5 to 10 feet below land surface to 5 feet above land surface. The end of the perforated screen was capped, and the vent completed at the surface with a "gooseneck" style elbow (180 degree sweep). The top end of each vent was covered with a protective screen to allow the free flow of LFG out of the vent and to prevent animals, insects and material from entering.

The annulus of the borehole was backfilled with #57 aggregate (washed stone) that typically extended from the bentonite seal to 2 feet below land surface. A non-woven geotextile fabric ring was then placed around the vent pipe and on top of the gravel pack. A 12-inch diameter sonatube was placed around the vent pipe for later filling with concrete. The remainder of the annulus was then backfilled with re-compacted soil. The vents were then completed by backfilling the sonatubes with concrete to create a collar. Photographs taken during passive gas vent construction are provided in ***Appendix II***.

S&ME proposed to install 16 passive gas vents (GV-1 through GV-16) across the site as illustrated on ***Drawing 1*** in ***Appendix I***. However, only 15 passive gas vents were constructed. Passive gas vent GV-5 was omitted during construction due to no waste being encountered in the area. GV-5 was off-set 4 times in approximate 50-foot increments in a northeasterly direction toward the rip rap channel. The boring and offset borings were advanced 5 to 10 feet with no evidence of waste placement. The location of the surveyed vent locations are shown on ***Drawing 3*** in ***Appendix I***.

Based on drilling observations, the soil cover ranged in thickness from 1.5 to 4 feet thick, and the depth to the bottom of waste ranged from 11 to 45 feet deep.

2.1.3 Passive Gas Trench

To address methane concentrations measured in the methane monitoring wells along the southern property boundary adjacent to the residential structures along Owl's Den Road, A 400-foot long passive gas trench was installed along the edge of waste as shown on ***Drawing 1*** in ***Appendix I***. The purpose of the trench is to create a relief area between the

edge of waste and the property boundary that provides a pathway for methane to vent to the atmosphere.

The passive gas trench was constructed as shown on ***Drawing 5*** in ***Appendix I***. The trench dimensions are generally 400 feet long, by 24 inches wide, by 15 feet deep. The trench was installed along the edge of waste boundary, adjacent to the waste mass. Five passive gas vents were spaced at 100-foot intervals along the trench (T-1 through T-5) and were connected by a horizontal perforated pipe.

After excavation, the trench was backfilled with #57 aggregate (washed stone) to a depth of 8 feet below land surface. A 6-inch diameter perforated HDPE pipe was placed on top of the gravel pack and connected to the vertical vent pipes. The vertical vent pipe extends from the horizontal screen to 5 feet above land surface where each vent terminates into a gooseneck. After the HDPE pipe was installed and stabilized in-place, the remainder of the trench was backfilled with gravel to 2 feet below land surface.

Twelve-inch diameter sonatubes were placed around the vertical vent pipes for later filling with concrete. A non-woven geotextile fabric was then placed around the vent pipes and on top of the gravel pack. The remainder of the trench was backfilled with compacted soil to ground surface. The vertical vent pipes were completed by backfilling the sonatubes with concrete to create a collar.

3. MONTHLY LANDFILL GAS MONITORING

Monthly landfill gas monitoring has been performed since June 2010 following the issuance of your letter dated May 20, 2010 titled "October 2009 Semiannual Monitoring of Groundwater, Surface Water, and Methane" requiring monthly monitoring of methane gas at the facility. Monthly landfill gas monitoring data is included in ***Appendix III***.

The attached data includes measurements from the Methane Monitoring Wells which are currently part of the approved monitoring regime (MMW-2, MMW-4, MMW-5, MMW-6, MMW-7, MMW-8, and MMW-9). Measurements from the methane wells were collected by Lincoln County personnel using a GEM 2000 combustible gas meter that was field calibrated prior to data collection.

Monitoring forms for both the facility and residential monitoring, as well as tabulated and graphical presentations of historical methane measurements are included in ***Appendix III***.

It should be noted that the site is operating under the Contingency Plan of the approved Methane Monitoring Plan dated June 18, 2010. In accordance with the Contingency Plan, Lincoln County has contacted the adjacent property owner at 659 Owl's Den Road and gained permission to monitor for the presence of landfill gas on the property. However, the resident only allows County personnel to monitor in the doorway of the property, and has not allowed monitoring elsewhere in the residence. Residential monitoring forms have been included in Appendix III for the months where the resident could be contacted to monitor the property.

Included on the graphical presentations of the historical methane measurements are linear trend lines for the data. For Methane Monitoring Wells MMW-2, MMW-4, and MMW-5 methane concentrations have historically been above the LEL; however, trends in the monthly monitoring concentration data appear to be trending downward. Lincoln County will continue monthly landfill gas monitoring at the site until NCDENR deems otherwise. Monthly data will be provided in the semi-annual monitoring reports for the facility.

APPENDIX I

DRAWINGS

REFERENCE:

1. EXISTING CONTOURS FROM AERIAL SURVEY PERFORMED ON JULY 4, 2010. BY SPATIALDATA CONSULTANTS INC.
2. EDGE OF WASTE IS APPROXIMATE AND WAS FIELD DELINEATED BY LINCOLN COUNTY AND S&ME INC.

PROJECT DESCRIPTION

THE AREA PROPOSED IS FOR THE OWL'S DEN LANDFILL PROJECT. THE PROPOSED DISTURBED AREA IS APPROXIMATELY 27.3 ACRES.

EXISTING SITE CONDITIONS

THE SITE IS COMPRISED OF THE OWL'S DEN LANDFILL AND AN ADJACENT BORROW AREA. OWL'S DEN LANDFILL HAS RECENTLY BEEN CLEARED OF WOODY VEGETATION AND SHRUBS AND CURRENTLY CONSISTS PREDOMINATELY OF SPARSELY TO MODERATELY GRASSED AREA. THE BORROW AREA CONSISTS OF A GRASSED FIELD.

SCHEDULE

CONSTRUCTION IS SCHEDULED TO BEGIN SPRING, 2011.

EROSION AND SEDIMENTATION CONTROL NARRATIVE

THE EROSION AND SEDIMENT CONTROL MEASURES FOR THIS PROJECT INVOLVE THE PLACEMENT OF A VARIETY OF EROSION AND SEDIMENT CONTROL DEVICES AT STRATEGIC LOCATIONS. THESE DEVICES INCLUDE:

1. SILT FENCE
2. SILT FENCE OUTLET
3. CHECK DAM (UPSTREAM OF CHANNEL BREAK)
4. DIVERSION BERM
5. ROCK PIPE INLET PROTECTION
6. PERMANENT SEEDING

ADDITIONAL EROSION CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION.

CONSTRUCTION SEQUENCE

1. OBTAIN PLAN APPROVAL AND PERMITS.
2. HOLD PRE-CONSTRUCTION MEETING.
3. INSTALL EROSION CONTROL DEVICES.
4. BEGIN CONSTRUCTION. INSTALL PASSIVE GAS VENTS AND PASSIVE GAS TRENCH, PROVIDE GRADING IN LOCALIZED AREAS TO PROMOTE DRAINAGE, AND INSTALL STORMWATER MANAGEMENT DEVICES.
5. STABILIZE DENUDED AREAS WITH SEED AND MULCH UPON FINAL INSTALLATION ACCORDING TO SEEDING SPECIFICATIONS ON THE DRAWINGS.
6. FINALIZE CONSTRUCTION.
7. PROVIDE PERMANENT VEGETATION ACCORDING TO SEEDING SPECIFICATIONS ON THE DRAWINGS.
8. UPON ACHIEVING FINAL STABILIZATION, REMOVE TEMPORARY EROSION CONTROL MEASURES AS APPLICABLE.

EROSION CONTROL DEVICE NOTES

1. SILT FENCE SHOULD BE PLACED DOWN-GRADIENT OF CONSTRUCTION AREA AS SHOWN ON THE DRAWINGS.
2. CHECK DAMS SHALL BE LEFT IN PLACE UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN SUFFICIENTLY STABILIZED WITH VEGETATION.

MAINTENANCE

1. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING CONSTRUCTION UNTIL THE COMPLETION OF CONSTRUCTION ACTIVITIES AND DISTURBED AREAS HAVE BEEN STABILIZED.
2. SEDIMENT AND EROSION CONTROL DEVICES AND PLANTED AREAS SHALL BE INSPECTED BY THE CONTRACTOR EVERY SEVEN (7) CALENDAR DAYS AND AFTER EACH RAINFALL OCCURRENCE THAT EXCEEDS ONE-HALF (1/2) INCH. DAMAGED OR INEFFECTIVE DEVICES SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS NECESSARY, AS SOON AS PRACTICAL.
3. DURING EROSION CONTROL DEVICE INSPECTION, IF EROSION IS OBSERVED AT AN EXISTING PERMANENT SLOPE DRAIN OUTLET, STABILIZE OUTLET WITH RIPRAP OF SUFFICIENT SIZE TO PREVENT FURTHER EROSION.
4. TEMPORARY EROSION CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
5. SEEDED AREAS SHALL BE FERTILIZED, RESEEDED AS NECESSARY, AND MULCHED ACCORDING TO THE SEEDING PLAN TO PROMOTE AND MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. SEEDED AREAS SHOULD BE INSPECTED PERIODICALLY BY LINCOLN COUNTY UNTIL FINAL GROUND COVER HAS BEEN ESTABLISHED.
6. THE OWNER OR THEIR AGENT SHOULD ADHERE TO THE SELF-INSPECTION PROGRAM FOR EROSION AND SEDIMENTATION CONTROL (EFFECTIVE OCTOBER 1, 2010). DETAILS OF THE PROGRAM AND RECOMMENDED INSPECTION FORMS CAN BE FOUND AT THE FOLLOWING WEBSITE: http://www.dlr.enr.state.nc.us/pages/sedimentation

GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROLS PROPOSED HEREIN.
2. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING UTILITY COMPANIES TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PUBLIC ROADWAYS. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PUBLIC ROADWAYS, AS MAY BE REQUIRED.
4. ALL CHANNEL BREAK AND RIPRAP APRON LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON CONDITIONS IN THE FIELD.

LEGEND

- EXISTING CONTOURS (REF. 1)
- PROPOSED GRADE CONTOURS
- PROPOSED DISTURBED AREA
- DL — DL PROPOSED DISTURBED LIMITS
- EOW — EOW EDGE OF WASTE (REF. 2)
- PROPERTY LINE
- x — x EXISTING FENCE
- SILT FENCE
- PROPOSED DIVERSION BERM
- > — > EXISTING SLOPE BREAK
- EXISTING RIPRAP CHANNEL
- PROPOSED RIPRAP CHANNEL
- PROPOSED CHANNEL BREAK
- PROPOSED RIPRAP APRON
- POWER POLE
- TREELINE
- STREAM
- PROPOSED PASSIVE GAS TRENCH
- GV-1 PROPOSED PASSIVE GAS VENT
- T-1 PROPOSED PASSIVE GAS VENT IN PASSIVE GAS TRENCH
- SURFACE WATER SAMPLING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- METHANE MONITOR WELL LOCATION

Area ID	Area (square feet)	Area (acres)	Description
Area 1	239,387	5.50	steep area re-graded for shallower slopes; possible Fill Type 2 placement area
Area 2	39,173	0.90	grade areas to drain towards outlet structures
Area 3	9,959	0.23	cover exposed waste with at least two feet of soil cover and verify thickness with hand auger borings; install riprap channel
Area 4	16,553	0.38	grade road to drain towards south side of road with a maximum two percent slope and fill existing ditch on north side of road; re-surface with four inches of ABC stone. Road is approximately 660 ft. long and 12 ft. wide.

NOTES:
1. ANY PORTION OF THE EXISTING SOIL COVER DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO A MINIMUM THICKNESS OF TWO FEET.

GRAPHIC SCALE

0 60 120 (IN FEET)

S&ME
WWW.SMEINC.COM
9751 SOUTHERN PINE BLVD.
CHARLOTTE, N.C. 28273
PH: (704)523-4726

NORTH CAROLINA PROFESSIONAL SEAL 24486 ENGINEER JASON S. REES

NO.	DATE	DESCRIPTION	BY

E&SC AND GRADING PLAN
CORRECTIVE ACTION PLAN CONSTRUCTION

OWL'S DEN LANDFILL
LINCOLN COUNTY, NORTH CAROLINA

S&ME ENGINEERING LICENSE NO.	F-0176
DRAWN BY: CLD	CHECKED BY: JRP
DESIGNED BY: JRP	APPROVED BY: JSR
PROJECT NUMBER	1356-10-033
SCALE: 1" = 60'	DATE: 8-29-12
DRAWING: 1	OF: 5

GENERAL SEEDING SPECIFICATIONS

DEFINITION
Controlling runoff and erosion on disturbed areas by establishing perennial vegetative : cover with seed.

PURPOSE
To reduce erosion and decrease sediment yield from disturbed areas, and to permanently stabilize such areas in a manner that is economical, adapts to site conditions, and allows selection of the most appropriate plant materials.

SPECIFICATIONS

SEEDBED REQUIREMENTS
Establishment of vegetation should not be attempted on sites that are unsuitable due to excessive soil compaction, inappropriate soil texture, poor drainage, concentrated overland flow, or steepness of slope until measures have been taken to correct these problems.

To maintain a good stand of vegetation, the soil must meet certain minimum requirements as a growth medium. The existing soil should have these criteria:

- Enough fine-grained (silt and clay) material to maintain adequate moisture and nutrient supply (available water capacity of at least .05 inches water to 1 inch of soil).
- Sufficient pore space to permit root penetration.
- Sufficient depth of soil to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans should be 12 inches or more, except on slopes steeper than 2:1 where the addition of soil is not feasible.
- A favorable pH range for plant growth, usually 6.0 - 6.5.
- Free from large roots, branches, stones, large clods of earth, or trash of any kind. Clods and stones may be left on slopes steeper than 3:1 if they are to be hydro seeded.

If any of the above criteria are not met - i.e., if existing soil is too coarse, dense, shallow or acidic to foster vegetation - special amendments are required. The soil conditioners described below may be beneficial or, preferably, topsoil may be applied.

SEEDBED PREPARATION
Install necessary mechanical erosion and sedimentation control practices before seeding, and complete grading according to the approved plan.

