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March 18, 2008

Mr. Ming-Tai Chao
NCDENR
Division of Waste Management
1646 Mail Service Center
Raleigh, North Carolina 27699

Scanned by	Date	Doc ID #
Ming Chao	02/18/09	6836

RE: Response to Comments on Volume II – Application for Permit to Construct Phase 3
Coble's Sandrock, Inc. Construction and Demolition Debris Landfill
Alamance County, North Carolina
Permit #01-05
Doc ID No. 3974

Dear Mr. Chao:

This letter and the enclosed revised plan drawings and Volume II Application are in response to the comments received in your letter dated February 15, 2008. On behalf of Coble's Sandrock, Inc. we are requesting a Permit to Construct Phase 3.

Secton A – Facility Plan

Figures

Comment 1: (Figure FP-01)

i. The numbers next to borings do not hold relevance to this drawing. Any such numbers have been removed to eliminate confusion.
ii. Piezometer locations and symbols on Facility Plan, Engineering Plan and Monitoring Plan drawings that are part of this application have been made consistent with those shown on the Design Hydrogeologic drawings.
iii. The long structure immediately to the south of the scale house was demolished and is no longer on site. It was a former chicken house that was unused after the property became a landfill. The smaller structure is a storage shed and is now labeled as such on FP-01.
iv. Soil stockpile area has been identified on FP-01 and EP-01. The current soil stockpile is the northern portion of the closed LCID area, where the LCID material has now been removed.

Comment 2: "Foster Store Road" is now labeled on FP-02 and the basin outlets are consistently shown throughout the drawings.

Comment 3: Only bearings and distances for the entire facility boundary property are now shown, and the permanent benchmarks are called out. (Figure FP-03)

Section A.2 – Landfill Capacity

Comment 1: This statement has been revised to say "numerous" borings and reference is made to Table 2 of Appendix III which summarizes borings for which lab soil testing has been done.

Comment 2: Page 3 has been revised to clearly indicate gross capacity. The gross capacity is 969,089 cy (818,363 for waste; 81,836 for intermediate cover; and 68,890 for final cover).

Section A.3 – Special Engineering Features
Comment 1: (Containment and Environmental Control System)

i. "Infiltration barrier" and "infiltration layer" refer to the same thing. The term "infiltration barrier" is now used exclusively throughout the application to eliminate confusion.
ii. The minimum intermediate soil layer thickness is 12". The relevant sentence has been corrected.
iii. A discussion of the use of a GCL is now included in Section B – Engineering Plan.

Section B – Engineering Plan

Section B.1 Subgrade and Foundation & Appendix I

Comment 1:

i. Max. height of waste is calculated to be 120'. This value was determined by subtracting the lowest base grade elevation of Phase 3 (576 see EP-02) from the maximum grade of Phase 3 (696 see EP-06).
ii. Bearing capacity calculation has been revised to more clearly indicate the landfill loading.
iii. For the subgrade stability and settlement calculations conservative assumptions were made for soil characteristics. These assumptions were based on the soil lab data available, as summarized in Table 2 of Appendix III. During construction, as part of the CQA process, lab testing will be performed to verify that the soils used meet or exceed the assumed values. The assumed soil characteristics are listed on page 5.
iv. Even though there may be more than 1 soil stratum present, the soil parameters assumed are conservative enough that any soil strata present will have properties at least as strong as the values assumed, so therefore it is not necessary to use multiple layers for the bearing capacity calculation.
v. Soil and waste parameters are revised to be consistent throughout the calculations and values were chosen as described on page 5.
vi. Labeling has been added.

Section B.2 – Final Cover System

Comment 1:

i. Correction has been made.
ii. Correction has been made.

Comment 2: Section has been added to CQA Plan which describes methods of construction.

Comment 3:

i. Run-off direction and slope for Phase 3B has been added to EP-06.
ii. Grass/vegetation is now shown as suggested.
iii. Stormwater conveyance channels are now labeled.
iv. Basin outlets are now consistent.
v. The drawing is correct and the text has been revised. The intermediate cover is 12" minimum thickness.
vi. The density of the gas vents is now shown as 1 per acre, or 25 total. It is indicated that some of the vents may not be constructed if future landfill phases are to overlap, or "piggyback" on top of the area where the vent is proposed.

Comment 4:

i. Existing basin outlet is now shown on EP-07.

Comment 5: To clarify the word "removed" has been replaced by the phrase "cleaned out".

Section B.3 – Erosion and Sediment Control Plan & Appendix II
Comment 1: (Appendix II) Table of Contents has been revised to not include reference to drawings.

Comment 2: An open LCID disposal area is located on the southern portion of the property and is now labeled as such. The previously labeled LCID landfill is the closed LCID landfill. The LCID material is being removed from the closed LCID area and ground up for use and a landfill cover soil material.

Section C – Construction Quality Assurance Plan

Comment 1: The Specifications are included as Appendix IV. The term "approved" has been eliminated so as not to imply that the Division of Waste Management is approving the Specifications.

Comment 2: Text revision has been made as suggested.

Comment 3: Text revision has been made as suggested.

Comment 4: Provisions for placement of structural fill is outlined in the "Structural Fill" spec in Appendix IV.
Comment 5: Soil testing and moisture/density acceptability is further clarified.

Section D – Operation Plan
Section D.1 – Waste Acceptance and Disposal
Comment 1: Application has been revised to no longer include asbestos as an accepted waste.

Comment 2: The requirement has been added.

Comment 3: The correction has been made.

Section D.3 – Waste Exclusion
Comment 1: Yard waste in now included in the Waste Exclusions.

Comment 2: The correct Subparagraph (17) is now included.

Section D.7 – Air Criteria and Fire Control
Comment 1: A letter from the fire department (Appendix X) is now included in the application.

Section E – Closure and Post-Closure Plan
Closure
Comment 1: Specifications for the construction procedures for the cap system are now provided in Appendix IV.

Comment 2: The total tonnage of Phase 3 is 440,131. The total waste in place at the end of Phase 3 includes the tonnages from Phase 1 and Phase 2 as well. The tonnages from Phase 1 and Phase 2 make up the difference between 865,280 and 440,131.

Comment 3: Sections regarding certification and deed notation have been added.

Post-Closure
Comment 1: Additions have been made.

Comment 2: Additions have been made.

Comment 3: The text has been changed to say "quarterly inspections" instead of "monthly". Mowing will be done twice per year. The cost estimate reflects this.

Section F – Monitoring Plans (Plan)
Comment 1: Relevant additions have been made to monitoring plans.
Comment 2: Health and Safety Plan is now included as an appendix (Appendix XI).

Section F.2 – Surface Water Monitoring Plan
Comment 1: Correction was made.

Comment 2: Relevant additions have been made to monitoring plans.

Section F.3 – Gas Control Plan
Comment 1: Locations of the proposed gas probes have been revised and an explanation of their locations is provided in Section F.3. Drawing MP-01 has been updated to show the locations and label the proposed probes more clearly.

Comment 2:
i. An explanation for the revised, proposed gas probe locations is now provided in Section F.3.
ii. An explanation for the revised, proposed gas probe locations is now provided in Section F.3.

If you have any questions concerning these responses or the enclosed plans and application please call me at your convenience.

Sincerely,
JOYCE ENGINEERING, INC.

Stephen Cowie

Stephen Cowie, EIT
Project Consultant

Enclosures

Prepared for:

Coble Sandrock, Inc.
5833 Foster Store Road
Liberty, North Carolina 27298

JEI PROJECT NO. 419.00, TASK 22

COBLE'S SANDROCK, INC.
ALAMANCE COUNTY, NORTH CAROLINA
CONSTRUCTION AND DEMOLITION DEBRIS LANDFILL

VOLUME II
APPLICATION FOR
PERMIT TO CONSTRUCT
PHASE 3

SEPTEMBER 2007
REV. MARCH 2008

Prepared by:

ENGINEERING, INC.

