



# White Street Construction and Demolition Landfill Phase II Part 1 Closure



## As-Built Documentation and Certification Report

August 2013

*Prepared for:*

City of Greensboro  
Field Operations Department  
300 West Washington Street  
Greensboro, NC 27401

*Prepared by:*

**HDR**

HDR Engineering inc. of the Carolinas  
440 South Church St. Suite 1000  
Charlotte, NC  
HDR Project 06770-109019-018



August 6, 2013

Ms. Patricia Backus, PE  
Solid Waste Section  
Division of Waste Management  
North Carolina Department of Environment and Natural Resources  
1646 Mail Service Center  
Raleigh, NC 27699-1646



**Re: As-Built Documentation and Certification Report  
White Street Construction and Demolition Landfill  
Phase II Part 1 Closure  
Greensboro, North Carolina**

Dear Ms. Backus:

On behalf of the City of Greensboro, HDR Engineering, Inc. of the Carolinas is pleased to submit two (2) copies of the As-built Documentation and Certification Report for the Part 1 closure of the White Street Construction and Demolition Landfill for your review.

Please do not hesitate to call me at (919) 232-6618 if you should have any questions during your review.

Sincerely,

**HDR Engineering, Inc. of the Carolinas**  
N.C. Engineering Board No. F0116



Thomas M. Yanoschak, PE  
Project Engineer

Enclosures

cc: Gail Hay, PE, City of Greensboro  
Jason Jernigan, City of Greensboro  
Mike Plummer, PE, HDR



# Phase II Part 1 Closure

## White Street

### Construction and Demolition Landfill

# As-Built Documentation and Certification Report

*Prepared for:*



City of Greensboro  
Field Operations Department  
300 West Washington Street  
Greensboro, NC 27401

*Prepared by:*



HDR Engineering, Inc. of the Carolinas  
440 S. Church Street Suite 1000  
Charlotte, NC 28202-2075

HDR Project No. 06770-109019-018

**APPROVED**

DIVISION OF WASTE MANAGEMENT  
SOLID WASTE SECTION

Date 02/17/2014 By Patricia M. Beckus

DIN 20584

**CLOSURE CERTIFICATION**

Permit 4103-CDLF-1998

**August 2013**



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## ABSTRACT

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This certification report provides documentation for the construction of the approximately 8-acre Phase II Part 1 closure of the White Street Construction and Demolition (C&D) Landfill located in Greensboro, North Carolina.

The closure construction work was conducted between October 2012 and April 2013. HDR Engineering, Inc. of the Carolinas (HDR) provided part-time construction quality assurance (CQA) services to the City of Greensboro Field Operations Department (City) during closure construction. CQA services provided by HDR included the part-time observation of the following construction activities:

- low-permeability soil cap test pad construction;
- low-permeability soil cap construction;
- topsoil placement;
- installation of cap terminations, slope drain extensions, and diversion ditches; and
- permanent seeding.

HDR also provided limited CQA testing to independently verify that the soil materials used in the project met the specification requirements.

The conformance of the construction materials and installation methods with the requirements of the technical specifications prepared specifically for this project was documented for each component. The required testing was performed using the methods and frequencies outlined in the technical specifications. Materials, site conditions, or test results that indicated nonconformance were identified, reported, and remediated. The low-permeability soil cap was required to achieve both a maximum permeability of  $1 \times 10^{-5}$  cm/sec and a minimum thickness of 18 inches. The topsoil layer was required to achieve a minimum thickness of 6 inches. HDR reviewed construction and as-built survey information to verify conformance with the construction limits and tolerances specified.

