

Prepared for:

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

**Coble's Sandrock C&D LANDFILL  
PHASE 3A EXPANSION  
NC DENR PERMIT # 01-05  
ALAMANCE COUNTY, NORTH CAROLINA**



**CONSTRUCTION QUALITY ASSURANCE  
CERTIFICATION REPORT**

**April 2010**

Prepared by:



**2211 West Meadowview Road  
Boone Bldg, Suite 101  
Greensboro, NC 27407  
JEI Project No. 419.1000.11T02**





Waste Industry Experts

Joyce Engineering, Inc  
2211 W. Meadowview Road  
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April 26, 2010

Mr. Geoffrey Little, Environmental Engineer  
North Carolina Department of Environment and Natural Resources  
Division of Waste Management, Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646

RE: Construction Quality Assurance Certification Report  
Coble's Sandrock, Phase 3A Expansion  
NC DENR Permit #01-05  
Alamance County, North Carolina  
JEI Project 419.1000.11, Task 02

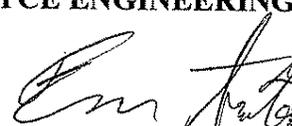
Dear Geof:

This letter is to certify that to the best of my knowledge and belief, the Phase 3A Expansion of the Coble's Sandrock C&D Landfill has been constructed in conformance with the plans and specifications.

The enclosed certification report presents an accumulation of field, laboratory, and other quality assurance data for the construction. It is our understanding that the enclosed construction quality assurance documentation was compiled in accordance with North Carolina Solid Waste Regulations 15A NCAC 13B .0541 and fulfills the submittal requirements listed in the General Permit Conditions of Permit 01-05 to the Permit to Construct for the C&D landfill unit Phase 3A dated January 30, 2009.

On behalf of Coble's Sandrock, Inc., we would like to thank you in advance for your assistance in reviewing this construction quality assurance certification report.

Sincerely,  
JOYCE ENGINEERING, INC.

  
Evan Andrews, P.E.  
Technical Consultant



Enclosure

Copy: Mr. Ed Mussler, Permitting Branch Supervisor, NCDENR – Div. of Waste Mgt.,  
Mr. and Mrs. Kent Coble, Coble's Sandrock, Inc.  
Hannu Kempainen, P.G., w/ enclosure (Joyce Engineering, Inc.)

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## **1.0 INTRODUCTION**

This report, prepared by Joyce Engineering, Inc. (JEI) on behalf of Coble's Sandrock, Inc. addresses the quality assurance procedures and activities performed during construction of the Phase 3A expansion at the C&DLF in Alamance County, North Carolina. The documents comprising this report were compiled in accordance with North Carolina Solid Waste Management Regulations 15A NCAC 13B .0541 Construction Quality Assurance for C&D Landfill Facilities, the General Permit Conditions of Permit 01-05, and acceptable engineering practices.

The North Carolina Department of Environment and Natural Resources, Division of Waste Management Solid Waste Section issued a Permit to Construct Coble's Construction and Demolition Landfill Phases 3A and 3B on January 30, 2009. A preconstruction meeting was held on February 19, 2009. Coble's Sandrock, Inc. the owner and operator decided to perform all earthwork for the proposed Phase 3A expansion. Phase 3B construction was proposed for future expansion as landfill airspace needs dictate. Earthwork included excavation to prepare subgrade for the Phase 3A. Geotechnics, Inc., subconsultant to JEI, provided third party construction quality assurance testing of the soil materials for the Owner.

Soil laboratory test results, minutes of preconstruction meeting, subgrade inspection letter, photos depicting the site prior to construction and completed subgrade, and the final subgrade survey drawing are presented in Appendices I through V respectively.

