

**PERMIT APPLICATION  
FOR  
CONTINUED OPERATION**

**Greene County  
Construction and Demolition  
Landfill Facility**

**Permit NO.:** 4002-CDLF-1997

**Site Location:** 105 Landfill Road  
Walstonburg, NC 27888

**Applicant:** County of Greene

**Applicant's Address:** 229 Kingold Blvd., Suite D  
Snow Hill, NC 28580

**MESCO Project Number  
G07061**

Permit No.	Date	Document ID No.
40-02	October 25, 2011	15496

RECEIVED  
**October 17, 2011**  
Solid Waste Section  
Raleigh Central Office

Revised October 2011  
Revised March 2010  
Revised September 2009  
June 2008



*Submitted By:*

**Municipal Engineering Services Company, P.A.**

Garner	Boone	Morehead City
P.O. Box 97	P.O. Box 349	P.O. Box 828
Garner, NC 27529	Boone, NC 28607	Morehead City, NC 28557
(919) 772-5393	(828) 262-1767	(252) 726-9481

CIVIL/SANITARY/ENVIRONMENTAL ENGINEERS

SOLID WASTE MANAGEMENT

**Municipal  
Services**

**Engineering  
Company, P.A.**

SITE PLANNING/SUBDIVISIONS

SUBSURFACE UTILITY ENGINEERING (SUE)

October 14, 2011

Ming-Tai Chao, P.E.  
Environmental Engineer II  
NCDENR – Solid Waste Section  
401 Oberlin Rd.  
Raleigh, NC 27605

Re: Application for Permit to Continue Operation  
Greene County C & D Landfill, Permit No. 40-02-CDLF-1997

Dear Mr. Chao:

In response to your July 1, 2010 letter, we submit the following:

**General*****Response to NCDENR Comment Numbers 1:***

We have added Facility Plan Drawings to Appendix A and we have also added Appendix E for the Written Facility Plan.

***Response to NCDENR Comment Number 2:***

The volumes, text and drawings have been revised.

***Response to NCDENR Comment Number 3(i. through iv.):***

- i. We have corrected the typographic error.
- ii. We have addressed items (a-g) as requested.
- iii. The Electronics Recycling Area is located under the shelter built behind the shop building. The electronics are stored under this shelter in Gaylord boxes, when the pallets are full, they are hauled away as necessary. We have addressed items (a-d) as requested.
- iv. All non-C&D wastes that are found are placed in dumpster(s). The dumpster(s) will move along with the progression of fill. When the dumpster reaches capacity the County will haul it to the Regional Landfill for disposal.

***Response to NCDENR Comment Number 4:***

We have revised the text in Section 1.2(5)(b) as requested.

***Response to NCDENR Comment Number 5:***

We have revised the text in Section 1.3 as requested.

***Response to NCDENR Comment Number 6:***

The text and the drawings have been revised to match the map in Appendix C of the CAP. There are 13 monitoring points shown on the map.



*Not scanned include  
the revised  
app!*

Fac/Perm/Co ID #	Date	Doc ID#
40-02	10/25/2011	DIN 15496

**Response to NCDENR Comment Number 7:**

We have revised the drawings to show the correct methane probes.

**Response to NCDENR Comment Number 8:**

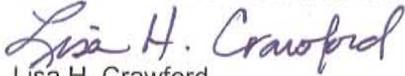
We have revised the drawings to show the correct methane probes.

**Response to NCDENR Comment Number 9:**

We have included the documentation requested.

Please find enclosed two (2) copies of the revised plans and text. If you have any questions or need additional information please don't hesitate to give us a call.

Sincerely,  
MUNICIPAL ENGINEERING SERVICES CO., PA



Lisa H. Crawford  
Designer

LHC:lhc  
Enclosures

cc: David Jones, Public Works Director

## Table of Contents

Section 1.0 - Operation Plan.....	3-17
Section 2.0 - Closure Plan.....	18-26
Section 3.0 - Post-Closure Plan.....	27-29
Section 4.0 - Financial Responsibility.....	30
Appendix A - Facility Drawings, Engineering/Operation Drawings..... and Closure Drawings	31
Appendix B - Local Government Approvals.....	32
Appendix C - Waste Screening Plan.....	33-42
Appendix D – State and Local Contact Information.....	43
Appendix E – Written Facility Plan.....	45

**SECTION 1.0**

**OPERATION  
PLAN**

Commissioners  
Bennie Heath – Chairman  
Jack Edmondson – Vice Chairman  
Denny Garner  
Jenny Jones  
James T. Shackelford, Jr.

County Manager  
Don Davenport

Finance Officer  
Shawna Wooten



September 8, 2009

**To: North Carolina Solid Waste Management**

**From: David Jones**

The purpose for this application is to continue the operation of our existing Construction and Demolition (C&D) Landfill, which is on top of a Municipal Solid Waste (MSW) Landfill. The air space that is available on top of the old MSW Landfill for the disposal of the C&D waste is very valuable. Utilizing the space on top of the MSW Landfill prevents the need to develop another area within our landfill property or on other property. The landfill property can be used for addition to our MSW Landfill. Also, if we move to another site, we are creating another brown field that is not necessary. Furthermore, we do not have to use valuable MSW landfill space to dispose of C&D waste. The space on top of the closed landfill is available for several years, and we need to be able to continue to utilize this space.

Sincerely,  
David Jones

Public Works Director For Greene County

229 Kingold Blvd., Suite D • Snow Hill, NC 28580 • (252) 747-3446 • FAX (252) 747-3884  
[www.co.greene.nc.us](http://www.co.greene.nc.us)

*The mission of Greene County Government is to serve and improve the lives of all citizens by providing high-quality, cost-effective services in an open, professional and ethical environment*

## **1.1 Introduction**

The County will continue to operate a Construction and Demolition Landfill (C&DLF) within the permitted boundaries and upon the closed unlined municipal solid waste (MSW) landfill. The unlined MSW area opened in 1982 and stopped receiving waste prior to October 9, 1991 and was certified closed on August 31, 1998. The closed MSW area has a minimum of two feet of final cover.

The County will implement a program at the landfill for detecting and preventing the disposal of hazardous and liquid wastes. The program consists of random inspection of incoming loads at a minimum of 1% of the weekly traffic. Landfill personnel will be trained to recognize hazardous and liquid wastes. Records will be kept on the training and the inspections. See Appendix C for the detailed plan.

The County will monitor for explosive gases at landfill structures and the perimeter of the landfill. The concentration of methane gases generated by the landfill cannot exceed 25 percent of the lower explosive limit for methane in the structures, and it cannot exceed 100 percent of the lower explosive limit for methane at the landfill property boundary. If methane gas is found to exceed the acceptable limits at either the property boundary or landfill structures, it is the County's responsibility to do the following:

1. Immediately take all necessary steps to ensure protection of human health (i.e. no smoking, etc.) temporarily abandon the structure and notify the Division of Waste Management (Division).
2. Within seven days of detection, place in the operating record the methane gas levels detected and a description of the steps taken to protect human health; and
3. Within 60 days of detection, implement a remediation plan for the methane gas releases, place a copy of the plan in the operating record, and notify the Division that the plan has been implemented. The plan will describe the nature and extent of the problem and the proposed remedy.

See Section 1.4 for the Explosive Gas Control Plan.

Off-site and on-site erosion will be controlled through erosion control structures and devices. Provisions for a vegetative ground cover sufficient to restrain erosion will be accomplished within 30 working days or 120 calendar days after completion of any phase of landfill development.

The County will record and retain at the landfill an operating record of the following information:

- (1) Inspection records, waste determination records, and training procedures;
- (2) Amounts by weight of solid waste received at the landfill;
- (3) Gas monitoring results and any remediation plans;
- (4) Any demonstration, certification, findings, monitoring, testing or analytical data required for surface and groundwater monitoring;
- (5) Any monitoring, testing or analytical data required for closure or post-closure;
- (6) Any cost estimates and financial assurance documentation.

All information contained in the operating record will be furnished upon request to the Division or be made available at all reasonable times for inspection by the Division.

Ground water and surface water will be sampled and analyzed according to 40 CFR, Part 258, Appendix I detection monitoring requirements. The monitoring frequency for all Appendix I detection monitoring constituents will be at least semiannual during the life of the facility (including closure) and the post-closure period. A minimum of four independent samples from each well (background and downgradient) will be collected and analyzed for the Appendix I constituents during the first semiannual sampling event. At least one sample from each well (background and downgradient) will be collected and analyzed during subsequent

semiannual sampling events. See Section 1.3 for the Ground water and Surface water Sampling and Analysis Plan.

If the County determines that there is a statistically significant increase over background for one or more of the constituents listed in Appendix I at any monitoring well at the relevant point of compliance, the County will, within 14 days of the finding, report to the Division and place a notice in the operating record indicating which constituents have shown statistically significant changes from background levels. The County will establish an assessment monitoring program within 90 days. The County may demonstrate that a source other than the landfill caused the contamination or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in ground-water quality. A report documenting these demonstrations will be certified by a Licensed Geologist or Professional Engineer and approved by the Division. A copy of this report will be placed in the operating record. If a successful demonstration is made, documented, and approved by the Division, the County may continue detection monitoring. If after 90 days, a successful demonstration is not made, the County will initiate an assessment monitoring program.

## **1.2 Operational Requirements**

1. Waste Acceptance and Disposal Requirements
  - a. The C&DLF will only accept those solid wastes which it is permitted to receive. The County will notify the Division within 24 hours of attempted disposal of any waste the landfill is not permitted to receive.
  - b. Asbestos waste will be managed in accordance with 40 CFR 61. The regulated asbestos waste will be covered immediately with soil in a manner that will not cause airborne conditions and will be disposed of separate and apart from other solid waste, as:
    - i. in a defined isolated area within the footprint of the landfill, or
    - ii. in an area not contiguous with other disposal areas. Separate areas will be designated so that asbestos will not be exposed by future land-disturbing activities.
  - c. Wastewater treatment sludges may be accepted, with the approval of the Division, either as a soil conditioner incorporated into or applied onto vegetative growth layer. The wastewater treatment sludge will not be applied at greater than agronomic rates nor to a depth greater than six inches;
  - d. Asphalt in accordance with G.S. 130-294(m) will be accepted;
  - e. Inert debris from any source that is defined as solid waste which consists solely of material that is virtually inert, such as brick, concrete, rock and clean soil will be accepted;
  - f. Construction materials, that could or would be part of any construction, remodeling, repair or demolition of pavement, buildings or other structures, from solid waste that is generated by mobile or modular home manufacturers and asphalt shingle manufacturers in Greene County. The waste must be source separated at the manufacturing site and must exclude municipal solid waste, hazardous wastes, and other wastes prohibited from disposal in a C&DLF. It must be transported to Greene County C&DLF in a shipment or container that consists solely of the separated waste to be disposed of. Greene County C&DLF will not accept this waste if it has not been separated or transported as specified.
  - g. Wooden pallets generated only from C&D activities.

- h. The following wastes are prohibited from disposal at the C&DLF:
  - i. Containers such as tubes, drums, barrels, tanks, cans, and bottles unless they are empty and perforated to ensure that no liquid, hazardous or municipal solid waste is contained therein.
  - ii. Garbage as defined in G.S. 130A-290(a)(7).
  - iii. Hazardous waste as defined in G.S. 130A-290(a)(8), to also include hazardous waste from conditionally exempt small quantity generators.
  - iv. Industrial solid waste unless a demonstration has been made and approved by the Division that the landfill meets the requirements of Rule .0503(2)(d)(ii)(A).
  - v. Liquid wastes.
  - vi. Medical waste as defined in G.S. 130A-290(a)(18)
  - vii. Municipal solid waste as defined in G.S. 130A-290(a)(18a)
  - viii. Polychlorinated biphenyls (PCB) wastes as defined in 40 CFR 761
  - ix. Radioactive waste as defined in G.S. 104E-5(14)
  - x. Septage as defined in G.S. 130A-290(a)(32)
  - xi. Sludge as defined in G.S. 130A-290(a)(34)
  - xii. Special waste as defined in G.S. 130A-290(a)(40)
  - xiii. White goods as defined in G.S. 130A-290(a)(44)
  - xiv. Yard trash as defined in G.S. 130A-290(a)(45), shall not be disposed in the landfill area. However, yard trash, along with land-cleaning debris and wooden pallets(as defined below), may be accepted for processing in the storm debris area and/or the Small Type-1 Composting Area as shown on the Existing Conditions maps in the Facility and the Engineering/Operation drawings.
  - xv. Wooden Pallets generated by means other than C&D activities
- i. The following waste will not be received if separate from C&DLF waste: lamps or light bulbs including but not limited to halogen, incandescent, neon or fluorescent; lighting ballast or fixtures; thermostats and light switches; batteries including but not limited to those from exit and emergency lights and smoke detectors; lead pipes; lead roof flashing; transformers; capacitors; and copper chrome arsenate (CCA) and creosote treated woods.
- j. Waste accepted for disposal in the C&DLF unit shall be readily identifiable as C&D waste and must not have been shredded, pulverized, or processed to such an extent that the composition of the original waste cannot be readily ascertained except in the case where the waste has come from a permitted recycling and reuse facility.
- k. The County will not knowingly dispose any type or form of C&D waste that is generated within the boundaries of a unit of local government that by ordinance:
  - i. Prohibits generators or collectors of C&D waste from disposing that type or form of C&D waste.
  - ii. Requires generators or collectors of C&D waste to recycle that type or form of C&D waste.

- l. Any recyclables received on site including yard wastes, white goods, used tires, etc., shall be segregated and stockpiled in designated areas within the permitted landfill property. The white goods collection area shall provide for the proper removal of chlorofluorocarbon refrigerants by well-trained personnel. The estimated waste amounts, from past records, is 121 tons a month. The maximum amount of white goods that may be stored on site is 5 tons. All other stockpiled recyclables will be removed from the site as needed. The scales will be used to weigh the amount of recyclables and will be documented in the operating record.
  - m. Electronic Recyclables shall be handled according to SL 2010-67(SB 887). The electronic wastes shall be stored in covered containers or in containers in a covered structure.
  - n. Contact information of contract haulers shall be place in the operating record.
2. Cover material requirements.
- a. Except as in Subparagraph (c), the County must cover the solid waste with six inches of earthen material when the waste disposal area exceeds one-half acre and at least once weekly. Cover must be placed at more frequent intervals if necessary to control disease vectors, fires, odors, blowing litter and scavenging. A notation of the date and time of the cover placement must be recorded in the operating record, as specified in Paragraph 10 in this Section.
  - b. Except as in Subparagraph (c), areas which will not have additional wastes placed on them for three months or more, but where final termination of disposal operations has not occurred, will be covered and stabilized with vegetative ground cover or other stabilizing material.
  - c. Alternative material or an alternative thickness of cover may be used, if the County demonstrates that the alternative material or thickness controls disease vectors, fires, odors, blowing litter, and scavenging without presenting a threat to human health and the environment, and is approved by the Division.
3. Spreading and compacting requirements.
- a. C&DLF units will restrict solid waste to the smallest area feasible.
  - b. Solid waste will be compacted as densely as practical into cells.
  - c. Fencing and/or diking will be provided within the area to confine solid waste which is subject to be blown by the wind. At the conclusion of each operating day, all windblown material resulting from the operation will be collected and disposed of by the County.
4. Disease vector control
- a. The County will prevent or control on-site populations of disease vectors using techniques appropriate for protection of human health and the environment.
  - b. "Disease vectors" means any rodents, flies, mosquitoes, or other animals, including insects, capable of transmitting disease to humans.
5. Air Criteria and Fire Control
- a. The County will ensure that the units do not violate any applicable requirements developed under a State Implementation Plan (SIP) approved or promulgated by the U.S. EPA Administrator pursuant to Section 110 of the Clean Air Act, as amended.

- b. Open burning of solid waste, except for the approved burning of land clearing debris generated on-site or debris from emergency clean-up operations, is prohibited at all C&DLF facilities. *Prior to any burning a request will be sent to the Division for review and approval. In addition, the Division of Air Quality and local fire department must approve the activity prior to burning.* The Division will determine the burning to be approved if it is one of two types of burning previously referenced. A notation of the date of approval and the name of the Division personnel who approved the burning must be included in the operating record.
  - c. Equipment will be provided to control accidental fires. In the event of an emergency the operator(s) will call 911. Castoria Voluntary Fire Department is located 2 miles away and the nearest fire hydrant is ¼ mile away. Fire extinguishers are located in all buildings and on all equipment. Dirt piles are also on site to use in emergency situations.
  - d. Fires and explosions that occur at the C&DLF require verbal notice to the Division within 24 hours and written notification within 15 days. Written notification must include the suspected cause of fire or explosion, the response taken to manage the incident, and the action(s) to be taken to prevent the future occurrence of fire or explosion.
6. Access and safety requirements
- a. The C&DLF will be adequately secured by means of gates, chains, beams, fences and other security measures approved by the Division to prevent unauthorized entry.
  - b. An attendant will be on duty at the site at all times while it is open for public use to ensure compliance with operational requirements.
  - c. The access roads to the site and monitoring locations will be of all-weather construction and maintained in good condition.
  - d. Dust control measures will be implemented when necessary. If dust problems should arise, the County will use any reasonable means necessary to reduce it. At a minimum the County will spray water on necessary areas.
  - e. Signs providing information on tipping or disposal procedures, the hours during which the site is open for public use, the permit number and other pertinent information will be posted at the site entrance.
  - f. Signs will be posted stating that no hazardous or liquid waste can be received.
  - g. Traffic signs or markers will be provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.
  - h. The removal of solid waste from the C&DLF will be prohibited unless the County has included in its operational plan a recycling program which has been approved by the Division. The general public is prohibited from removal activities on the working face.
7. Erosion and Sedimentation Control Requirements
- a. Adequate sediment control measures (structures or devices), will be utilized to prevent silt from leaving the landfill.
  - b. Adequate sediment control measures (structures or devices), will be utilized to prevent excessive on-site erosion.
  - c. Provisions for a vegetative ground cover sufficient to restrain erosion will be accomplished within **30 working days** or **120 calendar days** upon completion of any phase of landfill development.

8. Drainage Control and Water Protection Requirements

- a. Surface water will be diverted from the operational area and will not be impounded over waste.
- b. Solid waste will not be disposed of in water.
- c. Leachate will be contained on site and properly treated prior to discharge.
- d. The landfill will not:
  - (i) Cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements pursuant to Section 402.
  - (ii) Cause the discharge of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirements of an area-wide or state-wide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act, as amended.
- e. The County will inspect the exterior slopes of the landfill at least weekly to determine if there are any breakouts of leachate in the slopes. If any are discovered, they will be contained immediately to assure that they will not leave the site. The containment can consist but not be limited to an earthen berm, sand bags, erosion control logs and/or anything that will contain the leachate on the slope.

The repair of the breakout will require excavating into the cover soil on the slope down to the waste and into the waste to determine what is causing the leachate to come to the surface. Normally it is another layer of soil that has been used as cover and the leachate is flowing along that layer to the slope and surfacing on the slope. The lower layer of cover needs to be removed at the breakout so that the leachate that is flowing along this cover has a point where it will go vertically into the landfill instead of flowing along the soil boundary that was once either daily cover or an intermediate cover.

Once this soil layer has been breached, the excavation can be filled back with stone, clean waste or any material, other than soil, that will allow the leachate to flow vertically instead of horizontally. Once the excavation has been filled with this material, the surface can be cover with soil so that surface water does not intrude into the excavation. Vegetative cover will be reestablished over the excavated area.

9. Survey for Compliance

Within 60 days of a permittee's receipt of the Division's written request, the permittee will have a survey conducted of active and/or closed portions of the unit(s) at the facility in order to determine whether operations are being conducted in accordance with the approved design and operation plans. The permittee must report the results of the survey, including a map produced by the survey, to the Division within 90 days of receipt of the Division's request.

- a. A survey shall be required by the Division:
  - (i) If there is reason to believe that the operations are being conducted in a manner that deviates from the plan listed in the effective permit, or
  - (ii) As verification that operations are being conducted in accordance with the plan listed in the effective permit.

- b. Any survey pursuant to this Paragraph must be performed by a professional land surveyor duly authorized under North Carolina law to conduct such activities.

10. Record keeping Requirements

- a. The County will record and retain at the facility, or an alternative location near the facility approved by the Division, in an operating record the following information as it becomes available.
  - (i) Inspection records, waste determination records, and training procedures;
  - (ii) Amounts by weight of solid waste received at the landfill to include source of generation.
  - (iii) Any demonstration, certification, findings, monitoring, testing or analytical data required for surface water, ground water and gas monitoring;
  - (iv) Any monitoring, testing, or analytical data required for closure or post-closure;
  - (v) Any cost estimates and financial assurance documentation;
  - (vi) Notation of date and time of placement of cover material;
  - (vii) All audit records, compliance records and inspection reports;
  - (viii) Notation of approval date and the name of the Division personnel who approved the type of the open burning; and
  - (ix) Approved monitoring plan and corrective action plans.
- b. All information contained in the operating record will be furnished to the Division according to the permit or upon request, or be made available for inspection by the Division.
- c. The operating record will also include a copy of the approved operation plan and all required permits.

**1.3 Ground Water and Surface Water Sampling and Analysis Plan**

**Introduction**

**Objective**

The objective of this Groundwater and Surface water Sampling and Analysis Plan (SAP) is to provide clear guidelines and procedures for field and laboratory personnel when collecting and analyzing groundwater and surface water samples. This plan is an update that supersedes the November 1995 SAP for the Greene County C&D landfill on top of the municipal solid waste landfill (MSWLF). The sampling procedures outlined in this SAP are guidelines by which sampling will be performed. Deviation from the procedures may be warranted depending on facility conditions or unforeseen sampling variables. Alternative sampling procedures must conform to the guidance document "Solid Waste Section Guidelines for Groundwater, Soil, and Surface Water Sampling".

All groundwater and surface water monitoring points shall be sampled semi-annually for the constituents listed in 40 CFR Part 258 Appendix I and Appendix II. In addition to the Appendix I and Appendix II constituents, monitoring wells MW-1R and MW-4 will be sampled for the following suite of Monitored Natural Attenuation (MNA) parameters.

<b>MNA Performance Parameters</b>		
<b>Parameter</b>	<b>Analysis Type</b>	<b>Analytical Method</b>
Dissolved Oxygen (DO)	Field Reading	Field Instrument
pH	Field Reading	Multi-parameter Field Instrument w/ flow-through cell
Oxidation-Reduction Potential (ORP)	Field Reading	Multi-parameter Field Instrument w/ flow-through cell
Turbidity	Field Reading	Field Instrument
Conductivity	Field Reading	Multi-parameter Field Instrument w/ flow-through cell
Temperature	Field Reading	Multi-parameter Field Instrument w/ flow-through cell
Dissolved CO <sub>2</sub>	Field Reading	Field Instrument
Alkalinity (Total as CaCO <sub>3</sub> )*	Laboratory/Field*	EPA 310.2
Chloride*	Laboratory/Field*	SM 4500-CLB
Iron	Laboratory	SM3111B
Nitrate*	Laboratory/Field*	EPA 353.2 / SM 2320B
Sulfate*	Laboratory/Field*	EPA 375.4 / SM 4500-SO4E
Sulfide*	Laboratory/Field*	EPA 376.1 or SM 4500SE
TOC/BOD/COD	Laboratory	EPA 415.1 / EPA 405.1 / EPA 410.1
Methane	Laboratory	RSK 175
Ethane, Ethene	Laboratory	RSK 175
Hydrogen	Laboratory	AM19GA
Volatile Fatty Acids	Laboratory	AM23G

\*For budgetary considerations these analyses may be performed in the field using Hach® brand color wheel test kits.

### Water Quality Monitoring Summary

The nature of groundwater flow, geology, location of creeks, and close proximity of several drainage features will require extensive monitoring for early detection of a release. The monitoring plan includes sampling six (6) monitoring wells (MW-1R, MW-4, MW-5, MW-6, MW-7 and MW-8) and two (2) surface water monitoring points.

Monitoring well MW-1R, located southwest and upgradient of the landfill, will serve as the background well. MW-4, located near the northeastern corner of the landfill unit serves as a downgradient well. MW-5 serves as a downgradient well located east of the central portion of the landfill. MW-6 is a downgradient monitoring well located southeast of the landfill unit. MW-7 was installed northeast of the unit in June 2007 approximately 240 feet east of the waste limit, just inside the relevant point of compliance (250 feet from the waste limit). MW-8 was also installed in June 2007 farther northeast of the unit just inside the relevant point of compliance. Surface water sampling points are located off site on the tributary of Sandy Run.

### Assessment Monitoring

Assessment monitoring, consisting of collecting and analyzing groundwater samples for the Appendix I and Appendix II list of constituents will be performed on the background well (MW-1R) and the compliance wells (MW-4, MW-5, MW-6, MW-7 and MW-8). In addition field parameters including dissolved oxygen (DO), oxidation reduction potential (ORP), pH, temperature, turbidity, and conductivity will also be collected.

### Sampling Equipment

Groundwater purging and sampling will be performed using a submersible pump and/or disposable polyethylene bailers. The following procedure will be used to decontaminate the submersible pump:

1. Phosphate-free detergent & de-ionized or distilled water rinse.
2. De-ionized or distilled water rinse.
3. Isopropyl alcohol (isopropanol) rinse.
4. De-ionized or distilled water rinse.

A new bailer will be used to sample each individual well. *Under no circumstance will a disposable bailer used to sample a given well be used to sample any remaining well.*

At least one (1) equipment blank will be collected during pump decontamination procedures to ensure that cross-contamination has not occurred as a result of the decontamination process. The standard equipment necessary to conduct sampling for each well consists of:

- Sample containers (including trip blanks and equipment blanks)
- Wide-mouth container
- Bailing twine
- Disposable latex/nitrile gloves
- Temperature/pH/ORP/conductivity indicator
- Electronic water level indicator
- Transport or storage coolers with ice.

All equipment subject to damage and contamination will be transported in sealed, plastic bags or storage containers. The water level indicator will be decontaminated in accordance with Steps 2 and 3 described above prior to placement in a clean plastic bag or storage container.

### Appendix I and Appendix II Sample Containers

Groundwater and surface water samples will be collected for the various analyses in the appropriate laboratory-supplied containers.

- Each sample container will be clearly labeled providing the following information: site name, county location, sample identification number, parameters to be analyzed, preservative added, date and time of sampling, and initials of the sampler.
- Samples to be analyzed for VOCs will be collected first in three 40-ml glass vials with Teflon septa caps. The sample vials will be completely filled to create zero headspace in the vials.
- Samples to be analyzed for inorganic constituents will be collected second in a quart/1-liter polyethylene container.
- Samples to be analyzed for the remaining target analytes will be collected in the appropriate laboratory-supplied containers.

All sample containers will be obtained from an independent laboratory in a sterilized condition and with the appropriate, method-specific preservative. Care will be taken by the field technician to not allow the preservative to wash out of the sample containers during sampling.

### MNA Sampling Containers

Groundwater samples to be analyzed for MNA performance parameters will be collected into the container types listed in the table below.

MNA Parameter	Volume	Bottle Type	Preservative
Alkalinity	250 mL	Plastic	none; cool to 4°C
Chloride	125 mL	Plastic	none; cool to 4°C
TOC/COD	250 mL	Glass	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> )
BOD	500 mL	Polyethylene	none; cool to 4°C
Iron	125 mL	Plastic	Nitric acid (HNO <sub>3</sub> )
Nitrate	125 mL	Plastic	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> )
Sulfate	125 mL	Plastic	none; cool to 4°C
Sulfide	250 mL	Glass	Sodium hydroxide (NaOH)
Methane/Ethane/Ethene	125 mL	Plastic	none; cool to 4°C
Hydrogen	-	-	proprietary lab sampler
Volatile Fatty Acids	40 mL	Glass	Hydrochloric Acid (HCl)

### Sampling

Wells will be sampled from upgradient to downgradient; or when previous analytical data is available, from least to greatest contamination. This procedure is required to limit the potential of cross contamination between sampling points.

A clean sheet of plastic will be placed around the well to provide a clean surface for sampling equipment. The total well depth read from the well tag and the measured depth to water, determined using the water

level indicator, will be used to compute the depth of water in the well. The total well depth will be measured and compared to the depth indicated on the well tag as a check for silt buildup or blockage at depth.

All meters used to monitor purge parameters will be calibrated immediately prior to purging and sampling, and those readings recorded in a field logbook. Entries will always include pre- and post- calibration readings as well as the model and serial number of the equipment and the date, time, and person performing the calibration(s). Two standards, which bracket the average or suspected measurements for pH and specific conductance, will be used at the site. Since natural waters (including those impacted by environmental contaminants) tend to have pH values less than 7.0, pH buffers of 4.0 and 7.0 will typically be used for instrument calibration.