Lime and fertilizer needs should be determined by soil tests. Directions, sample cartons, and information sheets are available through county Agricultural Extension offices. Testing is also done by commercial laboratories.

When soil tests results are not available, follow rates suggested in the seeding specifications shown at right. Application rates usually fall into the following ranges:

- Ground agricultural limestone: Light-textured, sandy soils: 1 to 1-1/2 tons/acre
  Heavy-textured, clayey soils: 2-3 tons/acre
- Fertilizer: Grasses: 800-1200 lb/acre of 10-10-10 (or the equivalent) Grass-legume mixtures: 800-1200 lb/acre of 5-10-10 (or the equivalent)

Apply lime and fertilizer evenly and incorporate into the top 4-6 inches of soil by disking or other suitable means. Operate machinery on the contour. When using a hydro seeder, apply lime and fertilizer to a rough, loose surface.

Roughen surfaces prior to seeding.

Complete seedbed preparation by breaking up large clods and raking into a smooth, uniform surface (slopes less than 3:1). Fill in or level depressions that can collect water. Broadcast seed into a freshly loosened seedbed that has not been sealed by rainfall.

SEEDING
Seeding dates given in the seeding mixture specifications are designated as "best" or "possible". Seedings properly carried out within the "best" dates have a high probability of success. It is also possible to have satisfactory establishment when seeding outside these dates. However, as you deviate from them, the probability of failure increases rapidly. Seeding on the last date shown under "possible" may reduce changes of success by 30-50%. Always take this into account in scheduling land-disturbing activities.

Use certified seed for permanent seeding whenever possible.

Labeling of non-certified seed is also required by law. Labels contain important information on seed purity, germination, and presence of wood seeds. Seeds must meet State standards for content of noxious weeds. Do no accept seed containing "prohibited" noxious weed seed.

Inoculate legume seed with the Rhizobium bacteria appropriate to the species of legume.
Apply seed uniformly with a cyclone seeder, drop-type spreader, drill, cultipacker seeder, or hydro seeder on a firm, friable seedbed.

When using a drill or cultipacker seeder, plant small grains no more than 1 inch deep, grasses and legumes no more than 1/2 inch. Equipment should be calibrated in the field for the desired seeding rate.

When using broadcast-seeding methods, subdivide the area into workable sections and determine the amount of seed needed for each section. Apply one-half the seed while moving back and forth across the area, making a uniform pattern: then apply the second half in the same way, but moving at right angles to the first pass.

Mulch all plantings immediately after seeding.

HYDRO SEEDING
Surface roughening is particularly important when hydro seeding, as a roughened slope will provide some natural coverage for lime, fertilizer, and seed. The surface should not be compacted or smooth. Fine seedbed preparation is not necessary for hydro seeding operations: large clods, stones, and irregularities provide cavities in which seeds can lodge.

Rate of wood fiber (cellulose) application should be at least 2,000 lb/acre.

Apply legume inoculants at four times the recommended rate when adding inoculant to a hydro seeder slurry.

If a machinery breakdown of 1/2 to 2 hours occurs, add 50% more seed to the tank, based on the proportion of the slurry remaining. This should compensate for damage to seed. Beyond 2 hours, a full rate of new seed may be necessary.

Lime is not normally applied with a hydraulic seeder because it is abrasive. It can be blown onto steep slopes in dry form.

MAINTENANCE
Generally, a stand of vegetation cannot be determined to be fully established until soil cover has been maintained for one full year from planting. Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

Reseeding--If a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or over- seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding.

If vegetation fails to grow, soil must be tested to determine if acidity or nutrient imbalance is responsible.

Fertilization--On the typical disturbed site, full establishment usually requires re-fertilization in the second growing season. Fine turf requires annual maintenance fertilization. Use soil tests if possible or follow the guidelines given for the specific seeding mixture.

TEMPORARY SEEDING SPECIFICATIONS

Seeding mixture (fall)

Species*	Rate (lb/acre)
Rye Grain (*Secalin cereale*)	120

Seeding Mixture (late winter early spring)

Species*	Rate (lb/acre)
Rye Grain (*Secalin cereale*)	120
Annual (Korean) Lespedeza (*Kummerowia stipulacea*)	50

Seeding mixture (summer)

Species*	Rate (lb/acre)
German Millet (*Setaria italica*)	40

Seeding dates (Piedmont)
Fall: Aug. 15 - Dec. 30
Late winter (early spring): Jan. 1 - May 1 Late
Summer: May 1 - Aug. 15

Soil amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor mulch by tacking with asphalt, roving or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring. tool.

Maintenance
Re-fertilize if growth is not fully adequate. Reseed, re-fertilize and mulch immediately following erosion or other damage.

Pursuant to G.S. 113A-57(2), the angle for graded slopes and fills shall be no greater than the angle that can be retained by vegetative cover or other adequate erosion-control devices or structures. In any event, slopes left exposed will, within 21 calendar days of completion of any phase of grading, be planted or otherwise provided with temporary or permanent ground cover, devices, or structures sufficient to restrain erosion.
Pursuant to G.S. 113A-57(3), provisions for permanent groundcover sufficient to restrain erosion must be accomplished for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development.

*REF: 6.10.A,B and C, NC Erosion and Sediment Control Planning and Design Manual, 2006

PERMANENT SEEDING SPECIFICATIONS

Seeding mixture

Species*	Rate (lb/acre)
Tall fescue (*Festuca arundinacea*) (Grass lined Channels)	200
Tall fescue (*Festuca arundinacea*) (Other Areas)	100

Nurse plants
Between May 1 and Aug. 15, add 10 lb/acre German millet (*Setaria italica*) or 15 lb/acre Sudan grass. Prior to May 1 or after Aug. 15, add 40 lb/acre Rye Grain (*Festuca arundinacae*).

Seeding dates

	Best	Possible	Fall:
	Aug. 25 - Sept. 15	Aug. 20 - Oct. 25	
Late winter:	Feb. 15 - Mar. 21	Feb. 1 -Apr. 15	

Fall is best for tall fescue (*Festuca arundinacea*) and late winter or summer for lespedeza. Over seeding of Kobe lespedeza (*Kummerowia striata*) over fall-seeded tall fescue is very effective.

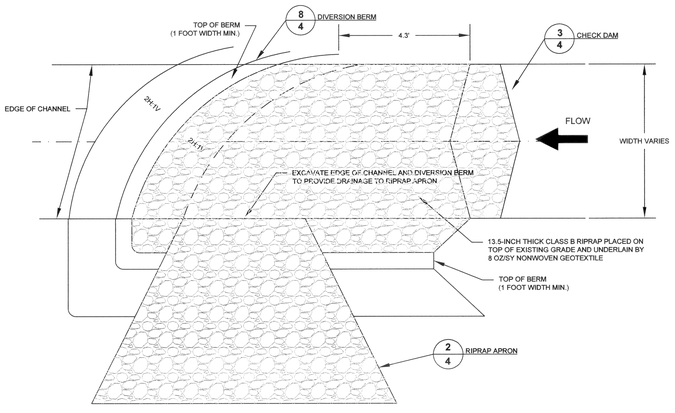
Soil amendments
Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000-5,000 lb/acre grain straw or equivalent cover of another suitable mulching material. Anchor mulch by tacking with asphalt, roving, or netting. Netting is the preferred anchoring method on steep slopes.

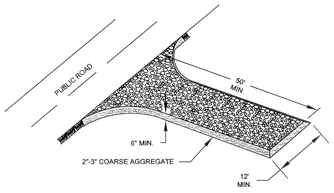
Maintenance
Re-fertilize in the second year unless growth is fully adequate. May be mowed once or twice a year, but mowing is not necessary. Reseed, fertilize, and mulch damaged areas immediately.

Pursuant to G.S. 113A-57(3), provisions for permanent groundcover sufficient to restrain erosion must be accomplished for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development.

*REF: 6.11L NC Erosion and Sediment Control Planning and Design Manual, 2006



3 / 3 CHANNEL BREAK
NTS



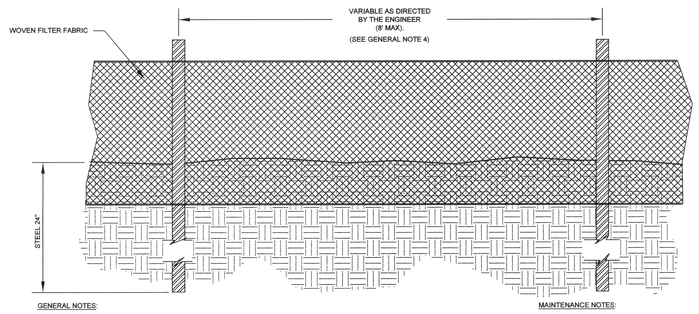
GENERAL NOTES:

1. PLACE NON-WOVEN GEOTEXTILE BENEATH STONE.
2. CONSTRUCTION ENTRANCE WILL BE PLACED AT LOCATION SHOWN ON DRAWINGS.

MAINTENANCE NOTES:

1. INSPECT CONSTRUCTION ENTRANCE AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT STORM EVENT (0.5" OR GREATER). DURING PERIODS OF HEAVY USE THE CONSTRUCTION ENTRANCE SHOULD BE INSPECTED MORE FREQUENTLY.
2. THE ENTRANCE WILL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO EXISTING ROADWAYS. SEDIMENT TRACKED, SPILLED, DROPPED OR OTHERWISE DEPOSITED ONTO ROADWAYS WILL BE SWEPT UP AS SOON AS PRACTICABLE AND HAULED OFF-SITE FOR PROPER DISPOSAL.
3. IF EXCESS SEDIMENT HAS CLOGGED THE PAD, THE ENTRANCE WILL BE TOPDRESSED WITH NEW STONE AS NEEDED. REPLACEMENT OF THE ENTIRE PAD MAY BECOME NECESSARY WHEN THE PAD BECOMES ENTIRELY FILLED WITH SEDIMENT AND MUD.
4. THE CONSTRUCTION ENTRANCE WILL BE REMOVED WHEN CONSTRUCTION ACTIVITIES CEASE ON THE PROJECT. THE REMOVED STONE AND SEDIMENT FROM THE EXIT WILL BE HAULED OFF-SITE AND DISPOSED OF PROPERLY.

4 / 3 CONSTRUCTION ENTRANCE
NTS



GENERAL NOTES:

1. PREFABRICATED SILT FENCE IS NOT ACCEPTABLE ON THIS PROJECT.
2. STEEL POSTS SHALL BE USED ON THIS PROJECT INSTEAD OF WOOD POSTS. STEEL POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
3. WOVEN FILTER FABRIC SHALL BE USED WHERE SILT FENCE IS TO REMAIN FOR A PERIOD OF MORE THAN 30 DAYS. FILTER FABRIC FENCE SHALL BE A MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
4. SILT FENCE SHALL BE STANDARD STRENGTH FILTER FABRIC WITH WIRE MESH REINFORCEMENT OR EXTRA STRENGTH FILTER FABRIC. WHEN FABRIC IS USED WITH WIRE MESH, 8' CENTERED POSTS MAY BE USED. OMISSION OF THE CONSTRUCTION CHANGE THAT NECESSITATES MORE POSTS FOR SUPPORT (IE. THE SPACING REINFORCING WIRE IS A DISTANCE NEEDS TO BE REDUCED TO NO GREATER THAN SIX (6) FEET APART).
5. TURN SILT FENCE UP SLOPE AT ENDS.
6. THE USE OF SILT FENCE IN AREAS OF CONCENTRATED FLOW IS INAPPROPRIATE

MAINTENANCE NOTES:

1. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH SIGNIFICANT (0.5" OR GREATER) RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEANOUT.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

*REF: 6.62.7 NC Erosion and Sediment Control Planning and Design Manual, 2006

1 / 3 TYPICAL SILT FENCE INSTALLATION DETAIL
NTS

DEFINITION:

A STRUCTURE DESIGNED TO CONTROL EROSION AT THE OUTLET OF A CHANNEL OR CONDUIT.

PURPOSE:

TO PREVENT EROSION AT THE OUTLET OF A CHANNEL OR CONDUIT BY REDUCING THE VELOCITY OF FLOW AND DISSIPATING THE ENERGY.

CONSTRUCTION SPECIFICATIONS:

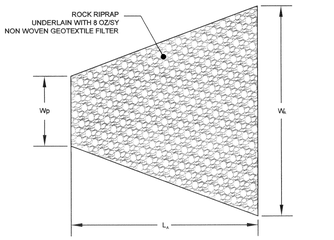
1. ENSURE THAT THE SUBGRADE FOR THE FILTER AND RIPRAP FOLLOWS THE REQUIRED LINES AND GRADES SHOWN IN THE PLAN. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO THE DENSITY OF THE SURROUNDING DISTURBED MATERIAL. LOW AREAS IN THE SUBGRADE ON UNDISTURBED SOIL MAY ALSO BE FILLED BY INCREASING THE RIPRAP THICKNESS.
2. THE RIPRAP AND GRAVEL FILTER MUST CONFORM TO THE SPECIFIED GRADING LIMITS SHOWN ON THE PLANS.
3. FILTER CLOTH, WHEN USED, MUST MEET DESIGN REQUIREMENTS AND BE PROPERLY PROTECTED FROM PUNCHING OR TEARING DURING INSTALLATION. REPAIR ANY DAMAGE BY REMOVING THE RIPRAP AND PLACING ANOTHER PIECE OF FILTER CLOTH OVER THE DAMAGED AREA. ALL CONNECTING JOINTS SHOULD OVERLAP SO THE TOP LAYER IS ABOVE THE DOWNSTREAM LAYER A MINIMUM OF 1 FT. IF THE DAMAGE IS EXTENSIVE, REPLACE THE ENTIRE FILTER CLOTH.
4. RIPRAP MAY BE PLACED BY EQUIPMENT, BUT TAKE CARE TO AVOID DAMAGING THE FILTER.
5. THE MINIMUM THICKNESS OF THE RIPRAP SHOULD BE 1.5 TIMES THE MAXIMUM STONE DIAMETER.
6. RIPRAP SHALL BE NCDOT RIPRAP CLASS AS SPECIFIED IN THE OUTLET PROTECTION SCHEDULE, OR APPROVED EQUIVALENT. IT SHOULD BE HARD, ANGULAR, HIGHLY WEATHER-RESISTANT AND WELL GRADED.
7. CONSTRUCT THE APRON ON ZERO GRADE WITH NO OVERFILL AT THE END. MAKE THE TOP OF THE RIPRAP AT THE DOWNSTREAM END LEVEL WITH THE RECEIVING AREA OR SLIGHTLY BELOW IT.
8. ENSURE THAT THE APRON IS PROPERLY ALIGNED WITH THE RECEIVING STEAM AND PREFERABLY STRAIGHT THROUGHOUT ITS LENGTH. IF A CURVE IS NEEDED TO FIT SITE CONDITIONS, PLACE IN THE UPPER SECTION OF THE APRON.
9. IMMEDIATELY AFTER CONSTRUCTION, STABILIZE ALL DISTURBED AREAS WITH VEGETATION.