## CERTIFICATION

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HDR Engineering, Inc. of the Carolinas (HDR) hereby provides Certification that:

- The construction specifications entitled *White Street Landfill Phase II Partial Closure - Issued for Construction, Construction Documents Project Manual*, dated June 2012; the drawings entitled *Construction Plans for the White Street Landfill, Phase II Partial Closure, Issued for Construction*, dated July 2012; and the Construction Quality Assurance (CQA) Plan entitled, *White Street Landfill, Greensboro, North Carolina, Construction Quality Assurance Plan, Phase 2 Partial Closure*, dated November 2011 for the partial closure project were developed in general accordance with the following documents:
  - *City of Greensboro White Street Landfill, Construction & Demolition Landfill Permit Application*, dated June 2008, by the City of Greensboro and approved by the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management, Solid Waste Section on March 30, 2012.
  - NCDENR Municipal Solid Waste Facility Permit No. 41-03-CDLF issued on March 30, 2012.
  - The requirements of the applicable North Carolina Solid Waste Management Regulations, Title 15A, Chapter 13B, Section .0547, *Existing C&DLF Units as of January 1, 2007*.
- To the best of our knowledge, the Phase II Part 1 closure of the White Street C&D Landfill was constructed in general accordance with the construction specifications and drawings.
- Our knowledge is based on HDR's observations during construction, along with the test results, reports, and as-built documentation presented in this report.
- The Phase II Part 1 closure of the White Street C&D Landfill was completed around the end of April 2013.

The services provided for this project were performed with the care and skill ordinarily exercised by reputable members of the profession practicing under similar conditions at the same time and the same or similar locality. No warranty, expressed or implied, is made or intended by rendition of these consulting services or by furnishing oral or written reports of the findings made. This certification report has been prepared for the exclusive use of the City of Greensboro, North Carolina.



Thomas M. Yanoschak, P.E.  
Certifying Engineer  
N.C. P.E. # 18887

HDR Engineering, Inc. of the Carolinas  
N.C. Engineering Board No. F0116



8/6/13

## SECTION 1.0 INTRODUCTION

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### 1.1 Background

The City owns approximately 980 acres at the eastern end of White Street, designated as the White Street Landfill. The area includes both active and inactive solid waste management facilities. The C&DLF unit on top of the closed MSWLF that is the subject of this certification report is referenced as Phase II of the White Street Landfill. Phase II was originally permitted in the late 1970s as a 135-acre, unlined MSWLF. A transition plan to close the unlined MSWLF and develop the remaining capacity as a C&DLF over the closed MSWLF was approved in 1996 and revised in 1997. Approximately 70 acres of the MSWLF were permanently closed in 1997, with a capping system. The remaining 65 acres were permitted as a C&DLF over closed MSWLF in 1998.

The Phase II Part 1 closure area consists of approximately 8 acres located on the south side of Phase II and is bisected by the access road to the active portion of the C&D landfill. This area was chosen first for closure since final grades had been achieved and is represented by this certification report. Additional portions of the C&D landfill will be closed incrementally as more areas reach final grades.

The closed Phase I sanitary landfill and the active compost processing area are located directly southwest and south of Phase II, respectively. An inactive borrow area is located west of Phase II. Private land, comprised primarily of rural residences, borders the north and east sides of Phase II. A general contractor's equipment yard also is located along a portion of the east side of Phase II.

### 1.2 Project Description

HDR was contracted by the City of Greensboro to perform part-time construction quality assurance (CQA) services during construction of the Phase II Part 1 closure which began in October 2012 and was completed in April 2013. The Phase II Part 1 closure was designed with a cap system which consists of the following components:

- 6-inch topsoil layer;
- 18-inch low-permeability soil cap (hydraulic conductivity  $< 1 \times 10^{-5}$  cm/sec);
- cap terminations, slope drain extensions, and diversion ditches; and
- permanent vegetation

Construction of the Phase II Part 1 closure was completed in general accordance with the requirements of the construction specifications and drawings dated June 2012 and July 2012, respectively, prepared by HDR. Supporting documentation such as field and laboratory testing reports, inspection forms and documentation, and as-built drawings is provided in the appendices of this report.

## SECTION 2.0 CONSTRUCTION QUALITY PROGRAMS

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### 2.1 Purpose and Scope

The purpose of this certification report is to present the results of the construction quality control (CQC) and construction quality assurance (CQA) documentation related to observations and test data compiled during construction of the Part 1 closure of the Phase II C&D landfill. This report has been prepared as required by, and in accordance with, the Closure Plan as contained within the *City of Greensboro White Street Landfill, Construction & Demolition Landfill Permit Application*, dated June 2008 and approved by NCDENR in March 2012.