Disposable nitrile gloves will be worn by the field technician during sampling to minimize the risk of personal exposure to potentially harmful chemical substances and to minimize the risk of sample cross-contamination. Fresh pairs of nitrile gloves will be worn during each purge and sampling event. The groundwater samples will be transferred from the bailers into method-specific and appropriately preserved containers and placed into a clean cooler containing ice to chill the samples to a temperature of approximately 4°C.

Indicator parameters such as pH, temperature and specific conductance will be measured during purging as an indication that groundwater representative of the formation surrounding a given well is being sampled. Purging is considered complete when at least three well volumes have been purged and indicator parameters have stabilized such that three successive readings vary by no more than 10%. Purging may need to be continued beyond five well volumes if indicator parameters have not stabilized. All information will be recorded on a field data sheet or in a field logbook with copies submitted to the Division of Waste Management with the analytical results.

### **Purging**

Each well will be purged of approximately three (3) to five (5) volumes of standing water and allowed to settle prior to collection of groundwater samples. If the well should go dry and not recharge before the requisite well volumes are removed, the well will be allowed to recharge and a sample will be collected within 24 hours of the initial purging. The amount of standing water will be calculated by first subtracting the depth-to-water from total well depth.

After determination of the amount of water to be purged from a given well, the equipment necessary for purging will be assembled at the well. The disposable bailer will be maintained in a stable, upright position while the upper portion of the plastic wrapping will be pulled away to expose only the eyelet used for securing twine to the bailer. After the twine has been secured to the bailer with gloved hands, the bailer will be suspended as the remaining plastic is removed. The bailer will be lowered slowly into the well until the bailer contacts groundwater. The bailer twine will then be cut to an adequate length and secured to prevent loss of the bailer in the well. At no time during purging will the bailer twine be allowed to touch the ground. In order to not allow the twine to touch the ground during purging, the twine will be collected when raising the bailer either by loops gathered in one hand or by alternating hand-to-hand as the bailer is pulled from the well. When purging deep wells (in excess of 40 feet), the ground and the well head may be covered with a clean plastic bag or sheet of plastic with a slit cut to allow the plastic to slide over the well head. This will be a separate sheet of plastic from the one used for the sampling equipment.

### **Groundwater Sample Collection**

The bailer will be lowered slowly into the well to avoid volatilization of any dissolved-phase compounds that may be present in the groundwater. Once full, the bailer will be retrieved and containers filled by emptying the water through the hole at the bottom of the bailer. Glass 40-mL vials for VOC analyses will be filled in such a manner as to produce zero headspace in the vials. Polyethylene containers for metals analyses will be filled and sealed with the cap, leaving about ½-inch of airspace at the top. In addition to collecting the samples, water will be collected in the wide-mouth container for pH, temperature, and conductivity measurements. Upon completion of sampling, all groundwater samples, including equipment and trip blanks, will be placed in labeled and sealed plastic bags and stored in ice-filled coolers to chill the samples

to 4°C pending transport to an NCDENR-certified analytical laboratory. Contaminated nitrile gloves and twine will be discarded.

### **Surface water Sample Collection**

Surface water sampling will be taken with given consideration to minimize turbulence and aeration. As during groundwater sampling, surface water samples will be collected by a field technician wearing disposable gloves. Containers will be dipped at sampling location points by gently dipping the sample container into surface water and allowing surface water to flow over the mouth of container so as not to displace any preservative within the sample container. If there is little current movement, the container will be moved slowly through the water laterally. During times of low water, if the water is not deep enough to allow filling of sample containers, an appropriately decontaminated sampling cup will be used to retrieve the sample. All containers will be treated in the same manner as the groundwater samples. The samples will be sealed in labeled, plastic bags, and stored in an ice-filled cooler to chill the samples to 4°C pending transport to an NCDENR-certified analytical laboratory.

### **Chain of Custody**

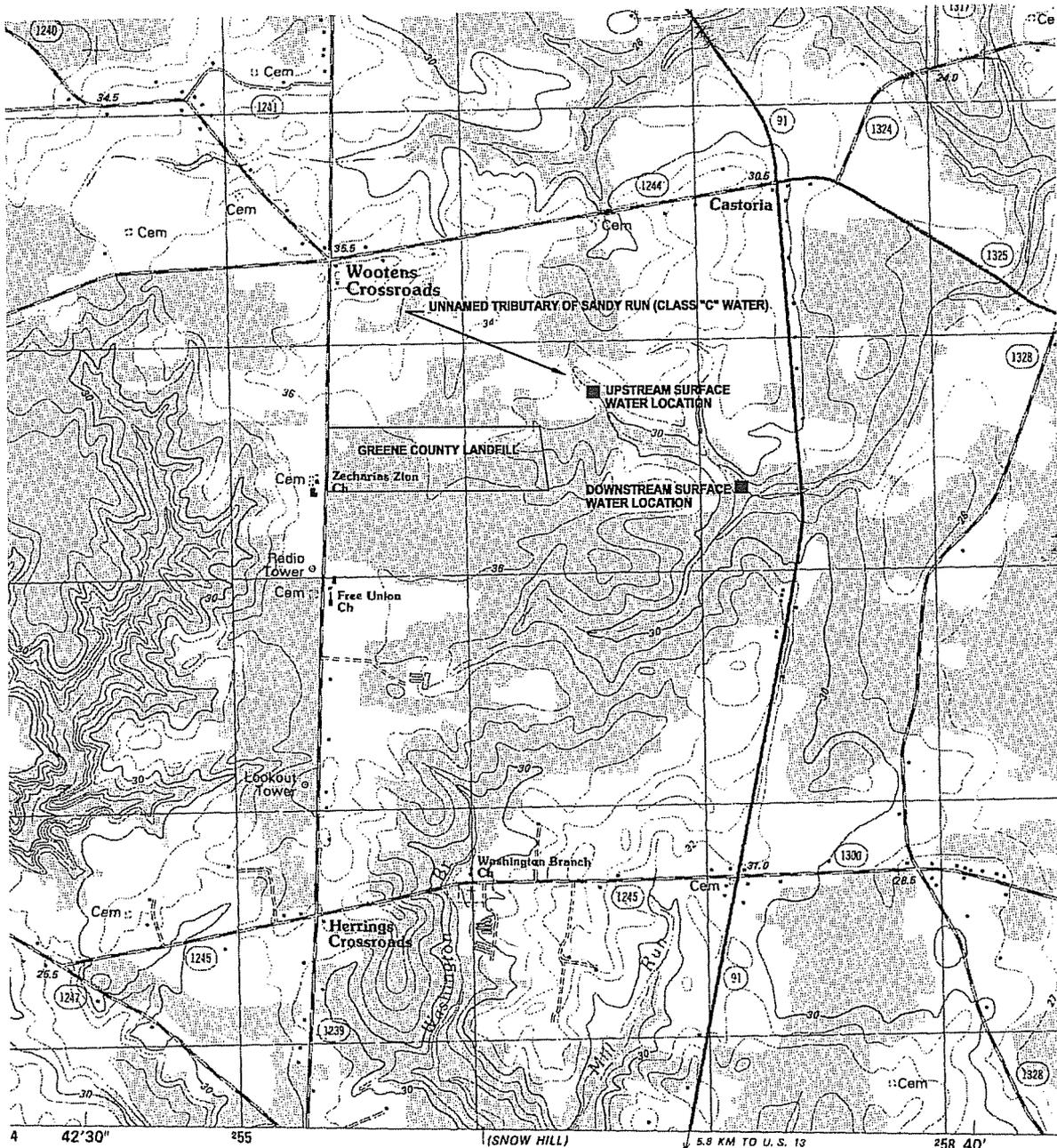
Chain-of-custody forms will be used to document the handling of all samples collected and listing all individuals who have taken possession of a given set of samples, including field personnel, laboratory couriers, and laboratory personnel. Trip blanks, equipment blanks, and sample containers will all travel and be stored together. Trip blanks will remain in the condition they are received from the laboratory and will not be opened or tampered with during the sampling. A chain-of-custody record will be completed for each day's samples, indicating the date and time, sample location, sample matrix (soil, water, etc.), and laboratory analyses to be conducted.

### **Analysis**

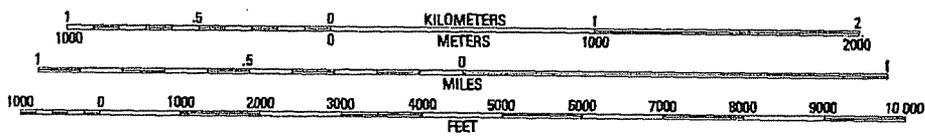
When the water samples reach the laboratory, they will be transferred to a sample custodian who will sign the chain of custody documentation as receipt of the samples. Internal control of the water samples in the laboratory will be in accordance with QA/QC procedures for the laboratory. Copies of QA/QC manuals for approved laboratories are on file at the Division of Waste Management.

Groundwater and surface water will be analyzed for the Appendix I and Appendix II list of analyte constituents. QA/QC procedures utilized during the testing will be in conformance with laboratory QA/QC manual. Monitoring wells MW-1R and MW-4 will be sampled for the Appendix I list and the aforementioned MNA performance parameters.

# SURFACE WATER SAMPLING LOCATIONS USGS WALSTONBURG QUADRANGLE



(SNOW HILL)  
5454 1 NW  
**SCALE 1:24 000**



**CONTOUR INTERVAL 2 METERS**  
 SUPPLEMENTARY CONTOUR INTERVAL 1 METER  
 DASHED SUPPLEMENTARY CONTOURS ARE APPROXIMATE  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929  
 CONTROL ELEVATIONS SHOWN TO THE NEAREST 0.1 METER  
 OTHER ELEVATIONS SHOWN TO THE NEAREST 0.5 METER

ORTH  
RECT

#### **1.4 Explosive Gas Control Plan**

Quarterly, the County Landfill will monitor the explosive gas at the landfill structures, existing methane monitoring probes, and at/near the landfill boundary. The permanent probes consist of a plastic stand pipe similar to a piezometer used for groundwater detection. A typical permanent methane probe is detailed in the operation drawings.

The existing permanent methane probes are surrounding the Closed MSW Landfill Limits. The location and spacing of the methane probes is somewhat arbitrary. The locations were determined by the relationship of solid waste with property lines and landfill structures. The spacing of the monitoring probes is between 200 and 400 feet. The migration of methane gas is induced by pressure gradients. The methane will move from areas of high pressure to those of low pressure following the path of least resistance. The methane will migrate vertically until it reaches the landfill cap, where it will begin to flow horizontally. This occurs until it finds a pathway out, either by the installed methane collection trenches or migration through the permeable *in situ* soils. Since methane is lighter than air, it wants to escape into the atmosphere. It has been our experience that whenever gas is migrating no matter what the spacing or depth of the monitoring probes, the gas will fill the void created by the monitoring point and an explosive meter will monitor the level. The various depths of the monitoring probes are to ensure a stable monitoring point. The only time a shallow monitoring point has not worked is in a very heavy, impermeable clay layer that acts as a seal to the migration of the gas. The permanent probes are surrounding the Closed MSW Landfill Limits.

The gas can be detected by use of an instrument that reports the percent of lower explosive limit. The instrument being used is the Gas Tech GP 204.

Based on current conditions, there are thirteen(13) existing monitoring points. Quarterly, a County employee will visit each monitoring point. The monitoring points consist of all methane probes. Using the detection instrument, he will determine if methane gas has filled the probes. If the probe is near the property line and methane gas is detected at or beyond the lower explosive limit (100% LEL), it must then be determined if the gas is migrating across the landfill boundary. If the probe is on the boundary or methane gas has migrated beyond the boundary, a remediation plan must be completed by Greene County.

Other points of monitoring will be the landfill structures. Each structure will be monitored for methane using the following methods:

1. All crawl spaces will be monitored;
2. All corners in the structure will be monitored;
3. Any holes, cracks and pipes through the foundation will be monitored

If methane gas is detected beyond 25% of its lower explosive limit in any structure, check the calibration of the monitor and resample. If the reading is still above 25%, evacuate the building and try to find the source of gas. If the source is found try to remove the source. If this fails a remediation plan is stated in the operational requirements.

#### **1.5 Electronic Waste Plan**

The County will collect electronic waste to be recycled according to State Law SL 2010-67(SB 887). The County will store all electronic recyclables in the Electronic Recyclables Area as indicated by signage at the Facility and as shown on the Facility, and Engineering/Operation Plans. The electronic recyclables will be stored in Gaylord boxes, in a covered shelter. The electronic recyclables will be hauled as necessary. Contact information of all contracted haulers will be placed in the operating record.

## **1.6 Small Type-1 Composting Plan**

The County will operate a Small Type-1 Compost Facility. The County will process or store less than 6,000 cubic yards of material per quarter. The County will meet the following conditions:

- A) The County will notify the Solid Waste Section prior to operation and on an annual basis as to:
  - i) Located at Greene County Construction and Demolition Landfill Facility, 105 Landfill Road, Walstonburg, NC 27888
  - ii) The Operator is David Jones, Public Works Director, located at 105 Landfill Road, Walstonburg, NC 27888
  - iii) The site will accept less than 6,000 cubic yards of yard and garden waste, silvicultural waste, untreated and unpainted wood or any combination per quarter;
  - iv) The Composting process to be used is static piles; and
  - v) The product will be used on-site and as a soil amendment.
  
- B) The County will operate in accordance with operational requirements as follows:
  - 1. The site will not restrict the 100 year flood.
  - 2. A 50 foot buffer between the site and all property lines and perennial streams/rivers will be maintained.
  - 3. A 200 foot buffer between the site and all residences and dwellings not owned by the County will be maintained.
  - 4. A 100 foot buffer between the site and all wells with the exception of monitoring wells will be maintained.
  - 5. The site will receive yard and garden waste, silvicultural waste, untreated and unpainted wood waste or any combination thereof.
  - 6. The site will be located in accordance with 15A NCAC 2B .200, Classification and Water Quality Standards Applicable to Surface Waters in N.C.
  - 7. The site will not be located in an area that runoff from the site will come in contact with any cap or side slopes of a closed disposal area.
  - 8. A 25 foot minimum distance between the site and swales or berms will be maintained to allow for fire fighting equipment.
  - 9. The site will meet the following surface water requirements:
    - a) The site will not cause a discharge of materials or fill materials into waters or wetlands of the state that is in violation of Section 404 of the Clean Water Act;
    - b) The site will not cause a discharge of pollutants into waters of the state that is violation of the requirements of the National Pollutant Discharge Elimination System (NPDES), under Section 402 of the Clean Water Act; and
    - c) The site will not cause non-point source pollution of waters of the state that violates assigned water quality standards;
  - 10. The site will meet the following groundwater requirements:
    - a) The site will not contravene groundwater standards as established under 15A NCAC 2L;
    - b) Portions of the site used for waste receipt and storage, active composting, and curing will have a soil texture finer than loamy sand and a depth to the seasonal high water table will be maintained at least 12 inches.
  - 11. The compost process will be maintained at or above 55 degrees Celsius (131 degrees F) days and aerated to maintain elevated temperatures.

**SECTION 2.0**

**CLOSURE  
PLAN**

## **2.1 Introduction**

The Division requires that the Engineer certifies the constructed cap is built according to approved plans and specifications. The Engineer that will accomplish this task is the one who did the planning and has written the Closure Plan specifications.

Before construction can begin, a pre-construction meeting will be held and the responsibilities and duties of each party will be discussed.

The Contractor is responsible for following and meeting the requirements set forth in the contract documents. The Contractors will provide to the Owner of the landfill and the Engineer a completed landfill constructed by Division's approved plans and specifications. The Contractor will give the Engineer a schedule for completion of the landfill including dates for expected construction of the cohesive soil test pad, cohesive soil cap, erosive layer, and estimated time for project completion. The Contractor is responsible for providing a foreman to remain on site at all times during construction, provide qualified personnel to conduct quality control, scheduling and coordinating the subcontractors, provide progress reports and as-built drawings, and coordinating construction activities with the Engineer. The foreman is responsible for supervising and coordinating with his crew, subcontractors, quality control personnel, attending all meetings and notifying the Engineer's Construction Observer when any discrepancies occur. The Contractor will meet with the Construction Observer on a daily basis to discuss the days construction activities. The results of all tests and any change in schedule shall be given to the Construction Observer as soon they are known by the Contractor. The Contractor must be registered in the State of North Carolina.

The Engineer is responsible for providing the engineering design, drawings and specifications, contract documents and Construction Quality Assurance (CQA) needed for construction of the landfill. The Engineer is responsible for conducting the pre-construction meeting, which will lay out the foundation for the project. The Engineer will approve any design changes and certify to the Division that the cap was constructed according to the requirements of Rule .0541 Construction Quality Assurance Plan and .0540 Construction requirements for C&D Facilities, and Division approved plans and specifications. This will be accomplished by on-site observation and independent laboratory soil testing to test site-specific soil properties including permeability. The Engineer will provide Quality Assurance by spot testing along side the Contractor, who will be providing the Quality Control. The Engineer will certify that the construction was completed in accordance with the CQA manual. The Engineer must be a professional engineer registered in North Carolina.

The Construction Observer (CO) is the Engineer's representative on-site. It is the CO's responsibility to know and interpret the plans and specifications of the project. On a daily basis the CO will coordinate with the Foreman to help ensure a quality product for the Owner. The CO will keep a daily log on the activities of the Contractor, keep notes on all meetings, and handle all quality assurance activities indicated in this document. The CO will keep a log of all material delivered on site and ensure the materials meets or exceeds the specifications indicated in this report. If the need arises, additional meetings will be scheduled as determined by the CO.

The estimate of the maximum inventory of wastes ever on-site over the active life of the landfill facility is 31,029 tons from FY 97-98 through FY 07-08.

Prior to beginning closure, the County shall notify the Division that a "Notice of the Intent to Close" the unit has been placed in the operating record. The County shall begin closure activities no later than thirty (30) days after the date on which the landfill receives the final wastes, or if the landfill has remaining capacity and there is a reasonable likelihood that the landfill will receive additional wastes, no later than one year after the most recent receipt of wastes. Extensions beyond the one-year deadline for beginning closure may be granted by the Division if the County demonstrates that the landfill has the capacity to receive additional waste and the County has taken and will continue to take all steps necessary to prevent threats to human health and the environment from the closed landfill.

The County shall complete closure activities in accordance with the Closure Plan within 180 days following the final receipt of waste. Extensions of the closure period may be granted by the Division if the County demonstrates that closure will, of necessity, take longer than one hundred eighty (180) days and the County has taken and will continue to take all steps to prevent threats of human health and environment from the enclosed landfill.

Following closure of the landfill, the County shall notify the Division that a certification, signed by the Project Engineer verifying that closure has been completed in accordance with the Closure Plan, and has been placed in the operating record. The County shall record a notation on the deed to the landfill property and notify the Division that the notation has been recorded and a copy has been placed in the operating record. The notation on the deed shall in perpetuity notify any potential purchaser of the property that the land has been used as a landfill and its use is restricted under the Closure Plan approved by the Division. The County may request permission from the Division to remove the notation from the deed if all waste is removed from the landfill.

## **2.2 Cap System**

The County will cap their landfill within 180 days after the final receipt of solid waste. The cap system will consist of 12 inches of intermediate cover, 18 inches of cohesive soil with a permeability no greater than  $1.0 \times 10^{-5}$  cm/sec, and 18 inches of erosive layer. The cap will contain a gas venting system consisting of a series of washed stone trenches below the soil liner that will be vented through 10" diameter PVC pipes that penetrate the cap. The cap system will also include the proper seeding and mulching of the erosive layer and other erosion control devices. The largest area currently requiring a cap system will be 12.65 acres.

## **2.3 Cohesive Soil Cap**

All materials and equipment shall be furnished by an established and reputable manufacturer or supplier. All materials and equipment shall be new and shall be of first class ingredients and construction, designed and guaranteed to perform the service required and shall conform with the following standard specifications or shall be the product of the listed manufacturers or similar and equal thereto as approved by the Engineer.

### **Cohesive Soil Cap Borrow Material**

<b>Test Name</b>	<b>Test Method</b>	<b>Contractor/Engineer Frequency</b>
Moisture/Density	ASTM D698/D1557	1 per 5000 c.y.
Remolded Permeability	ASTM D5084	1 per 5000 c.y.
Atterberg Limits	ASTM D4318	1 per 5000 c.y.
Visual Classification	ASTM D2488	1 per 5000 c.y.
Grain Size Distribution	ASTM D422	1 per 5000 c.y.

### **Cohesive Soil Cap Test Pad**

Test Name	Test Method	Contractor/Engineer Frequency
Field Moisture/Density	ASTM D1556 (sand cone) ASTM D2922/D3017 (nuclear gauge) ASTM D2937 (drive cylinder)	3 per lift
Permeability	ASTM D5084	1 per lift
Remolded Permeability	ASTM D5084	1 per lift
Atterberg Limits	ASTM D4318	1 per lift
Visual Classification	ASTM D2488	1 per lift
Grain Size Distribution	ASTM D422	1 per lift

#### In-Place Cohesive Soil Cap

Test Name	Test Method	Contractor/Engineer Frequency
Field Moisture/Density	ASTM D1556 (sand cone) ASTM D2922/D3017 (nuclear gauge) ASTM D2937 (drive cylinder)	1 per lift per acre
Permeability	ASTM D5084	1 per lift per acre
Atterberg Limits	ASTM D4318	1 per lift per acre
Visual Classification	ASTM D2488	1 per lift per acre
Grain Size Distribution	ASTM D422	1 per lift per acre

(a) Suitable on-site and/or off-site soils may be used as cohesive soil cap if it can achieve an in-place permeability of  $1.0 \times 10^{-5}$  cm/sec or less and meets all testing requirements indicated in the material testing paragraph in this section. Wyoming bentonite or an approved equivalent may be blended with the soil to lower the soil's permeability.

(b) A permeability "window" shall be developed for each type of soil from the borrow material that will be used for construction of the cohesive soil cap. The window shall be plotted on a semi-log plot with moisture content versus density. Laboratory testing to develop the window shall include a series of remolded samples compacted to various dry densities and moisture contents utilizing the same compactive effort (ASTM D 698 or D 1557). The remolded samples shall be tested for permeability to determine whether or not the particular soil type will provide the maximum permeability ( $1.0 \times 10^{-5}$  cm/sec) at various dry densities and moisture contents. The window is then developed from the accepted remolded samples and moisture contents from the semi-log plot. A straight line is typically drawn between the acceptable points on the moisture-density curve to indicate a range of probable acceptable permeability results. The window will be used in the construction of the test strip to verify the laboratory remolded permeability results.

(c) Atterberg Limits (ASTM D4318) and grain size distribution (ASTM D422) and visual classification (ASTM D2488) shall also be conducted on the bulk samples used to prepare the permeability window. These tests can be used as indices on random samples collected from the borrow site during construction to verify the soil type is the same as was used to develop the "window". As a minimum, sufficient visual classifications and Atterberg Limits shall be conducted in association with each permeability test to verify that the construction materials meet specifications.

(d) A test strip of compacted cohesive soil cap shall be prepared to verify the permeability "window" prior to general installation of the cohesive soil cap. The test strip will be used to verify the results from the remolded permeabilities from the borrow site utilizing the permeability window(s) for each soil type that is going to be used for construction of the cohesive soil cap. At a minimum, the verification will consist of three moisture density tests, one Atterberg limits test, one grain size distribution test (ASTM D2488, D4318, and D422 respectively), and one Shelby Tube sample (ASTM D1587) for each lift constructed in the test pad. Laboratory permeability tests shall be performed on tube (Shelby or drive tubes) samples of the cohesive soil cap after placement and compaction. The

permeability must be a maximum of  $1.0 \times 10^{-5}$  cm/sec. Tests shall be performed in accordance with the ASTM D5084. The test strip shall be approximately 2,500 sq. ft. in surface area and constructed to conform geometrically to the site topography with a minimum lateral dimension in any direction of 25 feet. The test strip shall consist of at least three compacted 6 inch lifts of cohesive soil cap. Placement and testing of the test strip shall be in conformance with the construction specifications and requirements for general installation of the cohesive soil cap. Test results from the test strip shall be used to guide placement and achievement of the required maximum permeability of  $1.0 \times 10^{-5}$  cm/sec of the cohesive soil cap. The test strip may be used as an integral part of the overall cohesive soil cap if it meets the required specification for the cap. All results shall be given to the CO.

(e) The soils shall be placed to the total thickness shown on the plans in maximum 8-inch thick loose lifts resulting in a maximum 6" lift compacted preferably at a moisture content between 0 to 3% above optimum moisture content to 95% (Standard Proctor) maximum dry density (ASTM D698). A sheepfoot roller or approved alternative may be used to compact the soil cap provided the compaction and permeability requirements can be achieved. Each lift shall be tested for permeability, moisture content, particle size distribution analysis, Atterberg Limits, moisture-density-permeability relation, and if needed, percent bentonite admixed with soil, prior to the placement of the succeeding lift. Each lift shall also be visually inspected to confirm that all soil clods have been broken and that the surface is sufficiently scarified so that adequate bonding can be achieved. Soils for cohesive soil cap shall be screened, disked, or prepared using any other approved method as necessary to obtain a homogeneous cohesive soil with clod sizes in a soil matrix no larger than approximately 1.5 inches in maximum diameter. After each lift, the surface shall be scarified prior to the placement of the next lift to provide good bonding from one lift to the next.

(f) The cohesive soil cap shall be tested in the field to evaluate the coefficient of permeability. The coefficient of permeability of the soil cap shall be equal to or less than  $1.0 \times 10^{-5}$  cm/sec after placement and compaction. The soil cap must be a minimum of 1.5 feet thick.

(g) Laboratory permeability tests shall be performed on tube (Shelby or drive tubes) samples of the cohesive soil cap after placement and compaction. The permeability must be a maximum of  $1.0 \times 10^{-5}$  cm/sec. Tests shall be performed in accordance with ASTM D5084.

(h) The soil cap shall be tested a minimum of one soil sample per lift per acre for laboratory permeability. All permeability testing will be on random samples judged by the Engineer to be representative of the most permeable soil conditions for the area being tested. The project engineer shall certify that the materials used in construction were tested according to the Division approved plans. If after placement of the soil cap it fails the required tests, the material will either be reworked or replaced and then retested for permeability. The soil cap must remain moist at all times. If any section becomes dry, rework the dry area and moisten.

(i) A minimum of two (2) inches of soil shall be removed prior to securing each sample for permeability testing. The sampling tube shall be advanced vertically into the soil with as little soil disturbance as possible and should be pushed using a uniform pressure. The sampling tube (Shelby tube), when extracted, shall be free of dents, and the ends shall not be distorted. A backhoe or approved alternative should be used to advance the sampling tube (Shelby tube) as long as disturbance is minimized. Drive tube samples of the Cap may be obtained for permeability testings. If the Engineer judges the sample to be too disturbed, another sample shall be taken. Once an acceptable sample has been secured and properly prepared, all sample excavations shall be backfilled to grade with a 50% mixture of bentonite and similar soils in maximum 3-inch loose lifts and hand tamped with a blunt tool to achieve a tight seal equivalent to the original density.

(j) No additional construction shall proceed on the soil layers at the area being tested until the Engineer has reviewed the results of the tests and judged the desired permeability is being achieved.

(k) As a minimum, sufficient visual classifications (ASTM D2488) , Gradation analyses (ASTM D422) and Atterberg limits (ASTM D4318) shall be conducted in association with each permeability test to verify that the construction materials meet specifications. The minimum number of tests will be one per lift per acre.

(l) If the soil for the cohesive soil cap is incapable of achieving the required permeability when compacted, bentonite or approved alternative may be mixed with the soils to decrease the permeability. The amount of additive required must be determined in the laboratory. Where additives are required, the soil shall be placed in maximum 8-inch thick loose lifts and compacted preferably between 0 to +3% optimum moisture content to 95% standard Proctor maximum dry density (ASTM Test Designation D698) for the soil-additive mixture. All other compaction procedures for the soil apply.

(m) The Contractor shall protect the cohesive soil cap from desiccation, flooding and freezing. Protection, if required, may consist of a thin plastic protective cover, (or other material as approved by the engineer) installed over the completed cohesive soil cap until such time as the placement of flexible membrane liner begins. Areas found to have any desiccation cracks or which exhibit swelling, heaving or other similar conditions shall be replaced or reworked by the contractor to remove these defects.

(n) The thickness and grade of the soil cap will be verified by the surveyor. The soil cap will be surveyed at 100 foot grid points where the elevations of the top of landfill will be checked with the top of soil cap to verify 1.5 feet of soil cap. The grade will then be verified with the surveyed information. The survey will be performed by North Carolina Professional Land Surveyor.