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FIGURES

Figure 1	Future Tonnage Projection

TABLES

Table 1	CQA Testing Frequencies

DRAWINGS

	Title and Index Sheet
Drawing FP-01	Facility Plan – Site Development
Drawing FP-02	Facility Plan – Final Contours
Drawing FP-03	Facility Plan – Property Plat
Drawing EP-01	Engineering Plans – Existing Conditions
Drawing EP-02	Engineering Plans – Base Grade Plan
Drawing EP-03	Engineering Plans – Phased Grading Yr. 1
Drawing EP-04	Engineering Plans – Phased Grading Yr. 2-3
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Drawing EP-06	Engineering Plans – Final Grading Plan
Drawing EP-07	Engineering Plans – Phase 3 Final E&S Plan
Drawing EP-08	Engineering Plans – Phase 3A E&S Plan
Drawing EP-09	Engineering Plans – Phase 3B E&S Plan
Drawing EP-10	Engineering Plans – Cross Sections
Drawing EP-11	Engineering Plans – Erosion Control Details
Drawing EP-12	Engineering Plans – Sediment Basin Details
Drawing MP-01	Monitoring Network

APPENDICES

Appendix I	Stability Analyses
Appendix II	Erosion and Sediment Control Calculations
Appendix III	Design Hydrogeologic Report
Appendix IV	Construction Specifications
Appendix V	Property Deeds
Appendix VI	Franchise Agreement
Appendix VII	Material Reclamation Info
Appendix VIII	Waste Screening Forms
Appendix IX	Post Closure Inspection Forms
Appendix X	Fire Department Letter
Appendix XI	Health & Safety Plan

GENERAL

Coble's Sandrock, Inc. requests a permit to construct a new 5-year phase (Phase 3) for its construction and demolition debris (C&D) landfill. Joyce Engineering, Inc. (JEI) has prepared this permit application on behalf of Coble's Sandrock and presents the following information in support of this request.

A. FACILITY PLAN (.0537)

Facility Plan Drawings (FP-01 through FP-02) provide the information required in Section .0537(d).

1. Waste Stream

Types of Waste Specified for Disposal: Only construction/demolition debris will be accepted at the C&D landfill, and only land clearing/inert debris (LCID) will be accepted in permitted LCID areas. Construction and demolition debris is defined in NC General Statutes as waste or debris resulting solely from construction, remodeling, repair, or the demolition of pavement, buildings, or other structures. LCID is waste that is generated from land clearing activities.

Disposal Rates:	2005	55,405 tons of C&D waste
	2004	59,041 tons of C&D waste
	2003	65,000 tons of C&D waste
	2002	34,404 tons of C&D waste
	2001	36,012 tons of C&D waste

The Franchise Agreement for Coble's Sandrock limits the waste acceptance rate to 600 tons per day. Assuming a 5.5 day work week, this is the equivalent of 171,600 tons per year. Based on the current growth rate, Coble's Sandrock is expected to reach this ceiling in the year 2023.

Service Area: The Alamance County Franchise Agreement limits the service area to be served by the Coble's Sandrock Landfill to customers within 25 miles from the site. Existing customers outside the 25-mile service limitation are grandfathered under the Franchise Agreement and Coble's Sandrock may continue to accept wastes from these customers. Coble's Sandrock may also accept waste from new customers outside the 25-mile service area to replace existing customers outside the service area; however, first priority in terms of disposal capacity is to be given to waste generated within Alamance County.

The 25-mile radius area includes almost all of Alamance County, and approximately half of Orange, Chatham, Randolph, and Guilford Counties. The North Carolina State Demographics Department estimated populations of the above-listed counties in 2004 to be: Alamance (137,126), Orange (120,965), Chatham (55,000), Randolph (135,805), Guilford (434,693). Therefore the population within a 25 mile area of Coble's Sandrock, assuming 50% of Orange, Chatham, Randolph and Guilford Counties, was approximately 510,000 in 2004.

The average population growth rate for the five counties listed is approximately 1.5% per year (from NC State Demographics Department). At that rate, the population within 25 miles of Coble's Sandrock will be approximately 568,000 by the year 2011, and 754,000 by the year 2030.

Segregation Management Procedures: Materials other than C&D waste, such as metal recyclables and cardboard are managed separately. Coble's Sandrock deconstructs mobile trailer homes at the working face of the C&D landfill. Identified C&D waste material removed from the deconstruction process is placed into the landfill. Metal material that is removed from the trailer homes is temporarily stored adjacent to the deconstruction area on the working face. Approximately 70 cubic yards of metal material is removed from the site weekly. The scrap metal is removed from the site and taken to D.H. Griffin Wrecking Co. Inc. Cardboard is also removed from the waste stream and is temporarily stored in a 40-yard container that is located adjacent to the working face. Federal Paper Board removes the cardboard material from the site when the 40-yard container becomes full.

The locations of the mobile trailer home deconstruction area and the metals and cardboard temporary storage containers follow the location of the working face as it progresses across the landfill.

Equipment: Coble Sandrock proposes to operate the following equipment at the C&D landfill:

- Front End Track Loaders (2)
- Grapple Track Hoe (1)
- Bucket Track Hoe (1)
- Electric Magnet Track Hoe (1)
- Cat Compactor (1)
- Rex Compactors (2)
- Pans – TX 14 y (2)
- Rubber Tire Loader (1)
- Screener (1)
- Grinder (1)
- 60 y Container (3)
- 40' Steel Trailer (2)
- Road Tractor (1)
- Off Road Truck (1)

Additional equipment may be added, depending on the actual quantity of waste accepted.

2. Landfill Capacity

Overall Facility Life

The available air space for waste and intermediate cover material for the entire facility is 6,935,903 cy. Assuming that 10% of that volume will be taken up with soil material, 6,242,313 cy are available for waste material. If an in-place waste density of 1050 lbs/cy is used, the

remaining tonnage capacity of the landfill is 3,277,214 tons. The in-place waste density stated above is within the typical range of densities measured for C&D debris.

The annual tonnages received by Coble's Sandrock over the last five years are: 36,012 tons (2001); 34,404 tons (2002); 65,000 tons (2003); 59,041 tons (2004) and 55,405 tons (2005). To show the expected air space consumption for the life of the facility, a best-fit line was applied to these data points and projected out until the Franchise Agreement limit for daily tonnage was reached (See Figure 1). The Franchise Agreement for Coble's Sandrock limits the waste acceptance rate to 600 tons per day. Assuming a 5.5 day work week, this is the equivalent of 171,600 tons per year. Based on the current growth rate, Coble's Sandrock is expected to reach this ceiling in the year 2023. From 2023 on, it is assumed that Coble's Sandrock will accept 171,600 tons per year. At this projected rate, the landfill will run out of space in the year 2030.

Overall Facility Soil Balance

The base grading plan, including access roads, for the entire remaining facility yields a net 1,537,784 cy of cut. Approximately 325,871 cy of soil will be needed for final cap (3 feet thick) construction. The total volume of air space available for waste and intermediate soil covers is 6,935,903 cy. Assuming 10% of the volume will be taken up with soil material, 693,590 cy of soil will be needed for intermediate cover material. Subtracting the estimated soil requirements from the calculated available cut material leaves an excess of 518,323 cy of soil.

Numerous soil borings have been completed on the site. A summary of soils testing performed on various borings is presented in Table 2 of Appendix III. Laboratory testing indicates that the near-surface soils have remolded permeabilities on the order of 10^{-7} cm/sec, and are therefore suitable for use as cover material.

Phase 3 Life

To evaluate the air space requirement for a new 5-year phase, a best-fit line was applied to tonnage data from the past five years and projected forward through 2011 (See Figure 1). The projected total tonnage for the next 5-year phase is 440,130 tons (See Figure 1). Assuming an in-place waste density of 1050 lbs per cubic yard, the required air space for waste for the 5-year phase is 836,250 cubic yards. Also, assuming that a 6-inch lift of cover soil will be placed on the working face once per week, an additional 10% (83,625 cubic yards) of air space will be required. Therefore, the total air space required, not including the intermediate or final cap, is 919,875 cubic yards.

Using Autodesk Land Desktop 2006, the total gross capacity is 969,089 cy (818,363 cy for waste; 81,836 cy for intermediate cover; and 68,890 cy for final cover). Since the design volume for waste is 98% of the volume for waste required for a 5-yr duration (818,363 cy / 836,250 cy), the life of the phase is estimated to be 98% of 5 years, or 4.9 years. The final cover volume was calculated, assuming 3.5' of soil over an area of 12.2 acres. The 3.5' includes placing 6" on top of the last intermediate cover layer to establish the 12" intermediate layer.

The base grading plan for Phase 3 results in 150,200 cubic yards (net) of cut. The cut material will be stockpiled for use as weekly cover and final cover. The weekly cover required for Phase 3 is estimated to be 81,836 cubic yards and the final cover volume is 68,890 cubic yards. No outside soil material will need to be imported.