#### 2.1.1 Construction Quality Control Program

Construction quality control (CQC) refers to those actions which provide a means to measure and regulate the characteristics of an item or service to the specified contractual and regulatory requirements, including those actions taken by manufacturers, fabricators, installers, or subcontractors (paid for by the contractor) to ensure that the materials and the workmanship meet the requirements of the technical specifications for the project.

Triangle Grading and Paving, Inc. (Triangle), of Burlington, North Carolina, was the general contractor for the Phase II Part 1 closure project. Triangle subcontracted the following firms to provide CQC services.

- ECS Carolinas, LLP, of Greensboro, North Carolina, provided CQC inspection and testing services required during construction for the earthwork during the Phase II Part 1 closure. Field and laboratory CQC test results associated with the earthwork portion of the landfill closure as well as field reports are presented in Appendix A.
- Borum, Wade and Associates, PA of Greensboro, North Carolina, provided CQC surveying services required for the earthwork for the Phase II Part 1 closure. Surveying data is provided in Appendix C.

#### 2.1.2 Construction Quality Assurance Program

Construction quality assurance (CQA) is a planned and systematic pattern of all means and actions designed to provide confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service.

CQA refers to means and actions employed by the Owner to assure the conformity of the earthwork, cap system, and drainage structures with the technical specifications and drawings issued for the project. CQA is provided by a party independent from the manufacturer, fabricator, contractor, and installer. HDR provided part-time CQA monitoring services during construction of the Phase II Part 1 closure. These services included the following.

- Overall coordination between all parties including City representatives, the contractor, the CQC soils consultant/laboratory, and the CQA soils laboratory.
- Periodic inspection during periods of major work.

- Verification testing in the form of laboratory hydraulic conductivity and classification testing of the low-permeability soil cap.

Geotechnics of Raleigh, North Carolina, provided CQA laboratory services under the direction of HDR and is also referred to as CQA personnel.

Laboratory CQA test results associated with the earthwork portion of the landfill closure as well as field reports are presented in Appendix B.

## 2.2 Project Criteria

The Phase II Part 1 closure construction was performed under the guidance of the following documents.

- The construction specifications entitled White Street Landfill Phase II Partial Closure - Issued for Construction, Construction Documents Project Manual, dated June 2012 and drawings entitled Construction Plans for the White Street Landfill, Phase II Partial Closure, Issued for Construction, dated July 2012.
- The Construction Quality Assurance (CQA) Plan entitled, White Street Landfill, Greensboro, North Carolina, Construction Quality Assurance Plan, Phase 2 Partial Closure, dated November 2011.
- The City of Greensboro White Street Landfill, Construction & Demolition Landfill Permit Application, dated June 2008, by the City of Greensboro and approved by the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management, Solid Waste Section on March 30, 2012.
- NCDENR Municipal Solid Waste Facility Permit No. 41-03-CDLF issued on March 30, 2012.
- The requirements of the applicable North Carolina Solid Waste Management Regulations, Title 15A, Chapter 13B, Section .0547, Existing C&DLF Units as of January 1, 2007.

The quality of the overall project was governed by adherence to the construction specifications and drawings. The quality of the low-permeability soil cap and topsoil layer were governed by adherence to the construction specifications. All construction and CQA/CQC activities were conducted in accordance with the construction specifications and drawings. Documentation of the construction activities and the results of quality assurance and quality control testing are contained in the following sections and appendices of this report.

## 2.3 CQA/CQC Personnel

HDR provided part-time CQA services during construction of the Phase II Part 1 closure, as described in this report. Key HDR personnel for this project are listed below.

- Michael D. Plummer, P.E., Design Engineer and Project Manager
- Thomas M. Yanoschak, P.E., Field Inspection and Certifying Engineer
- Michael G. Batten, P.E., Field Inspection

Key representatives of the other parties involved are as follows.