## **2.4 Erosive Layer**

The soil for the erosive layer shall consist of any soils suitable of supporting vegetative growth.

(a) Native vegetation will be used as recommended in the NC Erosion and Sediment Control Planning and Design Manual and as shown in the Closure Plan drawings in Appendix A.

(b) The thickness and grade of the erosive layer will be verified by the surveyor. The erosive soil layer will be surveyed at 100 foot grid points where the elevations of the top of landfill will be checked with the top of soil cap to verify 1.5 feet of erosive soil layer. The grade will then be verified with the surveyed information. The survey will be performed by North Carolina Professional Land Surveyor.

## **2.5 Methane Venting System**

### **Gas Venting System**

NC.D.O.T. No.5 stone, Geotextile fabric, and 8" and 10" plastic pipes will be used in the construction of the Gas venting system.

#### **(1) Stone in Trenches and Surrounding Perforated Collection Piping**

Stone for methane collection system shall meet the requirements of NC DOT aggregate, Standard Size No. 5 and shall contain no fines. Stone must pass the sieve analysis test for No. 5 stone performed at the quarry.

(2) Geotextile Fabric

Geotextile fabric surrounding the stone/piping shall be non-woven needle punched fabric with the following minimum properties:

1) Weight	8.0 oz/yd <sup>2</sup>	ASTM D-3776
2) Grab Strength	205 lbs.	ASTM D-4632
3) Grab Elongation	50%	ASTM D-4632
4) Trapezoidal Tear Strength	85 lbs.	ASTM D-4533
5) Puncture Strength	100 lbs.	ASTM D-4833
6) Mullen Burst Strength	320 psi	ASTM D-3786
7) Permittivity	1.4 sec <sup>-1</sup>	ASTM D-4491

Geotextile fabric shall be manufactured by Polyfelt , TNS Advanced Technologies, or approved equal.

(3) Plastic Pipe

Plastic gravity sewer pipe and fittings used for methane vent shall be unplasticized polyvinyl chloride (PVC) and conform to the requirements of ASTM Designation D-3034 on ASTM F679, Type PSM, Class 12454-B, SDR-35 with elastomeric gasket joints. PVC pipe and fittings shall be as manufactured by J-M Pipe, Certainteed, H&W Industries or equal. The methane riser pipe shall be a 10-inch solid wall PVC pipe.

The methane gas venting system on top of the landfill will be constructed after all phases of filling have been completed.

**2.6 Construction Quality Assurance(CQA) Report**

The CQA report will contain the results of all the construction quality assurance and construction quality control testing including documentation of any failed test results, descriptions of procedures used to correct the improperly installed material, and results of all retesting performed. The CQA report will contain as-built drawings noting any deviation from the approved closure plans and will also contain a comprehensive narrative including, but not limited to, daily reports from the project engineer, a series of color photographs of major project features, and documentation of proceedings of all progress and troubleshooting meetings.

## 2.7 Closure Costs

The largest area to be closed within the permitted life will be 12.65 Ac. Post Closure will be 30 years after Closure.

Closure Costs:

Closure will consist of the following which costs are estimated as being done by a third party.

1. 18" of  $1 \times 10^{-5}$  cm/sec. soil cover, surface preparation;
2. Erosion Control Devices;
3. 18" Erosive layer;
4. Seeding and Mulching;
5. Mobilization/Demobilization, machine /equipment costs, and fuel costs;
6. Labor Costs;
7. Stone for methane gas collection.
8. Geotextile for methane gas collection.
9. Vent pipes for methane gas collection, and
10. Engineering Costs and QA/QC of the Composite liner and certification of closure, including CQA field monitoring and lab testing, CQA reporting and certification, construction administration and bidding, Survey as-builts and recordation fees.

Estimate of Probable Costs:

1. 18" of  $1 \times 10^{-5}$  cm/sec. cohesive soil cap for 12.65 acres:  
(including surface preparation)  
 $12.65 \times 43,560 = 551,034 \times 1.5 = 826,551 / 27 = 30,613 \text{ cy}$   
Total yardage + 15% =  $35,205 \text{ yd}^3$  @ a cost of  $\$9.00/\text{yd}^3$   
 $\therefore \text{Cost} = \$316,845$
2. Erosion Control devices  
  
Estimated costs @  $\$75,000$   
 $\therefore \text{Cost} = \$75,000$
3. 18" erosive soil layer for 12.65 acres.  
 $12.65 \times 43,560 = 551,034 \times 1.5 = 826,551 / 27 = 30,613 \text{ cy}$   
Total yardage + 15% =  $36,205 \text{ yd}^3$  @ a cost of  $\$4.00/\text{yd}^3$   
 $\therefore \text{Cost} = \$140,820$
4. Seeding and Mulching for 12.65 acres.  
  
Estimated cost of  $\$2,000/\text{acre}$   
 $\therefore \text{Cost} = \$25,300$
5. Mobilization/Demobilization.  
(including Machine/Equipment costs and fuel costs)  
  
Estimated cost of  $\$175,000$
6. Labor Costs.  
  
Estimated cost of  $\$200,000$   
 $\therefore \text{Cost} = \$200,000$

7. Stone for methane gas collection.

Total estimated linear feet =1,759 ft.

Total estimated volume for a 2'x1' trench = 3,518 ft<sup>3</sup>

with a density of 120 lbs/ft<sup>3</sup> total weight =211 tons @ a cost of \$25.00/ton

∴ Cost = \$5,275

8. Geotextile for methane gas collection.

Total estimated linear feet = 1,759 ft.

Total estimated perimeter for a 2'x1' trench =

(1759 ft × 6 ft )=10,554 ft<sup>2</sup> @ a cost of \$0.20/ ft<sup>2</sup>

∴ Cost = \$2,111

9. Vent pipes for methane gas collection.

Estimated cost @ \$600.00 each (9 vents).

∴ Cost = \$5,400

10. Engineering Costs and QA/QC of the Composite liner and certification of closure.  
(including CQA field monitoring and lab testing, CQA reporting and certification,  
construction administration, construction documentation and bidding, Survey as-builts  
and recordation fees)

Estimated cost = \$200,000

∴ Cost = \$200,000

Total of Estimated Closure Costs:

1.	\$	316,845
2.	\$	75,000
3.	\$	140,820
4.	\$	25,300
5.	\$	175,000
6.	\$	200,000
7.	\$	5,275
8.	\$	2,111
9.	\$	5,400
10.	\$	<u>200,000</u>
Total:	\$	1,145,751

**SECTION 3.0**

**POST-CLOSURE  
PLAN**

### **3.1 Introduction**

#### **CONTACTS:**

Name:	David Jones
Title:	Solid Waste Director
Phone No.:	(252) 747-5720
Address:	105 Landfill Rd. Walstonburg, NC 27888

#### **DESCRIPTION OF USE:**

The County has no future use planned for their landfill at this time. However, any future use of the landfill shall not disturb the integrity of the cap system, base line system or any other components of the containment system or the functioning of the monitoring systems.

#### **DESCRIPTION OF MAINTENANCE ACTIVITIES:**

The County Landfill will be monitored quarterly for evidence of settlement, subsidence and ponding in the cap system. The entire site will be monitored quarterly for evidence and effects of erosion. The erosion control plan will be preserved. All gates, fencing, access roads, and signs shall be maintained appropriately. Annually in the Spring, the vegetative cover will be monitored to assure a good stand of vegetation, and where needed, it will be reseeded. The vegetative cover will be mowed twice a year, once in mid-summer and again in early fall. These maintenance activities will take place over the entire post closure period of thirty years. The County will make repairs as necessary to maintain the integrity and effectiveness of the Cap System.

#### **DESCRIPTION OF MONITORING ACTIVITIES:**

The County Landfill will monitor and analyze ground water and surface water semi-annually for Appendix I constituents for a period of thirty years. The County will also monitor methane gas at landfill structures and the boundary quarterly for the thirty-year period.

The County will inspect the exterior slopes of the landfill at least weekly to determine if there are any breakouts of leachate in the slopes. If any are discovered, they will be contained immediately to assure that they will not leave the site. The containment can consist but not be limited to an earthen berm, sand bags, erosion control logs and/or anything that will contain the leachate on the slope.

The repair of the breakout will require excavating into the cover soil on the slope down to the waste and into the waste to determine what is causing the leachate to come to the surface. Normally it is another layer of soil that has been used as cover and the leachate is flowing along that layer to the slope and surfacing on the slope. The lower layer of cover needs to be removed at the breakout so that the leachate that is flowing along this cover has a point where it will go vertically into the landfill instead of flowing along the soil boundary that was once either daily cover or an intermediate cover.

Once this soil layer has been breached, the excavation can be filled back with stone, clean waste or any material, other than soil, that will allow the leachate to flow vertically instead of horizontally. Once the excavation has been filled with this material, the surface can be cover with soil so that surface water does not intrude into the excavation. Vegetative cover will be reestablished over the excavated area.

#### **COMPLETION OF POST-CLOSURE CARE**

Following completion of the post-closure care period for each unit, the owner or operator will notify the Division that a certification, signed by a registered professional engineer, verifying that post-closure care has been completed in accordance with the post-closure plan, has been placed in the operating record.

### 3.2 Post Closure Costs

The largest closed area to be monitored within the post closure life will 12.65 acres.

#### Post Closure Costs:

Methane gas, ground water and surface water will be monitored for 30 years after closure. The cap will also be monitored for the 30-year period. All costs include reports, data analysis, and certifications.

1. Ground Water and Surface Water monitoring semi-annually for 30 years for Appendix I constituents and statistical analysis.  
Estimated cost/sample = \$840.00/sample  
Total annual samples = 2(6 wells + 2 surface) = 16 samples/year  
Estimated cost = 30 years x 16 samples/year x \$840.00/sample =  
  
∴ Cost = \$403,200
2. Methane Gas monitoring quarterly for 30 years.  
Estimate \$600.00/quarter = \$2,400.00/year  
Estimated cost = 30 year x \$2,400.00 = \$72,000.00  
  
∴ Cost = \$72,000.00
3. Cap Monitoring and repairing (including maintenance of all gates, fencing, access roads and signs, mowing and revegetation)  
  
Estimate \$100,000 for the 30 years.  
  
∴ Cost = \$100,000
4. Closure of sedimentation and erosion control devices.  
Estimate \$24,000.00 for closure  
  
∴ Cost = \$24,000
5. Maintenance of gas vents, monitoring wells, etc.  
Estimate \$60,000
6. Administration/Record keeping/Certification  
Estimate \$4,000.00/year for 30 years  
  
∴ Cost = \$120,000

#### Total of Estimated Post Closure Costs:

1.	\$ 403,200
2.	\$ 72,000
3.	\$ 100,000
4.	\$ 24,000
5.	\$ 60,000
6.	\$ 120,000
Total:	\$ 779,200

**SECTION 4.0**

**FINANCIAL  
RESPONSIBILITIES**

**APPENDIX A**

**FACILITY DRAWINGS,  
ENGINEERING/  
OPERATION DRAWINGS  
AND  
CLOSURE DRAWINGS**

# GREENE COUNTY CONSTRUCTION AND DEMOLITION LANDFILL FACILITY FACILITY PLAN

Permit Number: 40-02

Site Location: 105 Landfill Road  
Walstonburg, NC 27888

Applicant: County of Greene

Applicant's Address: 229 Kingold Blvd., Suite D  
Snow Hill, NC 28580

**BOARD OF COMMISSIONERS**

Jack Edmondson - Chairman  
Jesse Tyndall - Vice-Chairman  
Denny Garner  
Bennie Heath  
James T. Shackelford

**COUNTY MANAGER**

Don Davenport

**SOLID WASTE DIRECTOR**

David Jones

**Engineer**

Municipal Engineering Services Company, P.A.  
Garner, NC - Morehead City, NC - Boone, NC



by \_\_\_\_\_  
Professional Engineer  
(Garner Office)



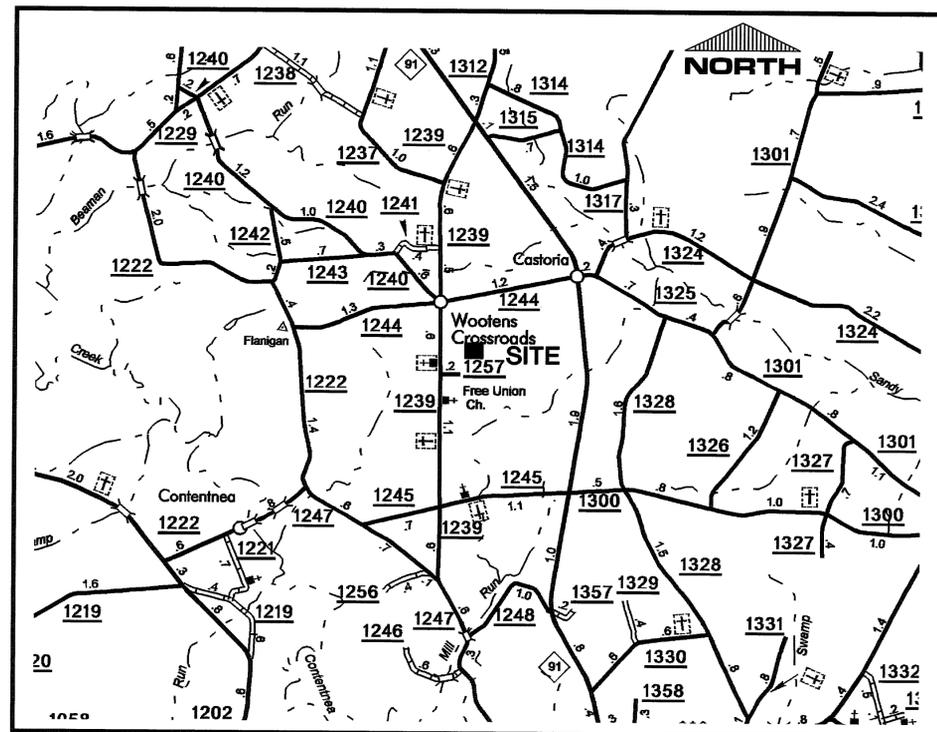
DATE	BY	REV.	DESCRIPTION
10/12/2011	LHC	1	REVISED SET PER DENR LETTER DATED 7/1/2010.

SCALE: 1:1  
 DATE: 12/01/09  
 DRWN. BY: L. HAMPTON  
 CHKD. BY: J. WOODIE  
 PROJECT NUMBER: G07061  
 DRAWING NO. T1 SHEET NO. 1 OF 7

P:\SolidWorks\07061-Greene Co. C&D Transition\eng\FACILITY\07061F-01-rev1.dwg, 10/14/2011 3:22:58 PM, ichich

# INDEX

SHEET NO.	DRAWING NO.	DESCRIPTION
1	T1	TITLE SHEET
2	T2	INDEX AND VICINITY MAP
3	F1	FACILITY PLAN AND EXISTING CONDITIONS
4	F2	PHASE 2 FILL PLAN
5	F3	PHASE 3 FILL PLAN
6	F4	PHASE 4 FILL PLAN
7	F5	PHASE 5 FILL PLAN



VICINITY MAP

Engineering Company, P.A.  
 P.O. BOX 349 BOONE, N.C. 28607  
 (828) 262-1767  
 Municipal Services  
 P.O. BOX 97 GARNER, N.C. 27529  
 (919) 772-5393  
 P.O. BOX 928 MOREHEAD CITY, N.C. 28557  
 (252) 726-9481  
 LICENSE NUMBER: C-0281

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

10/12/2011	DATE	INDEX AND VICINITY MAP
LHC	BY	INDEX AND VICINITY MAP
1	REV.	INDEX AND VICINITY MAP
1	REVISED INDEX AND SHEET NUMBER	INDEX AND VICINITY MAP
SCALE: 1:1		
DATE: 12/01/09		
DRWN. BY: L. HAMPTON		
CHKD. BY: J. WOODIE		
PROJECT NUMBER		
G07061		
DRAWING NO.	SHEET NO.	
T2	2 OF 7	



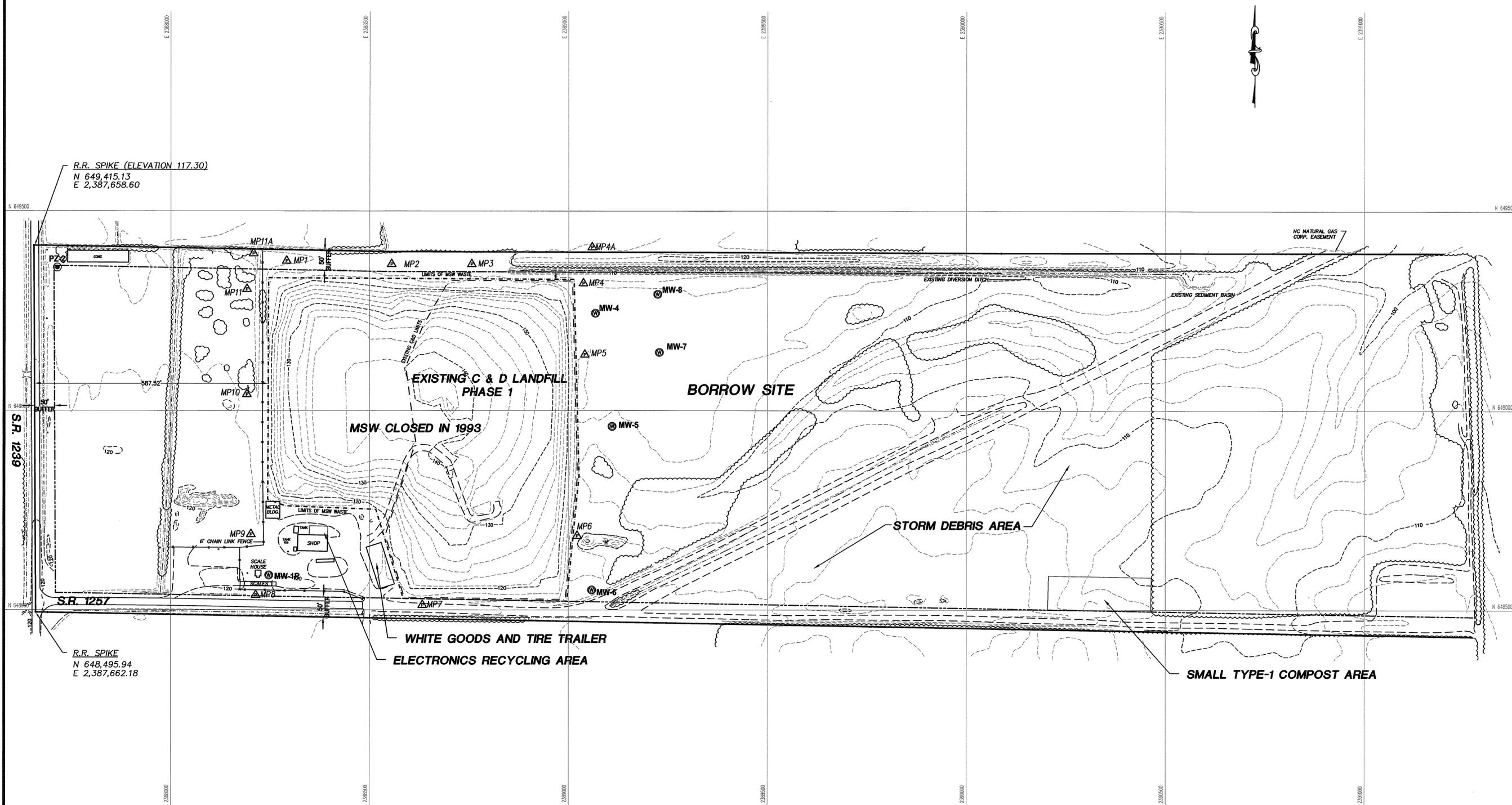
P:\SolidWorks\G07061-Greene Co. C&D Transition\dwg\FACILITY\G07061F-02-rev1.dwg, 10/14/2011, 3:30:30 PM, lch

**LEGEND**

- EXISTING DIVERSION DITCH/DRAINAGE FEATURE
- - - - - 120 EXISTING CONTOURS
- BUFFER
- PROPERTY
- - - - - LIMITS OF MSW WASTE
- - - - - CURRENT LIMITS OF C&D WASTE
- ⊙ MW-5 EXISTING MONITORING WELLS
- ⊙ PZ-2 EXISTING PIEZOMETER
- △ MP3 EXISTING METHANE MONITORING PROBES

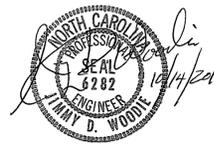
**NOTES**

THIS MAP WAS GENERATED FROM AERIAL PHOTOS FLOWN ON 2-22-94 BY TRIANGLE AERIAL MAPPING, SUPPLEMENTED WITH SURVEYS BY MUNICIPAL ENGINEERING SERVICES CO., PA.



PROPERTY	BOOK	PAGE	ACREAGE	GRANTOR	GRANTEE
C&D Landfill	424	352	77.7	Lan-Man, Inc.	Greene County
C&D Landfill(Map)	MB 7	24	77.785	-	Greene County

UNIT	FOOTPRINT ACREAGE	GROSS CAPACITY (CUBIC YARDS)
Closed Unlined MSW Unit	12.65	146,752
C&D Unit on top of closed MSW Unit (filled) 1/1/1998 - 5/8/2009	7.81	122,023
C&D Unit on top of closed MSW Unit (remaining as of 5/8/2009)	12.65	263,867



**Engineering Company, P.A.**  
 P.O. BOX 349 BOONE, N.C. 28607  
 (828) 282-1787  
**Municipal Services**  
 P.O. BOX 87 GARNER, N.C. 27559  
 (619) 772-6393  
 P.O. BOX 928 MOREHEAD CITY, N.C. 28557  
 (919) 726-9451  
 LICENSE NUMBER: C-0281

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

**FACILITY PLAN  
 EXISTING CONDITIONS**

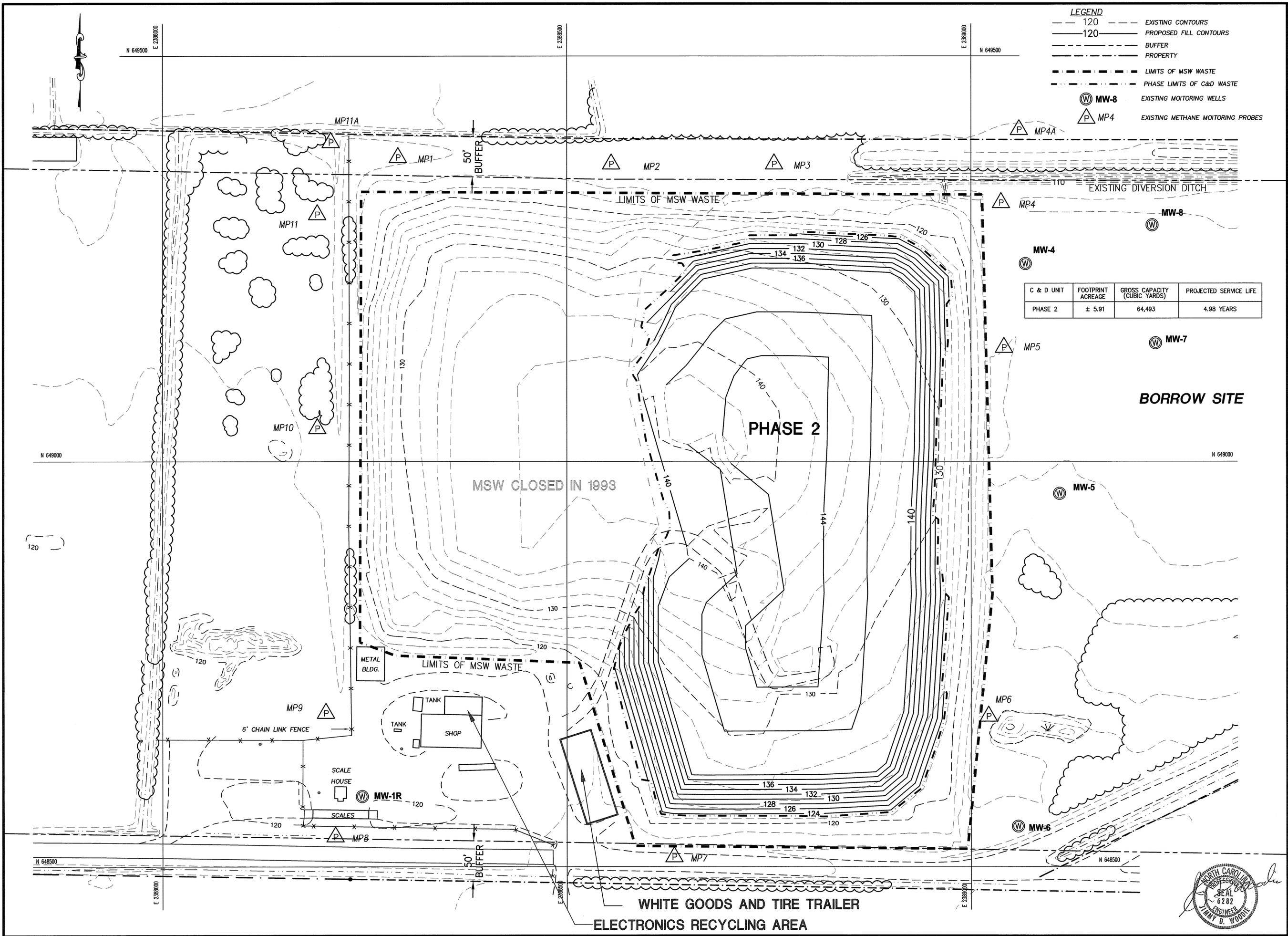
NO./DATE	BY	REV.	DESCRIPTION
10/12/11 <td>UHC <td>1 <td>REVISION PER NCEM DATE 7/1/2010</td> </td></td>	UHC <td>1 <td>REVISION PER NCEM DATE 7/1/2010</td> </td>	1 <td>REVISION PER NCEM DATE 7/1/2010</td>	REVISION PER NCEM DATE 7/1/2010

SCALE: 1" = 120'  
 DATE: 12/01/09  
 DRWN. BY: L. HAMPTON  
 CHKD. BY: J. WOODIE  
 PROJECT NUMBER: **G07061**  
 DRAWING NO. **F1** SHEET NO. **3 OF 7**

P:\SolidWorks\G07061-Greene Co. C&D Transition\map\FACILITY\G07061F-03-rev1.dwg, 10/13/2011 10:48:15 AM, lchub

- LEGEND**
- 120 --- EXISTING CONTOURS
  - 120 --- PROPOSED FILL CONTOURS
  - - - - - BUFFER
  - - - - - PROPERTY
  - - - - - LIMITS OF MSW WASTE
  - - - - - PHASE LIMITS OF C&D WASTE
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - △ MP4 EXISTING METHANE MONITORING PROBES