## **2.0 CONSTRUCTION QUALITY ASSURANCE**

### **2.1 General**

Geotechnics, Inc. provided the Construction Quality Assurance (CQA) laboratory testing of the soils for the Phase 3A expansion construction project. The following sections describe the specific areas of CQA:

### **2.2 Soil Subgrade Foundation**

Coble's Sandrock, Inc. excavated and graded the proposed expansion area floor in accordance with the plans and specifications. The earthwork was accomplished by the landfill personnel and equipment and the cutting as part of the landfill operations. Cut soil was utilized as daily cover for the C&D waste. The expansion area excavation took approximately a year as the owner worked on the site. Due to the long construction schedule and all cut earthwork, JEI did not provide daily CQA observation or field testing. In early March 2010 Coble's Sandrock, Inc. informed JEI of the completion of grading and requested JEI to provide subgrade inspection which was conducted on March 17, 2010. Upon completion, a survey verified that the specified design grade elevations had been achieved and the vertical separation requirement was met. The survey drawing is included Appendix V.

### 3.0 SUMMARY OF CQA SOILS DATA

#### 3.1 Earthwork

Coble's Sandrock excavated, graded and hauled all the soil materials from the Phase 3A expansion area utilizing their personnel and equipment. The foundation grading and cutting was accomplished with dozers, and proof-rolled with loaded trucks.

The site soils were subjected to laboratory testing for their properties as required by the rule .0540 for construction of C&DLF and the project CQA Plan. Rule .0540 states that in-situ or modified soils making the upper two feet of separation must consist of soils classified by USCS as SC, SM, ML, CL, MH, OR CH. Material evaluation and verification for the pre-construction testing included: natural moisture content, specific gravity, gradation and plasticity. Summary of soil laboratory test results is listed below and the complete report included in Appendix I.

#### Summary of Pre-Construction Soil Testing Data

- ❖ Moisture Content (ASTM D2216) 23.9%
- ❖ Atterberg Limits (ASTM D4318) LL 44, PL 28, PI 16, USCS **ML**
- ❖ Sieve Analysis (ASTM D 422) #10 sieve 9.7%, #40 sieve 33.8%, #200 sieve 51.4%
- ❖ Compaction Standard Method (ASTM D 698) MDD 107.2 pcf, OMC 17.8%

### 4.0 DEVIATIONS FROM THE CONTRACT DOCUMENTS

#### 4.1 General

The purpose of this section is to identify any deviation from the contract documents, which occurred during construction.

#### 4.2 Adjustments to Bottom Grades and Subgrade Elevations

As constructed, subgrade elevations were adjusted slightly from the design. The Phase 3A final grades are few tenths of a foot higher from the design grades in some areas. Coble's Sandrock is aware of the higher than design grades and assumes the loss of capacity from slightly higher subgrade elevations. Geologist Inspection of the prepared subgrade was submitted to the NCDENR and a copy is included in Appendix III.

The final record survey is included in Appendix V shows the changes to grades and modifications to the subgrade construction.

END



March 4, 2009

Project No. 2009-631-01

Mr. Hannu Kemppinen, P.G.  
Joyce Engineering, Inc.  
2211 W. Meadowview Rd., Suite 101  
Greensboro, NC 27407

**Transmittal**  
**Laboratory Test Results**  
**Coble's Sandrock, Inc. Phase 3A**

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was faxed to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,  
**Geotechnics, Inc.**

A handwritten signature in black ink, appearing to read 'Michael P. Smith', is written over a horizontal line.

Michael P. Smith  
Regional Manager

***We understand that you have a choice in your laboratory services  
and we thank you for choosing Geotechnics.***

**MOISTURE CONTENT**

ASTM D 2216 (SOP-S1)

Client JOYCE ENGINEERING, INC.  
 Client Reference COBLES' SANDROCK, INC. PHASE 3A  
 Project No. 2009-631-01

Lab ID	.001
Boring No.	NA
Depth (ft)	NA
Sample No.	NA
Tare Number	217
Wt. of Tare & WS (gm)	743.95
Wt. of Tare & DS (gm)	633.39
Wt. of Tare (gm)	171.12
Wt. of Water (gm)	110.56
Wt. of DS (gm)	462.27
<b>Water Content (%)</b>	<b>23.9</b>

Notes : NA

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Tested By SD Date 2/26/2009 Checked By *GEM* Date 3-4-09

page 1 of 1 DCN: CT-S1 DATE 6-30-98 REVISION: 2 \\Server\c\data Sheets\WATCONT.XLS\Sheet1

### ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	COBLE'S SANDROCK, INC. PHASE 3A	Depth (ft)	NA
Project No.	2009-631-01	Sample No.	NA
Lab ID	2009-631-01-01	Soil Description	<b>ORANGE SILT</b>

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus No. 40 sieve material, Airdried)  
 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

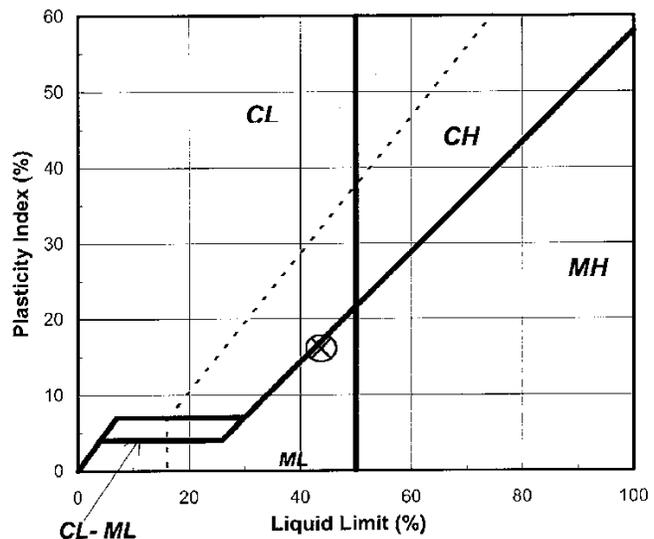
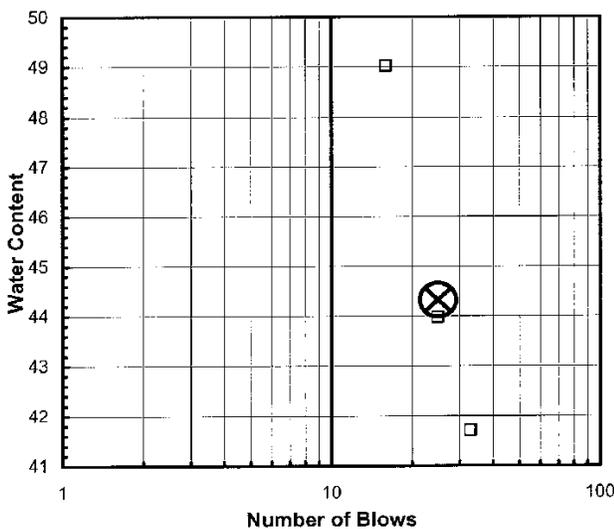
Liquid Limit Test	1	2	3	MULTIPOINT
Tare Number	A-P	L	A-L	
Wt. of Tare & WS (gm)	29.23	28.00	29.93	
Wt. of Tare & DS (gm)	24.74	24.10	25.69	
Wt. of Tare (gm)	15.58	15.23	15.52	
Wt. of Water (gm)	4.5	3.9	4.2	
Wt. of DS (gm)	9.2	8.9	10.2	
<b>Moisture Content (%)</b>	<b>49.0</b>	<b>44.0</b>	<b>41.7</b>	
<b>Number of Blows</b>	<b>16</b>	<b>25</b>	<b>33</b>	

Plastic Limit Test	1	2	Range	Test Results	
Tare Number	A-K	V		Liquid Limit (%)	44
Wt. of Tare & WS (gm)	22.46	22.48		Plastic Limit (%)	28
Wt. of Tare & DS (gm)	20.95	20.91		Plasticity Index (%)	16
Wt. of Tare (gm)	15.54	15.24		USCS Symbol	ML
Wt. of Water (gm)	1.5	1.6			
Wt. of DS (gm)	5.4	5.7			
<b>Moisture Content (%)</b>	<b>27.9</b>	<b>27.7</b>	<b>0.2</b>		