3. Special Engineering Features

Containment and Environmental Control Systems

Cap System:

The cap system is described from bottom to top in the following paragraphs.

Infiltration Barrier: An infiltration barrier will consist of an 18-inch low-permeability soil layer compacted to achieve a hydraulic conductivity no greater than 1 x 10^{-5} cm/sec. The 18-inch low permeability soil barrier may be replaced with a geosynthetic clay layer (GCL), as discussed in the Engineering Plan of this report. The low-permeability soil barrier, or the GCL, will lie directly above an intermediate soil cover layer of at least 12 inches in thickness.

Erosion Control Components (Protective Layer and Erosion Layer): A protective layer consisting of at least 18 inches of local soil will be placed on top of the infiltration barrier. The erosion and protective layers will not be heavily compacted so that vegetative growth will be promoted. Soil tests will be conducted prior to seeding to determine if amendments to the soil are needed to establish a healthy stand of vegetation.

Vegetative Cover: After placement of the erosion layer, the area that has been closed will be seeded with a grass mixture. Mulch and erosion control matting will be used as needed to further minimize erosion.

Gas Management System:

To relieve pressure beneath the low permeability cap, a system of passive vents will be installed as shown on Drawing EP-06.

B. ENGINEERING PLAN (.0539)

Engineering Plan Drawings (EP-01 through EP-10) provide the information required in Section .0539.

Summary of Facility Design

Subgrade and Foundation:

For the subgrade stability and settlement calculations conservative assumptions were made for soil characteristics. These assumptions were based on the soil lab data available, as summarized in Table 2 of Appendix III. During construction, as part of the CQA process, lab testing will be performed to verify that the soils used meet or exceed the assumed values. The assumed soil characteristics are listed below.

Soil	
Dry Unit Weight (lbs/cf):	100
Moisture Content (%):	16.5
Moist Unit Weight (lbs/cf):	120
Saturated Unit Weight (lbs/cf):	130
Friction Angle:	20°
Cohesion:	0

Waste	
Max. Height (ft):	120*
Moist Unit Weight (lbs/cf):	75

* This value was determined by subtracting the lowest base grade elevation of Phase 3 (576 see EP-02) from the maximum grade of Phase 3 (696 see EP-06).

The subgrade of the landfill consists of the underlying soils and controlled fill components (berms and embankments). The underlying materials that will serve as the foundation for the landfill are predominantly sandy silts and silty sands. Controlled fill will be placed in uniform lifts and compacted to within 95% of the soil's maximum dry density as determined by a Standard Proctor Test (ASTM D698). The excavation grades are shown on Drawing EP-02.

A land surveyor licensed in North Carolina will verify that the dimensions and elevations of the subgrade are in accordance with the approved plans. Settlement and bearing capacity analyses have been conducted to demonstrate that the subgrade will support the loads of the landfill and maintain required separation from groundwater and bedrock. The anticipated maximum total settlement is estimated to be 0.84 inches. Supporting calculations are included in Appendix I-A.

The bearing capacity of the subgrade was evaluated to determine if the subgrade material could bear the weight of the landfill without enduring shear failure. The results of the bearing capacity analyses indicate a minimum factor of safety of 13.4 using the Vesic Equation. For the purposes of the bearing capacity calculation, a single subgrade layer is used for the calculation. Considering the conservative values used for the soil parameters (friction angle of 20 deg) it can reasonably be assumed that any subsurface layers would possess at least the assumed strength characteristics. Additionally, the high factor of safety indicates that the underlying soil can easily support the weight of the landfill. Supporting calculations are in Appendix I-B.

Deep-seated rotational and translational failures were analyzed for the northeastern final slope and underlying layers (Phase 3A). The analyses indicate a minimum factor of safety of 2.45 in the static condition, and 1.77 during a seismic event. Supporting calculations are in Appendix I-C.

Final Cover System

Final grading contours and cover details for Phase 3 are shown on Drawing EP-06. Final contours have been designed with post-settlement surface slopes of at least five percent on top of the cell. Cross-sections of the proposed closure cap are provided on Drawing EP-10. The following components are proposed from bottom to top as shown on the details:

a. Intermediate Cover - Local soil will be placed over the daily cover soil to provide at least 12 inches of intermediate cover and a uniform base for construction of the cap.

Passive Gas Vents – Passive gas vents will be installed at a frequency of one per acre. Areas of the landfill that will be overlapped by waste from future phases of the landfill may not have vents installed. Examples of such vents are shown, shaded gray, on Drawing EP-06. A typical passive gas vent is detailed on Drawing EP-06. Passive venting of landfill gasses will protect the integrity of the cap by preventing excessive pressure buildup beneath the cap.

b. Infiltration Barrier - The infiltration barrier is proposed to consist of either (1) 18 inches of compacted soil with a permeability no greater than $1x10^{-5}$ cm/sec; or (2) a geosynthetic clay liner. This layer will be constructed over the intermediate soil layer. In the case of soil, the permeability requirement will be achieved using construction specifications developed prior to construction, and verified with laboratory test data. Installation and testing requirements for the cap are provided in the CQA Plan (Section C).

c. Protective/Erosion Layer - A layer consisting of at least 18 inches of local soil will be placed above the infiltration barrier to provide a protective cover. Compaction of the layer will be limited to about 90 percent (plus or minus three percent) of the Standard Proctor maximum dry density so that the vegetation can develop a strong root system.

d. Vegetation - After placement of the protective/erosion layer, the area will be seeded. Seeding will be accomplished in accordance with the "North Carolina Erosion and Sediment Control Planning and Design Manual," and the approved E&S Plan.

Additional information on the design, construction, maintenance and probable cost of the final cover system can be found in the Closure and Post-Closure Plan, Section E of this Application.

Erosion and Sediment Control Plan

The erosion and sediment control plan for Phase 3 has been submitted to the Division of Land Quality under separate cover. The erosion and sediment control plans are included in this volume as Drawings EP-06, 07, 08 and 10. Supporting calculations and correspondence with Land Quality are included in Appendix II.

TECHNICAL REFERENCES

ASCE "Seminar on Waste Containment and Final Closure Systems" Reference Manual (1995).

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Richardson, G.N, et al., RCRA Subtitle D (258) Seismic Guidance for Municipal Solid Waste Landfill Facilities, EPA Publication EPA/600/R-95/051, 1995.

Soil Mechanics, Design Manual 7.01 Revalidated by Change 1, Naval Facilities Engineering Command, Alexandria, Virginia, September 1986.

Tan, Chia K. et al, Engineering Manual for Shallow Foundations, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1991.

U.S. Soil Conservation Service, Technical Release 55: Urban Hydrology for Small Watersheds, June 1986.

Waste Containment and Final Closure Systems, ASCE Seminar Design Manual, American Society of Civil Engineers.

C. CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN (.0541)

Purpose:

This plan addresses the construction quality assurance (CQA) procedures and requirements to be employed during construction of the project. All parties involved in the project should obtain a copy of this plan from the OWNER or ENGINEER. They should also obtain copies of any supplemental CQA documents prepared specifically for the project.

The overall goals of the CQA program are to ensure that proper construction techniques and procedures are employed, and to verify that the materials used meet the requirements of the Specifications provided in Appendix IV. Additionally, the program shall identify and define problems that may occur during construction, allowing corrective activities to be implemented in a timely manner. At the completion of the work, the program requires the certifying ENGINEER(s) to prepare certification reports indicating that the facility has been constructed in accordance with the design standards and specifications.

Responsibilities and authorities:

OWNER: The OWNER is the owner of the solid waste permit, and bears the ultimate responsibility for the facility; the OWNER may or may not also be the Operator of the facility. The OWNER shall contract and manage the CONTRACTOR(s), and the CQA consultant(s) and laboratories. For this project, Coble's Sandrock, Inc. is the OWNER, Operator and primary CONTRACTOR.

ENGINEER: The ENGINEER is the official representative of the OWNER, and is responsible for the preparation of the CQA Plan. The ENGINEER is also responsible for the interpretation of those documents and for the resolution of technical matters that may arise during construction. For this project, the ENGINEER is Joyce Engineering, Inc. of Greensboro, North Carolina.

CQA Consultant: The CQA Consultant is independent from the OWNER, CONTRACTOR(s), Manufacturer, and Installer, that is responsible for observing, testing, and documenting activities related to the Quality Assurance of the earthwork and geosynthetic components at the site. The CQA Consultant reports to the ENGINEER. The CQA Consultant is also responsible for issuing a certification report, sealed by a registered Professional Engineer, licensed in the State of North Carolina.