C & D UNIT	FOOTPRINT ACREAGE	GROSS CAPACITY (CUBIC YARDS)	PROJECTED SERVICE LIFE
PHASE 2	± 5.91	64,493	4.98 YEARS



**Engineering Company, P.A.**  
**Municipal Services**

LICENSE NUMBER: C-0281

P.O. BOX 87 GARNER, N.C. 27828 (616) 775-5393  
 P.O. BOX 328 MOREHEAD CITY, N.C. 28557 (252) 725-9451

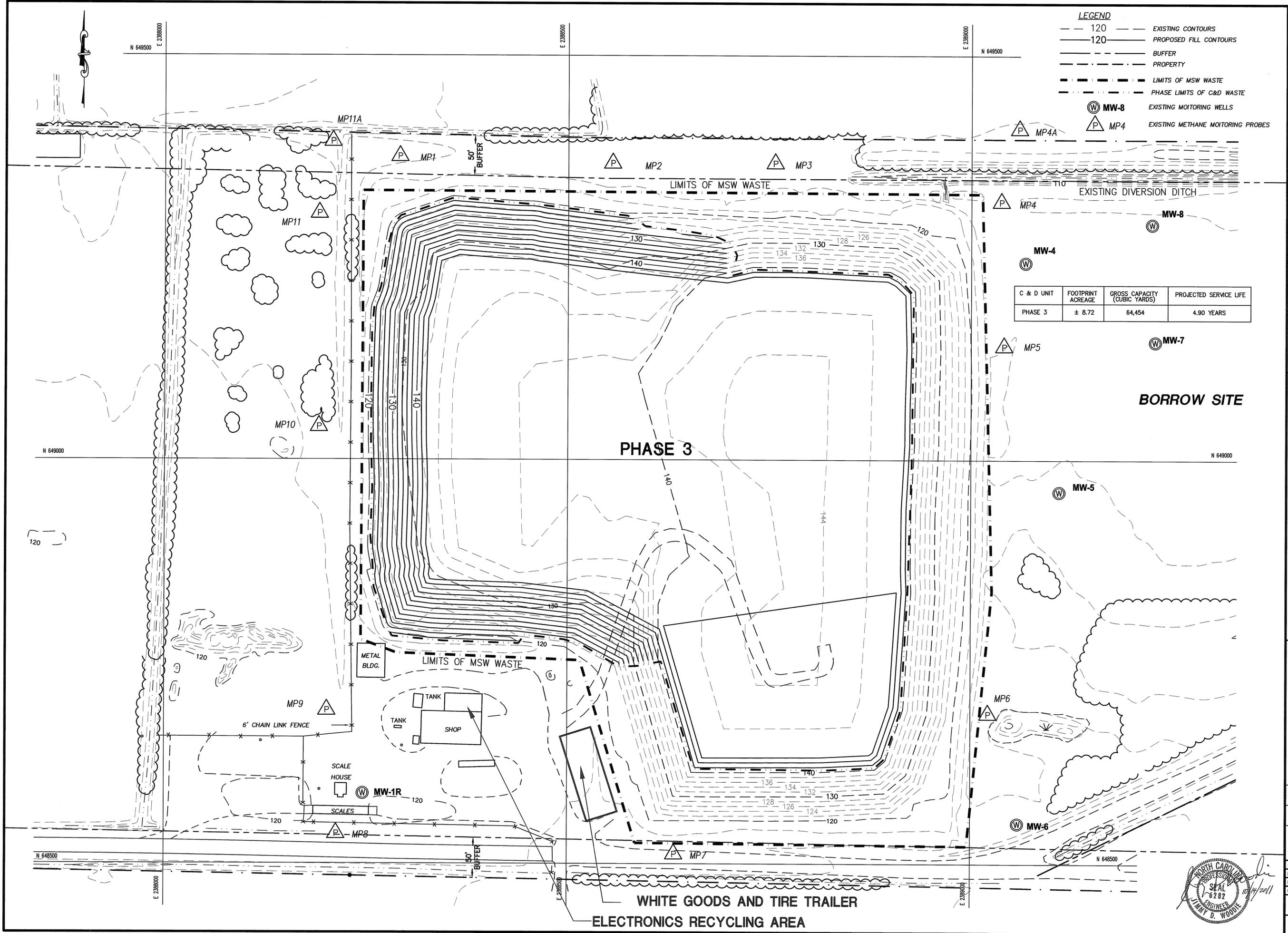
**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

10/12/11	DATE	REVISION	DESCRIPTION
LHC	BY	1	REVISED PER NOBOR LETTER DATED 7/7/10
FACILITY PLAN PHASE 2 FILL PLAN			
SCALE: 1" = 50'			
DATE: 12/01/09			
DRWN. BY: B. LAUX			
CHKD. BY: J. WOODIE			
PROJECT NUMBER G07061			
DRAWING NO. F2	SHEET NO. 4 OF 7		



**WHITE GOODS AND TIRE TRAILER  
 ELECTRONICS RECYCLING AREA**

P:\Solidwaste\G07061-Greene Co. C&D Transition\dwg\FACILITY\G07061F-04-rev1.dwg, 10/13/2011 10:49:50 AM, lch,lch



- LEGEND**
- 120 --- EXISTING CONTOURS
  - 120 — PROPOSED FILL CONTOURS
  - BUFFER ---
  - PROPERTY ---
  - LIMITS OF MSW WASTE ---
  - PHASE LIMITS OF C&D WASTE ---
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - ⊙ MP4 EXISTING METHANE MONITORING PROBES

C & D UNIT	FOOTPRINT ACREAGE	GROSS CAPACITY (CUBIC YARDS)	PROJECTED SERVICE LIFE
PHASE 3	± 8.72	64,454	4.90 YEARS

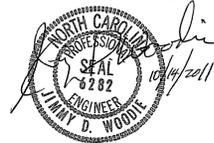
**Engineering Company, P.A.**  
 P.O. BOX 348 BOONE, N.C. 28607  
 (828) 262-1767  
**Municipal Services**  
 LICENSE NUMBER: C-0281  
 P.O. BOX 97 GARNER, N.C. 27529  
 (919) 772-5593  
 P.O. BOX 828 MOREHEAD CITY, N.C. 28557  
 (813) 738-3481

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

DATE	BY	REV.	DESCRIPTION
10/12/11	LHC	1	REVISED PER INCUBER LETTER DATED 7/1/10

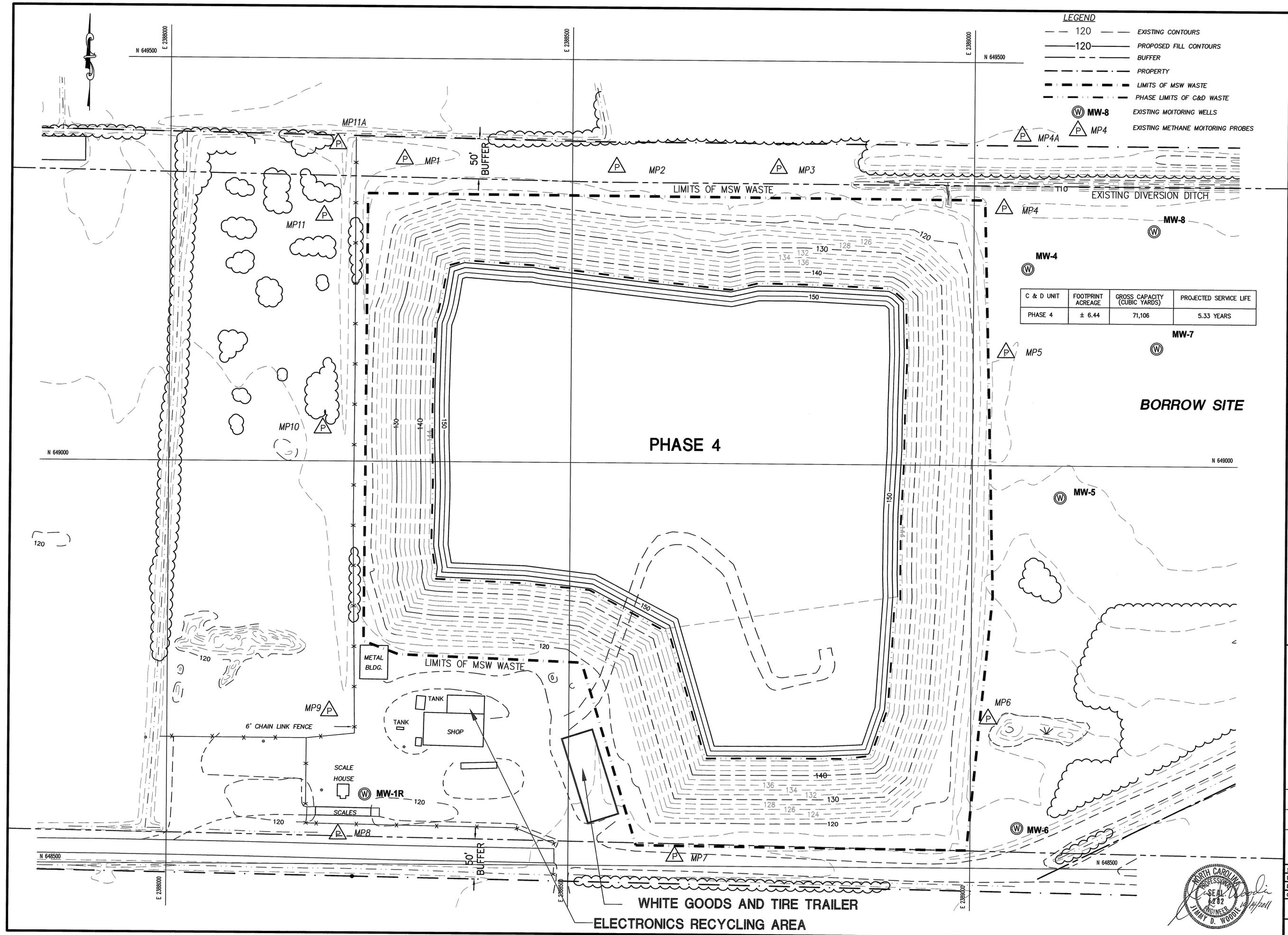
FACILITY PLAN  
PHASE 3 FILL PLAN

SCALE: 1" = 50'  
 DATE: 12/01/09  
 DRWN. BY: B. LAUX  
 CHKD. BY: J. WOODIE  
 PROJECT NUMBER: G07061  
 DRAWING NO. F3 SHEET NO. 5 OF 7



**WHITE GOODS AND TIRE TRAILER  
 ELECTRONICS RECYCLING AREA**

F:\SolidWaste\G07061-Greene Co. C&D Transition\dwg\FACILITY\G07061F-05-rev1.dwg, 10/13/2011 10:51:02 AM, lch, lch



- LEGEND**
- 120 --- EXISTING CONTOURS
  - 120 — PROPOSED FILL CONTOURS
  - BUFFER ---
  - PROPERTY ---
  - LIMITS OF MSW WASTE ---
  - PHASE LIMITS OF C&D WASTE ---
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - ⊙ MP4 EXISTING METHANE MONITORING PROBES

C & D UNIT	FOOTPRINT ACREAGE	GROSS CAPACITY (CUBIC YARDS)	PROJECTED SERVICE LIFE
PHASE 4	± 6.44	71,106	5.33 YEARS

**Engineering Company, P.A.**

P.O. BOX 349 BOONE, N.C. 28607  
(828) 292-1787

**Municipal Services**

P.O. BOX 97, GARNER, N.C. 27529  
(919) 772-5393

P.O. BOX 928 MOREHEAD CITY, N.C. 28557  
(813) 726-3451

LICENSE NUMBER: C-0281

**CONSTRUCTION & DEMOLITION  
LANDFILL FACILITY  
GREENE COUNTY  
NORTH CAROLINA**

DATE	BY	REV.	DESCRIPTION
10/12/11	LUC	1	REVISED PER NOBIS LETTER DATED 7/1/10

FACILITY PLAN  
PHASE 4 FILL PLAN

SCALE: 1" = 50'  
DATE: 12/01/09  
DRWN. BY: B. LAUX  
CHKD. BY: J. WOODIE  
PROJECT NUMBER: G07061  
DRAWING NO. F4 SHEET NO. 6 OF 7



**WHITE GOODS AND TIRE TRAILER  
ELECTRONICS RECYCLING AREA**

P:\SolidWorks\G07061-Greene Co. C&D Transition\dwg\FACILITY\G07061F-05-rev.dwg, 10/13/2011 10:53:12 AM, lch, lch

- LEGEND**
- 120 --- EXISTING CONTOURS
  - 120 — PROPOSED FILL CONTOURS
  - - - - - BUFFER
  - - - - - PROPERTY
  - - - - - LIMITS OF MSW WASTE
  - - - - - PHASE LIMITS OF C&D WASTE
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - ⊙ MP4 EXISTING METHANE MONITORING PROBES

C & D UNIT	FOOTPRINT ACREAGE	GROSS CAPACITY (CUBIC YARDS)	PROJECTED SERVICE LIFE
PHASE 5	± 5.28	63,814	4.71 YEARS

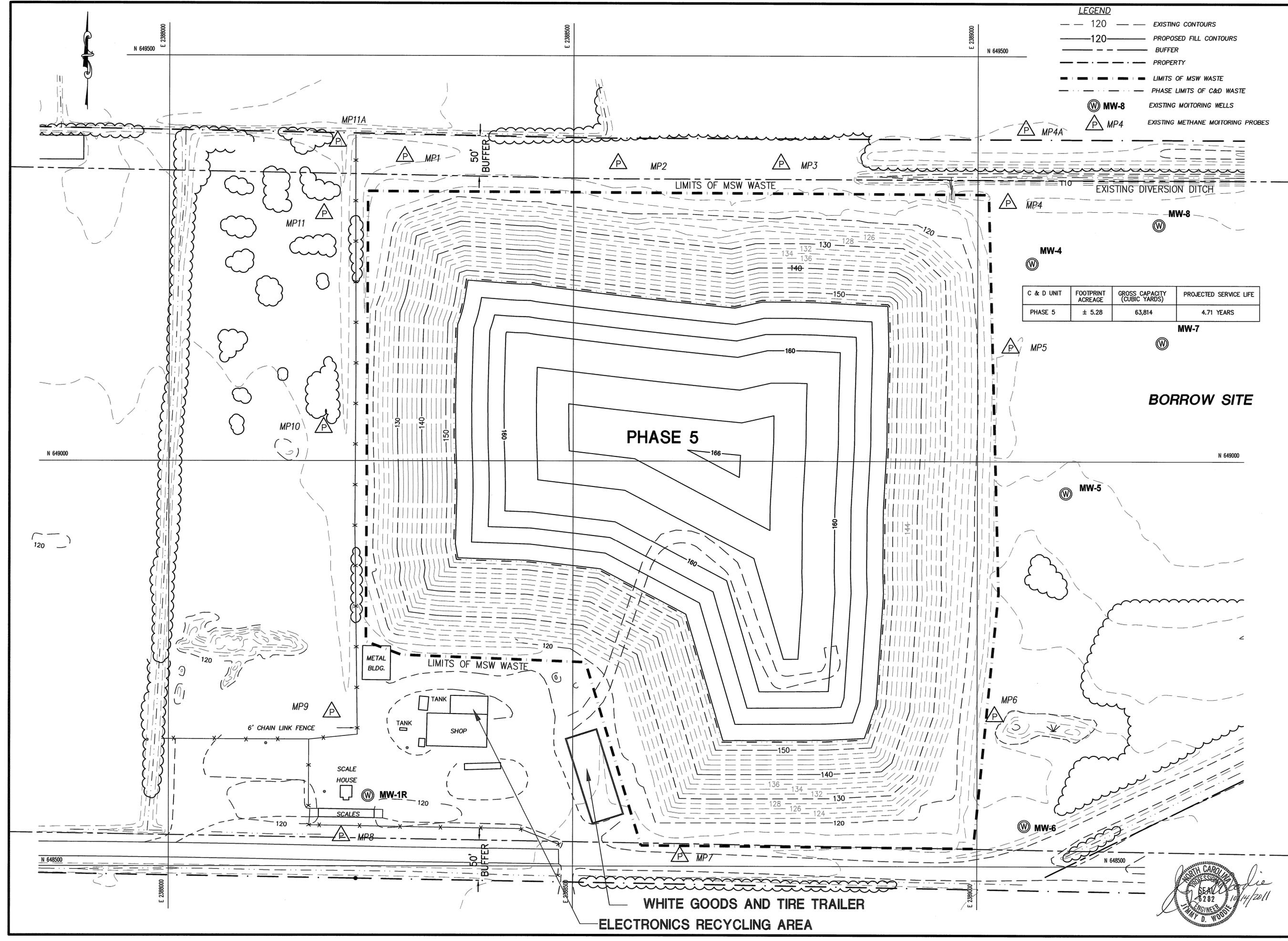
**Engineering Company, P.A.**  
 P.O. BOX 546 BOONE, N.C. 28607  
 (828) 262-1767  
**Municipal Services**  
 P.O. BOX 87 GARNER, N.C. 27626  
 (919) 772-6993  
 P.O. BOX 828 MOREHEAD CITY, N.C. 28557  
 (813) 728-9481  
 LICENSE NUMBER: C-0281

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

DATE	BY	REV.	DESCRIPTION
10/12/11	LHC	1	REISSUED PER NOBEHR LETTER DATED 7/1/10

FACILITY PLAN  
PHASE 5 FILL PLAN

SCALE: 1" = 50'	
DATE: 12/01/09	
DRWN. BY: B. LAUX	
CHKD. BY: J. WOODIE	
PROJECT NUMBER: G07061	
DRAWING NO. F5	SHEET NO. 7 OF 7



P:\SolidWaste\G07061-Greene Co. C&D Transition\Drawings\FACILITY\G07061-F-07-rev1.dwg, 10/13/2011 10:55:33 AM, lch, lch

# GREENE COUNTY CONSTRUCTION AND DEMOLITION LANDFILL FACILITY ENGINEERING/OPERATION PLAN

Permit Number: 40-02

Site Location: 105 Landfill Road  
Walstonburg, NC 27888

Applicant: County of Greene

Applicant's Address: 229 Kingold Blvd., Suite D  
Snow Hill, NC 28580

**BOARD OF COMMISSIONERS**

Jack Edmondson - Chairman  
Jesse Tyndall - Vice-Chairman  
Denny Garner  
Bennie Heath  
James T. Shackelford

**COUNTY MANAGER**

Don Davenport

**SOLID WASTE DIRECTOR**

David Jones

*Engineer*

***Municipal Engineering Services Company, P.A.  
Garner, NC - Morehead City, NC - Boone, NC***

by  *[Signature]*  
**Professional Engineer  
(Garner Office)**

Engineering Company, P.A.  
 P.O. BOX 346 BOONE, N.C. 28607  
 (828) 282-1767  
 Municipal Services  
 P.O. BOX 87 GARNER, N.C. 27626  
 (919) 772-5985  
 P.O. BOX 828 MOREHEAD CITY, N.C. 28557  
 (252) 728-3451  
 LICENSE NUMBER: C-0281

DATE	BY	REV.	DESCRIPTION
10/12/11	LOH	3	REV'D PER NCDENR LETTER DATED 7/1/10. NO CHANGES THIS SHEET.
3/2/10	LOH	2	REVISED PER DENR LETTER DATED 10/23/09.
2/23/08	LOH	1	REVISED PER DENR LETTER DATED 12/23/08.

SCALE: 1:1  
DATE: 11/21/07  
DRWN. BY: L. HAMPTON  
CHKD. BY: J. WOODIE  
PROJECT NUMBER: G07061  
DRAWING NO. T1 SHEET NO. 1 OF 8

P:\SolidWorks\G07061-Greene Co. C&D Transition\dwg\G07061-01-REV3.dwg, 10/13/2011 10:43:15 AM, lsh.kh

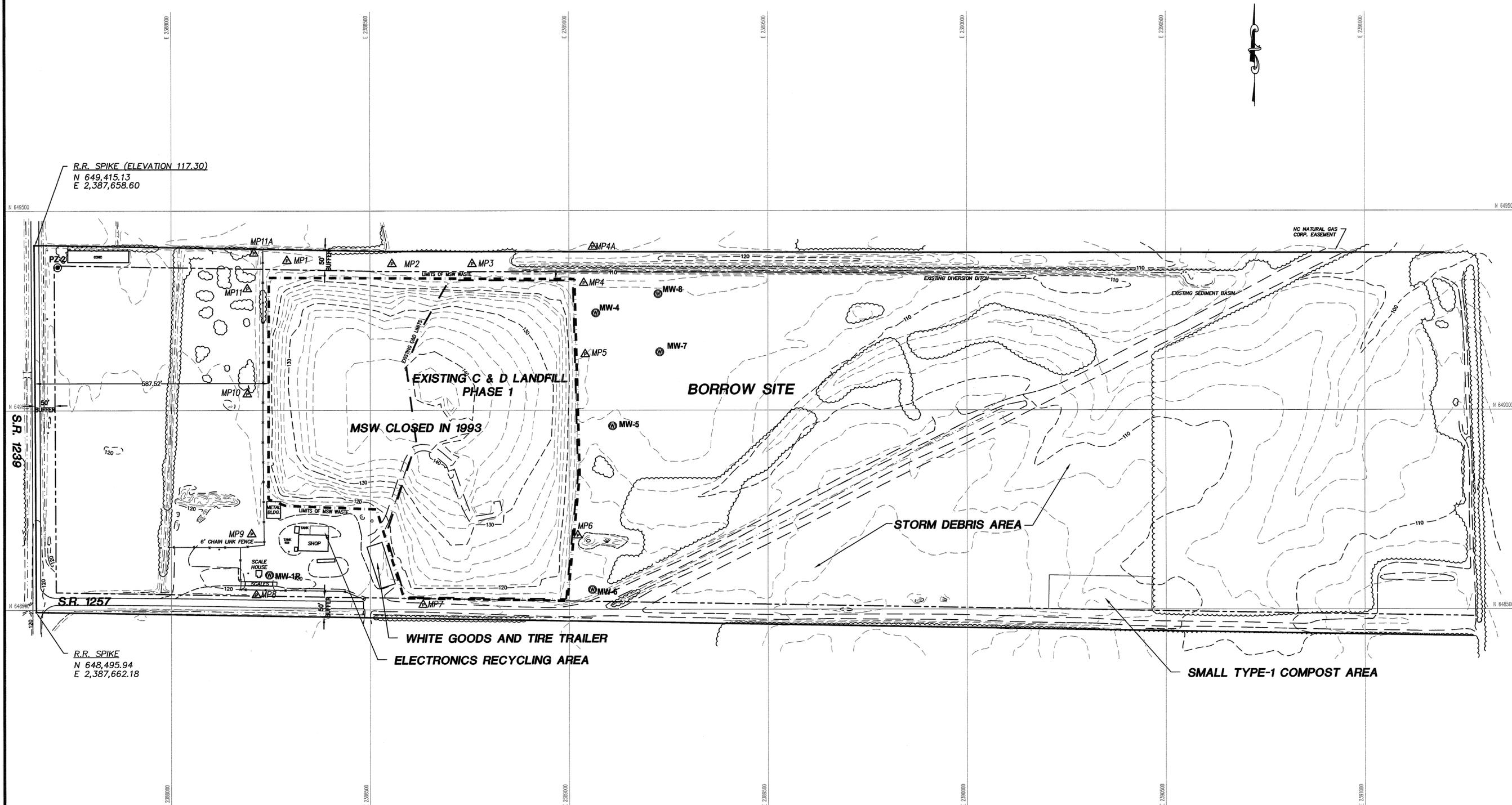


**LEGEND**

- - - - - EXISTING DIVERSION DITCH/DRAINAGE FEATURE
- - - - - 120 EXISTING CONTOURS
- - - - - BUFFER
- - - - - PROPERTY
- - - - - LIMITS OF MSW WASTE
- - - - - CURRENT LIMITS OF C&D WASTE
- ⊙ MW-5 EXISTING MONITORING WELLS
- ⊙ PZ-2 EXISTING PIEZOMETER
- △ MP3 EXISTING METHANE MONITORING PROBES

**NOTES**

THIS MAP WAS GENERATED FROM AERIAL PHOTOS FLOWN ON 2-22-94 BY TRIANGLE AERIAL MAPPING, SUPPLEMENTED WITH SURVEYS BY MUNICIPAL ENGINEERING SERVICES CO., PA.



R.R. SPIKE (ELEVATION 117.30)  
N 649,415.13  
E 2,387,658.60

R.R. SPIKE  
N 648,495.94  
E 2,387,662.18

**Engineering Company, P.A.**

P.O. BOX 948 BOONE, N.C. 28607  
(828) 262-1767

**Municipal Services**

P.O. BOX 97 GARNER, N.C. 27529  
(919) 772-5895

P.O. BOX 828 MOREHEAD CITY, N.C. 28557  
(813) 798-9451

**CONSTRUCTION & DEMOLITION  
LANDFILL FACILITY  
GREENE COUNTY  
NORTH CAROLINA**

DATE	REV.	BY	DESCRIPTION
10/12/11	2	LUC	REV'D PER NCEMIR LETTER DATED 7/1/10
3/2/10	1	LCH	ADDED EXISTING FEATURES

OPERATIONS PLAN  
FACILITY PLAN AND  
EXISTING CONDITIONS AS OF 11/20/07

SCALE: 1" = 120'

DATE: 5/21/08

DRWN. BY: L. HAMPTON

CHKD. BY: J. WOODIE

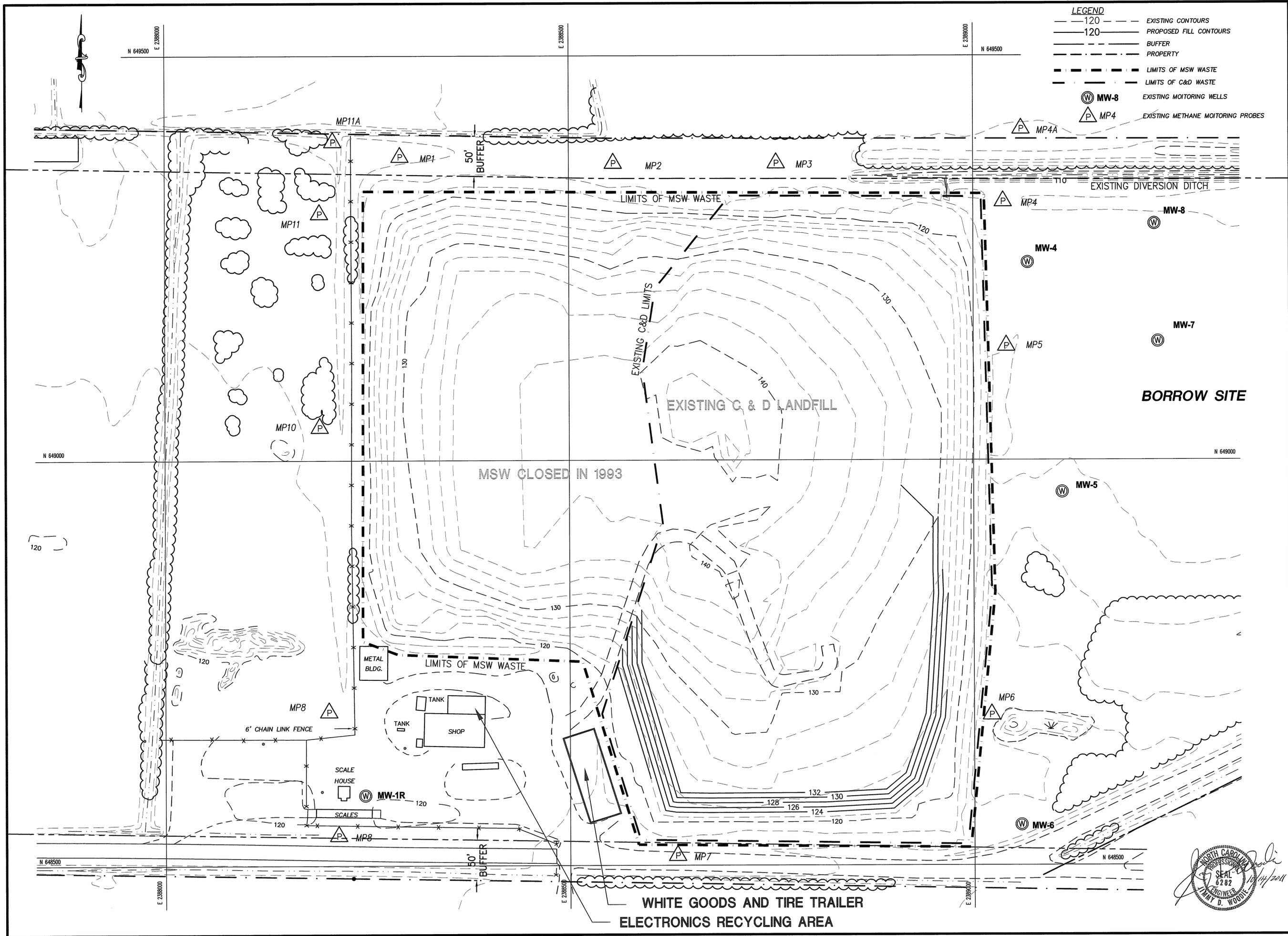
PROJECT NUMBER  
**G07061**

DRAWING NO. **CD1** SHEET NO. **3 OF 8**



P:\SolidWorks\G07061-Greene Co. C&D Transition\dwg\07061-03-REV2.dwg, 10/13/2011 10:33:15 AM, lch,lch

- LEGEND**
- - - 120 - - - EXISTING CONTOURS
  - - - 120 - - - PROPOSED FILL CONTOURS
  - - - - - BUFFER
  - - - - - PROPERTY
  - - - - - LIMITS OF MSW WASTE
  - - - - - LIMITS OF C&D WASTE
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - △ MP4 EXISTING METHANE MONITORING PROBES



**Engineering Company, P.A.**  
 P.O. BOX 849 BOONE, N.C. 28607  
 (828) 292-1787  
 P.O. BOX 936 MORRISVILLE, N.C. 27567  
 (336) 728-9451

**Municipal Services**  
 LICENSE NUMBER: C-0251  
 P.O. BOX 97, GARNER, N.C. 27529  
 (919) 772-8383  
 P.O. BOX 836 MORRISVILLE, N.C. 27567  
 (336) 728-9451