MAINTENANCE:

INSPECT RIPRAP OUTLET STRUCTURES WEEKLY AND AFTER SIGNIFICANT (0.5 INCH OR GREATER) RAINFALL EVENTS TO SEE IF ANY EROSION AROUND OR BELOW THE RIPRAP HAS TAKEN PLACE, OR IF STONES HAVE BEEN DISLODGED. IMMEDIATELY MAKE ALL NEEDED REPAIRS TO PREVENT FURTHER DAMAGE.

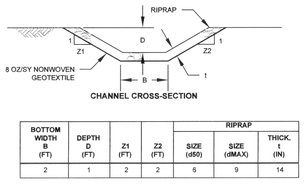
REFERENCE:

6.41.5 NC EROSION AND SEDIMENTATION CONTROL PLANNING AND DESIGN MANUAL, 2006



2 / 3 TYPICAL RIPRAP APRON
NTS

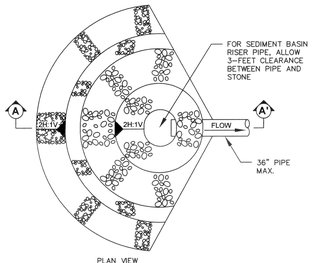
d50 (IN)	dMAX (IN)	T (IN)	L, (FT)	Wp (FT)	Wa (FT)
6	9	13.5	6	4.5	10.5



CHANNEL CROSS-SECTION

BOTTOM WIDTH B (FT)	DEPTH D (FT)	Z1 (FT)	Z2 (FT)	RIPRAP SIZE (d50)	RIPRAP SIZE (dMAX)	RIPRAP THICK, t (IN)
2	1	2	2	6	9	14

5 / 3 RIPRAP CHANNEL
NTS



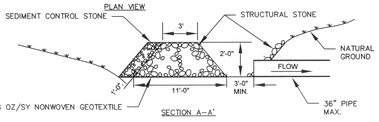
GENERAL NOTES:

1. INSTALL ROCK PIPE INLET PROTECTION AT THE INLET TO PERMANENT SLOPE DRAINS AND THE SEDIMENT BASIN RISER INLET.
2. FOR THE SEDIMENT BASIN, INSTALL STONE A MINIMUM OF THREE FEET AWAY FROM THE SEDIMENT BASIN RISER PIPE.
3. STRUCTURAL STONE SHALL BE CLASS B RIPRAP.
4. SEDIMENT CONTROL STONE SHALL BE NO. 5 OR NO. 57 STONE.
5. DIMENSIONS ARE MINIMUM ACCEPTABLE UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.

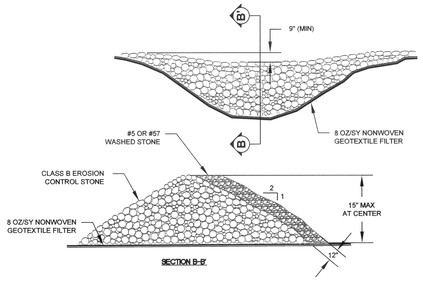
MAINTENANCE NOTES:

1. INSPECT ROCK PIPE INLET PROTECTION AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (0.5" OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. REMOVE SEDIMENT AND RESTORE THE SEDIMENT STORAGE AREA TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. PLACE THE SEDIMENT THAT IS REMOVED IN THE DESIGNED DISPOSAL AREA AND REPLACE THE CONTAMINATED PART OF THE GRAVEL FACING.
2. CHECK THE STRUCTURE FOR DAMAGE. ANY RIPRAP DISPLACED FROM THE STONE HORSESHOE MUST BE REPLACED IMMEDIATELY.
3. AFTER ALL THE SEDIMENT-PRODUCING AREAS HAVE BEEN PERMANENTLY STABILIZED, REMOVE THE STRUCTURE AND ALL THE UNSTABLE SEDIMENT, SMOOTH THE AREA TO BLEND WITH THE ADJOINING AREAS AND PROVIDE PERMANENT GROUND COVER (SURFACE STABILIZATION).

*REF: 6.55.3 NC Erosion and Sediment Control Planning and Design Manual, 2005



6 / 3 STANDARD ROCK RING INLET PROTECTION DETAIL
NTS



DEFINITION

A SMALL TEMPORARY STONE DAM CONSTRUCTED ACROSS A DRAINAGE WAY.

PURPOSE

TO REDUCE EROSION IN A DRAINAGE CHANNEL BY REDUCING THE VELOCITY OF FLOW.

GENERAL NOTES

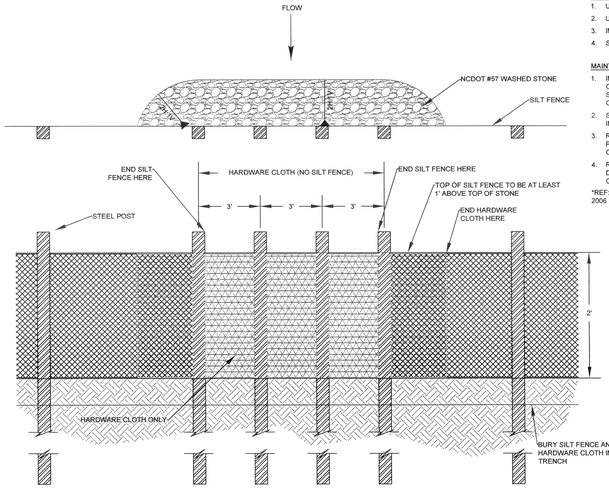
1. SPACE CHECK DAM IN A CHANNEL SO THAT THE CREST OF DOWNSTREAM DAM IS AT ELEVATION OF THE TOE OF UPSTREAM CHECK DAM.
2. STONE SHOULD BE PLACED OVER THE CHANNEL BANKS TO KEEP WATER FROM CUTTING AROUND THE DAM.

MAINTENANCE NOTES

1. INSPECT CHECK DAMS AND CHANNELS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (0.5" OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. CLEAN OUT SEDIMENT, STRAW, LIMBS, OR OTHER DEBRIS THAT COULD CLOG THE CHANNEL WHEN NEEDED.
2. ANTICIPATE SUBMERGENCE AND DEPOSITION ABOVE THE CHECK DAM AND EROSION FROM HIGH FLOWS AROUND THE EDGES OF THE DAM. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN DAMS, ADDITIONAL MEASURES CAN BE TAKEN SUCH AS, INSTALLING A PROTECTIVE RIPRAP LINER IN THAT PORTION OF THE CHANNEL (PRACTICE 6.31, RIPRAP-LINE AND PAVED CHANNELS).
3. REMOVE SEDIMENT ACCUMULATED BEHIND THE DAMS AS NEEDED TO PREVENT DAMAGE TO CHANNEL VEGETATION, ALLOW THE CHANNEL TO DRAIN THROUGH THE STONE CHECK DAM, AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE DAM. ADD STONES TO DAMS AS NEEDED TO MAINTAIN DESIGN HEIGHT AND CROSS SECTION.

*REF: 6.83.3 NC Erosion and Sediment Control Planning and Design Manual, 2006

7 / 3 CHECK DAM
NTS



8 / 3 SILT FENCE OUTLET
NTS

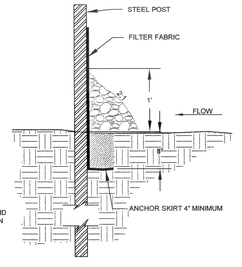
GENERAL NOTES:

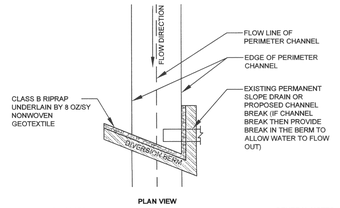
1. USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL
2. USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH ½" MESH OPENINGS.
3. INSTALL 5' SELF FASTENER ANGLE STEEL POST 2' DEEP MINIMUM
4. SPACE POSTS A MAXIMUM OF 3'.

MAINTENANCE NOTES:

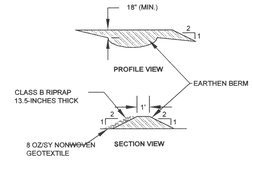
1. INSPECT OUTLETS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (0.5" OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. CLEAN OUT SEDIMENT, STRAW, LIMBS, OR OTHER DEBRIS THAT COULD CLOG THE OUTLET WHEN NEEDED.
2. SHOULD THE FABRICS OF THE OUTLET COLLAPSE, TEAR, OR BECOME INEFFECTIVE REPLACE THEM PROMPTLY.
3. REMOVE SEDIMENT ACCUMULATED BEHIND THE OUTLET AS NEEDED TO PREVENT DAMAGE SILT FENCE AND OUTLET MEASURES. ADD STONE TO OUTLET AS NEEDED TO MAINTAIN DESIGN HEIGHT AND CROSS SECTION.
4. REMOVE ALL FENCING AND OUTLET MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

*REF: NC DOT Roadway Standard Detail 1606.01 - Special Sediment Control Fence, 2006





PLAN VIEW



MAINTENANCE NOTES:

1. INSPECT DIVERSION BERMS AND ASSOCIATED OUTLETS AT LEAST ONCE EVERY 7 CALENDAR DAYS AND AFTER EACH RAINFALL EVENT THAT EXCEEDS 0.5 INCHES.
2. KEEP DIVERSION BERMS FREE OF DEBRIS AND OBSTRUCTIONS.
3. SEED AND MULCH THE DOWNSTREAM FACE OF DIVERSION BERMS FOLLOWING CONSTRUCTION.
4. ADDITIONAL MEASURES MAY BE REQUIRED AS CONDITIONS IN THE FIELD CHANGE.

GENERAL NOTES:

1. INSTALL DIVERSION BERMS AT APPROXIMATE LOCATIONS AS SHOWN ON THE DRAWINGS.
2. CONSTRUCT DIVERSION BERMS OF COMPACTED EARTH. DIVERSION BERMS MUST BE A MINIMUM OF 18 INCHES TALL/DEEP ABOVE THE EDGE OF THE PERIMETER CHANNEL.
3. DIVERSION BERMS WILL DIRECT FLOW INTO EXISTING PERMANENT SLOPE DRAINS AND/OR PROPOSED CHANNEL BREAKS.
4. DIVERSION BERMS SHALL BE GRADED SUCH THAT THE TOP OF THE BERM IS AT A CONSTANT ELEVATION AND AT LEAST 1 FOOT WIDE.
5. ARMOR UPSTREAM SIDE OF DIVERSION BERM WITH CLASS B EROSION CONTROL STONE.

9 / 3 DIVERSION BERM DETAIL
NTS

S&ME
WWW.SMEINC.COM
9751 SOUTHERN PINE BLVD.
CHARLOTTE, N.C. 28273
PH: (704)525-4429

NORTH CAROLINA PROFESSIONAL SEAL 24486 ENGINEER JASON S. REEVES

NO.	DATE	DESCRIPTION	BY

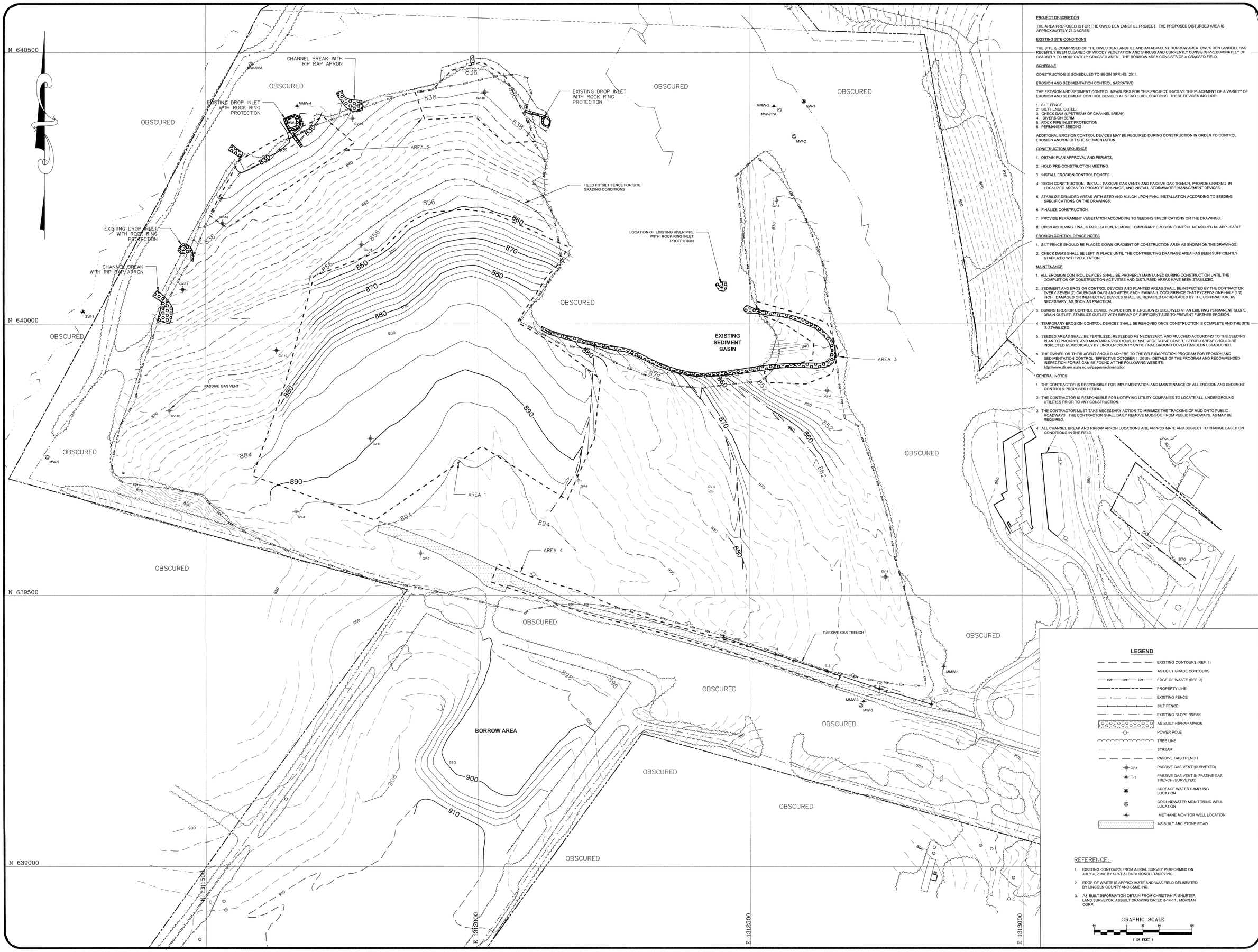
E&SC AND GRADING DETAILS
CORRECTIVE ACTION PLAN CONSTRUCTION

OWL'S DEN LANDFILL
LINCOLN COUNTY, NORTH CAROLINA

SAME ENGINEERING LICENSE NO.: F-0176

DRAWN BY:	CHECKED BY:
CHR	JRP
DESIGNED BY:	APPROVED BY:
JRP	JSR

PROJECT NUMBER: 1356-10-033
SCALE: N.T.S.
DATE: 8-29-12
DRAWING: 2
OF: 5



PROJECT DESCRIPTION

THE AREA PROPOSED IS FOR THE OWL'S DEN LANDFILL PROJECT. THE PROPOSED DISTURBED AREA IS APPROXIMATELY 27.3 ACRES.