Soils CQA Laboratory: The Soils CQA Laboratory is independent from the OWNER, CONTRACTOR(s), and Supplier, responsible for performing the required laboratory testing of the project earthwork components.

CONTRACTOR: The CONTRACTOR has the primary responsibility for ensuring that the work is performed in accordance with the Permit Drawings. Other responsibilities include the performance of all construction activities at the site including site facilities, administration, material purchasing, procurement, supervision, Construction Quality Control, installation, and subcontracting. The CONTRACTOR is responsible for the protection of completed work until it

is accepted by the OWNER. The CONTRACTOR is also responsible for informing the OWNER and Quality Assurance Consultants of the scheduling and occurrence of all construction activities.

Surveyor: The Surveyor is responsible for establishing and maintaining lines and grades and temporary benchmarks throughout all relevant areas of the construction site. The Surveyor shall issue Record Drawing(s) certified by a Professional Land Surveyor, licensed in the State of North Carolina. The Surveyor must also conduct his/her tasks in compliance with the requirements of survey control and location coordinates in accordance with the Rules 15A NCAC 13B .0540 (3) and (4).

Meetings:

A pre-construction meeting will be conducted prior to beginning construction of the initial cell. The meeting will include a discussion of the construction management organization, respective duties during construction, and periodic reporting requirements for test results and construction activities. Periodic construction progress meetings will be held as necessary to address issues that arise during construction. All meetings will be documented, and meeting minutes will be included in the CQA Report.

Soils Index Testing:

Material Evaluation/Verification Testing: Pre-construction material evaluations shall be performed on samples from potential sources to ascertain their acceptability as construction materials. Evaluation tests are to be performed by the CQA laboratory. Test reports shall verify compliance with or deviation from applicable ASTM standards as outlined in Table 1 of this Plan.

Construction Quality Evaluation Testing

Construction quality evaluation shall be performed on all components of earthwork construction at the frequencies shown in Table 1.

Structural Fill

Structural fill material will be used for construction of earthen embankments, such as for the roads or sediment basin. Placement of the structural fill material will be done in accordance with the specification included in Appendix IV.

Lab testing will be performed at a frequency of 1/10,000 cubic yards to establish a moisture/density relationship for the given soil, and to allow the field instrument (nuclear gauge) to be properly calibrated. Field measurements of moisture and density will be made at a frequency of 5/acre with a nuclear gauge to ensure that adequate compaction is being achieved. An acceptable test for soils used in structural or "controlled fill" applications shall be defined as one which meets or exceeds the specified minimum density within the specified moisture range. If there is any question as to the classification of the tested soil, and hence the appropriateness of

a given moisture-density plot, a "one-point" Standard Proctor compaction test shall be performed for comparison with the available plots. The optimum moisture content and maximum dry density extrapolated from the one-point test result must fall on or near the plotted line of optimums for the classification of a soil to be confirmed. For controlled fill, the reference maximum dry density can be adjusted to accommodate the one-point data. At a frequency of 1/acre density and moisture tests will be performed in the field by the sand cone and drive cylinder methods for density, and direct heating (for moisture). These tests will verify the accuracy of the nuclear gauge testing.

Soil Cap

For placement of the infiltration barrier, lab and field testing will be performed as described for the placement of structural fill, but for each lift of soil. Soil will be placed in six inch lifts. In addition, a hydraulic conductivity test will be performed at a frequency of 1/acre/lift to verify that the maximum hydraulic conductivity of $1x10^{-5}$ cm/sec is being achieved. The field measurements of moisture and density, will not be used to determine a pass or fail for the material, but will be used as a guide to expedite construction by increasing the likelihood of passing hydraulic conductivity tests. Each time a passing hydraulic conductivity test is performed ($<1x10^{-5}$ cm/sec) the moisture and density of the soil will be plotted. The moisture/density plots of all the passing tests will form a "window" or "zone" that can be used as a benchmark for the desired moisture and density. Ultimately, the hydraulic conductivity tests will always determine the pass/fail status of the soil.

Landfill Base Grade

Soil samples from the constructed base of new landfill cells will be taken at a frequency of 1/acre and analyzed for soil classification per the Unified Soil Classification System to verify that only the following soil types are present in the upper two feet: SC, SM, ML, CL, MH, or CH.

Visual Observations

Construction evaluation testing shall consist of visual observations of the work. Evaluation of the construction work shall include the following:

- Observations and documentation of the water content, clod size and other physical properties of the soil during processing, placement and compaction;
- Observation and documentation of each compacted lift's ability to accept and bond to subsequent lifts;
- Observation and documentation of the thickness of compacted and loosely placed lifts;
- Observation and documentation of the performance of the compaction and heavy hauling equipment on the construction surface (sheepsfoot penetration, pumping, cracking, etc…); and
- Observation and documentation of the effectiveness of the procedures used to prevent desiccation and/or freezing of completed lifts and layers.

Lift Bonding

It is important to bond lifts together to the greatest extent possible. Bonding of lifts is enhanced by:

- Ensuring that the surface of the previously compacted lift (or subgrade) is rough before placing the new lift of soil;
- Adding moisture to the previously compacted lift (or subgrade); and
- Using a fully penetrating footed roller.

Evaluation of lift bonding in soil liner and similar applications shall be done by using test pits or auger holes to visually observe the lift interfaces. Alternatively, Shelby tubes pushed through the lift interfaces can be visually inspected for proper lift bonding.

Documentation:

The CQA Consultant shall document the activities associated with the construction of the earth material components of the project. Such documentation shall include, as a minimum, daily reports of construction activities and a summary technical report on the construction project.

Construction Monitoring:

Construction of earth material components of the project shall be monitored and documented by a CQA consultant. All soils laboratory testing shall be performed and documented by an independent testing laboratory working under the direction of the CQA consultant. Written daily documents shall include a record of observations, test data sheets, identification of problems encountered during construction, corrective measures taken, weather conditions, and personnel and equipment on site.

Certification Reports:

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 engineering 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.
For construction of each cell, the CQA report will be submitted:

(1) after completion of landfill construction in order to qualify the constructed C&DLF unit for a permit to operate;

(2) after completion of construction of the cap system in accordance with the requirements of Rule .0543; and

The CQA report must bear the seal of the project engineer and a certification that construction was completed in accordance with:
(A) the CQA plan,
(B) the conditions of the permit to construct,
(C) the requirements of Rule .0541, and
(D) acceptable engineering practices.

D. OPERATION PLAN (.0542)

The Operation drawings requirement is intended to be satisfied by the Engineering Plans (EP-01 through EP-10). The landfill owner will build and operate Phase 3 of the landfill according to this set of drawings. Additional drawings and operations plans will be prepared for future phases as development of those phases is needed.

1. Waste Acceptance and Disposal

Only construction/demolition and land clearing/inert debris is proposed for disposal at the landfill in their respective permitted areas. Construction and demolition debris is defined in NC General Statutes as waste or debris resulting solely from construction, remodeling, repair, or the demolition of pavement, buildings, or other structures. Land clearing and inert debris includes waste such as stumps, trees, limbs, leaves, brush, grass, brick, block and untreated wood. The landfill owner or operator will notify the Division of Waste Management (Division) within 24 hours of attempted disposal of any waste the C&DLF is not permitted to receive, including waste from outside the area the landfill is permitted to serve.

Materials other than C&D waste, such as metal recyclables and cardboard are managed separately. Coble's Sandrock deconstructs mobile trailer homes at the working face of the C&D landfill. Identified C&D waste material removed from the deconstruction process is placed into the landfill. Metal material that is removed from the trailer homes is temporarily stored adjacent to the deconstruction area on the working face. Approximately 70 cubic yards of metal material is removed from the site weekly. The scrap metal is removed from the site and taken to D.H. Griffin Wrecking Co. Inc. Cardboard is also removed from the waste stream and is temporarily stored in a 40-yard container that is located adjacent to the working face. Federal Paper Board removes the cardboard material from the site when the 40-yard container becomes full.

The locations of the mobile trailer home deconstruction area and the metals and cardboard temporary storage containers follow the location of the working face as it progresses across the landfill.