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

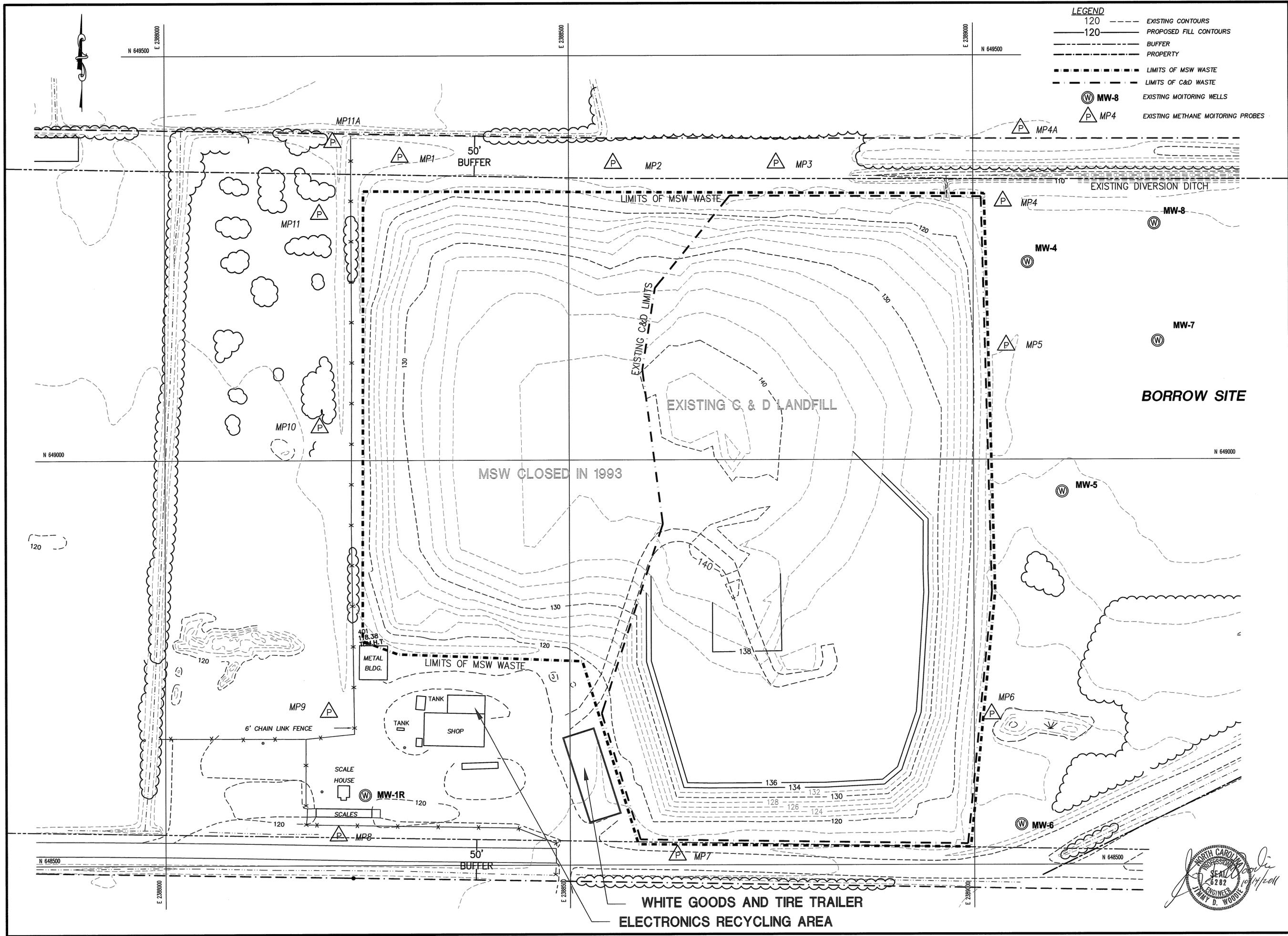
DATE	BY	REV.	DESCRIPTION
10/12/11	LJC	2	REVISED PER NODOR LETTER DATED 7/1/10
3/2/10	LJC	1	ADDED EXISTING FEATURES

SCALE: 1" = 50'  
 DATE: 12/14/07  
 DRWN. BY: L. HAMPTON  
 CHKD. BY: J. WOODIE  
 PROJECT NUMBER: G07061  
 DRAWING NO. CD2 SHEET NO. 4 OF 8



P:\SolidWaste\G07061-Greene Co. C&D Transition\dwg\07061-04-REV2.dwg, 10/13/2011 10:30:07 AM, lch,lch

- LEGEND**
- 120 --- EXISTING CONTOURS
  - 120 --- PROPOSED FILL CONTOURS
  - BUFFER
  - PROPERTY
  - LIMITS OF MSW WASTE
  - LIMITS OF C&D WASTE
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - △ MP4 EXISTING METHANE MONITORING PROBES



**Engineering Company, P.A.**  
 P.O. BOX 349 BOONE, N.C. 28607  
 (828) 292-1787  
 P.O. BOX 826 MOREHEAD CITY, N.C. 28557  
 (252) 726-9451

**Municipal Services**  
 LICENSE NUMBER: C-0261  
 P.O. BOX 97, GARNER, N.C. 27529  
 (919) 772-6363  
 P.O. BOX 826 MOREHEAD CITY, N.C. 28557  
 (252) 726-9451

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

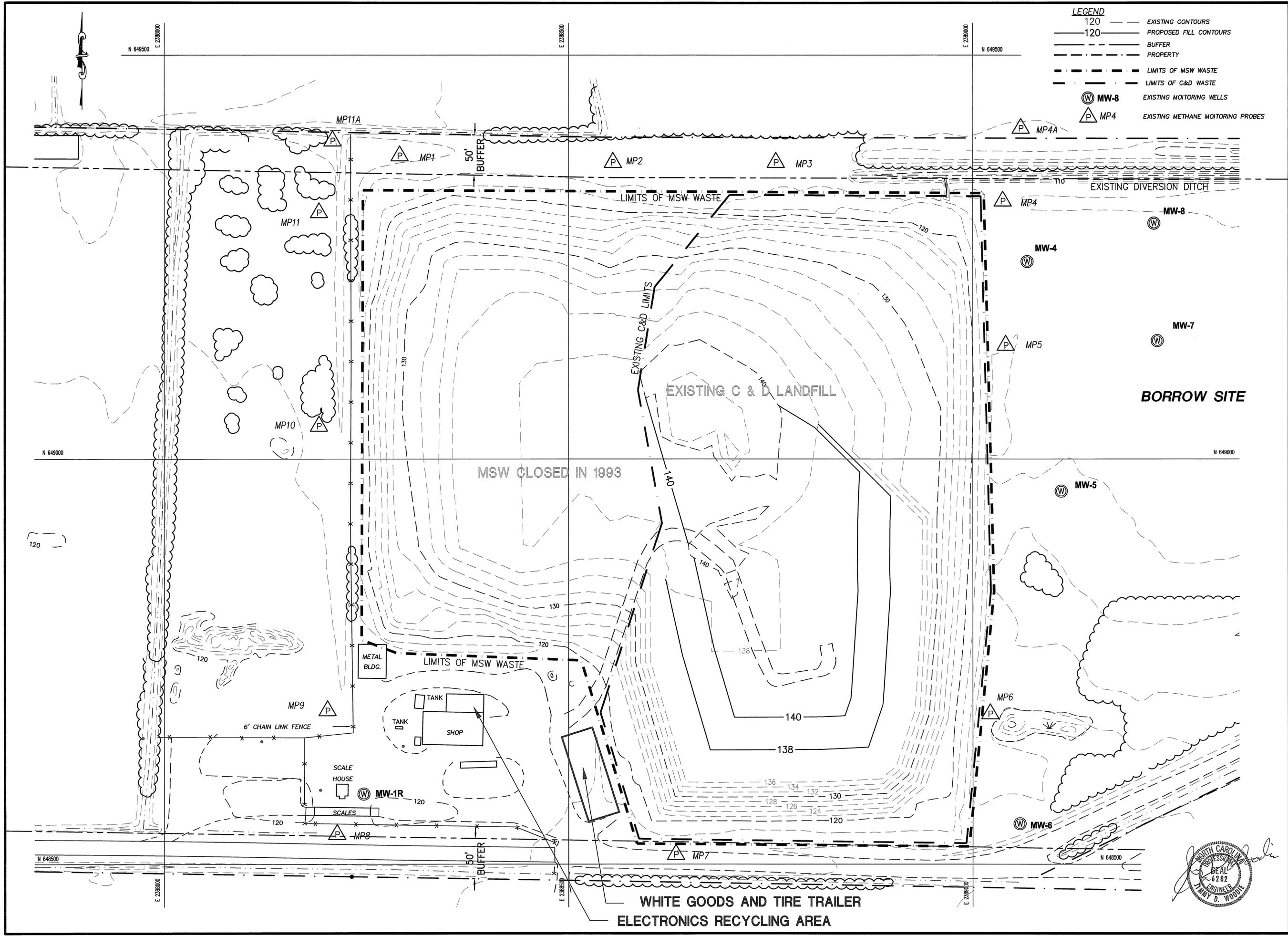
DATE	BY	REV.	DESCRIPTION
10/12/11	LCH	2	REVISED PER NOBEN LETTER DATED 7/1/10
3/2/10	LCH	1	ADDED EXISTING FEATURES

SCALE: 1" = 50'  
 DATE: 12/14/07  
 DRWN. BY: L. HAMPTON  
 CHKD. BY: J. WOODIE  
 PROJECT NUMBER: G07061  
 DRAWING NO. CD3 SHEET NO. 5 OF 8



P:\SolidWaste\G07061-Greene Co. C&D Transition\img\07061-05-REV2.dwg, 10/13/2011 10:28:48 AM, lch, lch

- LEGEND**
- 120 ——— EXISTING CONTOURS
  - 120 ——— PROPOSED FILL CONTOURS
  - BUFFER
  - PROPERTY
  - LIMITS OF MSW WASTE
  - LIMITS OF C&D WASTE
  - ⊙ MW-8 EXISTING MONITORING WELLS
  - △ MP4 EXISTING METHANE MONITORING PROBES



**Engineering Company, P.A.**  
 P.O. BOX 849 BOONE, N.C. 28607  
 (828) 262-1787  
 P.O. BOX 828 MOREHEAD CITY, N.C. 28557  
 (919) 728-3451

**Municipal Services**  
 LICENSE NUMBER: C-0281  
 P.O. BOX 87 GARNER, N.C. 27629  
 (919) 772-5363

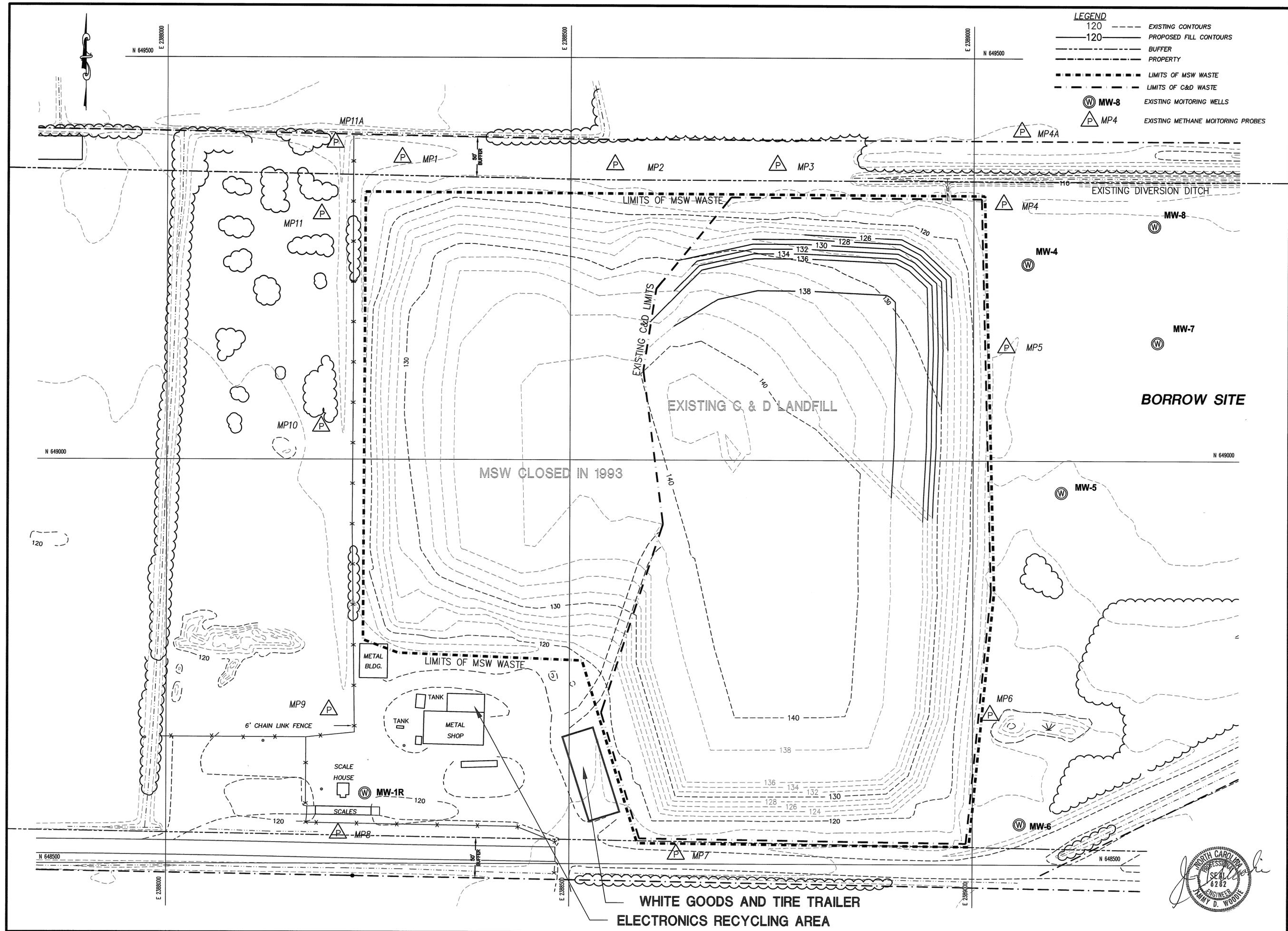
**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

DATE	BY	REV.	DESCRIPTION
10/12/11	LHC	3	REVISED PER INCORPORATE LETTER DATED 7/1/10
3/22/10	LCH	2	ADDED EXISTING FEATURES
2/23/09	LCH	1	REVISED FILL SLOPES

SCALE: 1" = 50'  
 DATE: 12/14/07  
 DRAWN BY: L. HAMPTON  
 CHKD. BY: J. WOODIE  
 PROJECT NUMBER: G07061  
 DRAWING NO. CD4 SHEET NO. 6 OF 8



P:\SolidWaste\G07061-Greene Co. C&D Transition\dwg\G07061-06-REV2.dwg, 10/13/2011 10:25:53 AM, lchlich



**Engineering Company, P.A.**  
 P.O. BOX 348 BOONE, N.C. 28607  
 (828) 262-1787

**Municipal Services**  
 P.O. BOX 87 GARNER, N.C. 27838  
 (919) 772-5993

LICENSE NUMBER: C-0281

**CONSTRUCTION & DEMOLITION LANDFILL FACILITY REVISION**  
**GREENE COUNTY NORTH CAROLINA**

DATE	BY	REV.	DESCRIPTION
10/12/11	LHC	3	REVISED PER INCENR LETTER DATED 7/1/10
3/2/10	LCH	2	ADDED EXISTING FEATURES
2/25/09	LCH	1	REVISED FILL SLOPES

SCALE: 1" = 50'

DATE: 12/14/07

DRWN. BY: L. HAMPTON

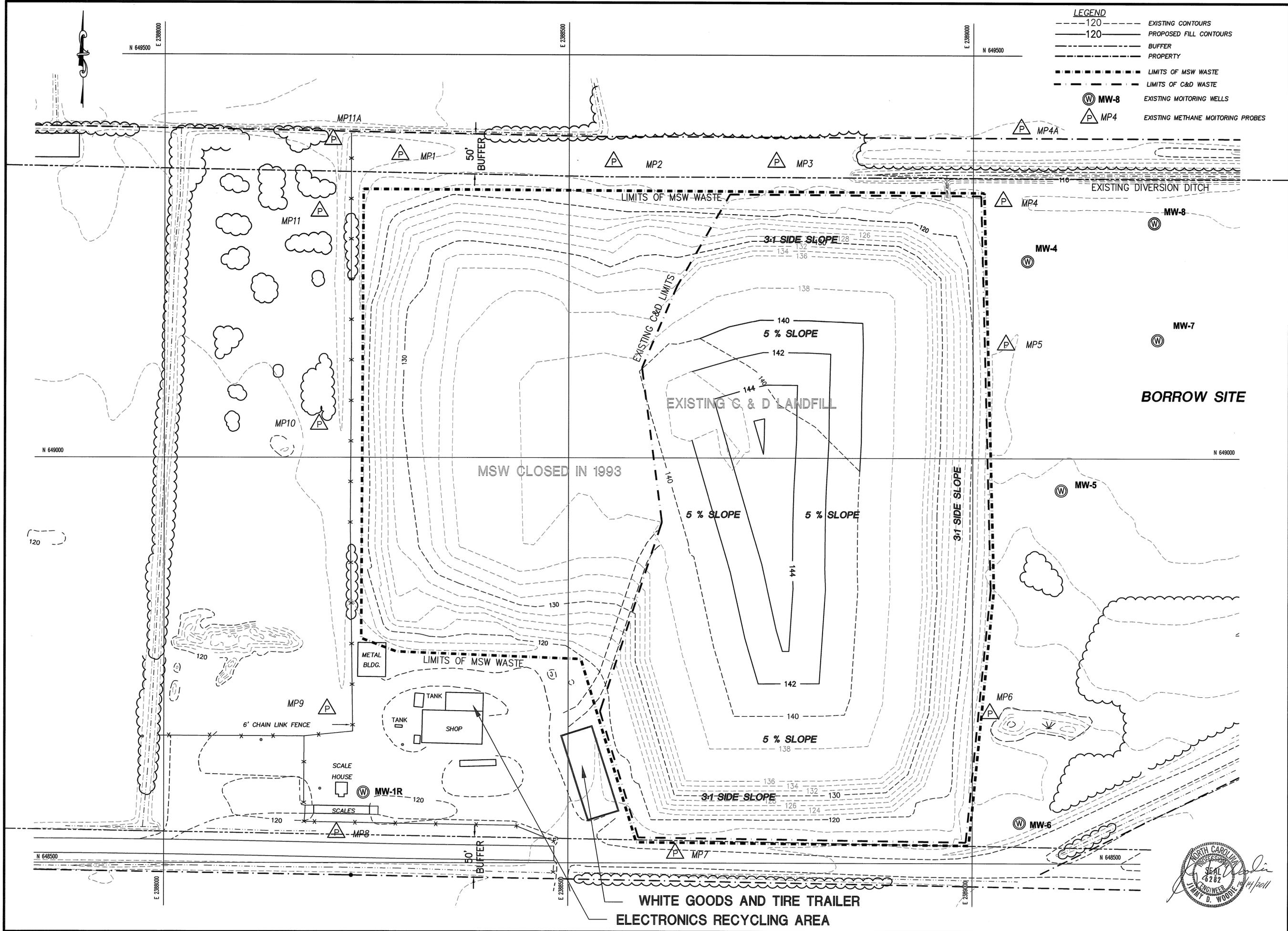
CHKD. BY: J. WOODIE

PROJECT NUMBER: G07061

DRAWING NO. CD5 SHEET NO. 7 OF 8



P:\SolidWorks\CD7061-Greene Co. C&D Transition\dwg\07061-07-REV03.dwg, 10/13/2011 10:19:42 AM, lchlich



**LEGEND**

--- 120 ---	EXISTING CONTOURS
— 120 —	PROPOSED FILL CONTOURS
---	BUFFER
---	PROPERTY
---	LIMITS OF MSW WASTE
---	LIMITS OF C&D WASTE
⊙ MW-8	EXISTING MONITORING WELLS
△ MP4	EXISTING METHANE MONITORING PROBES

**Engineering Company, P.A.**  
 P.O. BOX 346 BOONE, N.C. 28607  
 (828) 262-1787

**Municipal Services**  
 LICENSE NUMBER: C-0281  
 P.O. BOX 97 GARNER, N.C. 27028  
 (919) 772-5383

**Engineering Company, P.A.**  
 P.O. BOX 828 MORRISHEAD CITY, N.C. 28657  
 (828) 728-9481

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY REVISION  
 GREENE COUNTY  
 NORTH CAROLINA**

10/12/11	3	REVISED PER NODEAR LETTER DATED 7/1/10
3/2/10	2	ADDED EXISTING FEATURES
2/23/09	1	REVISED FILL SLOPES
		DATE
		BY
		REV.
		DESCRIPTION
OPERATION PLAN		
5th YEAR FILL PLAN		
SCALE: 1" = 50'		
DATE: 12/14/07		
DRWN. BY: L. HAMPTON		
CHKD. BY: J. WOODIE		
PROJECT NUMBER		
G07061		
DRAWING NO.	SHEET NO.	
CD6	8 OF 8	



P:\SolidWaste\G07061-Greene Co. C&D Transition.dwg (07061-08-REV) 10/13/2011 10:14:20 AM ichien

# GREENE COUNTY CONSTRUCTION AND DEMOLITION LANDFILL FACILITY CLOSURE PLAN

Permit Number: 40-02

Site Location: 105 Landfill Road  
Walstonburg, NC 27888

Applicant: Greene County

Applicant's Address: 229 Kingold Blvd., Suite D  
Snow Hill, NC 28580

**BOARD OF COMMISSIONERS**

Jack Edmondson - Chairman  
Jesse Tyndall - Vice-Chairman  
Denny Garner  
Bennie Heath  
James T. Shackelford

**COUNTY MANAGER**

Don Davenport

**SOLID WASTE DIRECTOR**

David Jones

*Engineer*

***Municipal Engineering Services Company, P.A.  
Garner, NC - Morehead City, NC - Boone, NC***

by  *J. Woodie*  
Professional Engineer  
(Garner Office)



DATE	BY	REV.	DESCRIPTION
10/12/10	LHC	3	REVISED SET PER DENR LETTER DATED 7/1/2010.
3/2/10	LCH	2	ADDED CORPORATE LICENSE NUMBER TO TITLE BLOCK
2/23/09	LCH	1	REVISED PER DENR LETTER DATED 12/23/08.

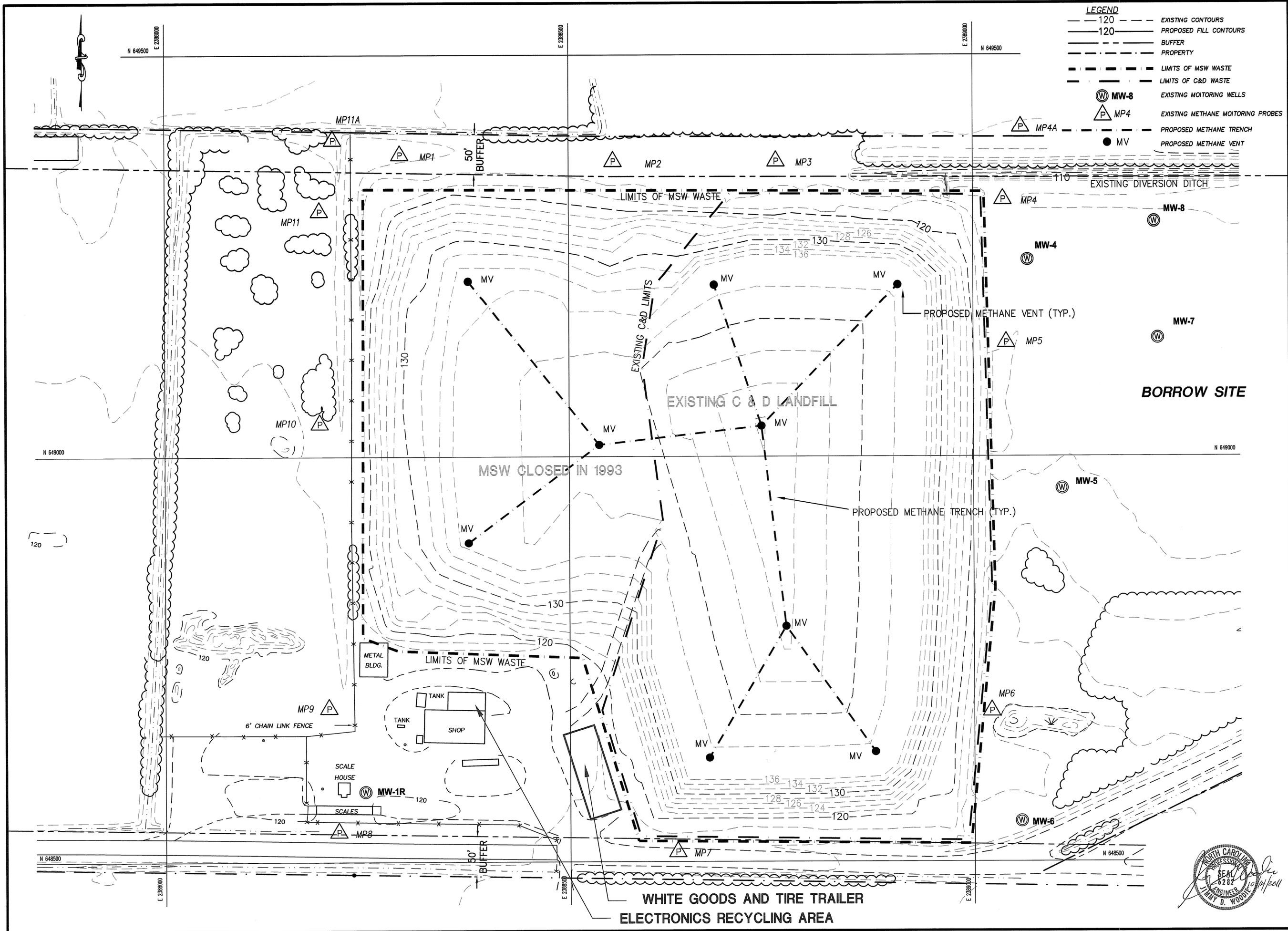
SCALE: 1:1  
DATE: 11/21/07  
DRWN. BY: L. HAMPTON  
CHKD. BY: J. WOODIE  
PROJECT NUMBER: G07061  
DRAWING NO. T1 SHEET NO. 1 OF 5

P:\SolidWaste\G07061-Greene Co. C&D Transition\dwg\CLOSURE\07061-C&D-REV3.dwg, 10/13/2011 10:10:07 AM, ehh1en





P:\SolidWaste\07061-Greene Co. C&D Transition\dwg\CLOSURE\07061-C14-REN2.dwg, 10/13/2011 9:48:43 AM, lch,lch



**Engineering Company, P.A.**

**Municipal Services**

LICENSE NUMBER: C-0281

P.O. BOX 349 BOONE, N.C. 28607 (828) 282-1787

P.O. BOX 97 GARNER, N.C. 27539 (919) 772-8383

P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (813) 728-3451

**CONSTRUCTION & DEMOLITION LANDFILL FACILITY**

**GREENE COUNTY NORTH CAROLINA**

DATE	BY	REV.	DESCRIPTION
10/12/11	LHC	3	REVISED PER NCEMHP LETTER DATED 7/1/10
3/2/10	LCH	2	ADDED EXISTING FEATURES
2/23/09	LCH	1	REVISED FILL SLOPES

SCALE: 1" = 50'

DATE: 12/14/07

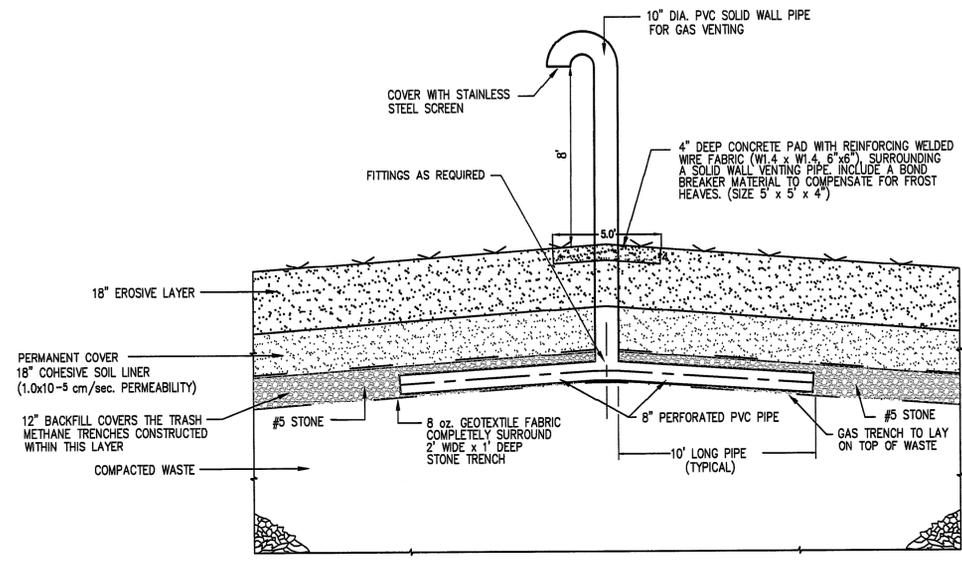
DRWN. BY: L. HAMPTON

CHKD. BY: J. WOODIE

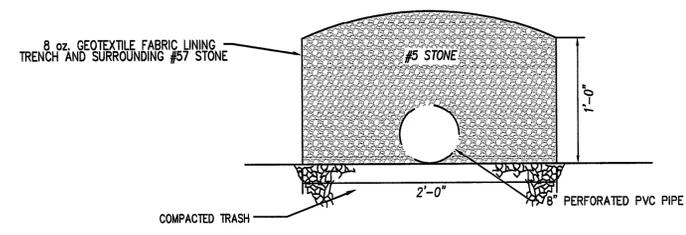
PROJECT NUMBER: G07061

DRAWING NO. CL2 SHEET NO. 4 OF 5





TYPICAL METHANE GAS COLLECTION TRENCH CLOSURE DETAIL AND CAP COVER DETAIL  
N.T.S.