*Note: The acceptable range of the two Moisture contents is  $\pm 2.6$*

Flow Curve

Plasticity Chart



Tested By SD Date 2/27/2009 Checked By GEM Date 3-4-09

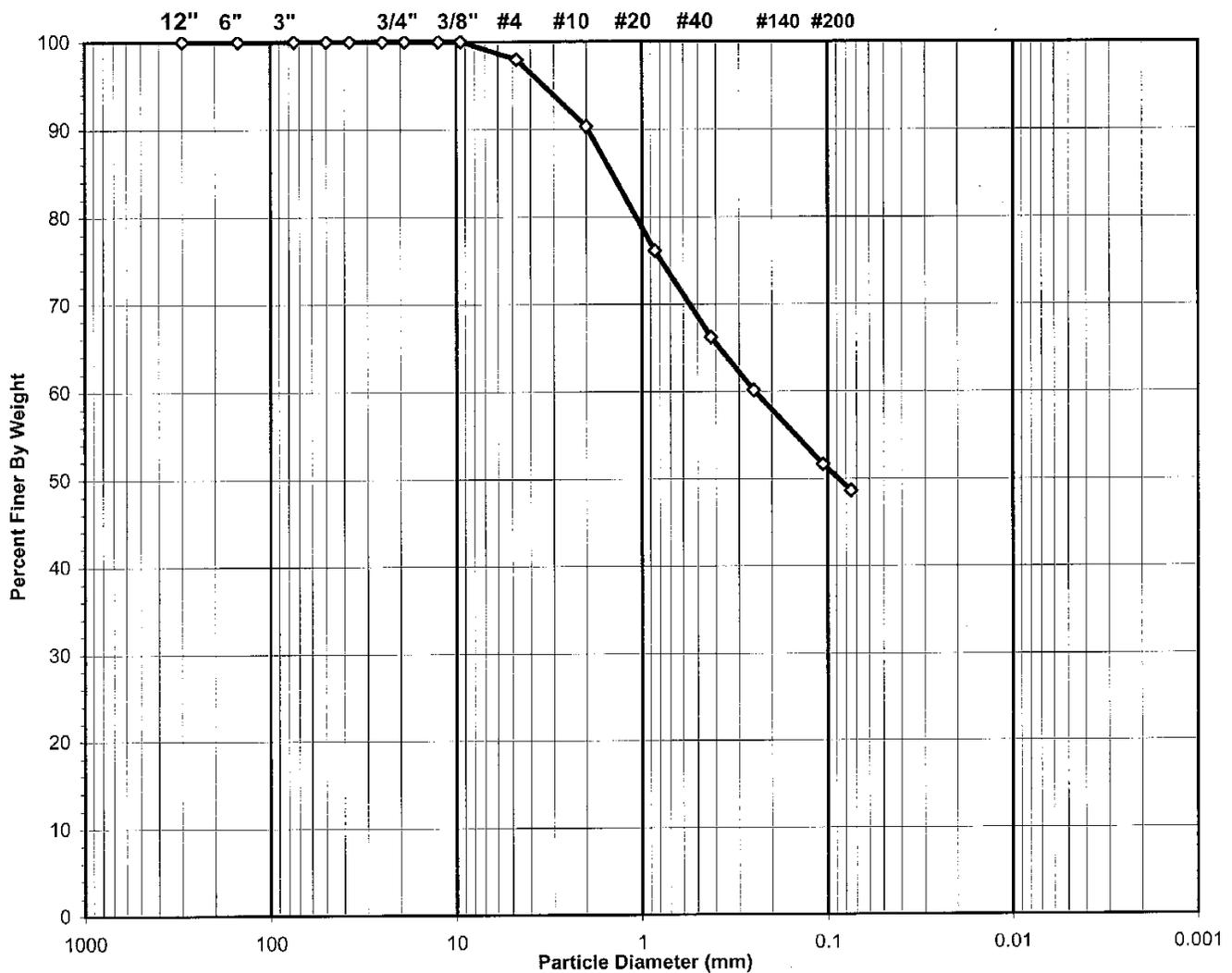
page 1 of 1 DCN: CT-S4B DATE: 10/8/2001 REVISION: 2