2. Wastewater Treatment Sludge

Wastewater treatment sludge will not be accepted for disposal. Wastewater treatment sludge may be accepted, with the approval of the Division, for utilization as a soil conditioner and incorporated into or applied onto the vegetative growth layer. The wastewater treatment sludge will neither be applied at greater than agronomic rates nor to a depth greater than six inches.

3. Waste Exclusions

The following wastes will not be disposed of in the landfill:

(1) 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,

(2) Garbage as defined in G.S. 130A-290(a)(7),

(3) Hazardous waste as defined in G.S. 130A-290(a)(8), to also include hazardous waste from conditionally exempt small quantity generators,

(4) 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),

(5) Liquid wastes,

(6) Medical waste as defined in G.S. 130A-290(a)(18),

(7) Municipal solid waste as defined in G.S. 130A-290(a)(18a),

(8) Polychlorinated biphenyls (PCB) wastes as defined in 40 CFR 761,

(9) Radioactive waste as defined in G.S. 104E-5(14),

(10) Septage as defined in G.S. 130A-290(a)(32),

(11) Sludge as defined in G.S. 130A-290(a)(34),

(12) Special wastes as defined in G.S. 130A-290(a)(40),

(13) White goods as defined in G.S. 130A-290(a)(44), and

(14) Yard trash as defined in G.S. 130A-290(a)(45),

(15) The following wastes cannot be received if separate from C&DLF waste: lamps or 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.

(16) Waste accepted for disposal in a C&DLF unit must 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 as specified in Subparagraph (17) of this Paragraph.
(17) C&D waste that has been shredded, pulverized or otherwise processed may be accepted for disposal from a facility that has received a permit from an authorized regulatory authority which specifies such activities are inspected by the authority, and whose primary purpose is recycling and reuse of the C&D material. A waste screening plan and waste acceptance plan must be made available to the Division upon request.

(18) The owner or operator 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:

(A) Prohibits generators or collectors of C&D waste from disposing that type or form of C&D waste.

(B) Requires generators or collectors of C&D waste to recycle that type or form of C&D waste.

(19) Friable asbestos

4. Cover Material Requirements

Waste will be covered with six inches of earthen material when the waste disposal area exceeds one-half acre and at least once weekly. Cover will 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 will be recorded in the operating record.

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.

Mulch generated from excavated LCID material may be used as a soil amendment for cover soil.

5. Spreading and Compacting Requirements

The open waste disposal area will be kept as small as is feasible. Waste will be compacted as densely as practical into cells. Windblown litter is not anticipated to be a significant problem at the C&D landfill due to the heavy, bulky nature of this waste type. Prompt compaction of the waste at the working face will be conducted to minimize litter. Wind fence will be used as necessary to minimize windblown trash. At the conclusion of each operating day, all windblown material resulting from the operation will be collected and disposed of by the owner and operator.

6. Disease Vector Control

On-site populations of disease vectors will be prevented or controlled using techniques appropriate for the protection of human health and the environment.

7. Air Criteria and Fire Control

The landfill will 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.

No open burning of solid waste, except for the approved burning of land clearing debris generated on-site or debris from emergency clean-up operations, will occur. Prior to any burning, a request will be sent to the Division for review. A notation of the date of approval and the name of the Division personnel who approved the burning will be included in the operating record.

If a fire occurs at the waste disposal area, the waste will be removed or segregated from other waste in the disposal area if possible. Following segregation, the situation will be reevaluated to determine whether emergency personnel should be notified.

If necessary, the Snow Camp and/or E.M. Holt Volunteer Fire Departments will be called to render assistance and provide support in fighting any fires that occur at this site. A letter from the fire department is included as Appendix X, along with contact information.

Fire extinguishers will be carried on each piece of landfill equipment on site, and will be used for small, localized fires. Equipment operators will be trained in the use of these extinguishers. A small stockpile of soil will be maintained near the working face to be used for extinguishing small surface fires that are too large to control with the fire extinguishers carried on the landfill equipment. Water in sedimentation ponds and nearby creeks can be used by firefighters to extinguish larger fires.

Fires and explosions that occur at the landfill will be verbally reported to the Division within 24 hours and written notification will occur within 15 days. Written notification will 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.

8. Access and Safety Requirements

Access to the facility is controlled through a single access road. A metal gate prevents access after operating hours. Traffic moves from the entrance gate to the landfill via a gravel haul road that extends approximately 0.25 mile from the facility entrance. The entrance is planned to remain at its present location. The gravel haul roads may be rerouted as needed to access the proposed C&D expansion area.

In accordance with G.S. 130A-309.25, an individual trained in landfill operations will be on duty at the site while the facility is open for public use and at all times during active waste management operations to ensure compliance with operational requirements.

The access road to the site and access roads to monitoring locations is of all-weather construction and maintained in good condition.

Access roads will be watered periodically, as needed, to minimize dust.

A sign providing information on disposal procedures, the hours during which the site is open for public use, the permit number and other pertinent information specified in the permit conditions is posted at the site entrance. Liquids and hazardous and municipal solid waste are listed on a sign as excluded wastes.

Traffic signs or markers are provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.

No removal of solid waste from the landfill will occur unless indicated in the operations plan as a recycling procedure. The general public will not be allowed to remove material from the working face.

9. Erosion and Sediment Control

Adequate sediment control measures will be used to prevent sediment from leaving the facility, and to prevent excessive on-site erosion of the landfill. Vegetative cover will be established on all competed areas of the landfill.

10. Drainage Control and Water Protection

Surface water will be diverted from the operational area and will not be impounded over or in waste. Waste will not be disposed of in water. The landfill will not cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Section 402. The landfill will not cause the discharge of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirement 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.

11. Survey for Compliance

Within 60 days of the permittee's receipt of the Division's written request, the permittee will cause to be conducted a survey of active or closed portions of unit or units at the facility in order to determine whether operations are being conducted in accordance with the approved design and operational plans. The permittee will report the results of such survey, including a map produced by the survey, to the Division within 90 days of receipt of the Division's request. The survey will be performed by a registered land surveyor duly authorized under North Carolina law to conduct such activities.

12. Operating Record and Recordkeeping

The owner and operator will record and retain at the facility, or in an alternative location near the facility, the following information:
(A) records of random waste inspections, monitoring results, certifications of training, and training procedures required by Rule .0544 of this Section;
(B) amounts by weight of solid waste received at the facility to include, consistent with G.S. 130A-309.09D, county of generation;
(C) any demonstration, certification, finding, monitoring, testing, or analytical data required by Rules .0544 through .0545 of this Section;
(D) any closure or post-closure monitoring, testing, or analytical data as required by Rule .0543 of this Section;

(E) any cost estimates and financial assurance documentation required by Rule .0546 of this Section;
(F) notation of date and time of placement of cover material; and
(G) all audit records, compliance records and inspection reports.

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.

The operating record will also include:
(A) A copy of the approved operation plan required by this Rule and the engineering plan required by Rule .0539 of this Section;
(B) A copy of the current Permit to Construct and Permit to Operate; and
(C) The Monitoring Plan, in accordance with Rule .0544 of this Section, included as appendices to the Operation Plan.

E. CLOSURE & POST-CLOSURE CARE PLAN (.0543)

CLOSURE

1. Description of Cap System:

The cap system to be used is designed to minimize infiltration and erosion. The cap system will consist of:

- A low-permeability infiltration layer of at least 18 inches with a permeability not greater than 1.0×10^{-5} cm/sec;
- An erosion layer that contains a minimum of 18 inches of earthen material that is capable of sustaining native plant growth.

Construction of the cap system will conform to the plans prepared in accordance with Rule .0540 of this Section and the following requirements:

(A) post-settlement surface slopes will be a minimum of five percent and a maximum of 33 percent; and

(B) a gas venting or collection system will be installed below the low-permeability barrier to minimize pressures exerted on the barrier.

Procedures for Cap Installation

The construction of the cap will be in accordance with the specifications provided in Appendix IV.

2. Closure Area

The maximum closure area during Phase 3 of the landfill is 25.1 acres.

3. Waste Inventory

The projected total tonnage in place at the end of Phase 3 is approximately 865,280 tons. This amount includes the tonnages from Phase 1 and Phase 2 in addition to the tonnage from Phase 3, which is estimated to be 440,131 tons (See Figure 1).