Owner: City of Greensboro

- Gail G. Hay, P.E., Technical and Planning Support Manager
- Jason Jernigan, Interim Solid Waste Disposal Manager

Contractor/Construction Quality Control:

- Triangle Grading and Paving, Inc. (General Contractor)
  - Steve Martin, Project Manager
  - Gary Smith, Superintendent
- ECS Carolinas, LLP (CQC Field Inspection and Testing Services)
  - Terry L. Pope, Construction Services Manager
- Borum, Wade and Associates, PA (CQC Surveying Services)
  - Homer S. Wade, PLS, Surveyor

Construction Quality Assurance:

- Geotechnics (CQA Testing Services)
  - Michael P. Smith, Regional Manager

## **SECTION 3.0 EARTHWORK CONSTRUCTION**

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### **3.1 General**

This section provides information regarding CQC/CQA activities for the earthwork associated with the construction of the Phase II Part 1 closure including observations and monitoring of all soil components. Preconstruction, field, and laboratory testing are also addressed. Field reports and earthwork test results are contained in Appendix A (CQC) and Appendix B (CQA). As-built drawings of the closure area and thickness verification tables are contained in Appendix C.

### **3.2 Borrow Source Characterization Study**

The material used for the construction of the low permeability soil cap was obtained from the on-site landfill borrow area. In accordance with the Specifications, Triangle performed a Borrow Source Characterization Study (BSCS) within the borrow area to confirm that the material proposed for use as the low permeability soil cap would meet the specification requirements. A total of 12 bulk soil samples were obtained from test pits excavated within the borrow area. Triangle delivered the samples to the ECS soils laboratory for Atterberg limits determinations (ASTM D 4318), percent fines determinations (ASTM D 1140), standard Proctor compaction test (ASTM D 698), and hydraulic conductivity tests (ASTM D 5084). A summary of the test results is provided in Appendix A. The results show that the borrow materials tested were suitable for use in construction of the low permeability soil cap with hydraulic conductivities ranging from  $7.2 \times 10^{-8}$  cm/sec to  $2.2 \times 10^{-6}$  cm/sec. These all met the maximum hydraulic conductivity requirement of  $1 \times 10^{-5}$  cm/sec as contained in the Specifications.

### **3.2 Test Strip Construction**

The suitability of the low permeability soil cap source was confirmed during test strip construction at the landfill. The test strip was constructed near the southwest corner of Phase II Part 1 closure area within Area 1 (see surveys in Appendix C) on October 18 and 19, 2012. The test strip was a minimum of 100 feet long and 30 feet wide and was constructed with three 6-inch lifts placed over a compacted subgrade using the same equipment and methods proposed for full-scale cap construction in accordance with the project Specifications.

The specifications required the subgrade within the test strip area to be compacted to a minimum of 95 percent of the maximum dry density as determined using the Standard Proctor test (ASTM D 698) at a minimum of three locations. ECS testing indicated the subgrade was adequately compacted prior to the placement of the low permeability soil cap material.

At least five field density measurements were required for each lift within the test strip to verify that adequate compaction was obtained. Triangle established a minimum compaction criterion of 95% of the maximum dry density as determined by the standard Proctor compaction test (ASTM D 698). Proctor curves obtained for the borrow soils during the BSCS were used to determine the maximum dry density target. Field density tests were performed by ECS to verify that adequate compaction was obtained. Any areas that did not meet the minimum 95% compaction criterion were additionally compacted or reworked and then compacted until satisfactory results were obtained.

ECS performed a total of 26 density tests using the drive tube method (ASTM D 2937) during test strip construction which included subgrade testing and low permeability soil cap testing (original tests and retests). The density test results are provided within the CQC field reports contained in Appendix A.

The project specifications also required the contractor to obtain five random samples of low permeability soil cap material during test strip installation for classification testing (i.e., Atterberg Limits, sieve analysis, and moisture content). These results are provided within the CQC Test Summary provide in Appendix A and show all samples classified as an elastic silt (MH) in accordance with ASTM D 2487.

One undisturbed drive tube sample was obtained for each lift of low permeability soil cap by ECS for hydraulic conductivity testing. The results are provided within the CQC Hydraulic Conductivity Tests in Appendix A and show each lift met the maximum  $1 \times 10^{-5}$  cm/sec permeability requirement.