**SIEVE ANALYSIS**  
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	COBLES' SANDROCK, INC. PHASE 3A	Depth (ft)	NA
Project No.	2009-631-01	Sample No.	NA
Lab ID	2009-631-01-01	Soil Color	<b>ORANGE</b>

<b>USCS</b>	<b>SIEVE ANALYSIS</b>		<b>HYDROMETER</b>
	gravel	sand	silt and clay



**USCS Symbol**      **SM, TESTED**

**USCS Classification**      **SILTY SAND**

Tested By **SD**      Date **2/26/2009**      Checked By **GAM**      Date **3-4-09**



**WASH SIEVE ANALYSIS**  
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	COBLES' SANDROCK, INC. PHASE 3A	Depth (ft)	NA
Project No.	2009-631-01	Sample No.	NA
Lab ID	2009-631-01-01	Soil Color	<b>ORANGE</b>

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	217	Tare No.	NA
Wgt. Tare + Wet Specimen (gm)	743.95	Wgt. Tare + Wet Specimen (gm)	NA
Wgt. Tare + Dry Specimen (gm)	633.39	Wgt. Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	171.12	Weight of Tare (gm)	NA
Weight of Water (gm)	110.56	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	462.27	Weight of Dry Soil (gm)	NA
<b>Moisture Content (%)</b>	<b>23.9</b>	<b>Moisture Content (%)</b>	<b>NA</b>

Wet Weight - 3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	462.27
Dry Weight - 3/4" Sample (gm)	237.5	Weight of minus #200 material (gm)	224.80
Wet Weight + 3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	237.47
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt. of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.0	0.0	100.0	100.0
6"	150	0.00	0.0	0.0	100.0	100.0
3"	75	0.00	0.0	0.0	100.0	100.0
2"	50	0.00	0.0	0.0	100.0	100.0
1 1/2"	37.5	0.00	0.0	0.0	100.0	100.0
1"	25.0	0.00	0.0	0.0	100.0	100.0
3/4"	19.0	0.00	0.0	0.0	100.0	100.0
1/2"	12.50	0.00	0.0	0.0	100.0	100.0
3/8"	9.50	0.00	0.0	0.0	100.0	100.0
#4	4.75	9.53	2.1	2.1	97.9	97.9
#10	2.00	35.29	7.6	9.7	90.3	90.3
#20	0.850	65.48	14.2	23.9	76.1	76.1
#40	0.425	46.05	10.0	33.8	66.2	66.2
#60	0.250	27.86	6.0	39.8	60.2	60.2
#140	0.106	39.21	8.5	48.3	51.7	51.7
#200	0.075	14.05	3.0	51.4	48.6	48.6
Pan	-	224.80	48.6	100.0	-	-