4. Schedule

As discussed in the Facility Plan, Phase 3 has a projected operating life of approximately 4.9 years. Thus, closure of the entire landfill is not anticipated until 2013, assuming waste disposal in Phase 3 begins in 2008. Prior to beginning final closure, Coble's Sandrock will notify the Division that a notice of intent to close the facility has been placed in the operating record. An itemized list of closure milestones and a proposed schedule follow. Closure activities are proposed to begin within 30 days of final receipt of waste. Construction of the closure cap is to be completed within 180 days following the initiation of closure activities. The total length of the proposed closure period is 210 days following the final receipt of waste.

Approximate closure milestones are shown below.

Proposed Closure Milestones and Schedule

Milestone	Proposed Schedule from the Date of Final Receipt of Waste
Testing of borrow sources	Within 6 months prior to closure
Grading of intermediate cover	Within 30 to 60 days
Placement of soil cap	30 to 150 days
Final inspection of cap by P.E.	150 to 180 days
Construction of stormwater controls	90 to 180 days
Seeding and mulching	150 to 180 days
Preparation of survey plat	180 to 210 days
Submittal of closure certification	180 to 210 days

5. Cost Estimate for Closure

Closure Cost Estimate for Largest Area (25 Acres) To Be Closed At Once

Component	Qnty	Unit	Unit Cost ($)	Total ($)
Mobilization	1	LS	$5,000	$5,000
18" Clay (10^-5 cm/sec)	60,500	CY	$3.50	$211,750
18" Vegetative Soil	60,500	CY	$3.50	$211,750
Seeding/Revegetation	25	ACRE	$1,500	$37,500
Survey	1	LS	$5,000	$5,000
			Subtotal:	$471,000
Engineering/CQA (~5%)				$23,550
Contingency (~5%)				$23,550
			TOTAL	**$518,100**

6. Closure Certification

A professional engineer, registered in the State of North Carolina, will verify that the closure has been completed in accordance with the Closure Plan. The contents of the signed Certification Report will be as described below.

Certification Reports:

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 engineering 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. The CQA report will be submitted after completion of construction of the cap system in accordance with the requirements of Rule .0543. The CQA report must bear the seal of the project engineer and a certification that construction was completed in accordance with the CQA Plan and acceptable engineering practices.

7. Deed Recordation

Following closure, the owner or operator will record a notation on the deed to the landfill facility property at the local county Register of Deeds office, or some other instrument that is normally examined during title search, 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 C&D landfill unit or facility and its use is restricted under the closure plan approved by the Division.

POST CLOSURE

Post-closure activities will be conducted at the landfill for a period of 30 years following closure of the landfill. The length of the period can be increased or decreased in accordance with Division directives.

1. Contact

Coble's Sandrock, Inc. will handle questions and/or problems which might occur during the post-closure care period.

CONTACT PERSON:	Mr. Kent Coble
OWNER:	Mr. Kent Coble
ADDRESS:	5833 Foster Store Road Liberty, North Carolina 27298

PHONE NUMBER: (336) 565-4750
FAX: (336) 565-4752

2. Security

Access to the site will be controlled by the use of barriers and gates at roadway entrances. These control devices will be maintained throughout the post-closure care period, and inspected as part of the monthly inspection program. All barriers and gates will be clearly marked with signs stating the name and nature of the facility and the person to contact in case of emergency or breach of security.

3. Post-Closure Maintenance

Post-closure maintenance and monitoring will be conducted at the landfill for a period of 30 years after final closure. The Division may decrease the length of the post-closure period if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment, and the Division approves this demonstration. The period might be increased by the Division if the Division determines that the lengthened period is necessary to protect human health and the environment. Monitoring will include semi-annual sampling of groundwater and surface water, quarterly gas monitoring, and quarterly inspection of the final cover and monitoring and control systems. Maintenance needs identified through the monitoring program will be initiated no later than 60 days after the discovery, and within 24 hours if a danger or eminent threat to human health or the environment is indicated. Minor cap maintenance may be deferred until there is a sufficient amount of work to justify the mobilization of equipment and personnel.

Soil will be added to the cap as necessary to correct the effects of settlement and subsidence of the soil cap and to prevent run-on and run-off from eroding the final cap.

Stormwater control devices, surveyed benchmarks, groundwater monitoring wells, surface water monitoring/sampling gauges and LFG wells will be protected and maintained.

Vegetation will be mowed twice per year, fertilized once every three years and re-seeded (as necessary) once every three years.

The security fencing, gates, and access roads will be maintained and repaired, as necessary.

4. Inspection Plan

Routine inspections will be conducted throughout the post-closure care period. These inspections will be carried out quarterly unless problems are detected that indicate that more frequent visits are warranted. Potential impacts to the public and environment will be considered in determining the inspection frequency. Items to be included in the monthly inspection will be as follows:

- Access and security control,
- Stormwater management,
- Erosion and sediment control,
- Gas management,
- Groundwater and landfill gas monitoring systems, and
- Vector control.

The quarterly inspections will be carried out by someone properly trained and knowledgeable about landfills, such as the landfill owner, operator or engineering consultant. The results of the inspections will be documented. If inspections indicate that repairs are necessary, repairs will be initiated as soon as practicable.

In addition to the routine quarterly inspections, special inspections will be performed and documented after events which may likely cause damage to the integrity of the landfill cover, such as heavy rainfall events. Inspection may also be necessary following written or verbal complaints, vandalism or fires. Following special inspections, any necessary repairs will be initiated as soon as practicable.

Records of all inspections will be kept in the operating record.

5. Post-Closure Land Use

The primary land use for the site after closure of the landfill will be open dormant green space.

6. Post-Closure Cost Estimate

An estimate of post-closure care costs is provided on the following page. All costs are given in 2007 dollars.

Annual Post Closure Care Cost Estimate

ITEM	UNIT	QUANTITY	UNIT COST	ANNUAL COST
INSPECTIONS/ RECORD KEEPING	per trip	4	$500	**$2,000**
MONITORING				
Explosive gases (quarterly)	per trip	4	$980	$3,920
Groundwater/Surfacewater (semi-annually)				
Sampling	per trip	2	$3,980	$7,960
Analysis	per trip	2	$2,400	$4,800
Reporting	per trip	2	$2,400	$4,800
Surface Water (semi-annually)	per trip	2	$2,000	$4,000
Subtotal				**$25,480**
ROUTINE MAINTENANCE				
Mowing (Twice Annually)	acre	25	$100	$5,000
Fertilizing (once every 3 years)	acre	5.0	$100	$500
Reseeding (once every 3 years)	acre	5.0	$1,000	$5,000
Vector and Rodent Control	acre	25	$25.0	$625
Subtotal				**$11,125**
WELL MAINTENANCE				
Groundwater Wells	lump sum	1	$1,000	$1,000
Gas Detection Probes	lump sum	1	$500	$500
Subtotal				**$1,500**
CAP REPAIR	lump sum	1	$5,800	**$5,800**
TOTAL OF ABOVE ITEMS				**$45,905**
ENGINEERING	-	-	3%	$1,377
CONTINGENCY	-	-	5%	$2,295
TOTAL ANNUAL POST-CLOSURE COST (IN 2007 DOLLARS)				**$49,577**

Notes:

1. All costs include labor by a third party.
2. Water quality monitoring costs are estimated.
3. Cost for groundwater wells assumes maintenance of each well during the period.
4. Cost for the gas probes assumes maintenance of each probe during the period.

F. MONITORING PLANS (.0544)

1. Ground-water Monitoring Plan

The Groundwater Monitoring Plan for this facility is presented in Appendix III, Section 2.B of this volume. The results of groundwater sampling will be compared to 15A NCAC 02L (NC-2L) groundwater standards. For parameters with no listed NC-2L standard, the results will be compared to the NC-DENR Groundwater Protection Standard (GPS).

Groundwater sampling will be conducted by professional environmental technicians trained in all aspects of groundwater sampling protocols relevant to this site and in accordance with common professional standards and practices. Proper safety precautions must be observed when collecting groundwater samples. Refer to the site-specific Health and Safety Plan (HASP) for this facility included as Appendix XI of this volume. These guidelines should be used to guide and complement the judgment of an experienced professional.

2. Surface Water Monitoring Plan

A description of the surface water sampling points for this facility, sampling frequency, and required analytical parameters are presented in Appendix III, Section 2.B.4 of this volume. The results of surface water sampling will be compared to 15A NCAC 02B (NC-2B) surface water standards contingent upon the classification of Pawpaw Creek. For parameters with no listed NC-2B standard, the NC-2L standard or GPS will be used, as appropriate.