HDR provided a geotechnical engineer during test strip installation to ensure the test strip construction and testing was being performed in accordance with the project specifications. The engineer also collected soil samples for confirmatory CQA laboratory testing. The results, including two hydraulic conductivity tests, are provided in Appendix B and show that the results agree reasonably with the CQC test strip results.

Based on CQA field observations, CQC field density testing, and CQA and CQC laboratory soils testing, the test pad was performed in general conformance with the specification requirements and indicated that the proposed low permeability soil cap material and proposed construction methods were suitable.

### **3.3 Inspection and In-Place Testing of Constructed Product**

#### **3.3.1 Low Permeability Soil Cap**

Subgrade preparation consisted of the stripping of vegetation and unsuitable soils from areas to receive low permeability soil cap, compacting with a sheep's foot roller, and then proofrolling the exposed surface with a loaded front-end loader. Any areas exhibiting excessive pumping or rutting were over-excavated and filled with compacted soil. Any waste exposed during this process was removed and disposed at the working face of the C&D landfill. ECS personnel were on-site to observe all proofrolling.

Approximately 220 field density tests were performed using the drive tube method (ASTM D 2937) by CQC personnel to verify that the compacted low permeability soil material met project specifications. This testing frequency far exceeded the minimum requirement of one test per every 2 acres as established within the specifications. The density test results are provided within the CQC field reports contained in Appendix A. Any areas that did not meet the minimum 95% compaction criterion were additionally compacted or reworked and then compacted until satisfactory results were obtained.

During placement and compaction of the low permeability soil layer, CQC personnel also obtained two drive tube samples of the compacted clay lifts for laboratory hydraulic conductivity testing (ASTM D5084) in order to meet the specified testing frequency of one test per every 5 acres. Four bulk samples were also obtained for classification testing at the specified frequency of one test per ever 2 acres. The results of these tests are provided in Appendix A and show that the soil cap materials and construction methods were satisfactory.

The quality of the low permeability soil cap was visually monitored by CQA personnel on a periodic basis during placement. CQA personnel conducted supplemental sampling and laboratory testing in order to confirm CQC testing results. These results, including three additional hydraulic conductivity tests, confirmed the CQC test results and are provided in Appendix B.

Approximately 19,400 cy of low permeability soil cap material with a maximum hydraulic conductivity of  $1 \times 10^{-5}$  cm/sec was required to complete the approximately 8-acre Phase II Part 1 closure. The layer is a minimum of 18 inches thick. Compaction was accomplished using a tamping foot compactor. Compaction quality was monitored by visual and quantitative means. CQA personnel periodically observed the placement, compaction, and field testing activities for the low permeability soil layer. All placed materials were visually monitored to ensure no debris existed in the layer (i.e., roots, stones, etc.); there were no void areas; the layer was firm and uniform after compaction; and no deleterious material existed on the surface. Holes created in the low permeability layer as a result of drive tubes were backfilled by tamping low permeability material into the holes in 2-inch lifts.

In addition to construction material conformance testing, CQC personnel performed thickness verification of the low permeability soil cap by comparing survey shots taken before and after low permeability cap placement. The project specifications required a minimum of eight thickness verifications per acre for a total of 64 verifications. As shown in Plan Sheet No. 1 in Appendix C, a total of 187 verifications were performed. Borum, Wade and Associates, PA provided the CQC survey of construction activities with horizontal and vertical control of the low permeability soil cap placement. All points indicated the minimum 18-inch thickness was achieved except at tie-in locations near the access road, in conformance with the proposed construction drawings. A topographic survey of the top of the low permeability soil cap is provided in Plan Sheet No. 2 in Appendix C.

For acceptance, the constructed low permeability soil cap is required to be at least 18 inches thick and demonstrate a maximum permeability of  $1 \times 10^{-5}$  cm/sec upon laboratory testing. Based on testing and survey data, these two requirements were achieved.