EXISTING SITE CONDITIONS

THE SITE IS COMPRISED OF THE OWL'S DEN LANDFILL AND AN ADJACENT BORROW AREA. OWL'S DEN LANDFILL HAS RECENTLY BEEN CLEARED OF WOODY VEGETATION AND SHRUBS AND CURRENTLY CONSISTS PREDOMINATELY OF SPARSELY TO MODERATELY GRASSED AREA. THE BORROW AREA CONSISTS OF A GRASSED FIELD.

SCHEDULE

CONSTRUCTION IS SCHEDULED TO BEGIN SPRING, 2011.

EROSION AND SEDIMENTATION CONTROL NARRATIVE

THE EROSION AND SEDIMENT CONTROL MEASURES FOR THIS PROJECT INVOLVE THE PLACEMENT OF A VARIETY OF EROSION AND SEDIMENT CONTROL DEVICES AT STRATEGIC LOCATIONS. THESE DEVICES INCLUDE:

1. SILT FENCE
2. SILT FENCE OUTLET
3. CHECK DAM (UPSTREAM OF CHANNEL BREAK)
4. DIVERSION BERM
5. ROCK PIPE INLET PROTECTION
6. PERMANENT SEEDING

ADDITIONAL EROSION CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION.

CONSTRUCTION SEQUENCE

1. OBTAIN PLAN APPROVAL AND PERMITS.
2. HOLD PRE-CONSTRUCTION MEETING.
3. INSTALL EROSION CONTROL DEVICES.
4. BEGIN CONSTRUCTION. INSTALL PASSIVE GAS VENTS AND PASSIVE GAS TRENCH, PROVIDE GRADING IN LOCALIZED AREAS TO PROMOTE DRAINAGE, AND INSTALL STORMWATER MANAGEMENT DEVICES.
5. STABILIZE DENUDED AREAS WITH SEED AND MULCH UPON FINAL INSTALLATION ACCORDING TO SEEDING SPECIFICATIONS ON THE DRAWINGS.
6. FINALIZE CONSTRUCTION.
7. PROVIDE PERMANENT VEGETATION ACCORDING TO SEEDING SPECIFICATIONS ON THE DRAWINGS.
8. UPON ACHIEVING FINAL STABILIZATION, REMOVE TEMPORARY EROSION CONTROL MEASURES AS APPLICABLE.

EROSION CONTROL DEVICE NOTES

1. SILT FENCE SHOULD BE PLACED DOWN-GRADIENT OF CONSTRUCTION AREA AS SHOWN ON THE DRAWINGS.
2. CHECK DAMS SHALL BE LEFT IN PLACE UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN SUFFICIENTLY STABILIZED WITH VEGETATION.

MAINTENANCE

1. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING CONSTRUCTION UNTIL THE COMPLETION OF CONSTRUCTION ACTIVITIES AND DISTURBED AREAS HAVE BEEN STABILIZED.
2. SEDIMENT AND EROSION CONTROL DEVICES AND PLANTED AREAS SHALL BE INSPECTED BY THE CONTRACTOR EVERY SEVEN (7) CALENDAR DAYS AND AFTER EACH RAINFALL OCCURRENCE THAT EXCEEDS ONE-HALF (1/2) INCH. DAMAGED OR INEFFECTIVE DEVICES SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS NECESSARY, AS SOON AS PRACTICAL.
3. DURING EROSION CONTROL DEVICE INSPECTION, IF EROSION IS OBSERVED AT AN EXISTING PERMANENT SLOPE DRAIN OUTLET, STABILIZE OUTLET WITH RIPRAP OF SUFFICIENT SIZE TO PREVENT FURTHER EROSION.
4. TEMPORARY EROSION CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
5. SEEDED AREAS SHALL BE FERTILIZED, RESEEDED AS NECESSARY, AND MULCHED ACCORDING TO THE SEEDING PLAN TO PROMOTE AND MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. SEEDED AREAS SHOULD BE INSPECTED PERIODICALLY BY LINCOLN COUNTY UNTIL FINAL GROUND COVER HAS BEEN ESTABLISHED.
6. THE OWNER OR THEIR AGENT SHOULD ADHERE TO THE SELF-INSPECTION PROGRAM FOR EROSION AND SEDIMENTATION CONTROL (EFFECTIVE OCTOBER 1, 2010). DETAILS OF THE PROGRAM AND RECOMMENDED INSPECTION FORMS CAN BE FOUND AT THE FOLLOWING WEBSITE:
http://www.dir.enr.state.nc.us/pages/sedimentation

GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROLS PROPOSED HEREIN.
2. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING UTILITY COMPANIES TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PUBLIC ROADWAYS. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PUBLIC ROADWAYS, AS MAY BE REQUIRED.
4. ALL CHANNEL BREAK AND RIPRAP APRON LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON CONDITIONS IN THE FIELD.

LEGEND

- EXISTING CONTOURS (REF. 1)
- AS BUILT GRADE CONTOURS
- EDGE OF WASTE (REF. 2)
- PROPERTY LINE
- EXISTING FENCE
- SILT FENCE
- EXISTING SLOPE BREAK
- AS-BUILT RIPRAP APRON
- POWER POLE
- TREE LINE
- STREAM
- PASSIVE GAS TRENCH
- GV-1 PASSIVE GAS VENT (SURVEYED)
- T-1 PASSIVE GAS VENT IN PASSIVE GAS TRENCH (SURVEYED)
- SURFACE WATER SAMPLING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- METHANE MONITOR WELL LOCATION
- AS-BUILT ABC STONE ROAD

REFERENCE:

1. EXISTING CONTOURS FROM AERIAL SURVEY PERFORMED ON JULY 4, 2010. BY SPATIALDATA CONSULTANTS INC.
2. EDGE OF WASTE IS APPROXIMATE AND WAS FIELD DELINEATED BY LINCOLN COUNTY AND S&ME INC.
3. AS-BUILT INFORMATION OBTAIN FROM CHRISTIAN P. SHURTER LAND SURVEYOR, ASBUILT DRAWING DATED 8-14-11 , MORGAN CORP.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

S&ME
WWW.SMEINC.COM
9751 SOUTHERN PINE BLVD.
CHARLOTTE, N.C. 28273
PH: (704)523-4726

NORTH CAROLINA PROFESSIONAL SEAL 24488 ENGINEER JASON S. REEVES

NO.	DATE	DESCRIPTION	BY

RECORD DRAWING
CORRECTIVE ACTION PLAN CONSTRUCTION

OWL'S DEN LANDFILL
LINCOLN COUNTY, NORTH CAROLINA

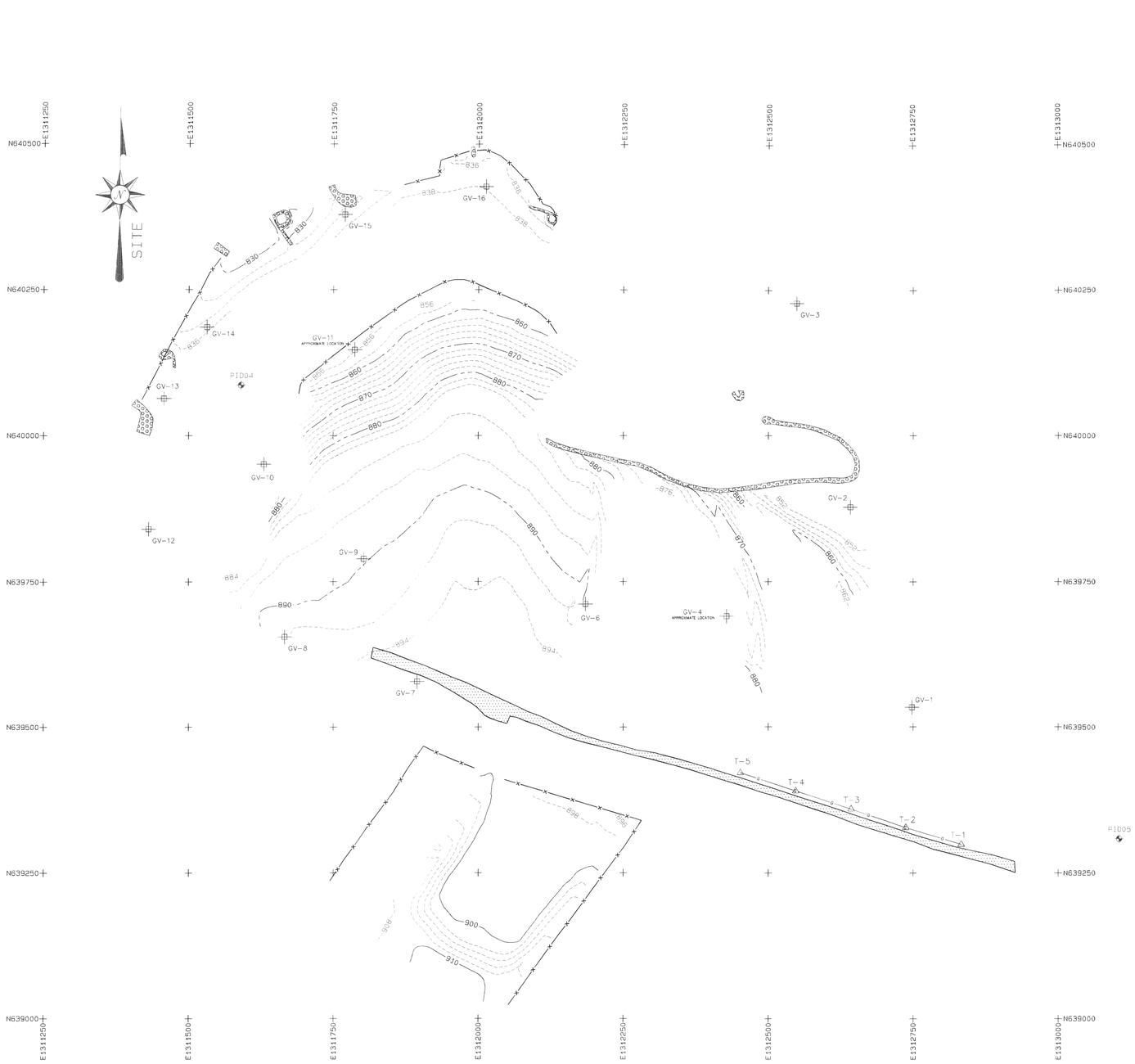
S&ME ENGINEERING LICENSE NO.
F-0176

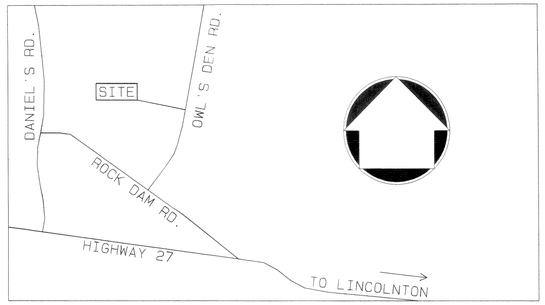
DRAWN BY:	CHECKED BY:
CLD	JRP
DESIGNED BY:	APPROVED BY:
JRP	JSR

PROJECT NUMBER
1356-10-033

SCALE:	DATE:
1" = 60'	8-29-12

DRAWING:	OF:
3	5





VICINITY MAP - NOT TO SCALE

NOTES

1. THE STREET ADDRESS OF THE PROPERTY SHOWN ON THIS SURVEY IS 701 OWLS DEN ROAD, LINCOLNTON, NORTH CAROLINA 28092
2. THE LAND SURVEYOR WHOSE SEAL IS AFFIXED HEREON DOES NOT GUARANTEE THE ALL EASEMENTS THAT MAY AFFECT THIS PROPERTY ARE SHOWN.
3. THIS DRAWING WAS CREATED ELCTRONICALLY, THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT UNLESS IT HAS BEEN PROPERLY SIGNED AND SEALED BY THE LAND SURVEYOR.
4. TWO-FOOT CONTOURS ARE SHOWN.
5. THIS SURVEY IS REFERENCED TO SURVEY CONTROL PROVIDED BY THE OWNER AND SHOWN HEREON. ALL BENCHMARKS SHOWN ARE #4 REBAR WITH PLASTIC CAP.
6. ANY UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THAT AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED.