PERMANENT METHANE TRENCH DETAIL  
N.T.S.

SEEDBED PREPARATION (SP)

SP-1 Fill slopes 3:1 or steeper to be seeded by a hydraulic seeder (PERMANENT SEEDING)

- 1) Leave the last 4-6 inches of fill loose and uncompact, allowing rocks, roots, large clods and other debris to remain on the slope.
- 2) Roughen slope faces by making grooves 2-3 inches deep, perpendicular to the slope.
- 3) Spread lime evenly over slopes at rates recommended by soil tests.

SP-2 Fill slopes 3:1 or steeper (temporary seedings)

- 1) Leave a loose, uncompact surface. Remove large clods, rocks, and debris which might hold netting above the surface.
- 2) Spread lime and fertilizer evenly at rates recommended by soil tests.
- 3) Break up large clods and rake into a loose, uniform seedbed.
- 4) Rake to loosen surface just prior to applying seed.

SP-4 Gentle or flat slopes where topsoil is not used.

- 1) Remove rocks and debris.
- 2) Apply lime and fertilizer at rates recommended by soil tests; spread evenly and incorporate into the top 6" with a disk, chisel plow, or rotary tiller.
- 3) Break up large clods and rake into a loose, uniform seedbed.
- 4) Rake to loosen surface just prior to applying seed.

SEEDING METHODS (SM)

SM-1 Fill slopes steeper than 3:1 (permanent seeding)  
Use hydraulic seeding equipment to apply seed and fertilizer, a wood fiber mulch at 45 lb./1,000 s.f., and mulch tackifier.

SM-2 Gentle to flat slopes or temporary seedings

- 1) Broadcast seed at the recommended rate with a cyclone seeder, drop spreader, or cultipacker seeder.
- 2) Rake seed into the soil and lightly pack to establish good contact.

MULCH (MU)

MU-1 Steep slopes (3:1 or greater)  
In mid-summer, late fall or winter, apply 100 lb./1,000 s.f. grain straw, cover with netting and staple to the slope. In spring or early fall use 45 lb. / 1,000 s.f. wood fiber in a hydroseeder slurry.

MU-2 High-maintenance vegetation and temporary seedings  
Apply 90 lb./1,000 s.f. (4000 lb./acre) grain straw and tack with 0.1 gal./s.y. asphalt (11 gal./1,000 s.f.).

MU-3 Cross-lined channels  
Install excelsior mat in the channel, extend up the channel banks to the highest calculated depth of flow, and secure according to manufacturer's specifications.  
On channel shoulders, apply 100 lb./1,000 s.f. grain straw and anchor with 0.1 gal./s.y. (11 gal./1,000 s.f.) asphalt.

MAINTENANCE (MA)

MA-1 Refertilize in late winter or early spring the following year. Mow as desired.

MA-3 Inspect and repair mulch and lining. Refertilize in late winter of the following year with 150 lb./acre 10-10-10 (3.5 lb./1,000 s.f.). Mow regularly to a height of 3-4 inches.

MA-4 Topdress with 10-10-10 fertilizer if growth is not fully adequate.

MA-5 Topdress with 50 lb./acre (1 lb./1,000 s.f.) nitrogen in March. If cover is needed through the following summer, overseed with 50 lb./acre Koba lespedeza.

TEMPORARY SEEDING SPECIFICATIONS

TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING		TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER	
Seeding Mixture species	Rate(lb./acre)	Seeding Mixture species	Rate(lb./acre)
Rye (grain)	120	German millet	40
Annual lespedeza (Koba in Piedmont and Coastal Plain, Korean in Mountains)	50		

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

SEEDING DATES  
Mountains—Above 2500ft.: Feb. 15 — May 15  
Below 2500ft.: Feb. 1 — May 1  
Piedmont—Jan. 1 — May 1  
Coastal Plain—Dec. 1 — Apr. 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 straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulching tool.

MAINTENANCE  
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL	
Seeding Mixture species	Rate(lb./acre)
Rye (grain)	120

SEEDING DATES  
Mountains—Aug.15 — Dec. 15  
Coastal Plain and Piedmont—Aug. 15 — Dec. 30

SOIL AMENDMENTS  
Follow recommendations of soil tests or apply 2,000 lb./acre ground agricultural limestone and 1,000 lb./acre 10-10-10 fertilizer.

MULCH  
Apply 4,000 lb./acre straw. Anchor straw by tacking with asphalt, straight can be used as a mulching tool.

MAINTENANCE  
Repair and refertilize damaged areas immediately. Topdress with netting, or a mulch anchoring tool. A disk with blades set nearly 50 lb./acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb./acre Koba (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

PERMANENT SEEDING SPECIFICATIONS

PERMANENT SEEDING REQUIREMENTS (N.C. NO. 10P)

Species	Rate (lb./acre)
Tall fescue	80
Pensacola Bahiagrass	50
Sericea lespedeza	30
Koba lespedeza	10

SEEDING DATES

	BEST	POSSIBLE
Early spring:	Aug.25-Sept.15	Aug.20-Oct.25
Fall:	Sept. 1-Sept.30	Sept. 1-Oct.31

SOIL AMENDMENTS  
Apply lime and fertilizer according to soil tests, or apply 3000-5000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10-10-10 fertilizer.

MULCH  
Apply 4,000 lb./acre small grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

MAINTENANCE  
If growth is less than fully adequate, refertilize in the second year, according to soil tests or topdress with 500 lb/acre 10-10-10 fertilizer. Mow as needed when sericea is omitted from the mixture. Reseed, fertilize and mulch damaged areas immediately.

CONSTRUCTION & DEMOLITION  
LANDFILL FACILITY  
GREENE COUNTY  
NORTH CAROLINA

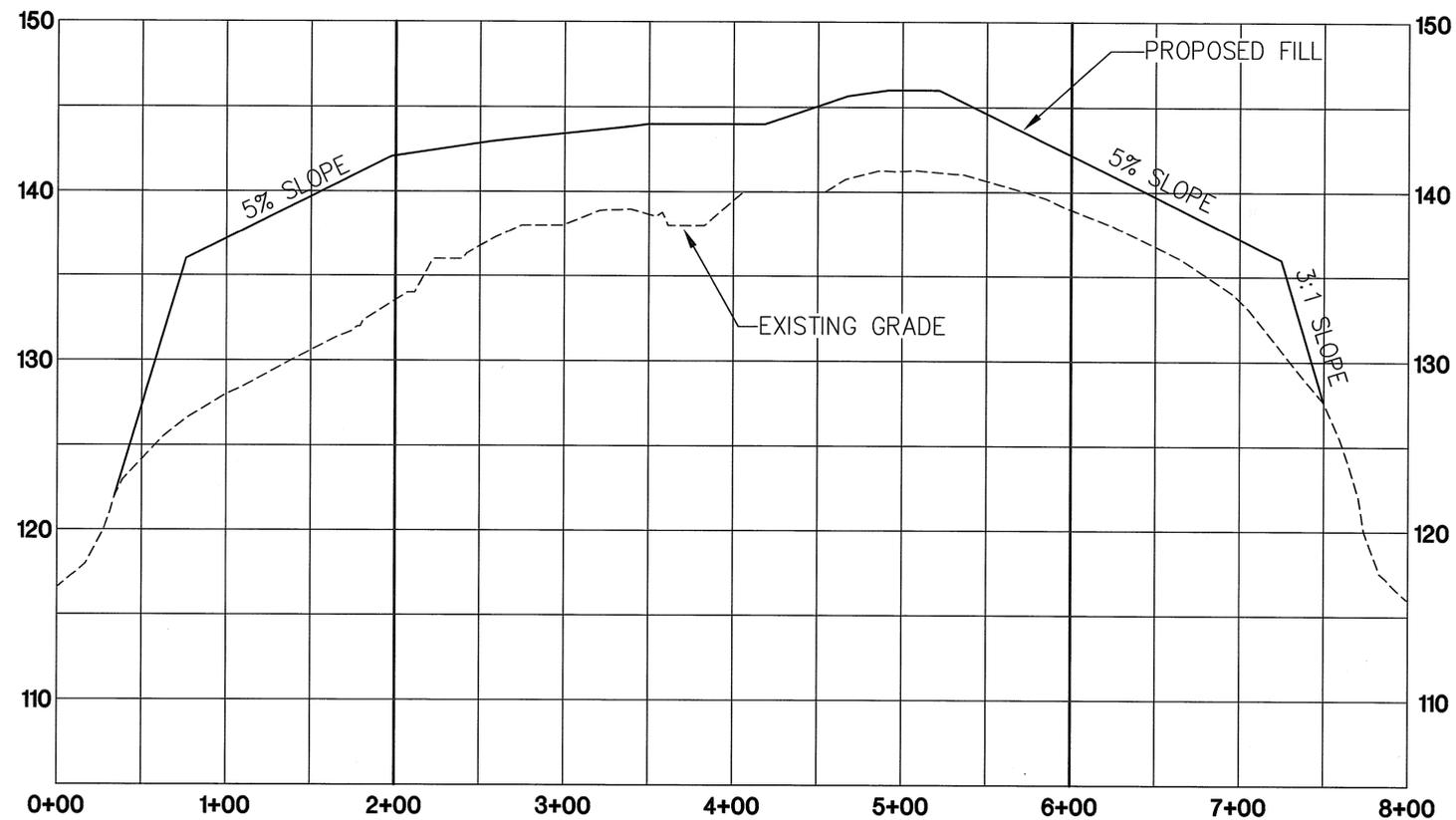
Engineering Company, P.A.  
Municipal Services  
P.O. BOX 97 GARNER, N.C. 27529  
(919) 772-6363  
P.O. BOX 928 MOREHEAD CITY, N.C. 28557  
(919) 726-3448

NO.	DATE	BY	DESCRIPTION
3	10/12/11	LHC	REV'D PER INCHER LETTER DATED 7/1/10, NO CHANGES THIS SHEET
2	3/2/10	LCH	REMOVED METHANE PROBE DETAIL
1	4/28/09	LCH	ADDED SEEDING SPECIFICATIONS

CLOSURE PLAN  
MISCELLANEOUS DETAILS

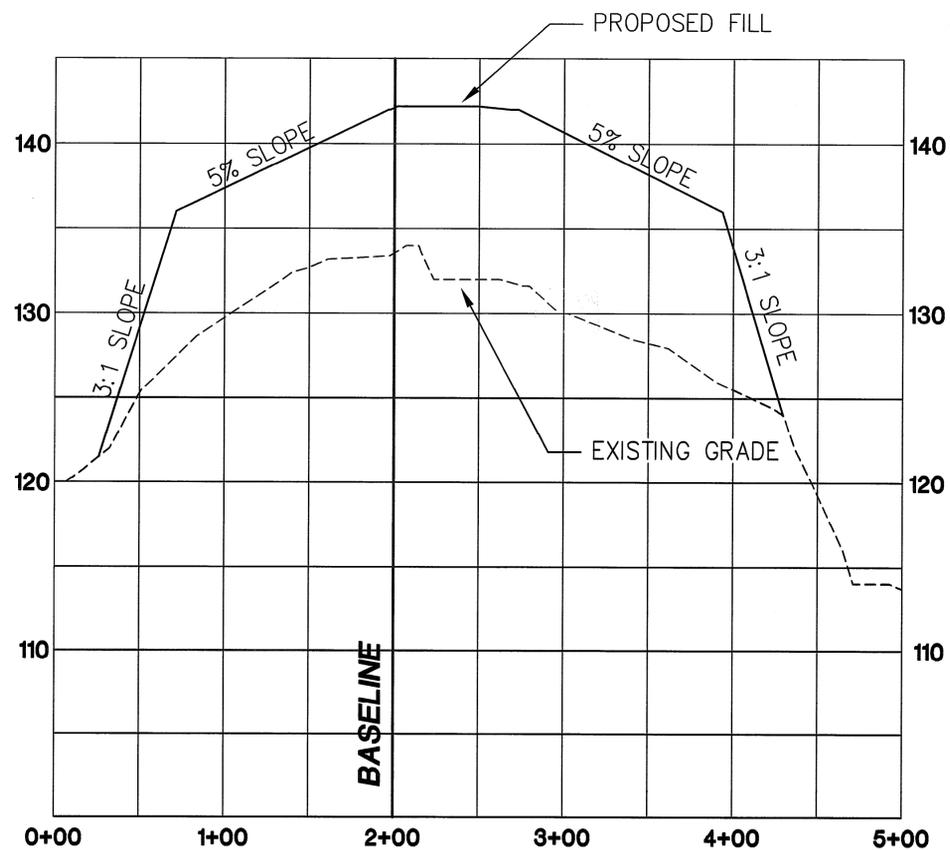
SCALE: 1:1  
DATE: 12/14/07  
DRWN. BY: L. HAMPTON  
CHKD. BY: J. WOODIE  
PROJECT NUMBER: G07061  
DRAWING NO. CL3 SHEET NO. 5 OF 5



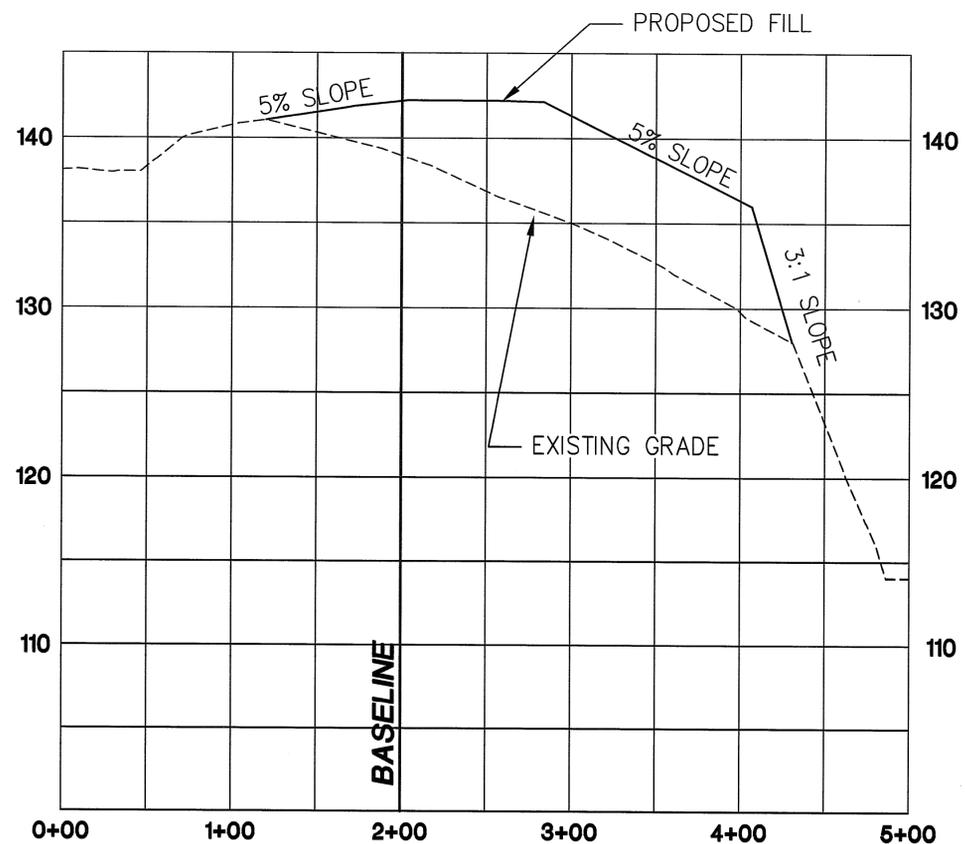


**BASELINE PROFILE**  
 SCALE: HORIZ. 1" = 50'  
 VERT. 1" = 5'

**NOTE**  
 THESE CROSS SECTIONS ARE INTENDED TO SHOW THE CROSS SECTIONS AT SPECIFIC POINTS AS DEFINED BY THE BASELINE GRID ON SHEET 3 OF 5.



**STATION 2+00**  
 SCALE: HORIZ. 1" = 50'  
 VERT. 1" = 5'



**STATION 6+00**  
 SCALE: HORIZ. 1" = 50'  
 VERT. 1" = 5'



**Engineering Company, P.A.**  
 P.O. BOX 349 BOONE, N.C. 28607  
 (828) 282-1767

**Municipal Services**  
 P.O. BOX 97 GARNER, N.C. 27529  
 (919) 772-5595

P.O. BOX 828 MOREHEAD CITY, N.C. 28557  
 (919) 738-9451

**CONSTRUCTION & DEMOLITION  
 LANDFILL FACILITY  
 GREENE COUNTY  
 NORTH CAROLINA**

10/24/11	DATE	DESCRIPTION
LWC	BY	REV.
1	REV.	8/24/09
REVISIONS PER NUMBER LETTER DATED 7/1/11, NO CHANGES TO THIS SHEET		
CLOSURE PLAN		
BASELINE PROFILE AND CROSS SECTIONS		
PROJECT NUMBER		
G07061		
DRAWING NO.	SHEET NO.	
PROF1	5A	

P:\SoudWesta\07061-Greene Co., C&D Transition\dwg\CLOSURE\07061-CL5A-REV1.dwg, 10/13/2011 9:24:22 AM, lwh:ch

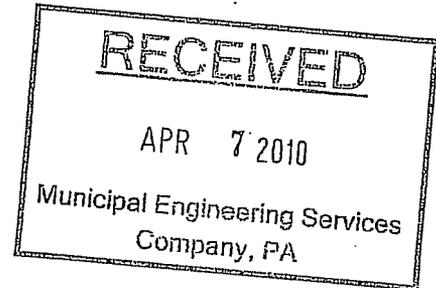


**ECS CAROLINAS, LLP**

**Geotechnical • Construction Materials • Environmental • Facilities** March 25, 2010

Mr. Wayne Sullivan, PLS  
Municipal Engineering Services Co. PA  
The Corporate Center  
1140 Benson Highway, Suite 220  
Garner, NC 27529

**RE: Report of Geotechnical Engineering Services  
Greene County C & D Landfill Slope Stability  
105 Landfill Road  
Walstonburg, North Carolina  
ECS Report Number: 06.17016**



Dear Mr. Sullivan:

ECS Carolinas, LLP (ECS) has completed the geotechnical slope stability analysis for the proposed Greene County Construction and Debris Landfill as requested by Municipal Engineering Services Company, PA (MESCO). The proposed landfill slopes are at 3 horizontal to 1 vertical (3H:1V).

#### **Project Information**

Based on the information provided by MESCO, it is our understanding that the new landfill will be constructed above the municipal landfill that was closed in 1993. The new landfill will result in a maximum waste height of approximately 100 feet. The permanent side slopes for the cap will have an inclination of 3H:1V.

ECS has been provided with well installation logs performed by others in areas to the southwest and east of the landfill. Selected boring logs are included in Appendix A, along with Figure 1 showing the site location and Figure 2 showing the approximate boring locations and slope stability section considered in the analysis. Groundwater was encountered within the borings ranging from approximately 1.5 to 17 feet below the prevailing ground surface.

#### **Engineering Analyses**

Analyses were performed to determine global slope stability of the landfill. These analyses were based on the design drawings provided by MESCO. Shear strength of the soil was estimated based on the soil descriptions on the provided boring logs and our previous experience. The analyses were performed by engineers specializing in geotechnical engineering and copies of the slope stability analyses are attached in Appendix B.

The waste fill was evaluated for slope stability analysis using circular potential failure mechanism. One section was selected for the stability analysis, which is considered representative of the most unfavorable conditions. The location of the analyzed section is shown on the Slope Stability Location Diagram in Appendix A. The slope stability analysis

representative of the most unfavorable conditions. The location of the analyzed section is shown on the Slope Stability Location Diagram in Appendix A. The slope stability analysis was performed using the proprietary Slide 5.0 computer program. The modeled slope configuration was based on the topographic information and site grading plan provided to us by MESCO, while the soil strata information, index properties and engineering properties used in these analyses were estimated based on the soil descriptions on the provided preliminary boring logs and our previous experience. For the pseudostatic analysis of the slope, we used an earthquake ground motion having a 2-percent probability of exceedance within a 50-year period (2,475 year return period).

The factors of safety were determined for both static and seismic loading, using the pseudo-static method. According to the USGS Map, Oct 2002, the seismic acceleration at the bed rock level based on the probabilistic earthquake (2,475 year return period) for this site is 0.07g. The seismic coefficient,  $k_s$ , for the site is 0.035g.

The resulting factors of safety were computed to exceed 1.5 for permanent slopes under static loading conditions and more than 1.1 for seismic conditions. The results of the slope stability analyses are presented in Appendix B.

In conclusion, the results of the geotechnical analysis indicate that the 3H: 1V (permanent) slope configuration will be stable and provide an adequate factor of safety.

This report has been prepared in order to aid in the evaluation of this property and to assist the architect and/or engineer in the design of this project. The scope is limited to the specific project and locations described herein and our description of the project represents our understanding of the significant aspects relative to soil and foundation characteristics. In the event that any changes in the nature or location of the proposed construction outlined in this report are planned, we should be informed so that the changes can be reviewed and the conclusions of this report modified or approved in writing by the geotechnical engineer. It is recommended that all construction operations dealing with earthwork and foundations be reviewed by an experienced geotechnical engineer to provide information as to whether the design requirements are fulfilled in the actual construction. If you wish, we would welcome the opportunity to provide field construction services for you during construction.

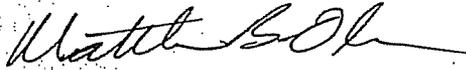
The data submitted in this report are based upon the information obtained from the soil borings and tests performed by others at the locations as indicated on the information referenced in this report. This report does not reflect any variations which may occur between the borings. In the performance of the subsurface exploration, specific information is obtained at specific locations at specific times. However, it is a well known fact that variations in soil conditions exist on most sites between boring locations and also such situations as groundwater levels vary from time to time. The nature and extent of variations may not become evident until the course of construction. If site conditions vary from those identified during the explorations, the recommendations contained in this report may require revision.

Report of Geotechnical Engineering Services  
Greene County C & D Landfill Slope Stability  
Walstonburg, North Carolina  
ECS Project Number: 06.17016

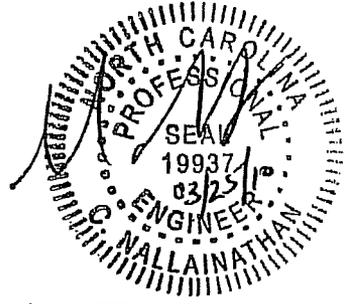
Thank you for the opportunity to work with you on this project. Should you have any questions or if we could be of further assistance, please do not hesitate to contact us.

Respectfully,

**ECS CAROLINAS, LLP** represented by:  
Firm License No. F-1078



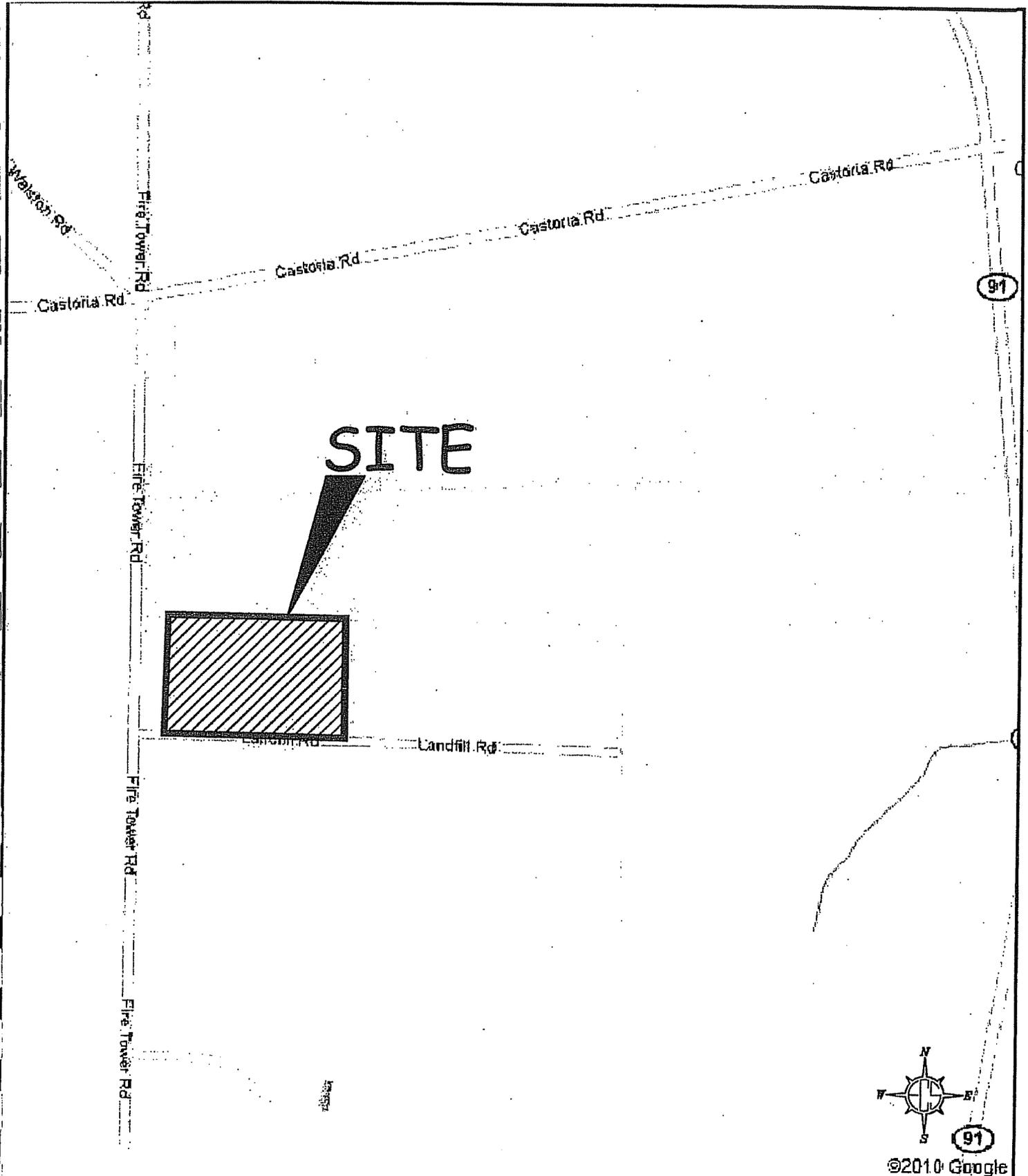
Matthew B. Olsen, PE  
Geotechnical Department Manager  
NC PE License No. 036537