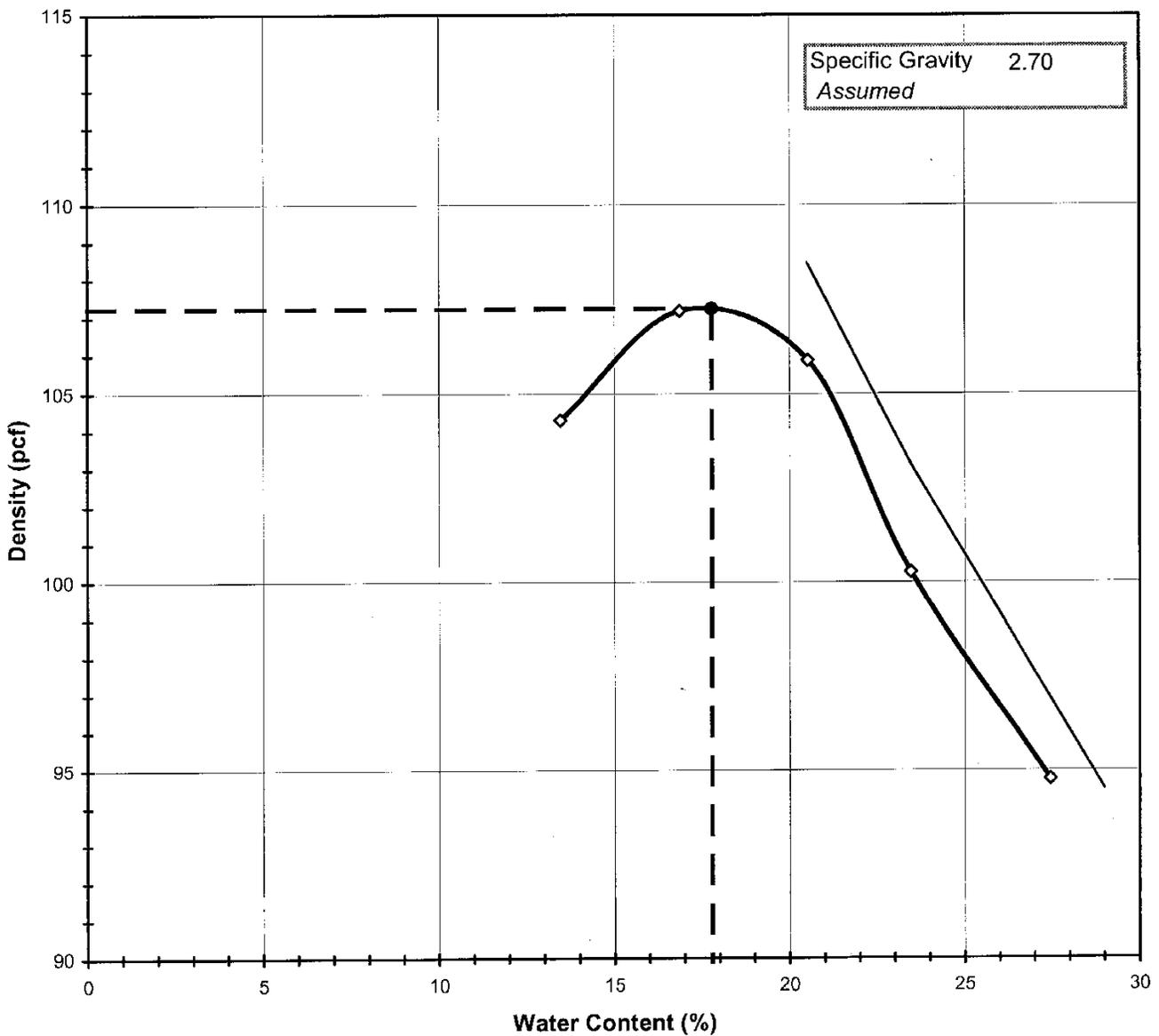
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**MOISTURE DENSITY RELATIONSHIP**  
ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	COBLE'S SANDROCK, INC. PHASE 3A	Depth (ft)	NA
Project No.	2009-631-01	Sample No.	NA
Lab ID	2009-631-01-01	Test Method	<b>STANDARD</b>

Visual Description      ORANGE SILTY SAND

**Optimum Water Content      17.8**  
**Maximum Dry Density      107.2**



Tested By SD      Date 2/27/2009      Checked By gem      Date 3-4-09



## MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	COBLE'S SANDROCK, INC. PHASE 3A	Depth (ft)	NA
Project No.	2009-631-01	Sample No.	NA
Lab ID	2009-631-01-01		

Visual Description      **ORANGE SILTY SAND**

Total Weight of the Sample (gm)	23956
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	3
Percent Retained on 3/8"	NA
Percent Retained on #4	6
Oversize Material	Not included
Procedure Used	B

TestType	<b>STANDARD</b>	
Rammer Weight (lbs)	5.5	
Rammer Drop (in)	12	
Rammer Type	MECHANICAL	
Machine ID	R	174
Mold ID	R	172
Mold diameter	4"	
Weight of the Mold	4320	
Volume of the Mold(cc)	937	

### Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	6098	6202	6237	6179	6134
Wt. of Mold (gm)	4320	4320	4320	4320	4320
Wt. of WS	1778	1882	1917	1859	1814
Mold Volume (cc)	937	937	937	937	937