LEGEND

CONTOUR	880
SILT FENCE	
PASSIVE GAS TRENCH	
PASSIVE GAS VENT (TRENCH)	T-1
PASSIVE GAS VENT	GV-1
BENCHMARK	PID05
RIPRAP	
ABC STONE ROAD	

I, CHRISTIAN P. SHURTER, CERTIFY THAT THIS SURVEY WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION THAT THIS SURVEY WAS PERFORMED TO MEET FEDERAL GEOGRAPHIC DATA COMMITEE STANDARDS AS APPLICABLE; THAT THE ORIGINAL DATA WAS OBTAINED JULY 8, 2011; AND ALL COORDINATES ARE BASED ON SURVEY CONTROL PROVIDED BY THE OWNER SHOWN HEREON.

NORTH CAROLINA PROFESSIONAL SEAL L-4841 LAND SURVEYOR CHRISTIAN P. SHURTER
8/14/2011

BENCHMARKS				
Pt #	Northing	Easting	Elevation	Descriptor
101	638469.5200	1310659.9800	872.41	PID01
102	638286.0500	1312716.9000	893.31	PID02
103	640711.5100	1313768.1800	839.24	PID03
104	640086.2200	1311590.3200	850.74	PID04
105	639308.3176	1313105.3045	866.18	PID05

GRAPHIC SCALE 1" = 100'
0 100 200 300

SCALE	1" = 100'
DATE	08/14/2011
DRAWN BY	CPS
CHECKED BY	CPS
PROJECT NO.	2493-001
SHEET NO.	1 OF 1

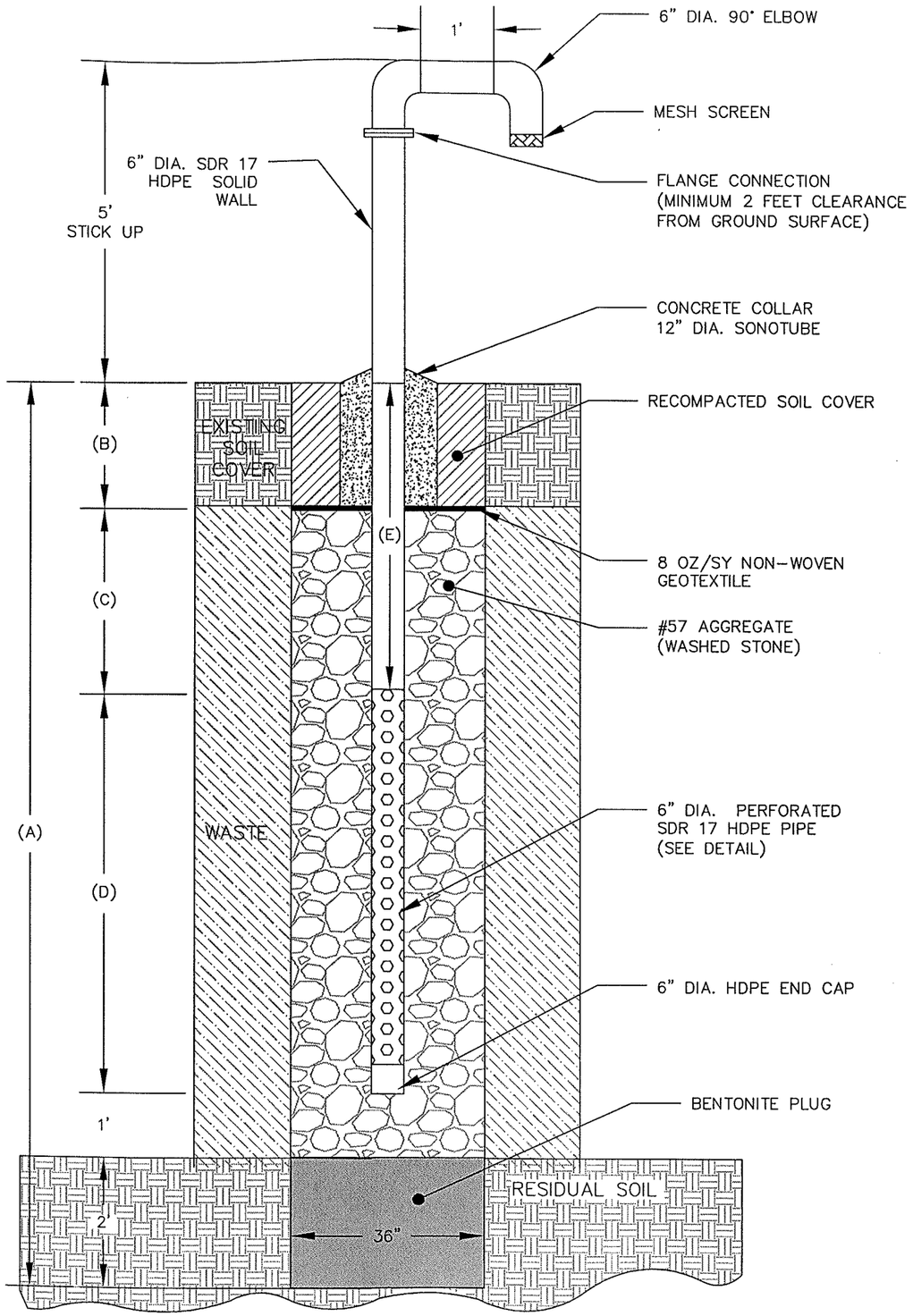
ASBUILT DRAWING

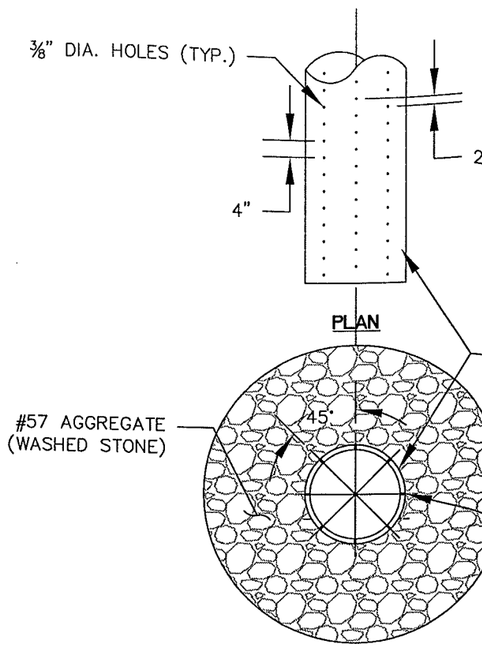
FOR
MORGAN CORP.
OF
OWL'S DEN LANDFILL
CORRECTIVE ACTION PLAN CONSTRUCTION

LINCOLN COUNTY NORTH CAROLINA

CHRISTIAN P. SHURTER
NORTH CAROLINA PROFESSIONAL LAND SURVEYOR L-4841

11700 REAMES ROAD, CHARLOTTE, NORTH CAROLINA 28269
(704) 598-9117 office (704) 374-598-5973 fax





PIPE PERFORATIONS

Well ID	Total Drilled Depth (ft)	Soil Cover Thickness* (ft)	Depth to Top of Perforated Pipe Below Soil Cover (ft)	Length of Perforated Pipe (ft)	Depth to Top of Perorated Pipe Below Ground Surface (ft)
	(A)	(B)	(C)	(D)	(E)
GV-1	15	3	2	7	5
GV-2	15	1.5	3.5	7	5
GV-3	13	3	2	5	5
GV-4	24	3	7	11	10
GV-5	Not Installed Due To No Waste In the Area (See Report For Details)				
GV-6	15	2.5	2.5	7	5
GV-7	35	3	7	22	10
GV-8	47	2	8	34	10
GV-9	26	1.5	8.5	13	10
GV-10	35	2	8	22	10
GV-11	14	2.5	3.5	5	6
GV-12	30	1.5	8.5	17	10
GV-13	20	4	6	7	10
GV-14	16	2	8	3	10
GV-15	23	2	8	10	10
GV-16	25	3	7	12	10

* Soil cover thickness was measured prior to regrading activities.

NORTH CAROLINA LICENSED SEAL 1995 GEOLOGIST JULIE R. PETERSEN 8/29/12

NORTH CAROLINA PROFESSIONAL SEAL 24486 ENGINEER CHARLES E. REEVES 8/30/12

S&ME WWW.SMEINC.COM

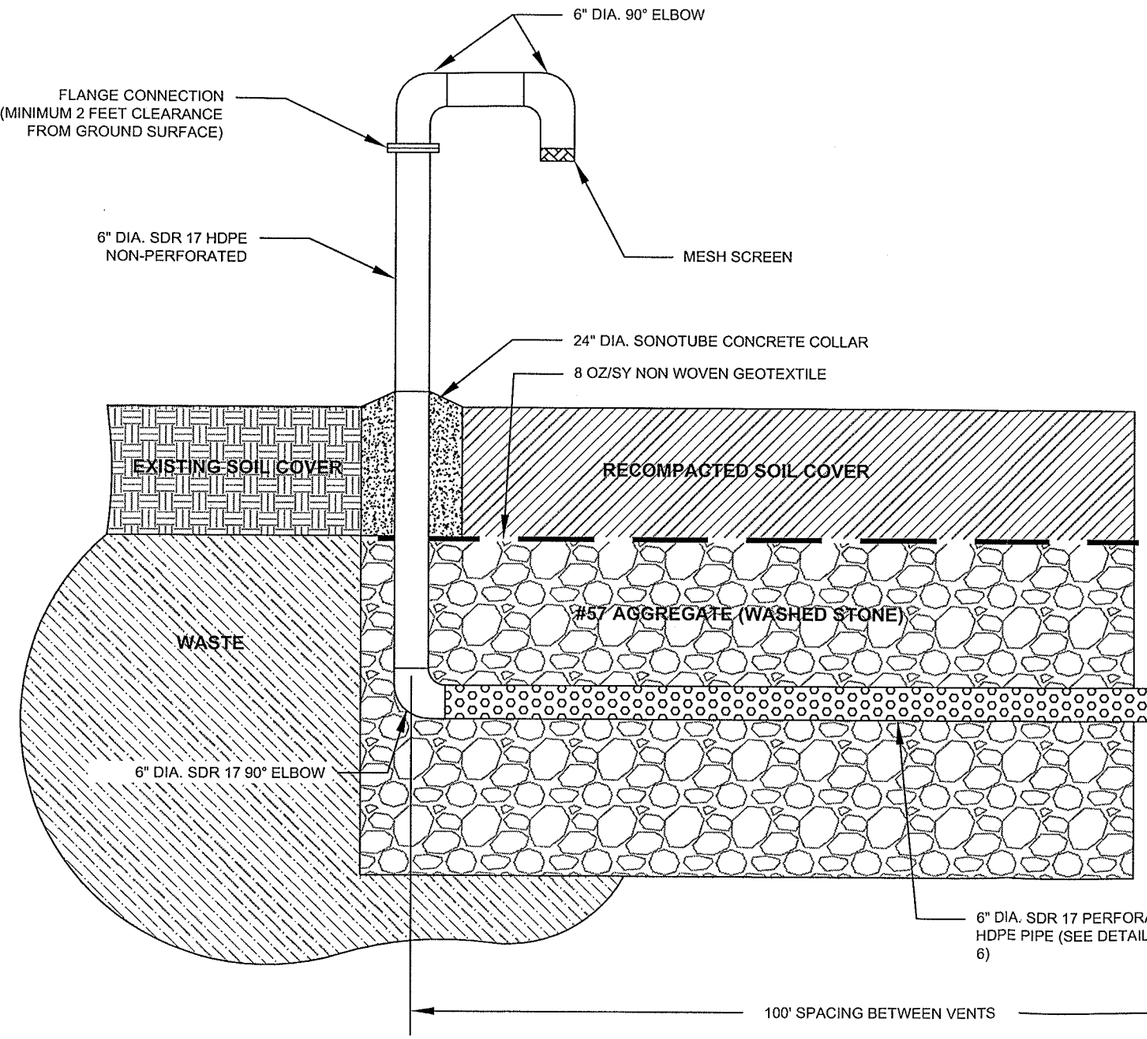
SCALE:	DATE:
N.T.S.	8-29-12
PROJECT NO.	DRAWN BY:
1356-10-033	CLD
ENGINEERING LICENSE NO:	CHECKED BY:
F-0176	JRP

RECORD DRAWING
PASSIVE GAS VENTS

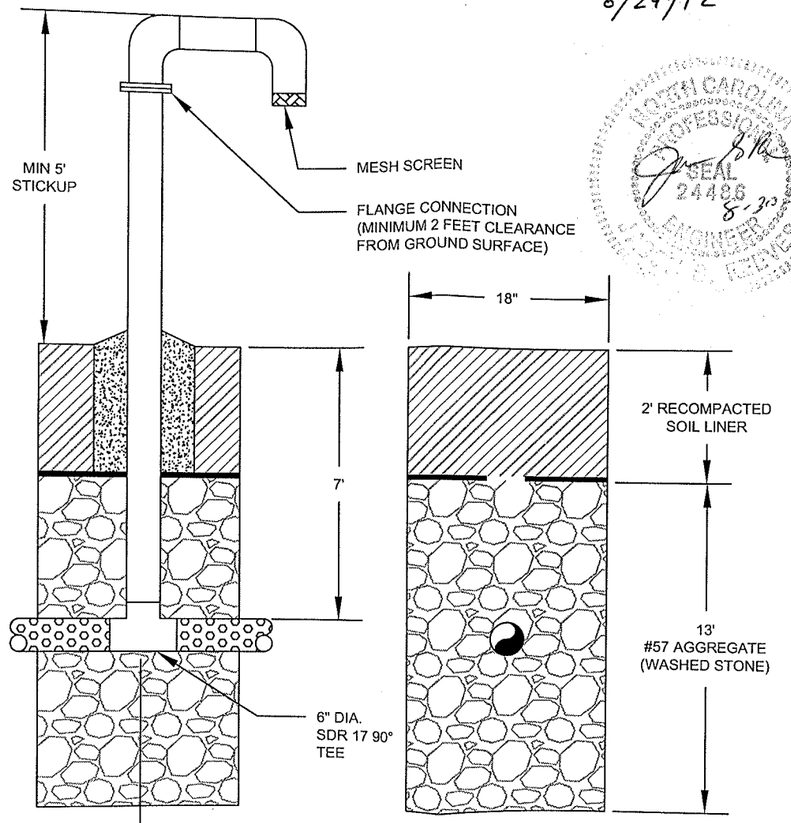
OWL'S DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

DRAWING NO.
4 of 5

Drawing path: Q:\1356\LINCOLN COUNTY\10-033 OWLS DEN CORRECTIVE ACTION PHII\CAD\CORRECTIVE ACTION REPORT\PASSIVE GAS VENT.DWG



PROFILE VIEW



CROSS SECTION VIEW

NORTH CAROLINA LICENSED SEAL 1995 GEOLOGIST JULIE R. PETERSEN

8/29/12

NORTH CAROLINA PROFESSIONAL SEAL 24486 ENGINEER

8-29-12

SCALE: NTS	PROJECT NO. 1356-10-033	ENGINEERING LICENSE NO: F-0176	DATE: 8-29-12
			DRAWN BY: CLD
			CHECKED BY: JRP

S&ME

WWW.SMEINC.COM

RECORD DRAWING
PASSIVE GAS TRENCH

OWL'S DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

FIGURE NO.