C. (Nathan) Nallainathan, PE  
Principal Engineer  
NC PE License No. 019937

**APPENDICES**

**APPENDIX A**  
**FIGURES &**  
**SELECTED BORING LOGS**



**VICINITY  
MAP**

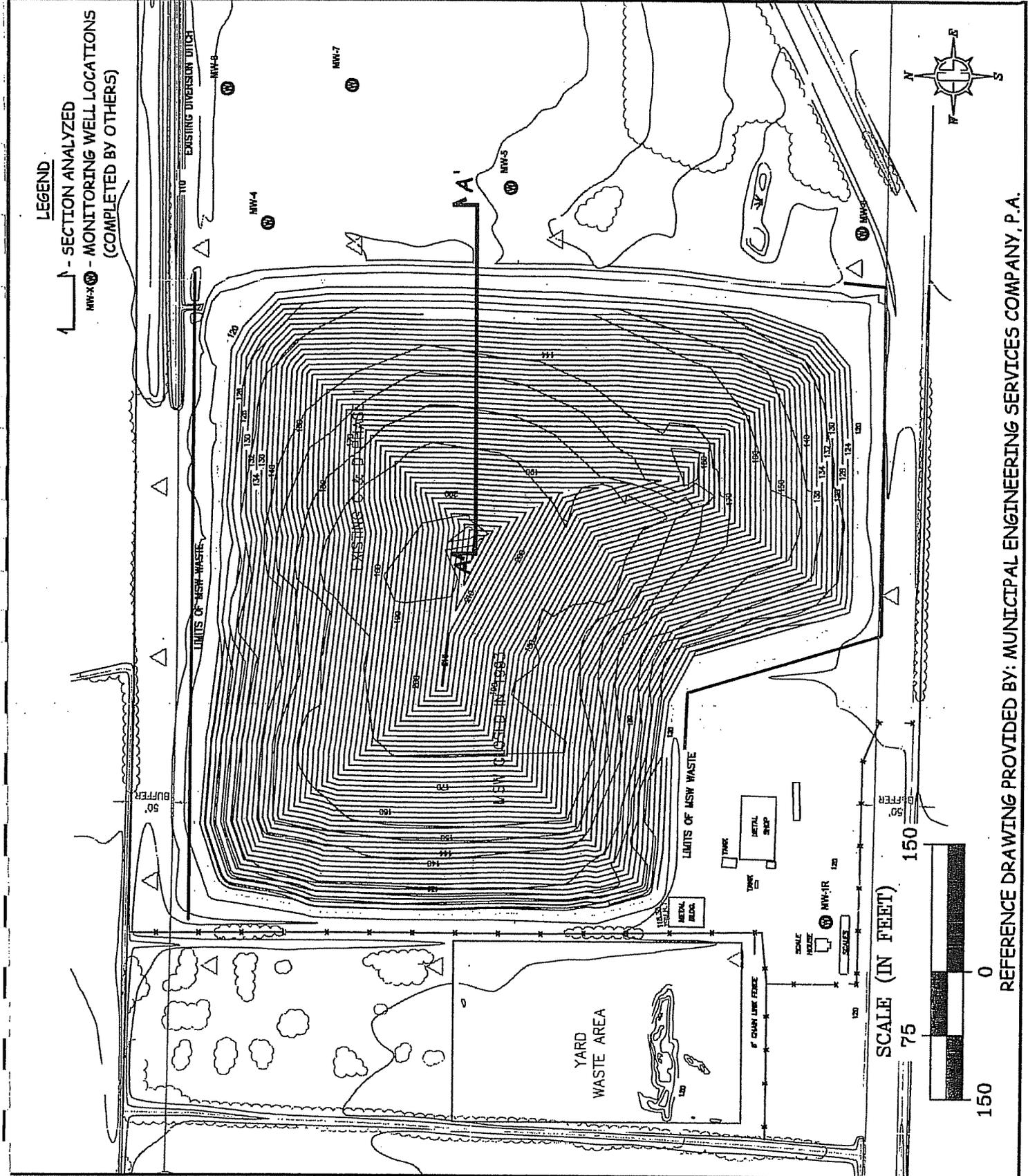
**MUNICIPAL ENGINEERING SERVICES CO.**



**GREENE COUNTY C & D LANDFILL  
35 LANDFILL ROAD**

**WALSTONBURG, NORTH CAROLINA**

ENGINEER	MBO	SCALE	NTS
DRAFTSMAN	DAH	PROJECT NO.	06:17016
REVISIONS		SHEET	FIGURE 1
		DATE	3-24-10



**APPROXIMATE SLOPE STABILITY  
 LOCATION DIAGRAM**

**MUNICIPAL ENGINEERING SERVICES CO.**

**ECS** **LLP**  
**CAROLINAS**  
 SETTING THE STANDARD FOR SERVICE

**GREENE COUNTY C & D LANDFILL  
 35 LANDFILL ROAD  
 WALSTONBURG, NORTH CAROLINA**

ENGINEER	MBO	SCALE	1"=150'
DRAFTSMAN	DAH	PROJECT NO.	06:17016
REVISIONS		SHEET	FIGURE 2
		DATE	3-24-10

REFERENCE DRAWING PROVIDED BY: MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

### MONITORING WELL 1R

PROJECT: Greene County Landfill  
 Wootens Crossroads, North Carolina  
 LOCATION: see Landfill Plans

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION	SPT VALUE
5	[Hatched Pattern]	X	Orange mottled gray silty clay	7
10			Gray fine sandy clay	14
15			-grades red gray	13
20			-grades mottled gray	10
			End of Boring	
25				
30				
35				
40				
45				
COMPLETION DEPTH: 20.9 ft      DATE: 8-26-94 DEPTH TO WATER: 1.1 ft while drilling, 3.63 ft after 24 hrs				

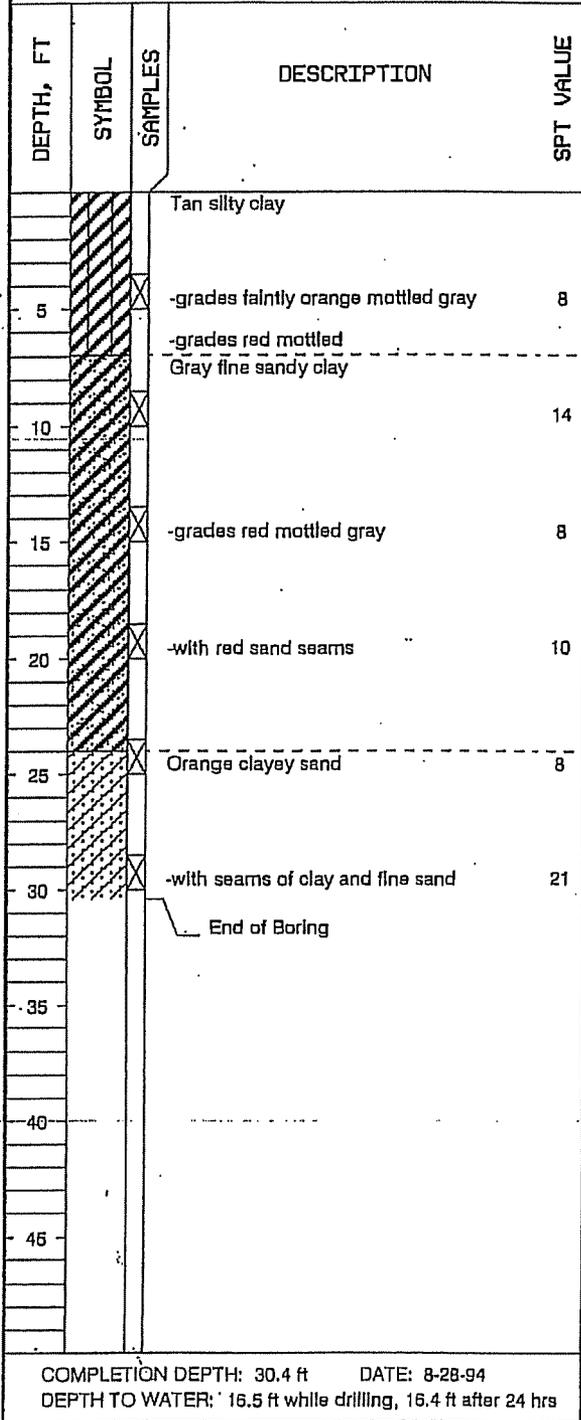
### MONITORING WELL 4

PROJECT: Greene County Landfill  
 Wootens Crossroads, North Carolina  
 LOCATION: see Landfill Plans

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION	SPT VALUE
5	[Hatched Pattern]	X	Red orange mottled gray clay, trace fine sand	10
10			Orange mottled gray silty clay	9
15			Red sandy clay, with thin fine sand seams	7
20			-grades more sandy, with thin clay seams	14
			Orange gray silty clay, trace fine sand	
25			-grades light gray	4
			End of Boring	
30				
35				
40				
45				
COMPLETION DEPTH: 26.0 ft      DATE: 8-26-94 DEPTH TO WATER: 17 ft while drilling, 17.15 ft after 24 hrs				

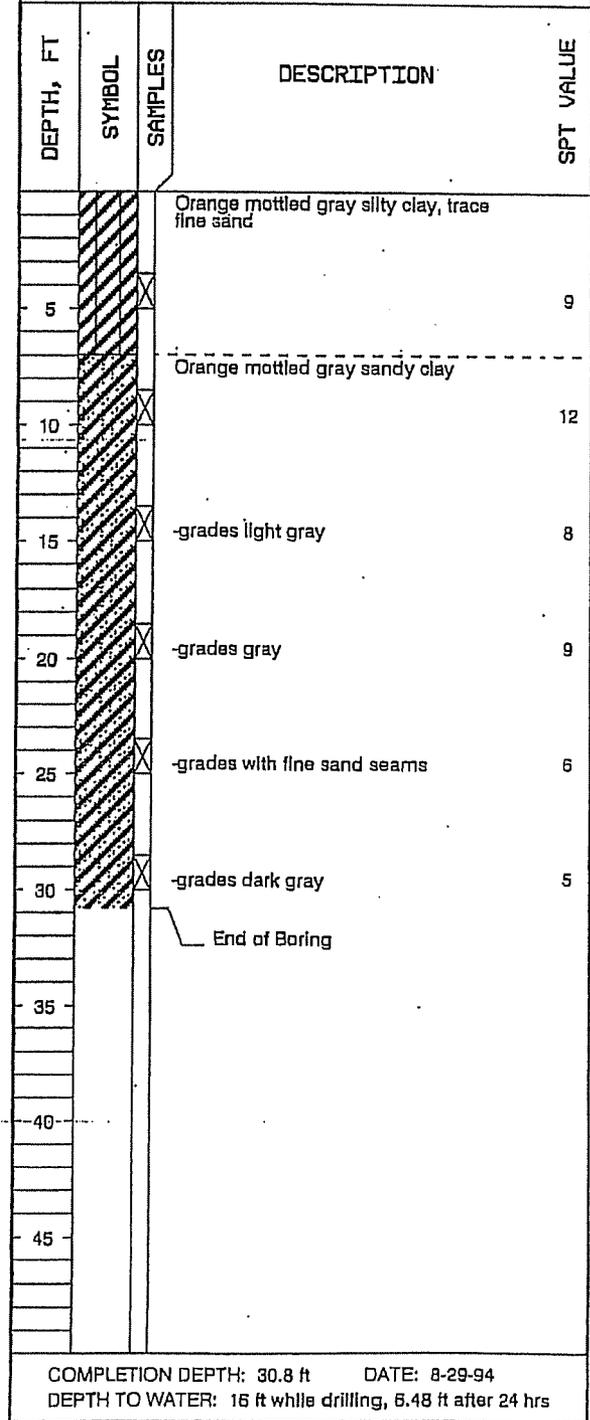
### MONITORING WELL 5

PROJECT: Greene County Landfill  
 Wootens Crossroads, North Carolina  
 LOCATION: see Landfill Plans



### MONITORING WELL 6

PROJECT: Greene County Landfill  
 Wootens Crossroads, North Carolina  
 LOCATION: see Landfill Plans



# LOG OF BORING: MW-7

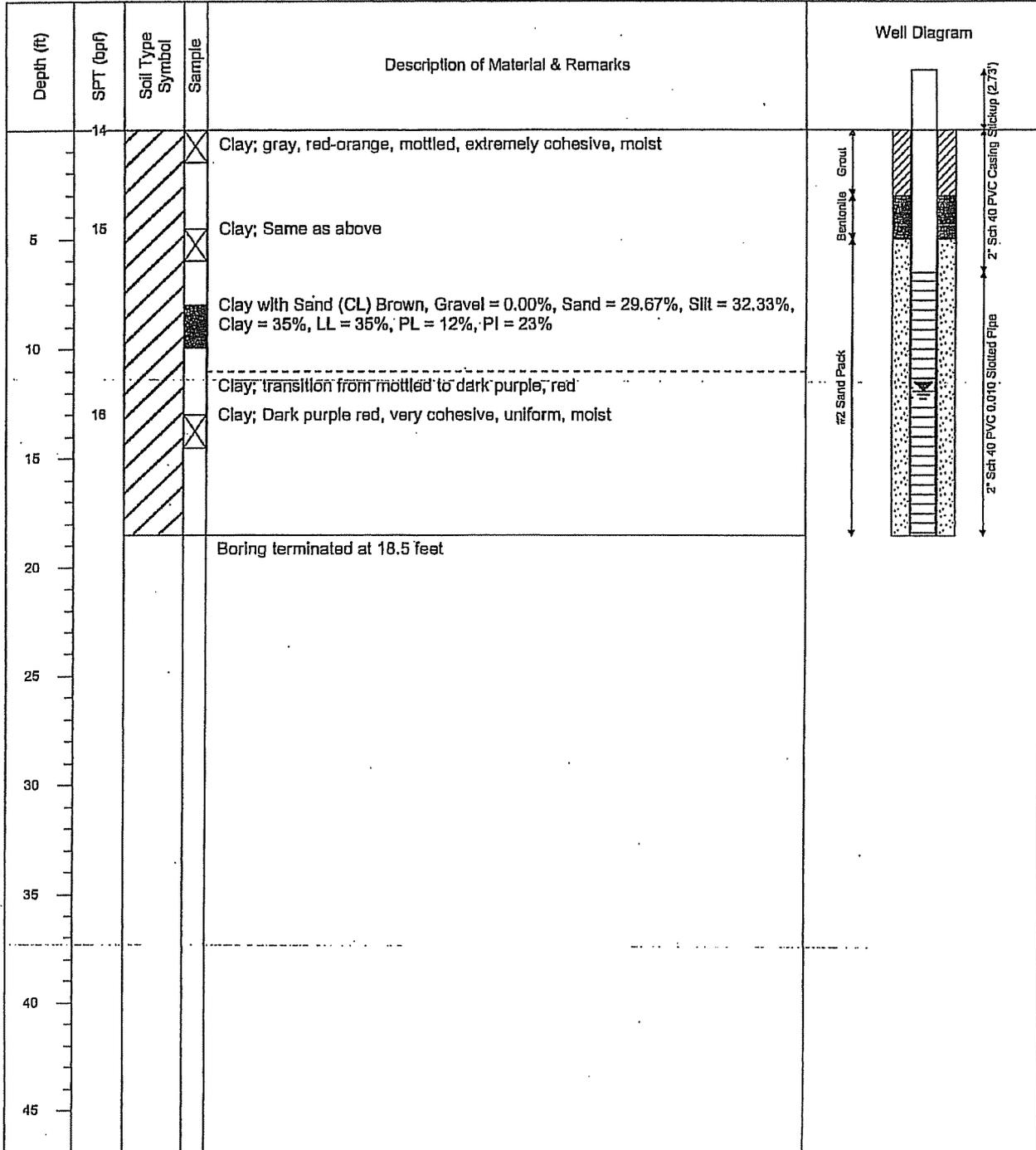
Greene County Closed Landfill

Project No. G07061.0

Drilling contractor: Derry's Well Drilling  
 Drill rig & method: 8" OD HSA w/SS  
 Logged by: J.Pfohl

Date started: 6/21/2007  
 Date ended: 6/21/2007  
 Completion depth: 18.50 ft  
 Stickup height: 2.73 ft

Surface elevation: 107.75 ft (MSL)  
 Top of pipe elevation: 110.48 ft (MSL)  
 Depth to water (TOB): 11.99 ft  
 Depth to water (24hrs): 11.88 ft



Municipal Engineering Services Company, P.A.

Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies

PO Box 97, Garner, North Carolina 27629 (919) 772-5393 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

# LOG OF BORING: MW-8

## Greene County Closed Landfill

Project No. G07061.0

Drilling contractor: Derry's Well Drilling  
 Drill rig & method: 8" OD HSA w/ SS  
 Logged by: J. Pfohl

Date started: 6/21/2007  
 Date ended: 6/21/2007  
 Completion depth: 17.98 ft  
 Stickup height: 2.65 ft

Surface elevation: 108.71 ft (MSL)  
 Top of pipe elevation: 111.36 ft (MSL)  
 Depth to water (TOB): 10.15 ft  
 Depth to water (24hrs): 10.10 ft

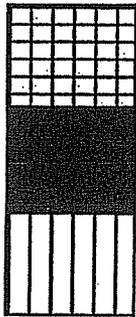
Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks	Well Diagram
13				Clay; Gray, red-orange, mottled, cohesive, moist	
5	12			Clay; Same as above, more gray, moist	
10	4			Clayey Sand (SC) Gray Orange, Gravel = 0.00%, Sand = 63.86%, Silt = 11.14%, Clay = 25%, LL = 32%, PL = 11%, PI = 21% Clayey Sand; Orange, fine grained sand with few grey clay nodules, wet	
15	3			Clayey Sand; Orange, fine grained sand, saturated	
20				Boring terminated at 18.0 feet	
25					
30					
35					
40					
45					

### Municipal Engineering Services Company, P.A.

Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies  
 PO Box 97, Garner, North Carolina 27529 (919) 772-5393 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

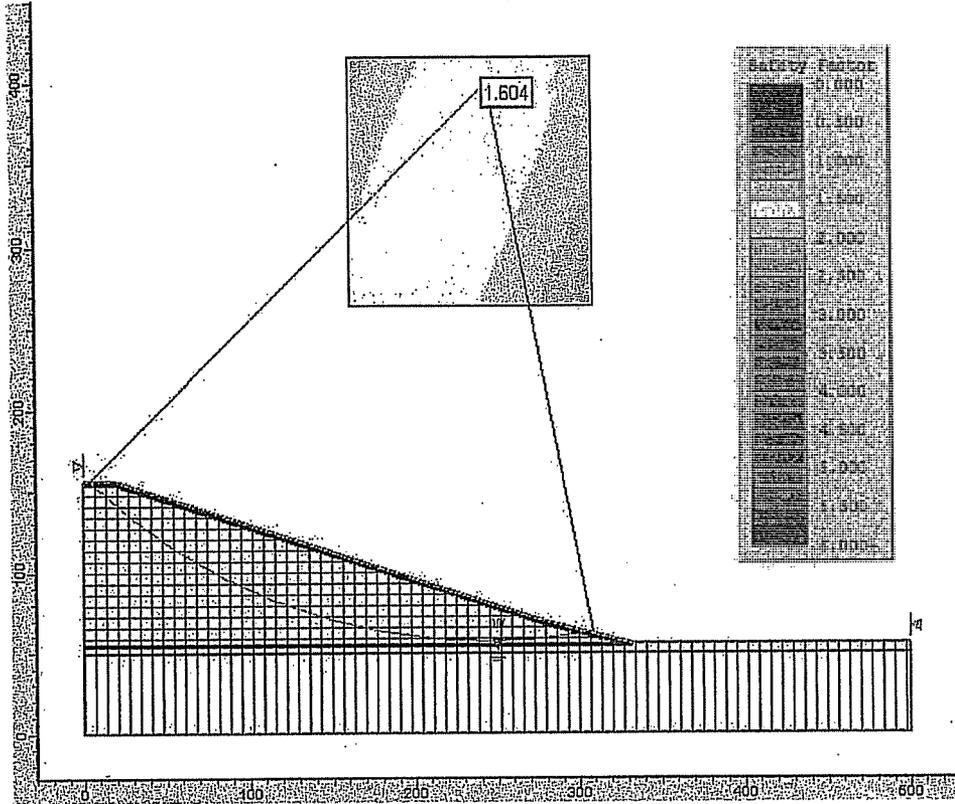
**APPENDIX B**  
**SLOPE STABILITY ANALYSES RESULTS**

### Material Property Legend

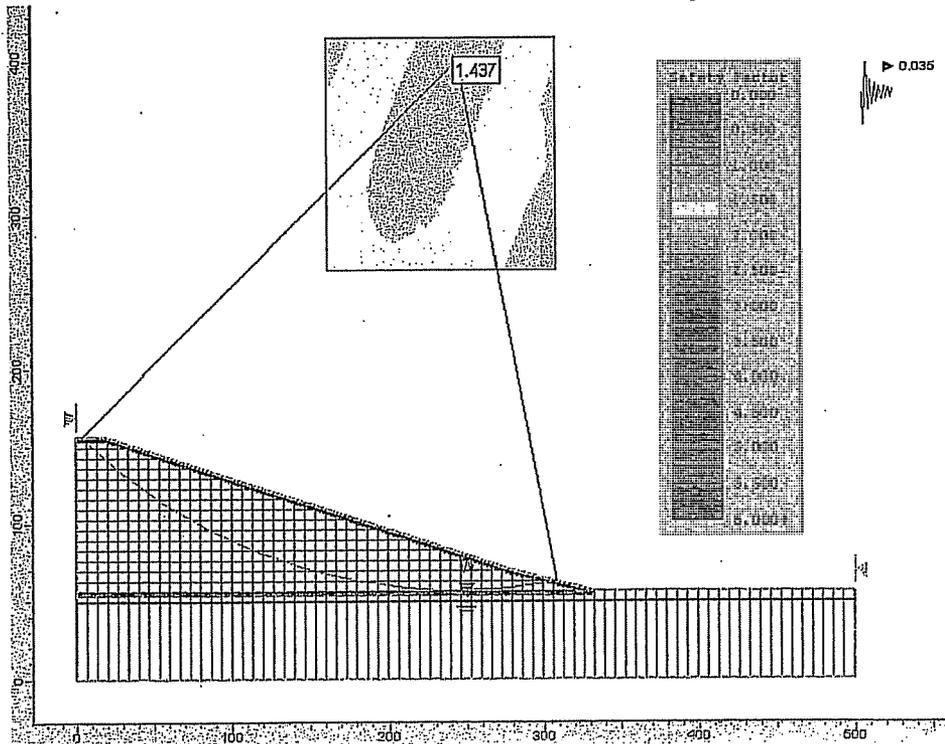


Soil Layer	Unit Weight (PCF)	Friction Angle	Cohesion (psf)
Waste	70	20	200
Clay Liner/Cap	125	20	400
Sandy and Silty CLAY	125	20	400

### Section A-A' – Global Analysis

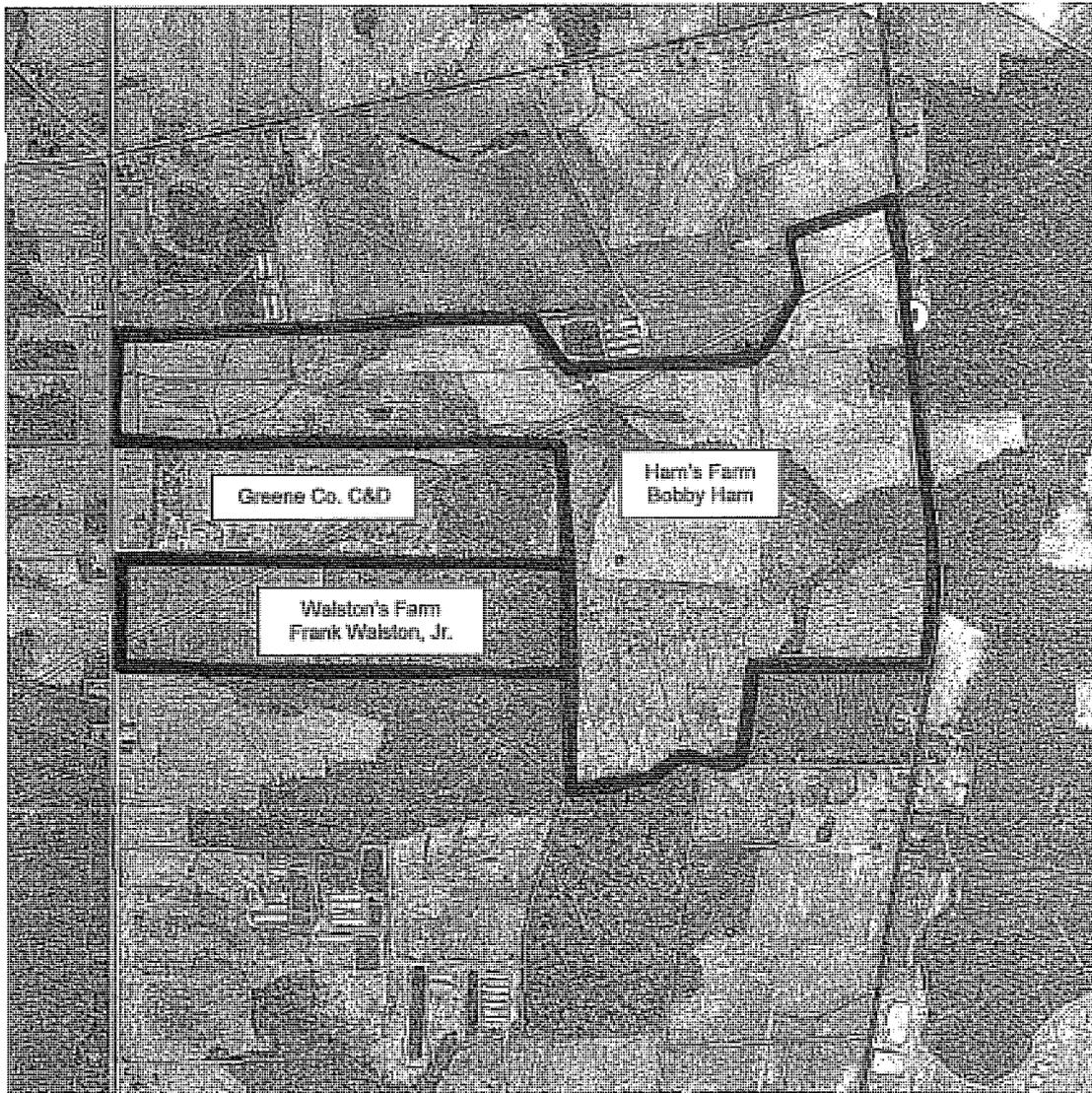


### Section A-A' – Seismic Global Analysis



**APPENDIX B**

**LOCAL GOVERNMENT  
APPROVALS**



**Adjoiner's to Green County C&D Landfill**  
**105 Landfill Road**  
**Walstonburg, NC 27888**

Frank Walston, Jr.  
573 Walston Road  
Walstonburg, NC 27888

Bobby Ham  
963 Hwy 258 South  
Snow Hill, NC 28580

January 24, 2008

Property Owner: Frank Walston Jr.  
Address: 573 Walston Rd.  
City: Walstonburg NC. 27888

Dear Mr. Walston:

Re: Notice to Adjoining Greene County Landfill Property Owners

In compliance with the North Carolina Department of Environment and Natural Resources (NCDENR), new Construction and Demolition Landfill Rules require notification to adjoining Greene County Landfill property owners of our intent to continue operating a Construction and Demolition Landfill (C&DLF) at our current Solid Waste Facility.

The C&DLF is part of the existing facility which consists of the White Goods Recovery and Recycling site, Tire disposal, and Yard Waste disposal areas.

The C&DLF debris is presently being disposed on top of a closed Municipal Solid Waste Landfill. New Solid Waste rules that regulate the disposal of C&D waste require that we obtain local government approval (County Commissioners) for the continuing operation of the C&DLF. This letter and subsequent public meeting are part of this process.

The proposed finish elevation for the C&DLF is 200' and the waste that is being disposed of is from the demolition, remodeling, and/or construction of structures. This landfill operates on top of the closed MSWLF and also accepts land clearing and inert debris along with C&D like waste or inert material. The entrance to the facility will not change.

The public meeting is scheduled for Monday March 3, 2008 at 9:00 a.m. and will be held at the regular scheduled Commissioner's meeting located at 229 Kingbold Rd., Snow Hill, NC 28580. Application documents may be viewed at the County Public Works Department located at 105 Landfill Road, Walstonburg, NC 27888 between the hours of 8:00 a.m. - 4:00 p.m. Monday through Friday.

For further information, you may contact the County Public Works Department at 252-747-5720.

Sincerely, 

David Jones  
Director of Public Works

January 24, 2008

Property Owner: Bobby Ham.  
Address: 963 Hwy 258 South.  
City: Snow Hill NC.28580

Dear Mr. Ham:

Re: Notice to Adjoining Greene County Landfill Property Owners

In compliance with the North Carolina Department of Environment and Natural Resources (NCDENR), new Construction and Demolition Landfill Rules require notification to adjoining Greene County Landfill property owners of our intent to continue operating a Construction and Demolition Landfill (C&DLF) at our current Solid Waste Facility.

The C&DLF is part of the existing facility which consists of the White Goods Recovery and Recycling site, Tire disposal, and Yard Waste disposal areas.

The C&DLF debris is presently being disposed on top of a closed Municipal Solid Waste Landfill. New Solid Waste rules that regulate the disposal of C&D waste require that we obtain local government approval (County Commissioners) for the continuing operation of the C&DLF. This letter and subsequent public meeting are part of this process.