### Moisture Content / Density

	311	315	K-7	317	300
Tare Number	311	315	K-7	317	300
Wt. of Tare & WS (gm)	516.80	489.50	679.60	646.50	522.50
Wt. of Tare & DS (gm)	465.50	434.80	582.66	539.63	433.83
Wt. of Tare (gm)	84.40	110.60	110.40	84.30	110.80
Wt. of Water (gm)	51.30	54.70	96.94	106.87	88.67
Wt. of DS (gm)	381.10	324.20	472.26	455.33	323.03

Wet Density (gm/cc)	1.90	2.01	2.05	1.98	1.94
Wet Density (pcf)	118.3	125.3	127.6	123.8	120.8
<b>Moisture Content (%)</b>	<b>13.5</b>	<b>16.9</b>	<b>20.5</b>	<b>23.5</b>	<b>27.4</b>
<b>Dry Density (pcf)</b>	<b>104.3</b>	<b>107.2</b>	<b>105.9</b>	<b>100.3</b>	<b>94.8</b>

### Zero Air Voids

<b>Moisture Content (%)</b>	20.5	23.5	29.0
<b>Dry Unit Weight (pcf)</b>	108.5	103.1	94.5

Tested By SD      Date 2/27/2009      Checked By GAM      Date 3-4-09

**PRECONSTRUCTION MEETING MINUTES**  
COBLE'S SANDROCK C&D LANDFILL, PHASE 3A EXPANSION  
ALAMANCE COUNTY, NORTH CAROLINA  
Held at: COBLE'S SANDROCK, INC., KIMESVILLE, NC,  
Thursday, February 19, 2009, 1:00 P.M.

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The following persons attended the meeting:

Kent Coble, Owner-Operator, Coble's Sandrock, Inc.  
Brenda Coble, Owner, Coble's Sandrock, Inc.  
Geof Little, Environmental Engineer, NCDENR  
Brian Wootton, Hydrogeologist II, NCDENR  
Chris Marriott, Environmental Senior Specialist, NCDENR  
Ming Chao, Environmental Engineer II, NCDENR  
Evan Andrews, Engineer of Record, Joyce Engineering  
Hannu Kemppinen, Project CQA Manager, Joyce Engineering

**Items of Discussion:**

1. *Review of Permit conditions* – The permit approved construction of Cell 3A and 3B. Only Cell 3A will be constructed at this time. Cell 3B construction was proposed for future expansion as airspace needs dictate.
2. *Register of Deed* – Requirements for recording the permit at the Alamance County Register of deed has been completed at the County Courthouse. Coble Sandrock is awaiting receipt of a copy of the recording which will be forwarded to NC DENR.
3. *Financial Responsibility* – Coble Sandrock, Inc. has an existing irrevocable trust fund set up that they would like to convert for financial responsibility. Representatives of DENR commented that the trust fund must be a type of instrument that the State can access the funds for financial responsibility to pay if need arises. Also, the funding mechanism should revert back to the Coble's in the event of a landfill sale. Joyce Engineering will send a letter to Donald Herndon of NC DENR to detail the terms of the existing trust and determine the adequacy of the mechanism. As this is the first permit of its kind to require the financial assurance from a small private C&D operator, all parties understood that it may take more than 30 days to establish the FA mechanism. A certificate to operate will not be issued without the FA in place.
4. *Sediment Control Plan* – An approved Sediment Control plan was received from NC DENR Land Quality Section prior to the submittal of the permit application for the construction of Phase 3. The Land Quality Section visited the site after the permit was issued. There were no comments from Land Quality regarding the implementation of the E&S plan. The permit was issued prior to the time the skimmer system requirement was amended to the construction erosion and sediment control plans.