2.1 Surface Water Sampling Procedures

Surface water sampling will be conducted by professional environmental technicians trained in all aspects of surface water sampling protocols relevant to this site and in accordance with common professional standards and practices. Proper safety precautions must be observed when collecting surface water samples. Refer to the site-specific Health and Safety Plan (HASP) for this facility included as Appendix XI of this volume. These guidelines should be used to guide and complement the judgment of an experienced professional.

The following procedures and precautions should be considered when collecting surface water samples.

- Special care must be taken not to contaminate samples. This includes storing samples in a secure location to preclude conditions which could alter the properties of the sample. Samples shall be custody-sealed during long-term storage or shipment.
- A clean pair of new, non-powdered, disposable gloves will be worn each time a different location is sampled and the gloves should be donned immediately prior to sampling. The gloves should not come in contact with the media being sampled and should be changed any time during sample collection when their cleanliness is compromised.
- Collected samples are in the custody of the sampler or sample custodian until the samples are relinquished to another party.
- If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.

- Shipped samples shall conform to all U.S. Department of Transportation (DOT) rules of shipment found in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179), and/or International Air Transportation Association (IATA) hazardous materials shipping requirements found in the current edition of IATA's Dangerous Goods Regulations.
- Documentation of field sampling is done in a bound logbook.
- Chain-of-custody documents shall be filled out and remain with the samples until custody is relinquished.

2.2 Sample Handling and Preservation Requirements

1. Surface water samples will typically be collected either by directly filling the container from the surface water body being sampled or by decanting the water from a collection device such as a scoop, bailer, or other device.

2. During sample collection, if transferring the sample from a collection device, make sure that the device does not come in contact with the sample containers.

3. Place the sample into appropriate, labeled containers. Samples collected for VOC analysis must not have any headspace (see item 5. below). All other sample containers must be filled with an allowance for ullage.

4. All samples requiring preservation must be preserved as soon as practically possible, ideally immediately at the time of sample collection, prior to departure for the field investigation.

5. Surface water samples for VOC analysis must be collected in 40 ml glass vials with Teflon® septa. The vial may be either preserved with concentrated hydrochloric acid or they may be unpreserved. Preserved samples have a two week holding time, whereas, unpreserved samples have only a seven day holding time. In the great majority of cases, the preserved vials are used to take advantage of the extended holding time. In some situations, however, it may be necessary to use the unpreserved vials. For example, if the surface water sample contains a high concentration of dissolved calcium carbonate, there may be an effervescent reaction between the hydrochloric acid and the water, producing large numbers of fine bubbles. This will render the sample unacceptable. In this case, unpreserved vials should be used and arrangements must be confirmed with the laboratory to ensure that they can accept the unpreserved vials and meet the shorter sample holding times. The samples should be collected with as little agitation or disturbance as possible. The vial should be filled so that there is a reverse or convex meniscus at the top of the vial and absolutely no bubbles or headspace should be present in the vial after it is capped. After the cap is securely tightened, the vial should be inverted and tapped on the palm of one hand to see if any undetected bubbles are dislodged. If a bubble or bubbles are present, the vial should be topped off using a minimal amount of sample to re-establish the meniscus. Care should be taken not to flush any preservative out of the vial during topping off.

2.3 Quality Control

Equipment blanks should be collected if equipment is field cleaned and re-used on-site or if necessary to document that low-level contaminants were not introduced by pumps, bailers or other sampling equipment. Trip blanks should accompany all samples collected for VOC analyses.

2.4 Records

Field notes, recorded in a bound field logbook, will be generated by sampling personnel. The field notes shall be kept and maintained in a secure location for as long as the site is active or in post-closure care. Data collected and recorded in the field notes shall include:

- Time, date, site name, and sample location ID;
- Names of field sampling personnel;
- Weather, site conditions, or other factors that may affect the samples; and
- Field parameters, such as pH, temperature, conductivity, and/or turbidity.

2.5 Equipment Selection Considerations

The physical location of the investigator when collecting a sample may dictate the equipment to be used. If surface water samples are required, direct dipping of the sample container into the stream is desirable. Collecting samples in this manner is possible when sampling from accessible locations such as stream banks or by wading or from low platforms, such as small boats or piers. Wading or streamside sampling from banks, however, may cause the re-suspension of bottom deposits and bias the sample. Wading is acceptable if the stream has a noticeable current (is not impounded), and the samples are collected while facing upstream. If the stream is too deep to wade, or if the sample must be collected from more than one water depth, or if the sample must be collected from an elevated platform (bridge, pier, etc.), supplemental sampling equipment must be used. To collect a surface water sample from a water body or other surface water conveyance, a variety of methods can be used:

- Dipping Using Sample Container
- Scoops
- Peristaltic Pumps
- Submersible Pumps
- Discrete Depth Samplers
- Bailers
- Buckets

Regardless of the method used, precautions should be taken to insure that the sample collected is representative of the water body or conveyance. These methods are discussed in the following sections.

<u>Dipping Using Sample Container</u>

A sample may be collected directly into the sample container when the surface water source is accessible by wading or other means. The sampler should face upstream if there is a current and

collect the sample without disturbing the bottom sediment. The surface water sample should always be collected prior to the collection of a sediment sample at the same location. The sampler should be careful not to displace the preservative from a pre-preserved sample container, such as the 40-ml VOC vial.

Scoops

Scoops provide a means of collecting surface water samples from surface water bodies that are too deep to access by wading and access from a bank or platform is not feasible. A stainless steel scoop is preferred. The scoop may be used directly to collect and transfer a surface water sample to the sample container, or it may be attached to an extension in order to access the selected sampling location. Scoops typically have a limited reach of about eight-ten feet, and if samples from distances too far to access using this method are needed, a mobile platform, such as a boat may be required.

Bailers

Disposable bailers may also be used for surface water sampling if the study objectives do not necessitate a sample from a discrete interval in the water column. A closed-top bailer with a bottom check-valve is sufficient for many studies. As the bailer is lowered through the water column, water is continually displaced through the bailer until the desired depth is reached, at which point the bailer is retrieved. This technique may not be successful where strong currents are found or where the water is very shallow.

3. Gas Control Plan

To protect public health and safety in the vicinity of the landfill, gas produced by the decomposition of refuse will be controlled and monitored during the operational, closure, and post- closure periods. A gas management plan and gas monitoring program will be implemented for the purpose of maintaining the concentration of methane gas below the following regulatory levels:

- The concentration of methane gas generated is not to exceed 25 percent of the lower explosive limit (LEL) for methane in on-site structures (excluding gas control or recovery system components); and

- The concentration of methane gas is not to exceed the LEL for methane at the facility property boundary.

The landfill gas management plan is currently proposed to include monitoring, and passive gas venting in the landfill. Other remedial measures will be implemented as needed to mitigate a potential gas migration problem.

General

Gas monitoring at the Coble's Sandrock C&D Landfill will be performed during the active life of the landfill and throughout the post-closure care period. Quarterly monitoring will be conducted at all subsurface gas detection probes (See Drawing MP-01 – Monitoring Network for proposed locations of gas probes and a typical probe construction detail).

Four gas probe locations are proposed GP-01 through GP-04. The probe locations were chosen to adequately surround areas where waste will be in place and where potential receptors are nearby. GP-01, for example, will ensure that no gas is migrating from Phase 3B, or any other portion of the landfill, to the structure on the property adjacent and to the west of Phase 3B. GP-02 will ensure gas is not migrating off the landfill property to the west of Phase 2B, GP-03 will ensure that gas is not migrating off the landfill property to the northeast of Phase 3A, and GP-04 will ensure that gas is not migrating off the landfill property to the southeast of Phase 3A. No probes are proposed directly to the north of the landfill since the property line in this direction is a perennial stream, Poppaw Creek, which will serve as a barrier for subsurface methane migration.

Additional gas detection probes will be installed on the site as additional phases are constructed. Proposed probe locations will be field engineered after the site is graded so that optimum locations can be selected. Sufficient numbers of gas probes will be installed to adequately monitor each phase. Construction records for the gas probes will be submitted to the Division upon completion.

Upon final closure, passive landfill gas vents will be installed along with the final cover system to allow release of gas to the atmosphere. These vents will be installed at a density of approximately one per acre of cap surface area.