5 of 5

Drawing path:

APPENDIX II

PHOTOGRAPHS FROM FIELD ACTIVITIES

OWL'S DEN LANDFILL
CORRECTIVE ACTION IMPLEMENTATION
PHOTOGRAPHS FROM FIELD ACTIVITIES
S&ME PROJECT NO. 1356-10-033

Photo 1		
	**Date:** 6/9/2011	**Photographer:** J. Addis
Activity	Passive Gas Vent Installation	
Remarks	Bucket auger rig drilling for passive gas vents.	

Photo 2		
	**Date:** 6/10/2011	**Photographer:** J. Addis
Activity	Passive Gas Vent Installation	
Remarks	Typical waste excavated from borehole.	

Photo 3		
	**Date:** 6/10/2011	**Photographer:** J. Addis
Activity	Passive Gas Vent Installation	
Remarks	Backfilling the vent with #57 Stone.	

Photo 4		
	**Date:** 6/14/2011	**Photographer:** J. Addis
Activity	Passive Gas Vent Installation	
Remarks	Concrete collar.	

Photo 5		
	**Date:** 6/30/2011	
	Photographer: J. Petersen	
Activity	Passive Gas Vent Installation	
Remarks	Completed passive gas vent installation with goose neck.	

Photo 6		
	**Date:** 6/2/2011	
	Photographer: J. Addis	
Activity	Passive Gas Trench Installation	
Remarks	Excavation of trench.	

Photo 7		
		**Date:** 6/3/2011 **Photographer:** J. Addis
Activity	Passive Gas Trench Installation	
Remarks	Stone backfill prior to vent pipe installation.	

Photo 8		
		**Date:** 6/7/2011 **Photographer:** J. Addis
Activity	Passive Gas Trench Installation	
Remarks	Installation of the vent piping.	

Photo 9		
	**Date:** 6/30/2011	
	Photographer: J. Petersen	
Activity	Passive Gas Trench Installation	
Remarks	Completed passive gas trench.	

Photo 10		
	**Date:** 6/30/2011	
	Photographer: J. Petersen	
Activity	Construction and Rehabilitation of Stormwater Features	
Remarks	Cleaned-out sediment basin and rock ring inlet protection.	

Photo 11		
	**Date:** 6/30/2011	
	Photographer: J. Petersen	
Activity	Construction and Rehabilitation of Stormwater Features	
Remarks	Rehabilitation of rip rap channel.	

Photo 12		
	**Date:** 6/30/2011	
	Photographer: J. Petersen	
Activity	Construction and Rehabilitation of Stormwater Features	
Remarks	Extension of rip rap channel to sediment basin.	

Photo 13		
	**Date:** 6/6/2011	**Photographer:** J. Addis
Activity	Construction and Rehabilitation of Stormwater Features	
Remarks	Rock ring inlet protection around existing drop inlets.	

Photo 14		
	**Date:** 6/6/2011	**Photographer:** J. Addis
Activity	Construction and Rehabilitation of Stormwater Features	
Remarks	Diversion berm and rip rap apron.	

Photo 15		
	**Date:** 6/30/2011	**Photographer:** J. Petersen
Activity	Construction and Rehabilitation of Stormwater Features	
Remarks	Rehabilitation of slope breaks.	

Photo 16		
	**Date:** 6/10/2011	**Photographer:** J. Addis
Activity	Re-Grading of Soil Cover	
Remarks	Re-shaping of Area 1.	

Photo 17		
	**Date:** 6/14/2011	**Photographer:** J. Addis
Activity	Re-Grading of Soil Cover	
Remarks	Burial of investigative derived waste.	

Photo 18		
	**Date:** 6/30/2011	**Photographer:** J. Petersen
Activity	Re-Grading of Soil Cover	
Remarks	Re-graded Area 1 prior to final seed and mulch.	

APPENDIX III

MONTHLY METHANE GAS MONITORING

Table 1 - Methane Gas Measurements

Data Tracking
Owl's Den Landfill (Permit #55-02)

S&ME

Percent Methane Gas by Date

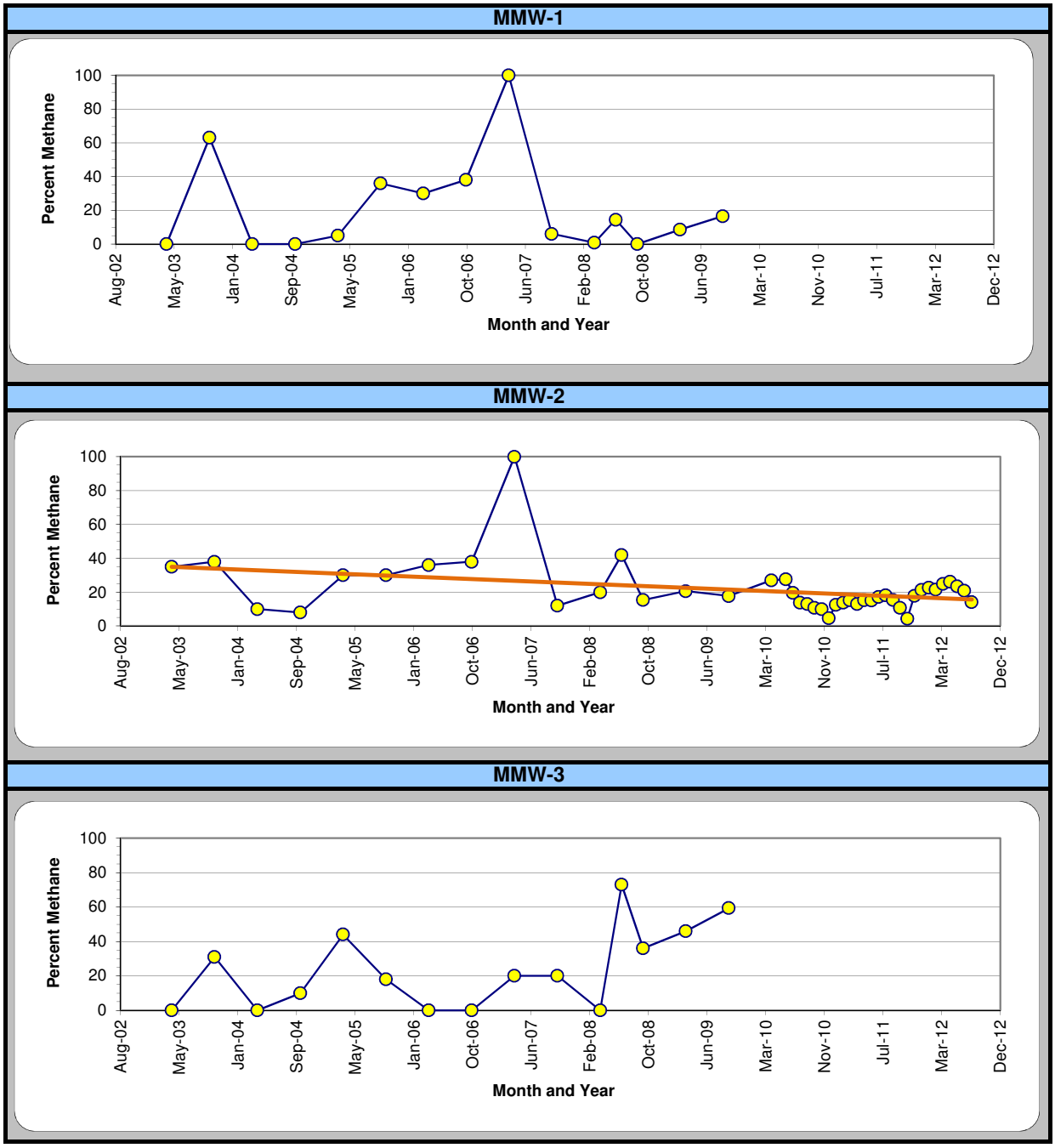
Date	Well Identification								
	MMW-1	MMW-2	MMW-3	MMW-4	MMW-5	MMW-6	MMW-7	MMW-8	MMW-9
Apr-03	0	35	0	62	N/A	N/A	N/A	N/A	N/A
Oct-03	63	38	31	56	N/A	N/A	N/A	N/A	N/A
Apr-04	0	10	0	0	N/A	N/A	N/A	N/A	N/A
Oct-04	0	8	10	38	N/A	N/A	N/A	N/A	N/A
Apr-05	5	30	44	68	N/A	N/A	N/A	N/A	N/A
Oct-05	36	30	18	58	N/A	N/A	N/A	N/A	N/A
Apr-06	30	36	0	0	N/A	N/A	N/A	N/A	N/A
Oct-06	38	38	0	58	N/A	N/A	N/A	N/A	N/A
Apr-07	100	100	20	100	N/A	N/A	N/A	N/A	N/A
Oct-07	6	12	20	55	N/A	N/A	N/A	N/A	N/A
Apr-08	0.8	20	0	0	N/A	N/A	N/A	N/A	N/A
Jul-08	14.4	42	73	0.2	10.6	0	0	0	0
Oct-08	0	15.4	36	12.6	6.2	3.1	0	0	0
Apr-09	8.5	20.6	46	0	6.6	0.2	0	0	0
Oct-09	16.5	17.7	59.3	61.3	4.2	0	0	0	0
Apr-10	N/A	27	N/A	0.2	8.5	0	0	0	0
Jun-10	N/A	27.6	N/A	68.4	9.9	1.5	0	0	0
Jul-10	N/A	19.6	N/A	66.9	9.4	1.7	0	0	0
Aug-10	N/A	13.8	N/A	48.4	6	0	0	0	0
Sep-10	N/A	13	N/A	0	5.3	0	0	0	0
Oct-10	N/A	10.7	N/A	58.5	4.3	0	0	0	0
Nov-10	N/A	10	N/A	6.8	4.1	0	0	0	0
Dec-10	N/A	4.6	N/A	0.1	3.7	0	0	0	0
Jan-11	N/A	12.6	N/A	41.2	3.4	0.2	0	0	0
Feb-11	N/A	13.9	N/A	36.7	4.4	0.2	0	0	0
Mar-11	N/A	15.3	N/A	11.1	4.8	0	0	0	0
Apr-11	N/A	13.1	N/A	0.2	6.2	0	0	0	0
May-11	N/A	15.2	N/A	9.6	3.4	0	0	0	0
Jun-11	N/A	15.1	N/A	48.7	6.3	0	0	0	0
Jul-11	N/A	17.2	N/A	42	9	0	0	0	0
Aug-11	N/A	18.2	N/A	0	5.2	0	0	0	0
Sep-11	N/A	15.5	N/A	66.5	3.7	0	0	0	0
Oct-11	N/A	10.7	N/A	6.4	3.6	0	0	0	0
Nov-11	N/A	4.3	N/A	59.3	3.4	0	0	0	0
Dec-11	N/A	17.9	N/A	60.2	3.8	0.1	0	0	0
Jan-12	N/A	21.4	N/A	36.2	5.4	0	0	0	0
Feb-12	N/A	22.6	N/A	0	5.9	0	0	0	0
Mar-12	N/A	21.6	N/A	36.3	5.9	0	0	0	0
Apr-12	N/A	24.9	N/A	19.7	6.1	0	0	0	0
May-12	N/A	26.2	N/A	70.5	5.2	0.2	0	0	0
Jun-12	N/A	23.4	N/A	70.9	4.5	0	0	0	0
Jul-12	N/A	20.9	N/A	0	3.9	0	0	0	0
Aug-12	N/A	14.2	N/A	8.3	2.4	0	0	0	0

Notes:
(1) Recorded measurements are in percent methane.
(2) Methane monitoring wells 5 through 9 were installed during the 2008 assessment activities.
(3) Methane monitoring wells 1 and 3 were removed from the monitoring plan following the 2008 assessment activities due to their close proximity to the edge of waste.
(4) Highlighted data are above 100 percent of the lower explosive limit.
(5) Lower explosive limit for methane is 5 percent.
(6) Upper explosive limit for methane is 15 percent.
(7) N/A = Not Available