5. *Subgrade preparation* – The Owner has encountered resistant bedrock in some areas while grading the Cell 3A. A D8 dozer with ripper has not been able to break and remove the rock. Rather than utilizing costly methods for rock removal, the Owner may wish to leave the rock in place and have base grades modified accordingly. Soil cover over the rock should maintain the permitted four-foot separation. In no case will the base grades be lower than permitted and the landfill base will be graded to drain.
6. *Piezometers and Monitoring Wells* – Piezometers within the Cell 3A footprint have been abandoned and the abandonment records submitted to NCDENR. MW-11 installation will be postponed until the time Cell 3B will be constructed; estimated in two to three years depending on incoming waste volumes.
7. *LF Capacity* – Representatives of NCDENR requested the Owner to provide a historical table following Cell 3A completion that will summarize the constructed cells and their capacities. Coble Sandrock is currently taking mulch from the LCID and mixing the composted material in temporary cover. The LCID area is approximately two-acres in size and located within the footprint of the future expansion Phase 4 of the landfill.
8. *Gas Probe Installation* – The Permit to Construct item 15 states that GP-1 and GP-2 will be constructed for the Phase 3. GP-3 and GP-4 will also be installed on the east side of Cell 3A in the locations shown on the drawing H-8. The gas probes will be monitored for explosive gasses.
9. *Background Sampling* – Wells to be added to compliance network will be sampled for background conditions. The wells added will be MW-8, MW-10S, and MW-19. Four events will be required for background sampling conducted in one month intervals.
10. *CQA* – The construction of Cell 3A will be all cut. The CQA documentation is expected to include subgrade certification, soils index testing, survey of final grades, construction photos, and general observations and meeting minutes.



*Waste Industry Experts*

Joyce Engineering, Inc  
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Greensboro, NC 27407

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[www.JoyceEngineering.com](http://www.JoyceEngineering.com)

April 26, 2010

Mr. Geoffrey Little, P.E.  
Permitting Engineer  
DENR Division of Waste Management, Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646

RE: Coble's Sandrock, Inc. C&D Landfill, Permit No. 01-05, Phase 3A Construction – Geologist Inspection.

Dear Geoffrey,

On behalf of Coble's Sandrock, Inc. Joyce Engineering, Inc. is submitting this geologist inspection for the Phase 3A construction at the Coble's Sandrock C&D landfill in response to Rule .0540 Construction Requirements for C&DLF Facilities.

On March 17, 2010 Hannu Kemppinen, P.G. (NC#1490) conducted an inspection of Phase 3A subgrade. On this day the Phase 3A grades exhibited no unusual geologic conditions that would adversely affect the design, construction or operation of the unit. After review of the subgrade survey it appears that the grading has been prepared in accordance with the design.

It is my belief that the Phase 3 subgrade was prepared in accordance with Rule .0540(5) certification requirements.

Sincerely,  
JOYCE ENGINEERING, INC.

A handwritten signature in black ink that reads "Hannu Kemppinen". The signature is written in a cursive, flowing style.

Hannu Kemppinen, P.G.  
Senior Project Consultant

C: Coble's Sandrock, Inc.



1. Proposed Phase 3A area used as borrow source in June 2009.



2. Phase 3A expansion area prepared for subgrade inspection March 2010.



3. Phase 3A subgrade in March 2010.



4. NW view of Phase 3A subgrade.



**Coble's Sandrock Phase 3A  
Subgrade survey**

Design Contour	Surveyed Elevation	Deviation from Design Grade
600	605.0	5.0
598	600.8	2.8
598	599.7	1.7
598	605.7	7.7
596	597.8	1.8
596	597.7	1.7
594	594.4	0.4
594	594.4	0.4
594	594.2	0.2
592	592.1	0.1
592	592.1	0.1
592	592.2	0.2
590	590.3	0.3
590	590.1	0.1
590	590.2	0.2
588	588.1	0.1
588	588.0	0.0
588	588.1	0.1
586	586.0	0.0
586	586.1	0.1
586	586.3	0.3
584	585.2	1.2
584	584.7	0.7
584	584.2	0.2
584	584.4	0.4
582	584.4	2.4
582	584.2	2.2
580	581.8	1.8
580	581.8	1.8
580	582.4	2.4
578	581.3	3.3
578	581.1	3.1
578	582.0	4.0
576	580.2	4.2
576	579.8	3.8

Survey By; Michael Stout, PLS # 3492  
Site & Utility Design Services, PA  
Dated 4/23/2010