The proposed finish elevation for the C&DLF is 200' and the waste that is being disposed of is from the demolition, remodeling, and/or construction of structures. This landfill operates on top of the closed MSWLF and also accepts land clearing and inert debris along with C&D like waste or inert material. The entrance to the facility will not change.

The public meeting is scheduled for Monday March 3, 2008 at 9:00 a.m. and will be held at the regular scheduled Commissioner's meeting located at 229 Kingbold Rd., Snow Hill, NC 28580. Application documents may be viewed at the County Public Works Department located at 105 Landfill Road, Walstonburg, NC 27888 between the hours of 8:00 a.m. - 4:00 p.m. Monday through Friday.

For further information, you may contact the County Public Works Department at 252-747-5720.

Sincerely, 

David Jones  
Director of Public Works

4254 44HT E000 01TE 5002

U.S. Postal Service™  
**CERTIFIED MAIL™ RE**  
(Domestic Mail Only; No Insurance)  
For delivery information, visit our website  
**OFFICIAL**

Postage	\$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	

Total  
Sent to: **Frank Walston, Jr.**  
**573 Walston Road**  
Street, or PO: **Walstonburg, NC 27888**  
City, S.

PS Form 3800, June 2002 See Reverse for Instructions



UNITED STATES POSTAGE  
02 1A  
0004356242 JAN 25 2008  
MAILED FROM ZIP CODE 28580  
**\$ 00.00**  
DIRECT BOWLES

4254 44HT E000 01TE 5002

U.S. Postal Service™  
**CERTIFIED MAIL™ RE**  
(Domestic Mail Only; No Insurance)  
For delivery information, visit our website  
**OFFICIAL**

Postage	\$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total	5.00

Sent to: **Bobby Ham**  
**963 Hwy 258 South**  
Street, or PO: **Snow Hill, NC 28580**  
City, S.

PS Form 3800, June 2002 See Reverse for Instructions



UNITED STATES POSTAGE  
02 1A  
0004356242 JAN 25 2008  
MAILED FROM ZIP CODE 28580  
**\$ 00.00**  
DIRECT BOWLES

**SENDER COMPLETE THIS SECTION**

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Bobby Ham  
 963 Hwy 258 South  
 Snow Hill, NC 28580

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature  Agent  Addressee  
*John Berman*

B. Received by (Printed Name)  Agent  Addressee  
 John Berman

C. Date of Delivery  
 01/28/03

D. Is delivery address different from item 1?  Yes  No  
 If YES, enter delivery address below:

3. Service Type

- Certified Mail
- Registered
- Insured Mail
- Express Mail
- Return Receipt for Merchandise
- G.O.D.

4. Restricted Delivery? (Extra Fee)  Yes  No

2. Article Number **7005 311B 0003 1473 4531**  
 (Transfer from service label)  
 PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

**SENDER COMPLETE THIS SECTION**

- 1. Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Frank Walston, Jr.  
 573 Walston Road  
 Walstonburg, NC 27888

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature  Agent  Addressee  
*Frank Walston*

B. Received by (Printed Name)  Agent  Addressee  
 Frank Walston

C. Date of Delivery  
 01-26-03

D. Is delivery address different from item 1?  Yes  No  
 If YES, enter delivery address below:

3. Service Type

- Certified Mail
- Registered
- Insured Mail
- Express Mail
- Return Receipt for Merchandise
- G.O.D.

4. Restricted Delivery? (Extra Fee)  Yes  No

2. Article Number **7005 311B 0003 1473 4524**  
 (Transfer from service label)  
 PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

County of Greene  
State of North Carolina

## *Publisher's Affidavit*

I, Jimmy Lewis, Circulation Manager of The Standard Laconic, a newspaper published in Snow Hill, County of Greene, North Carolina, do hereby certify that the notice in the action entitled:

Public Meeting Notice: North Carolina Solid  
Waste Management

Appeared in The Standard Laconic for 1 consecutive week(s) beginning 1/30/2008 and ending 1/30/2008.

A copy of the notice is attached.

This the 23<sup>rd</sup> day of December, 2009.

Jimmy Lewis  
Circulation Manager of The Standard Laconic

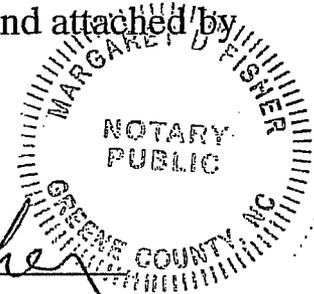
I, Margaret D. Fisher, a Notary Public, in and for the County and State aforementioned, do hereby certify the execution of the foregoing instrument for the purpose therein expressed.

In Witness Whereof, I have hereunto set my hand and attached by notarial seal, this the 23<sup>rd</sup> day of Dec. 2009.

My Commission Expires

4 Nov. 2012

Margaret D. Fisher  
Notary Public





Commissioners  
Jack Edmondson – Chairman  
Jesse C. Tyndall – Vice Chairman  
Denny Garner  
Bennie Heath  
James T. Shackelford, Jr.



**GREENE COUNTY**  
A Place To Grow. The Way To Live.

County Manager  
Don Davenport  
  
Finance Officer  
Shawna Wooten

### **Public Meeting Notice**

In compliance with North Carolina Solid Waste Management Rule § .1635 (d) Greene County will hold a public meeting to discuss the continued operation of a Construction and Demolition (C&D) Landfill at Greene County's current solid waste facility. This meeting will take place on Monday, the 3<sup>rd</sup> day of March at 9:00 a.m. The public meeting will be held at the County Commissioner Meeting Room located at Greene County Office Complex, 229 Kingold Blvd. in Snow Hill, North Carolina. This meeting will be used as an open forum to inform and discuss any concerns associated with the continued operation of a Construction and Demolition (C&D) Landfill at the Greene County Landfill. All interested parties should attend.

229 Kingold Blvd., Suite D • Snow Hill, NC 28580 • (252) 747-3446 • FAX (252) 747-3884  
[www.co.greene.nc.us](http://www.co.greene.nc.us)

*The mission of Greene County Government is to serve and improve the lives of all citizens by providing high-quality, cost-effective services in an open, professional and ethical environment*

NORTH CAROLINA  
COUNTY OF GREENE

The Greene County Board of Commissioners met in regular session on Monday, March 3, 2008, at 9:00 a.m. in the Greene County Office Complex. Present for the meeting were Chairman Jack Edmondson, Vice-Chair Jesse Tyndall and Commissioners Denny Garner, Bennie Heath and James Shackelford. County Manager Don Davenport and County Attorney E.B. Borden Parker were also present.

The Chairman called the meeting to order. Commissioner Shackelford gave the invocation and the Chairman led the Pledge to the Flag.

**On motion by Commissioner Heath, seconded by Commissioner Garner the Board voted unanimously to add the additional budget amendment to the consent agenda.**

**On motion by Commissioner Heath, seconded by Commissioner Garner the Board voted unanimously to approve the agenda as amended.**

**On motion by Commissioner Shackelford, seconded by Commissioner Garner the Board voted unanimously to approve the consent agenda which included the following:**

**February 18, 2008 Regular Meeting Minutes**

<b>Department</b>	<b>Amount</b>	<b>Explanation</b>
YAMCO Expansion Project	\$514,796.00	To budget for YamCo expansion project as approved on January 16, 2007.

REFUNDS

Clyde Jr. & Helen Roberson	\$32.00
----------------------------	---------

The Chairman opened the floor for Public Comments.

Being there were no comments, the Chairman announced the public meeting to discuss the County Governing Board's approval of the continued operation of a Construction and Demolition (C&D) landfill.

Mr. David Jones, Public Works Director introduced Mr. Wayne Sullivan, Municipal Engineering. Mr. Sullivan advised that the State had mandated new rules concerning construction and demolition landfills and that a public meeting is required to address any questions or concerns.

**On motion by Commissioner Heath, seconded by Commissioner Tyndall the Board voted unanimously to approve the continued operation of the Construction and Demolition (C&D) landfill.**

Mr. Mike Barnette, McDavid Associates presented information regarding the awarding of contracts for the 2006 CDBG Scattered Site Housing (SSH) program.

Economic Development  
&  
Planning



Chris Roberson,  
Assistant  
County Manager

September 8, 2009

NC Division of Solid Waste Management  
1646 Mail Service Center  
Raleigh, N.C. 27699

*RE: Zoning Compliance letter for 105 Landfill Road, Walstonburg, N.C. 27888*

Dear Sir:

This letter is to notify you that the property at 105 Landfill Road, Walstonburg, N.C. 27888 is not zoned. The county does not have any zoning regulations within its jurisdictional limits. Please note that it is the applicant's responsibility to ensure that all other requirements are met prior to permitting.

If I can be of further assistance, do not hesitate to give me a call at (252) 747-3446.

Sincerely,

A handwritten signature in black ink that reads "Chris Roberson". The signature is written in a cursive style with a long horizontal line extending to the right.

Chris Roberson, CFM  
Asst. County Manager  
Economic Development & Planning

Copy: file

APPENDIX C

# WASTE SCREENING PLAN

## **APPENDIX C**

### **A. INTRODUCTION**

The municipal solid waste stream is made up of wastes from all sectors of society. The waste is often categorized by its source or its characteristics. Terms used include commercial, industrial, residential, biomedical, hazardous, household, solid, liquid, demolition/construction, sludge, etc. Regardless of how one classifies wastes, the bottom line is that wastes are delivered to the landfill and a management decision must be made to either reject or accept them. This responsibility rests with the manager of the landfill. Wastes which are not authorized to be accepted at the landfill create a number of potential problems including: (1) liability due to future releases of contaminants; (2) bad publicity if media learns of unacceptable waste entering the landfill; (3) potential for worker injury; (4) exposure to civil or criminal penalties; (5) damage to landfill environmental control systems.

### **B. HAZARDOUS WASTE REGULATIONS AND MANAGEMENT**

In the United States, hazardous waste is regulated under RCRA, Subtitle C. A waste is hazardous if it is listed as a hazardous waste by the Administrator of the Environmental Protection Agency (EPA) in the Code of Federal Regulations, Title 40, Part 261, or if it meets one or more of the hazardous waste criteria as defined by EPA. These criteria are:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

#### **1. Ignitability**

Ignitable waste is a waste that burns readily, causes a fire by friction under normal circumstances, or is an oxidizer. Any waste having a flash point of <140F falls in this category. Flash point is that temperature at which a liquid gives off vapors that will ignite when an open flame is applied. Under Department of Transportation (DOT) definitions, a flammable liquid has a flash point of >100 F. A combustible liquid has a flash point between 100 and 200 F. Therefore, a flammable liquid is always hazardous while a combustible liquid may or may not be hazardous depending upon its flash point.

#### **2. Corrosivity**

A corrosive waste is one having a very high or a very low pH. The pH of a liquid is a measure of how acidic or basic (alkaline) the material is. The pH scale ranges from 0 to 14. High numbers are basic and low numbers are acidic. A substance having a pH  $\leq 2.0$  or  $\geq 12.5$  is defined as hazardous under RCRA.

#### **3. Reactivity**

A waste is reactive if it is normally unstable: reacts violently with water; forms an explosive mixture with water; contains quantities of cyanide or sulfur that could be released to the air; or can easily be detonated or exploded. These wastes may fall into any one of several DOT categories.

#### **4. Toxicity Characteristic Leaching Procedure (TCLP)**

A waste is TCLP toxic if the concentration of any constituent in Table 1 exceeds the standard assigned to that substance. The TCLP is a methodology which attempts to simulate the conditions within a landfill. An acidic solution is passed through a sample of waste and the resultant "leachate" is analyzed for contaminants. The TCLP is designed to detect heavy metals, pesticides

and a few other organic and inorganic compounds. The purpose of the test is to prevent groundwater contamination by highly toxic materials. TCLP tests the mobility of 40 different elements and compounds.

Except in certain specified circumstances, regulated quantities of hazardous waste must be disposed of at a permitted hazardous waste disposal facility. In accordance with 40 CFR Part 261.3, **any material contaminated by a hazardous waste is also deemed to be a hazardous waste and must be managed as such.** Hazardous waste from conditionally exempt small quantity generators are to be disposed of in a hazardous waste disposal facility. RCRA permits are also required to store, transport, and treat hazardous waste.

## C. POLYCHLORINATED BIPHENYL'S (PCBs)

### 1. Introduction

PCBs are nonflammable and conduct heat without conducting electricity. These compounds were most frequently used as an additive to oil or other liquids in situations where heat was involved. The PCBs enhance the heat conducting properties of the liquid and thereby increase the heat dissipation or cooling effect obtained. They have also been used in lubricants and paint. In the United States one of the most common applications was in electric transformers. The only effective method for destroying PCBs is high temperature incineration which is relatively expensive due to a shortage of PCB incineration capacity.

TABLE 1

<b>T.C.L.P. CONSTITUENTS &amp; REGULATORY LEVELS (mg/L)</b>			
CONSTITUENT	REG LEVEL	CONSTITUENT	REG LEVEL
Arsenic	5.0	Hexachlorobenzene	0.13
Barium	100	Hexachloro-1,3-butadiene	0.5
Benzene	0.5	Hexachloroethane	3.0
Cadmium	1.0	Lead	5.0
Carbon Tetrachloride	0.5	Lindane	0.4
Chlordane	0.03	Mercury	0.2
Chlorobenzene	100	Methoxychlor	10.0
Chloroform	6.0	Methyl ethyl ketone	200
Chromium	5.0	Nitrobenzene	2.0
m-Cresol	200	Pentachlorophenol	100
o-Cresol	200	Pyridine	5.0
p-Cresol	200	Selenium	1.0
Cresol	200	Silver	5.0
1,4-Dichlorobenzene	10.0	Tetrachloroethylene	0.7
1,2-Dichloroethane	0.7	Toxaphene	0.5
1,1-Dichloroethylene	0.5	Trichloroethylene	0.5
2,4-Dichlorophenoxyacetic acid	0.7	2,4,5-Trichlorophenol	400
2,4-Dinitrotoluene	0.13	2,4,6-Trichlorophenol	2.0
Endrin	0.02	2,4,5-TP (Silvex)	1.0
Heptachlor (and its hydroxide)	0.008	Vinyl Chloride	0.2

By law PCBs are no longer used as dielectrics in transformers and capacitors manufactured after 1979. There are many millions of pounds of PCBs still in use or in storage. One example is the ballasts used in fluorescent light fixtures. It has been estimated that there are between 0.5 million and 1.5 billion ballasts currently in use in this country. Due to the long life of these units, about half of these may be of pre-1979 manufacture and contain PCBs. Since each ballast contains about one ounce of nearly pure PCB fluid, there are about **20 to 30 million pounds** of PCBs in existing lighting fixtures. These items are not the subject to RCRA Subtitle D Waste Screening!

Commercial or industrial sources of PCB wastes that should be addressed by the program include:

- Mineral oil and dielectric fluids containing PCBs;
- Contaminated soil, dredged material, sewage sludge, rags, and other debris from a release of PCBs;
- Transformers and other electrical equipment containing dielectric fluids; and
- Hydraulic machines.

## 2. PCB Regulatory Requirements

As contrasted to hazardous wastes, the Toxic Substance Control Act regulates PCBs based on the concentration of PCBs in the waste rather than the source or characteristic of the waste. The regulations concerning PCB disposal are spelled out in 40 CFR Part 761. Subtitle D of RCRA merely requires that PCB waste not be disposed in a MSW landfill. PCB management requirements include:

Waste containing more than 500 ppm of PCBs must be incinerated. Waste containing from 50 to 500 ppm must be disposed of by incineration, approved burning, or in chemical waste landfill permitted to receive such wastes. The regulations are silent concerning wastes containing less than 50 ppm of PCBs; however, the regulations cannot be circumvented by diluting stronger wastes.

## D. FUNDAMENTALS OF WASTE SCREENING

### 1. Know Your Generators and Haulers

Since the level of sophistication of your waste screening program will be a reflection of the likelihood of hazardous waste and PCB waste being in your incoming waste, **knowledge of the commercial industrial base of your service area is critical.** Some examples are the automotive industry, which generates solvents, paint wastes, lead acid batteries, grease and oil; the dry cleaning industry, which may generate filters containing dry cleaning solvents; metal platers which generate heavy metal wastes; and other industries which generate a variety of undesirable wastes; e.g. chemical and related products, petroleum refining, primary metals, electrical and electronic machinery, etc.

Landfill managers should also know the haulers and trucks serving the businesses in their community which are likely to carry unacceptable wastes.

Some local governments and solid waste management agencies have enacted legislation requiring haulers to provide a manifest showing the customers whose wastes make up that particular load. Such a manifest is an extremely useful tool when a load is found to contain prohibited wastes. It is unwise to accept wastes from unknown, unlicensed, or otherwise questionable haulers.

### 2. Inspections

An inspection is typically a visual observation of the incoming waste loads by an individual who is trained to identify regulated hazardous or PCB wastes that would not be acceptable for disposal at

the C&DLF unit. The training of landfill personnel will be conducted by a local EMS official or a SWANA certification. An inspection is considered satisfactory if the inspector knows the nature of all materials received in the load and is able to discern whether the materials are potentially regulated hazardous wastes or PCB wastes.

Ideally, all loads should be screened; however, it is generally not practical to inspect in detail all incoming loads. Random inspections, therefore, can be used to provide a reasonable means to adequately control the receipt of inappropriate wastes. Random inspections are simply inspections made on less than every load. At a minimum the inspection frequency will not be less than one percent of the waste stream.

The frequency of random inspections may be based on the type and quantity of wastes received daily, and the accuracy and confidence desired in conclusions drawn from inspection observations. Because statistical parameters are not provided in the regulation, a reasoned, knowledge-based approach may be taken. A random inspection program may take many forms such as inspecting every incoming load one day out of every month or inspecting one or more loads from transporters of wastes of unidentifiable nature each day. If these inspections indicate that unauthorized wastes are being brought to the C&DLF site, the random inspection program should be modified to increase the frequency of inspections.

Inspection priority also can be given to haulers with unknown service areas, to loads brought to the facility in vehicles not typically used for disposal of C&D waste, and to loads transported by previous would-be offenders. For wastes of unidentifiable nature received from sources other than households (e.g., industrial or commercial establishments), the inspector should question the transporter about the source/composition of the materials.

An inspection flow chart to identify, accept, or refuse solid waste is provided as Figure 1.

Inspections of materials may be accomplished by discharging the vehicle load in an area designed to contain potentially hazardous wastes that may arrive at the facility. The waste should be carefully spread for observation using a front end loader or other piece of equipment. The Division recommends that waste should be hand raked to spread the load. Personnel should be trained to identify suspicious wastes. Some indications of suspicious wastes are:

- Hazardous placards or markings;
- Liquids;
- Powders or dusts;
- Sludges;
- Bright or unusual colors;
- Drums or commercial size containers; or
- Chemical odors.

The County will follow these procedures when suspicious wastes are discovered.

- Segregate the wastes;
- Dispose of non-C&D waste in designated container(s) for transport off-site;
- Question the driver;
- Review the manifest (if applicable);
- Contact possible source;
- Call the Division;
- Use appropriate protective equipment;
- Contact laboratory support if required; and
- Notify the local Hazardous Material Response Team.

Containers with contents that are not easily identifiable, such as unmarked 55-gallon drums, should be opened only by properly trained personnel. Because these drums could contain hazardous

waste, they should be refused whenever possible. Upon verifying that the solid waste is acceptable, it may then be transferred to the working face for disposal.

Testing typically would include the Toxicity Characteristic Leaching Procedure (TCLP) and other tests for characteristics of hazardous wastes including corrosivity, ignitability, and reactivity. Wastes that are suspected of being hazardous should be handled and stored as a hazardous waste until a determination is made.

If the wastes temporarily stored at the site are determined to be hazardous, the County is responsible for the management of the waste. If the wastes are to be transported from the facility, the waste must be: (1) stored at the C&DLF in accordance with requirements of a hazardous waste generator, (2) manifested, (3) transported by a licensed Treatment, Storage, or Disposal (TSD) facility for disposal.

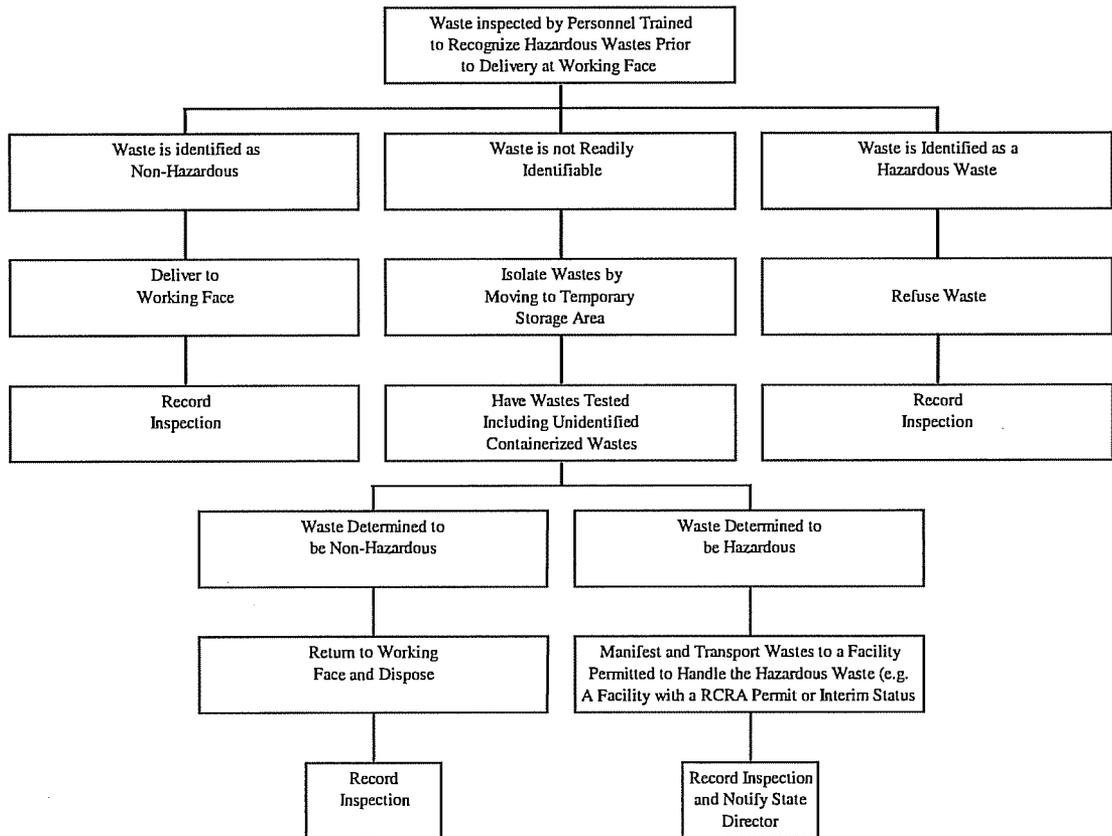
#### **E. RECORD KEEPING AND NOTIFICATION REQUIREMENTS**

Records must be kept pursuant to an incident where regulated hazardous waste or prohibited waste is found at the landfill. It is also recommended that records be kept of all screening activities and incidents, whether or not, regulated or prohibited wastes are found. This will help prove that the landfill owner/operator has acted in a prudent and reasonable manner.

The best way to prove compliance with this requirement is to document each inspection including:

- Date and time of waste detection
- Hauler name (company and driver)
- Waste(s) detected
- Waste generator(s) if able to identify
- Action(s) taken to manage or return material(s)
- Efforts taken if extreme toxicity or hazard was discovered
- Landfill employee in responsible charge

40 CFR Part 258 requires that records should be maintained at or near the landfill site during its active life and as long after as may be required by the appropriate state or local regulations.



**FIGURE 1**  
**Hazardous Waste Inspection Decision Tree**  
**Inspection Prior to Working Face**

## WASTE SCREENING CHECK LIST

<b>CONTAINERS</b>	<b>YES</b>	<b>NO</b>
FULL.....	_____	_____
PARTIALLY FULL.....	_____	_____
EMPTY.....	_____	_____
CRUSHED.....	_____	_____
PUNCTURED.....	_____	_____
<b>POWDERS/DUSTS</b>		
IDENTIFIED.....	_____	_____
UNKNOWN.....	_____	_____
SATURATION.....	_____	_____
LABEL/HAZARDOUS.....	_____	_____
<b>ODOR/FUMES</b>		
STRONG.....	_____	_____
FAINT.....	_____	_____
HEAT.....	_____	_____
<b>ITEMS FOUND</b>		
BATTERIES.....	_____	_____
OIL.....	_____	_____
BIOMEDICAL.....	_____	_____
RADIOACTIVE.....	_____	_____
ASHES/RESIDUE.....	_____	_____
SOD/SOIL.....	_____	_____
LIQUID.....	_____	_____
HAZARDOUS.....	_____	_____
PCB'S.....	_____	_____

**CHECK ALL THAT APPLY**

**DETAILED SCREENING REPORT**

WASTE SOURCE \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROBABLE [ ]                      SUSPECTED [ ]                      CONFIRMED [ ]

WASTE HAULER \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DRIVER'S NAME \_\_\_\_\_  
DETAIL \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOTIFIED:

WASTE SOURCE [ ]    HAULING MANAGEMENT [ ]    SITE MANAGEMENT [ ]  
STATE [ ]                      FEDERAL [ ]

NAME \_\_\_\_\_  
WITNESS (IF ANY) \_\_\_\_\_  
DATE \_\_\_\_\_ TIME \_\_\_\_\_ AM    PM

**ACTION REQUIRED**

**APPENDIX D**

**STATE AND LOCAL  
CONTACT INFORMATION**

**STATE AND LOCAL CONTACT INFORMATION**

NC Division of Waste Management Office:

Solid Waste Field Operation Branch  
Fayetteville Regional Office  
Eastern Regional Supervisor

Phone: (910) 433-3300

Local Hazardous Material Response Team:

Emergency: 911

Greene County Emergency Services

Phone: (252) 747-2544

Local Fire Department:

Emergency: 911

Castoria Fire Department

Phone: (252) 747-2482

Local Sheriff's Department:

Emergency: 911

Greene County Sheriff's Department:

Phone: (252) 747-3411

APPENDIX D

**WRITTEN  
FACILITY PLAN**

**Introduction**

The County will continue to operate a Construction and Demolition Landfill (C&DLF) within the permitted boundaries and upon the closed unlined municipal solid waste(MSW) landfill. The unlined MSW area opened in 1982 and stopped receiving waste prior to October 9, 1991 and was certified closed on August 31, 1998. The closed MSW area has a minimum of two feet of final cover.

**General**

The existing C&DLF unit is located a minimum of 50' from the property lines, 500' from existing wells, and 50' from any stream, river or lake.

The County will cap their landfill within 180 days after the final receipt of solid waste. The cap system will consist of 12 inches bridging material (temporary cover), 18 inches of soil liner with a permeability no greater than  $1.0 \times 10^{-5}$  cm/sec, drainage layer, 18 inches of protective/erosive layer. The cap contains gas venting system consisting of a series of washed stone trenches below the soil liner that will be vented through pipes that penetrate the cap. The cap system will also include the proper seeding and mulching of the erosive layer and other erosion control devices.

The total permitted C&D capacity is 352,500 cubic yards. The existing closed MSW footprint is approximately 12.65 acres in size.

**Landfill Capacity**

The Life Expectancy calculations were calculated for Phases 2-5 of development with a vertical expansion being included when a Phase is constructed adjacent to the previous Phase. Each successive phase will vary in size due to being able to expand onto the previously filled areas. The Operation Plan of the Engineering Report will delineate this more clearly. The airspace is a net volume excluding the capping requirements.

**LIFE EXPECTANCY CALCULATIONS PHASES 2-5**

**Given:**

Life expectancy based on actual survey dated May 8<sup>th</sup>, 2009 Fiscal Year 08-09 is as follows:

Life expectancy based on using the survey is 12,941 cubic yards/year, for the first year and an annual increase of 3.1% for each year thereafter.

<u>Phases</u>	<u>Airspace Available</u>	<u>Years of Life</u>
Phase 2	= 64,493 cubic yards	= 4.98 years
Phase 3	= 64,454 cubic yards	= 4.90 years
Phase 4	= 71,106 cubic yards	= 5.33 years
Phase 5	= 63,814 cubic yards	= 4.71 years
	263,867 cubic yards	19.92 years

Soil requirements for construction, daily cover and final caps for Phases 2-5  
(Assume an 10:1 Trash to soil ratio)

Soil needed for Daily Cover	= 23,988 cubic yards
Soil needed for Closure	= 81,635 cubic yards
Overall Soil Requirements	= 105,623 cubic yards (soil needed for closure and daily cover)

The County also owns property which it will utilize for borrow material as needed. There should be enough borrow material available to complete the landfill. If the need arises the County will purchase additional land to borrow from.

Estimated schedule of closure will be approximately 19.92 years.