Charts - Methane Gas Measurements

Data Tracking
Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date

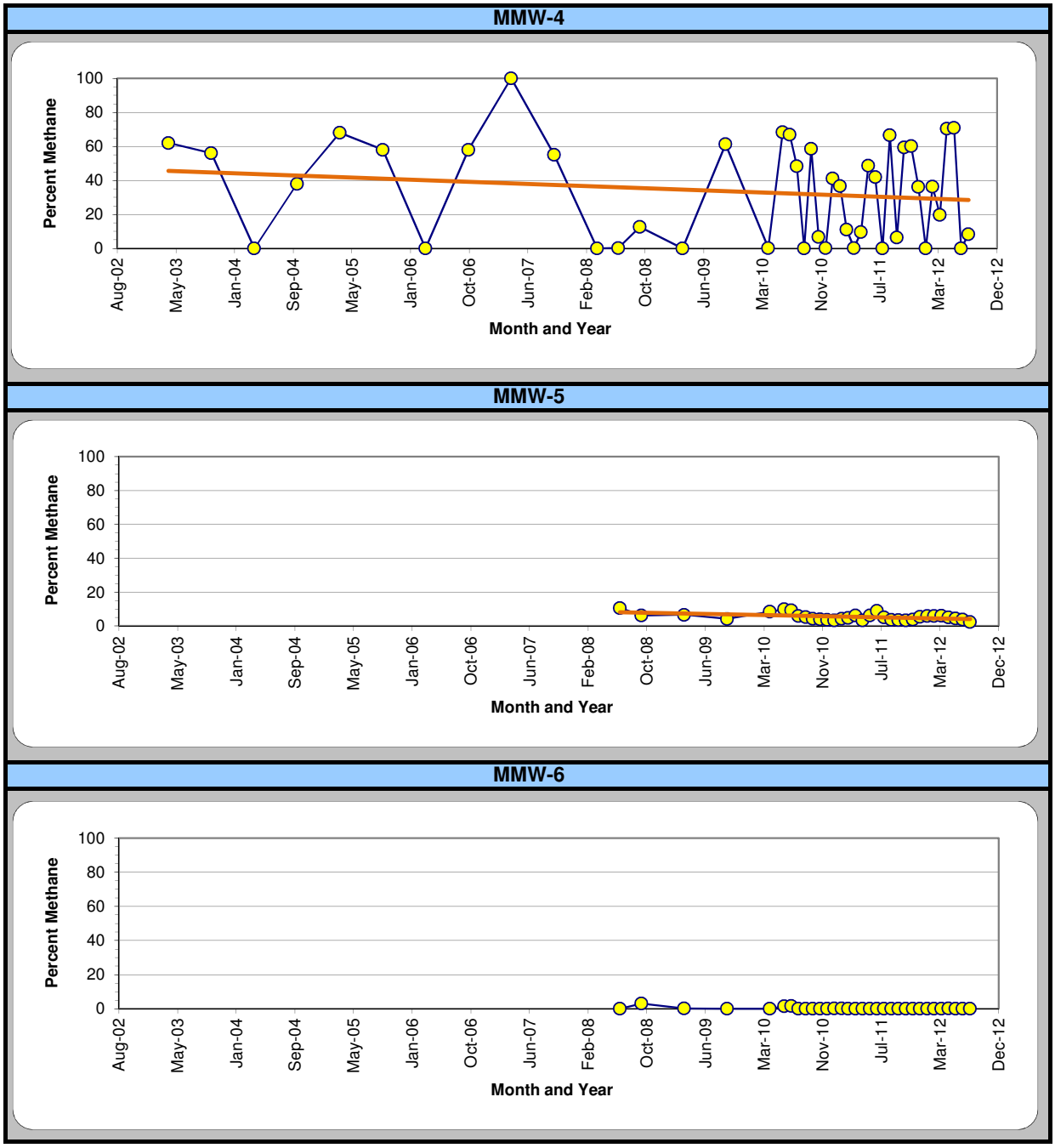


Charts - Methane Gas Measurements

Data Tracking

Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date

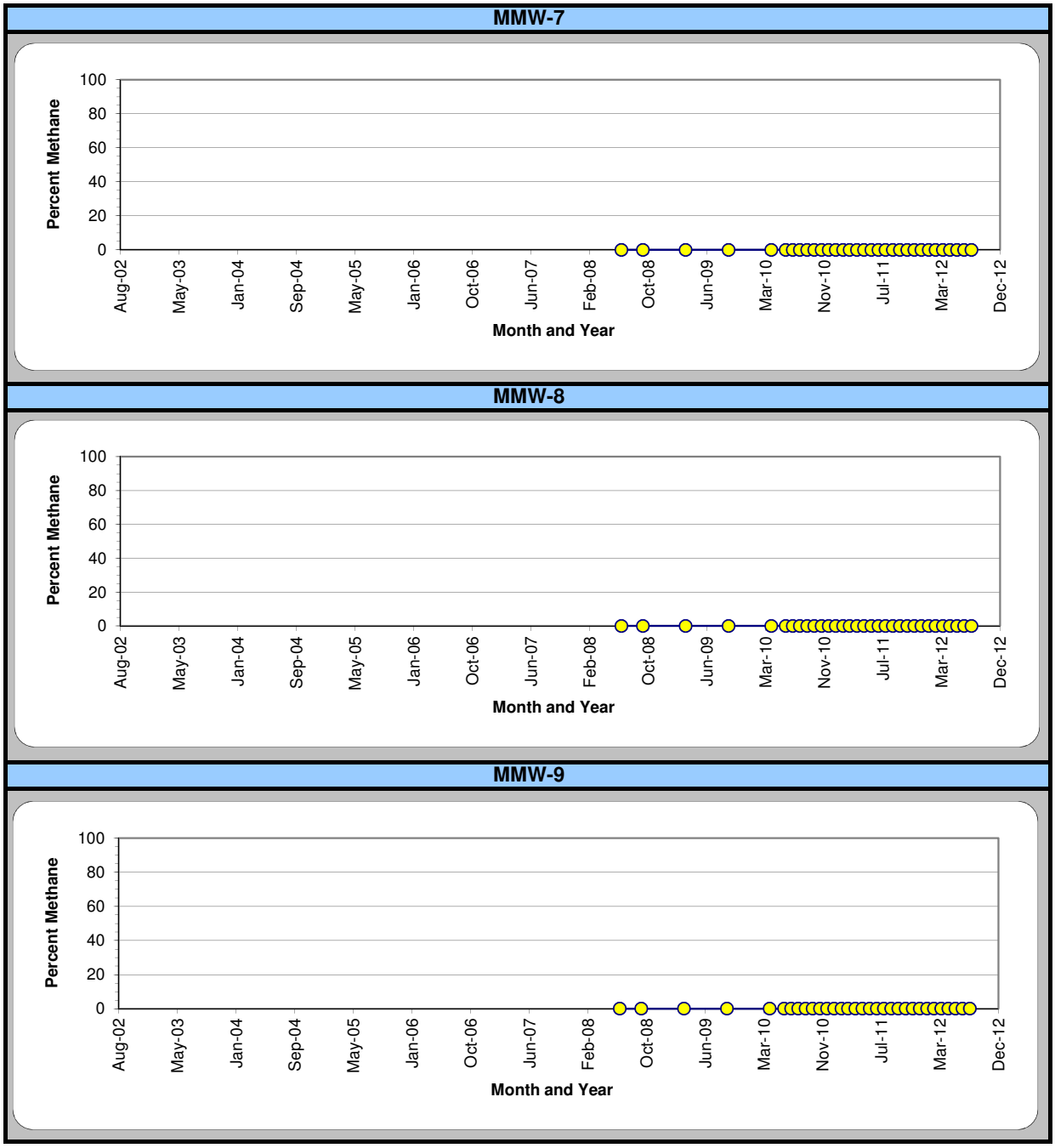


Charts - Methane Gas Measurements

Data Tracking

Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date



Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 8/10/2010

Field Personnel: Mark Bivins, Jimmy Wise

Ambient Outside Temperature: 82°F

Ambient Barometric Pressure: not measured

General Weather Conditions: Clear, Sunny

Meter Name and Model Number: GEM 2000

Meter Calibration Date: 8/10/10, prior to field measurements

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	11:26	>100	13.8	14.9	6.8
MMW-4	11:14	>100	48.4	19.1	2.6
MMW-5	11:34	>100	6	16.6	3.6
MMW-6	11:40	0	0	0.5	19.1
MMW-7	11:46	0	0	1.1	17.1
MMW-8	11:59	0	0	0.1	19.3
MMW-9	11:51	0	0	1.2	18

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 9/7/2010

Field Personnel: Mark Bivins

Ambient Outside Temperature: 75°F

Ambient Barometric Pressure: 30.27

General Weather Conditions: Clear

Meter Name and Model Number: GEM 2000

Meter Calibration Date: 9/7/10, prior to field measurements

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:41	>100	13	15.2	6.6
MMW-4	10:22	0	0	0	19.7
MMW-5	11:00	>100	5.3	16.4	3.5
MMW-6	11:06	0	0	0.1	19.4
MMW-7	11:16	0	0	0.4	18.6
MMW-8	11:25	0	0	0.1	19.4
MMW-9	11:19	0	0	0.3	19

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 10/14/2010

Field Personnel: Mark Bivins, Jimmy Wise

Ambient Outside Temperature: 68°F

Ambient Barometric Pressure: 28.67

General Weather Conditions: Mostly Cloudy

Meter Name and Model Number: GEM 2000

Meter Calibration Date: 10/14/10, prior to field measurements

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	13:47	>100	10.7	15.2	5.9
MMW-4	13:30	>100	58.5	22.2	0.4
MMW-5	13:56	87	4.3	16.1	3.2
MMW-6	14:01	0	0	20	0.6
MMW-7	14:07	0	0	4.5	13.2
MMW-8	14:18	0	0	5	15.2
MMW-9	14:15	0	0	6.2	13.4

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 11/10/2010

Field Personnel: Mark Bivins, Steven Brown

Ambient Outside Temperature: 73°F

Ambient Barometric Pressure: 28.87

General Weather Conditions: Clear, Warm

Meter Name and Model Number: GEM 2000

Meter Calibration Date: 11/10/10, prior to field measurements

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	14:40	>100	11	18.2	2.4
MMW-4	14:11	>100	6.8	4.3	15.2
MMW-5	14:20	82	4.1	15.6	2.8
MMW-6	14:28	0	0	13.5	7.1
MMW-7	14:58	0	0	1.5	17.3
MMW-8	15:02	0	0	2.8	17.1
MMW-9	15:03	0	0	2.5	16.7

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 12/17/2010

Field Personnel: Mark Bivins

Ambient Outside Temperature: 45°F

Ambient Barometric Pressure: 29.91

General Weather Conditions: Clear, Cold

Meter Name and Model Number: GEM 2000

Meter Calibration Date: 12/17/10, prior to field measurements

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	11:56	98	4.6	11.3	18.4
MMW-4	11:28	3	0.1	0.5	19
MMW-5	11:39	74	3.7	14.3	3.1
MMW-6	11:45	0	0	0.1	19.7
MMW-7	12:09	0	0	0.3	19.1
MMW-8	12:21	0	0	0.1	19.7
MMW-9	12:29	0	0	0.2	19.7

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 1/25/2011

Field Personnel: Mark Bivins, Jim Rudisill

Ambient Outside Temperature: 32°F

Ambient Barometric Pressure: 30.16

General Weather Conditions: Overcast and Cool

Meter Name and Model Number: GEM 2000

Meter Calibration Date: 01/25/11, prior to field measurements

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:07	>100	12.6	18.1	0.7
MMW-4	9:56	>100	41.2	18	3.2
MMW-5	10:21	67	3.4	12.7	4.3
MMW-6	10:25	4	0.2	9.9	7.9
MMW-7	10:45	0	0	2.8	16
MMW-8	10:55	0	0	2.9	17.4
MMW-9	10:50	0	0	5.8	14.1

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 2/24/2011

Field Personnel: Mark Bivins, Jimmy Wise

Ambient Outside Temperature: 52.5 ºF

Ambient Barometric Pressure: 30.05" Falling

General Weather Conditions: Overcast

Meter Name and Model Number: Landtec GEM 2000

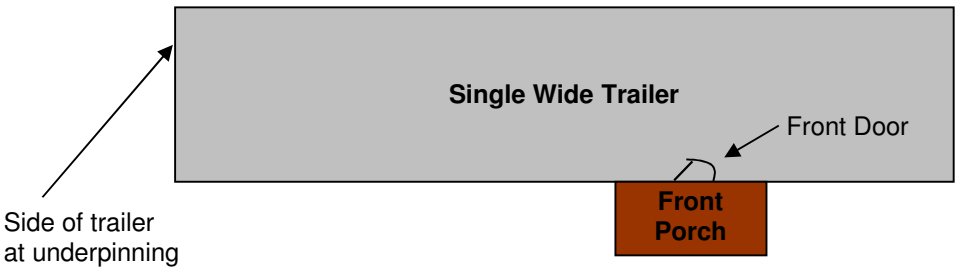
Meter Calibration Date: 2/24/2011

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	13:20	0	0	0.1	18.4
Underpinning	13:30	0	0	0.1	18.4

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 2/24/2011

Field Personnel: Mark Bivins, Jimmy Wise

Ambient Outside Temperature: 52.5°F

Ambient Barometric Pressure: 30.05" Falling

General Weather Conditions: Overcast

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 2/24/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	14:27	>100	13.9	15.1	4.2
MMW-4	13:42	>100	36.7	16.4	3.6
MMW-5	14:10	88	4.4	12.5	4.7
MMW-6	14:15	4	0.2	10.2	8.4
MMW-7	14:36	0	0	2.8	15.6
MMW-8	14:45	0	0	2.7	17.3
MMW-9	14:40	0	0	3.1	16.2

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 3/24/2011

Field Personnel: Mark Bivins

Ambient Outside Temperature: 60°F

Ambient Barometric Pressure: 29.68" Rising

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 3/24/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:25	>100	15.3	15.7	6.7
MMW-4	10:00	>100	11.1	4.7	16
MMW-5	10:09	96	4.8	12.7	5.3
MMW-6	10:13	0	0	0	19.4
MMW-7	10:37	0	0	0	19.7
MMW-8	10:51	0	0	0	19.8
MMW-9	10:42	0	0	0.1	19.7

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 5/19/2011

Field Personnel: Mark Bivins, Jim Rudisill

Ambient Outside Temperature: 79°F

Ambient Barometric Pressure: 29.67" Falling

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 5/19/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	14:12	>100	15.2	12.6	7.2
MMW-4	14:21	>100	9.6	5.8	15.4
MMW-5	14:28	68	3.4	10.1	9.4
MMW-6	14:37	0	0	0	18.9
MMW-7	14:52	0	0	0	19.2
MMW-8	15:04	0	0	0	19.6
MMW-9	15:07	0	0	0	19.7

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 6/28/2011

Field Personnel: Mark Bivins, Jimmy Wise

Ambient Outside Temperature: 75°F

Ambient Barometric Pressure: 30.01" Falling

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 6/28/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:15	>100	15.1	15.4	6.2
MMW-4	9:45	>100	48.7	20.3	0.9
MMW-5	9:58	>100	6.3	17.1	2.7
MMW-6	10:04	0	0	10.6	9.2
MMW-7	10:38	0	0	2	15.9
MMW-8	10:43	0	0	4.1	14.3
MMW-9	10:48	0	0	1.2	15.7

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 7/21/2011

Field Personnel: Jimmy Wise, Doug Morrison

Ambient Outside Temperature: 78°F

Ambient Barometric Pressure: 29.93"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 7/21/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	9:51	>100	17.2	17.7	4.7
MMW-4	9:19	>100	42	15.2	6.5
MMW-5	9:31	>100	9	14.4	4.6
MMW-6	9:35	0	0	0.1	19
MMW-7	9:59	0	0	0.1	19.2
MMW-8	10:15	0	0	0.1	19.2
MMW-9	10:03	0	0	3.4	19.3