Sampling and Analysis

The required monitoring will be completed by a properly trained Coble's Sandrock, Inc. employee or consultant. The portable equipment to be used will be designed for the detection of combustible gases or vapors. It will be calibrated in accordance with the manufacturer's instructions and indicate the percentage of LEL or methane.

The standard operating procedure for this type of monitoring is as follows:

- Calibrate the monitoring equipment in accordance with the manufacturer's instructions.
- Measure and record the undisturbed probe pressure/vacuum. This requires connecting the pressure gauge to a labcock valve, quick connect, or other valve device, and then opening the valve to measure the pressure.
- Leak check the entire sample train. This is done by sealing the end of the monitoring hose and verifying that air does not leak into the sample train, either through stoppage of the pump or maintaining a complete seal.

- Purge the probe casing (piping). Based on probe casing volume and sample pump flow rate, determine the pumping time to pump just over two probe volumes from the casing using the sample pump. The objective is to monitor soil gas from void spaces surrounding the probe screened interval.

- Read and record the stabilized concentration of methane.

- If the methane reading continually increases as the probe is pumped, the initial concentration after purging is recorded because the objective is to record the conditions of the gas around the probe rather than gases that can be pulled to the probe via the pumping process.

- Keep monitoring results in the landfill operating record.

The personnel performing the LFG migration monitoring and data evaluation will be knowledgeable of the factors that may influence migration. This will ensure that the monitoring effort will be thorough and that potential problems can quickly be identified and corrected. The following are several factors that monitoring personnel will remain aware of and/or make visual observations of:

- Distressed vegetation, signs of stunted growth, wilting, color changes, death during the growing season, and bare spots;
- Increased "rotten egg" odors around the landfill, indicating the presence of hydrogen sulfide, a common trace constituent found in landfill gas; and
- Air bubbles permeating through standing water outside the limits of waste that may be from gas laterally migrating and finding its way to the surface.
- Development of surrounding areas, such as placing impermeable ground covers (i.e., paved parking areas, building slabs), can force landfill gas to remain underground and promote lateral migration. Additionally, off-site structures and utilities can provide enclosed areas in which landfill gas may collect and pose a safety hazard;
- Heavy irrigation or rainfall that saturates the soil may provide an impermeable barrier to landfill gas causing lateral migration;
- Excavation activities such as utility trenches may cause landfill gas to escape through the adjacent soils and into the excavation. The landfill gas may accumulate to explosive levels or displace oxygen within the excavation. Both possibilities compromise safety;
- Surface cracks or settlement can cause uncontrolled venting of landfill gas or air intrusion into the landfill that could reduce landfill gas quality (decrease methane concentration) or increase the potential for a landfill fire;
- Barometric pressure, wind, and temperature can affect the net pressure of landfill gas present. At a lower barometric pressure, more landfill gas will tend to escape through the cover or the surrounding surface; and
- Snow or frozen ground cover, as with saturated soil, can reduce surface permeability and

increase lateral migration of landfill gas.

Results of the monitoring program will be reviewed by a party designated by Coble's Sandrock, Inc. who is knowledgeable in the area of landfill gas hazards and control systems and is familiar with the terrain and local site conditions.

Safety Precautions

During landfill gas monitoring events, special attention will be placed on areas and probes with methane concentrations approaching or exceeding the regulatory limits. Excessive concentrations of combustible gases in structures (i.e., 25% LEL or greater) shall be cause for immediate evacuation of any structure that is staffed. Entry into the building should be prohibited until the concentrations are maintained at satisfactory levels. The source of the gas, or gas migration pathway, shall be investigated to determine appropriate courses of action to prevent the reoccurrence of the event. As a general rule, maintaining a good air flow in the space and good ventilation will help prevent potential gas build-up situations. In addition, methane concentrations in areas that are usually closed off, such as closets and equipment service areas, can be managed with a louvered door and through-the-wall vents.

Record Keeping

The operator records the date, time, location, and sampling personnel, at the time of sampling, in addition to the concentration of combustible gases. The records will be maintained in the landfill operating record.

On-site Structures

Gas monitoring will also be conducted in any confined space requiring the entry of personnel for maintenance or inspection. The monitoring will take place prior to entry by personnel in accordance with OSHA regulations.

Gas Detection Probes

Gas monitoring in detection probes will consist of attaching the monitoring device to each tubing within the probes, and recording both the initial concentration and steady state concentration of combustible gases. SWANA guidelines for purging wells and other monitoring procedures shall be followed.

Equipment

A portable combustible gas monitor, measuring the concentration of combustible gases in units of percent of lower explosive limit, shall be used to conduct gas monitoring. Lower explosive limit (LEL) means the lowest percent by volume of a mixture of combustible gas in air that will propagate a flame at 25 degrees Celsius and atmospheric pressure. The gas monitoring device shall be calibrated using the manufacturer's calibration kit and procedure before the monitoring activities begin.

Response to Detected Combustible Gases

The regulatory action levels for combustible gas monitoring in gas detection probes are 100% LEL at the facility boundary and 25% LEL in on-site structures. Following a non-compliant reading, Coble's Sandrock, Inc. will notify the North Carolina Department of Environment, Health, and Natural Resources, Solid Waste Section in writing and will take immediate steps to ensure safety and protection of human health.

At a minimum, the following actions will be taken if the methane concentration exceeds 25% of the LEL in any structure:

- Put out all smoking materials and turn off all ignition sources;
- Evacuate all personnel;
- Vent the structure;
- Do not allow personnel to reenter the building, except to perform gas monitoring, until the results of additional monitoring indicate that methane concentrations are sustained or stabilized below 25% LEL;
- Begin continuous monitoring within the structure; and
- Undertake an assessment to determine the origin and pathways of the gas migration.

Within seven days of detection, the monitoring results, actions taken and actions proposed to resolve the problem will be placed in the Operating Record. Within 60 days of detection, Coble's Sandrock, Inc. will develop and implement a landfill gas remediation plan for the combustible gas releases 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.

4. Waste Acceptability Program

Random Selection

Random selection of vehicles to be inspected will be made on a regular basis. At least one vehicle per week will be randomly selected, at the working face, by the personnel conducting the inspection. A random truck number and time will be selected (e.g., the tenth load after 10:00 a.m.) on the day of inspections.

Record Keeping

Appropriate forms indicating the results of each inspection will be completed. All reports and resulting correspondence will be maintained at the facility office for the life of the landfill and during the post-closure period.

Training

Inspections will be supervised by the operator or by support personnel trained to identify and manage municipal solid waste, and hazardous and liquid waste.

Location

Inspections will be conducted in or near the working face of the landfill.

Contingency/Action Plan

The following contingency/action plan details the procedure currently used at Coble's Sandrock for conducting random waste inspections:

1) Upon weigh-in, drivers are asked about the contents of their load and sign an invoice stating that they are not discharging hazardous materials, liquid wastes or any other unacceptable materials into the landfill. Although all loads are visually inspected upon weigh-in, the complete contents of a load cannot be determined until the load is discharged by the driver and pushed back by Coble's Sandrock.

2) The dumped material is examined for safety hazards and waste excluded by the operating permit which include:

- Municipal solid waste (MSW);
- Containers labeled hazardous;
- Excessive or unusual moisture;
- Biomedical (red bag) waste;
- Powders, dusts, smoke, vapors, or chemical odors;
- Sludges, pastes, slurries, or bright colors (such as dyes); and
- Unauthorized waste
- Tires.

Loads that include large closed containers will be handled carefully to avoid possible rupturing of the containers.

3) Take the following actions as appropriate:

- Incorporate acceptable waste into working face.
- Haul MSW to a transfer facility or to a MSW landfill for disposal.
- If necessary, hold suspected unauthorized waste for identification by on-site personnel and confirmation by others, such as a contract laboratory or regulator.
- Interview driver and hauler to identify the source of waste in the load.
- Hold rejected hazardous or liquid waste for generator, or
- Arrange for hazardous or liquid waste collection by licensed collector.

4) Document Actions:

a) Record Inspection.
b) Retain Reports.
c) Report hazardous liquid, or PCB wastes to Solid Waste Section - NCDENR.

5) Should any materials be discharged into the landfills that are unacceptable, Coble's Sandrock may impose a clean-up fee to cover the cost of properly disposing of the unacceptable waste.

6) Should the unacceptable materials pose an immediate threat to the health and safety of individuals, the area will be secured. The material/wastes shall be handled by a licensed handler of hazardous waste and disposed of at a facility licensed to accept that material. The appropriate officials will be notified.

(End)