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 8/23/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 64°F

Ambient Barometric Pressure: 30.09"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 8/23/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:09	>100	18.2	18.7	3.5
MMW-4	9:40	0	0	0	19.6
MMW-5	9:51	>100	5.2	18.6	0.8
MMW-6	9:58	0	0	0.1	19.2
MMW-7	10:19	0	0	0	19.3
MMW-8	10:38	0	0	0.3	19.5
MMW-9	10:26	0	0	0	15.1

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 9/28/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 59°F

Ambient Barometric Pressure: 29.89"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 9/28/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	9:30	>100	15.5	17.4	4
MMW-4	8:57	>100	66.5	21.9	0.2
MMW-5	9:08	69	3.7	17.2	2.1
MMW-6	9:15	0	0	0.2	19.3
MMW-7	9:39	0	0	1.5	17.1
MMW-8	10:05	0	0	0.2	19.4
MMW-9	9:50	0	0	11.9	8

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 9/28/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 59 °F

Ambient Barometric Pressure: 29.89"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

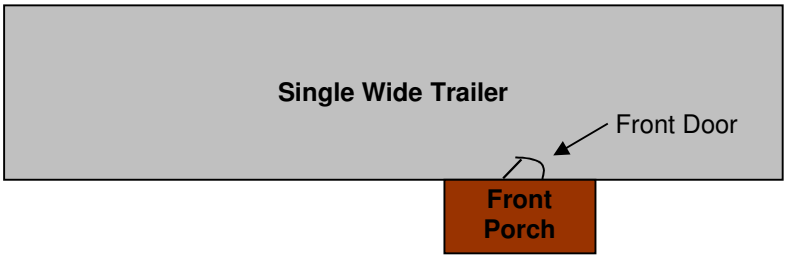
Meter Calibration Date: 9/28/2011

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	10:12	0	0	0.2	19.4

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 10/25/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 50°F

Ambient Barometric Pressure: 30.26"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 10/25/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:45	>100	10.7	13.4	6.9
MMW-4	10:10	>100	6.4	3.1	16.7
MMW-5	10:22	70	3.6	15.9	2
MMW-6	10:31	0	0	3.6	19.5
MMW-7	10:56	0	0	0	19.7
MMW-8	11:35	0	0	0	19.2
MMW-9	11:26	0	0	12.6	7.4

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 10/25/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 50 °F

Ambient Barometric Pressure: 30.26"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

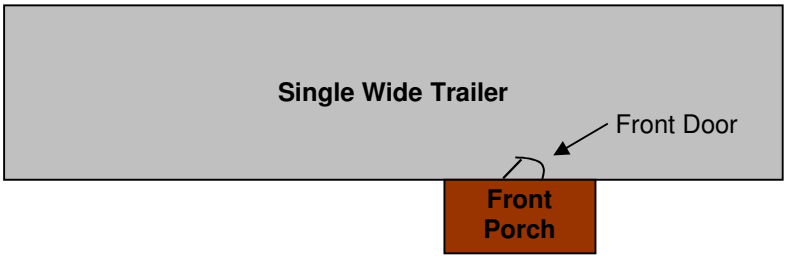
Meter Calibration Date: 10/25/2011

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	11:43	0	0	0	19.3

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 11/22/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 57°F

Ambient Barometric Pressure: 30.18"

General Weather Conditions: Haze

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 11/22/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	10:26	86	4.3	5.4	14.1
MMW-4	9:52	>100	59.3	21.5	0
MMW-5	10:06	68	3.4	15.2	2.3
MMW-6	10:15	0	0	16.6	4.5
MMW-7	10:37	0	0	3.4	14.3
MMW-8	10:58	0	0	3.8	15.6
MMW-9	10:44	0	0	12.5	7.5

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 11/22/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 57 °F

Ambient Barometric Pressure: 30.18"

General Weather Conditions: Haze

Meter Name and Model Number: Landtec GEM 2000

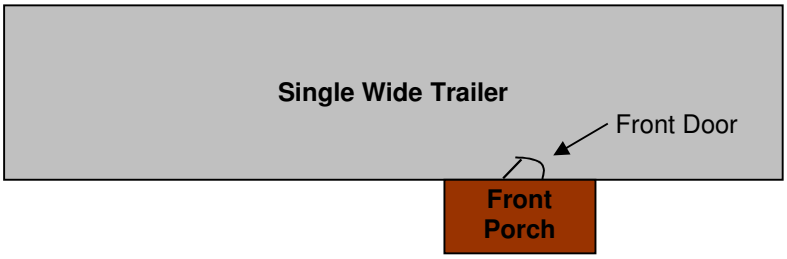
Meter Calibration Date: 11/22/2011

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	11:15	0	0	0.2	19.3

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 12/15/2011

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 63°F

Ambient Barometric Pressure: 30.15"

General Weather Conditions: Overcast

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 12/15/2011

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	14:24	>100	17.9	18.3	2.2
MMW-4	13:56	>100	60.2	21.5	0
MMW-5	14:06	76	3.8	15.1	1.8
MMW-6	14:12	0.3	0.1	18.7	0.3
MMW-7	14:32	0	0	3.6	14.1
MMW-8	14:54	0	0	5.7	14.2
MMW-9	14:43	0	0	12.4	7.5

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 1/18/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 43°F

Ambient Barometric Pressure: 30.02"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 1/18/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	11:15	>100	21.4	18.9	1.8
MMW-4	10:35	>100	36.2	13.8	7.4
MMW-5	10:53	>100	5.4	17.1	0
MMW-6	10:59	0	0	0	19.9
MMW-7	11:27	0	0	0	19.9
MMW-8	11:42	0	0	0	19.9
MMW-9	11:37	0	0	9.1	10.9

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 1/18/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 43 °F

Ambient Barometric Pressure: 30.07"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

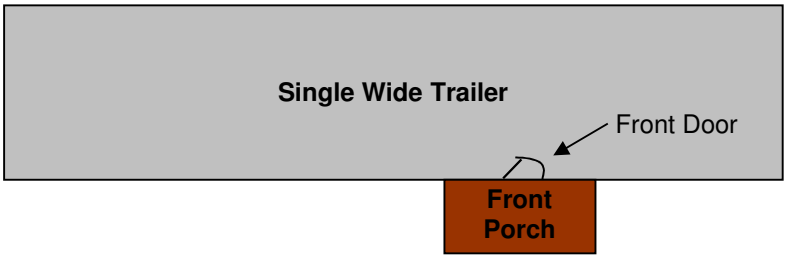
Meter Calibration Date: 1/18/2012

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	13:48	0	0	0	19.9

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 2/15/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 61°F

Ambient Barometric Pressure: 30.23"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 2/15/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	14:40	>100	22.6	19.7	1
MMW-4	14:04	0	0	0	18.9
MMW-5	14:15	>100	5.9	16.9	0
MMW-6	14:25	0	0	10.2	10.9
MMW-7	14:45	0	0	3	15.2
MMW-8	15:08	0	0	1.7	18
MMW-9	14:56	0	0	11.4	8.2

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 2/15/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 61 ºF

Ambient Barometric Pressure: 30.23"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

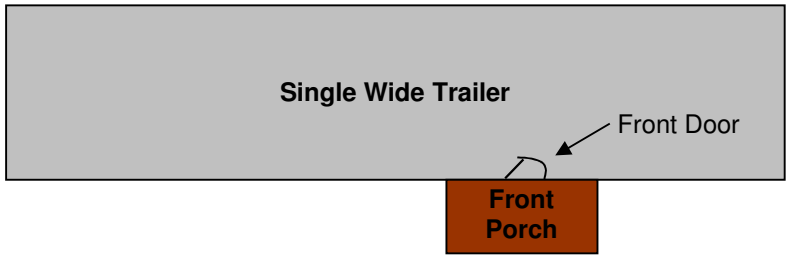
Meter Calibration Date: 2/15/2012

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	15:14	0	0	0.01	19.7

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 3/14/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 77°F

Ambient Barometric Pressure: 30.25"

General Weather Conditions: Cloudy

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 3/14/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	14:12	>100	21.6	17.9	2.8
MMW-4	13:40	>100	36.3	13.9	7.6
MMW-5	13:51	>100	5.9	17.3	0
MMW-6	13:59	0	0	8.6	11.2
MMW-7	14:21	0	0	1.9	15.4
MMW-8	14:36	0	0	4.7	14.7
MMW-9	14:27	0	0	10.5	8.3

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 4/11/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 55°F

Ambient Barometric Pressure: 30.02"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 4/11/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	13:35	>100	24.9	19	3.3
MMW-4	13:04	>100	19.7	9.9	11.3
MMW-5	13:15	>100	6.1	18	0
MMW-6	13:24	0	0	3	17.4
MMW-7	13:43	0	0	3.7	14.2
MMW-8	14:07	0	0	4.7	15.3
MMW-9	13:55	0	0	10.9	8.8

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 5/22/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 63°F

Ambient Barometric Pressure: 29.9"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 5/22/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	9:36	>100	26.2	21.1	1.7
MMW-4	8:55	>100	70.5	22.7	0
MMW-5	9:07	>100	5.2	18.8	0
MMW-6	9:18	5	0.2	16.6	8.6
MMW-7	9:50	0	0	4.3	12.4
MMW-8	10:12	0	0	5.6	14
MMW-9	10:00	0	0	11.3	7.9

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 5/22/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 63 °F

Ambient Barometric Pressure: 29.9"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

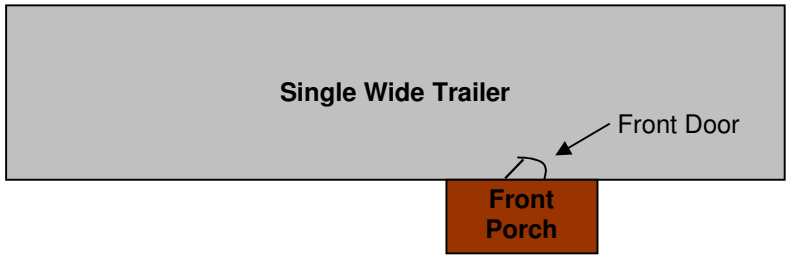
Meter Calibration Date: 5/22/2012

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	10:30	0	0	0.2	18.9

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 6/25/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 73°F

Ambient Barometric Pressure: 29.89"

General Weather Conditions: Haze

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 6/25/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	9:29	>100	23.4	20.2	2.6
MMW-4	9:00	>100	70.9	22.4	0
MMW-5	9:13	90	4.5	19.1	0
MMW-6	9:20	0	0	18	1.8
MMW-7	9:42	0	0	3.3	13.9
MMW-8	10:15	0	0	6.3	13.9
MMW-9	9:55	0	0	11.4	8.1

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 7/12/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 68°F

Ambient Barometric Pressure: 30.15"

General Weather Conditions: Overcast

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 7/12/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	9:48	>100	20.9	19.7	3
MMW-4	9:16	0	0	0.2	19.1
MMW-5	9:26	78	3.9	19.3	0.1
MMW-6	9:35	0	0	17.5	4
MMW-7	10:00	0	0	0.3	18.7
MMW-8	10:21	0	0	6.2	14.4
MMW-9	10:10	0	0	11.5	8.4

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 7/12/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 68 °F

Ambient Barometric Pressure: 30.15"

General Weather Conditions: Overcast

Meter Name and Model Number: Landtec GEM 2000

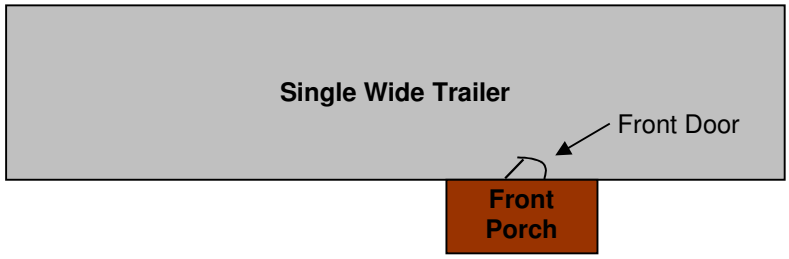
Meter Calibration Date: 7/12/2012

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	10:40	0	0	0.2	19.4

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 8/14/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 68°F

Ambient Barometric Pressure: 30.06"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

Meter Calibration Date: 8/13/2012

Field Measurements:

Well Identification	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
MMW-2	9:20	>100	14.2	18.4	3.8
MMW-4	8:45	>100	8.3	5.1	14.6
MMW-5	9:05	49	2.4	20	0
MMW-6	9:12	0	0	11.5	9
MMW-7	9:29	0	0	3.4	15.1
MMW-8	9:45	0	0	1	18.6
MMW-9	9:34	0	0	12.1	8.1

Landfill Gas Monitoring Form
Owl's Den Landfill (Permit #55-02)

Date: 8/14/2012

Field Personnel: Jimmy Wise

Ambient Outside Temperature: 68 °F

Ambient Barometric Pressure: 30.06"

General Weather Conditions: Clear

Meter Name and Model Number: Landtec GEM 2000

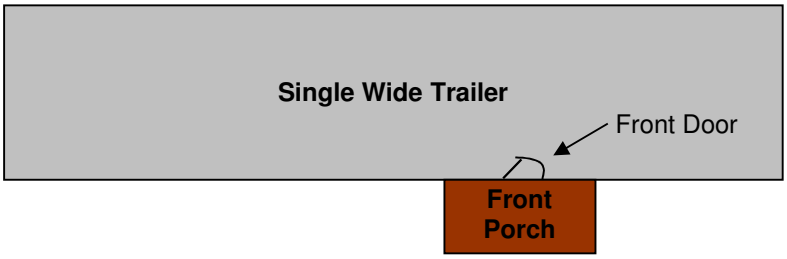
Meter Calibration Date: 8/13/2012

Residential Measurements:

Monitoring Location	Time of Measurement	Measurements			
		% LEL	% CH_4	% CO_2	% O_2
Front Door	10:56	0	0	0.1	19.5

* Use back of sheet if more locations are monitored

Sketch Building Layout and Identify Monitoring Locations



Note:
Resident asked that we not enter the home.