### **3.3.3 Topsoil Layer**

As areas of the soil cap layer were completed and determined to meet the acceptance criteria, the topsoil layer was installed. Approximately 6,500 cy of topsoil was required to cover the low permeability cap with the required 6-inch layer. No testing was required for the topsoil; however, the material used was required to be able to support vegetative growth. The topsoil for this project was either stripped from the borrow area at locations where the low permeability soil cap material was obtained or was excavated from stockpiles located within the borrow area. In addition, satisfactory material without debris or waste which was stripped from the closure area during subgrade preparation was reused as topsoil.

The quality of the topsoil layer material was visually monitored by CQA personnel on a periodic basis. CQC and CQA personnel also visually monitored for debris (i.e., roots) within the topsoil layer material. Debris was removed by the contractor during placement of the material.

CQC personnel performed thickness verification of the topsoil layer cap by comparing survey shots taken before and after topsoil placement. As shown in Plan Sheet No. 1 in Appendix C, a total of 158 verifications were performed. Borum, Wade and Associates, PA provided the CQC survey of construction activities with horizontal and vertical control of topsoil placement. All points indicated the minimum 6-inch thickness was achieved. A topographic survey of the top of topsoil is provided in Plan Sheet No. 3 in Appendix C.

The construction of the topsoil layer was also visually monitored by both the CQC and CQA representatives to assure that the underlying low permeability soil cap was not compromised. Based on the observations made by CQC and CQA, the topsoil layer component was constructed in accordance with the drawings and specifications using all means to prevent damage to the underlying layer during construction.

## **SECTION 4.0 DRAINAGE SYSTEM INSTALLATION**

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### **4.1 General**

This section provides information regarding construction activities, observation and monitoring conducted during the drainage system installation associated with the construction of the Phase II Part 1 closure.

### **4.2 Bench Cap Termination**

The upper edge of the Phase II Part 1 closure terminates at a bench with an integral stormwater swale. The low permeability soil cap extends across this bench and then ties into the landfill slope above the bench. A future closure will extend the cap above the bench. The bench cap termination is designed to intercept stormwater from above the Phase II Part 1 closure and direct it to flow westward to an existing downdrain.

The bench cap termination was constructed of low permeability soil cover material sloped to provide the required lateral slope for drainage. After the termination was constructed, topsoil was placed over the low permeability soil cover, seeding occurred, and temporary erosion control matting was installed in accordance with the drawings. CQA and CQC personnel periodically observed bench cap termination construction to ensure it was constructed in accordance with the project plans and specifications. The location of the bench cap termination is shown on the as-built survey provided on Plan Sheet No. 3 located in Appendix C.

### **4.3 Roadside Swale**

A roadside swale was constructed north of the access road that bisects the Phase II Part 1 closure area to direct runoff from the upper slope to the existing culverts beneath the road. The swale was constructed of low permeability soil cap material. After the swale was constructed, topsoil was placed over the swale, seeding occurred, and temporary erosion matting was installed. Permanent soil reinforcement mat was originally required for the swale, but the contractor inadvertently installed the temporary matting. The City agreed to tentatively accept the temporary matting under the condition that Triangle repair any erosion damage to the swale. The contractor also added rock check dams within the swale to further reduce erosion potential. To date, the swale has been performing satisfactorily and vegetation has been established within it. CQA and CQC personnel periodically observed swale construction to ensure it was constructed in accordance with the project plans and specifications. The location of the swale is shown on Plan Sheet No. 3 located in Appendix C.

### **4.4 Culvert Extensions**

Construction of the Phase II Part 1 closure required the extension of four existing culverts farther south in order to avoid discharging stormwater onto the cap. Two parallel culverts are located in Area 6, one culvert is located in Area 7, and one culvert is located in Area 8. All culverts were constructed of 15-inch diameter dual wall corrugated plastic pipe (CPP). Extension were constructed by uncovering the existing culvert outlets and removing any damaged pipe, excavating a trench within the existing soils downgradient from the existing culvert, installing the pipe extensions by connecting to the existing culvert pipe using the same pipe materials, backfilling the pipe trench with compacted soil, and

constructing the low permeability soil cap and topsoil layers over the pipe extensions. Outlets consisted of molded high density polyethylene (HDPE) flared end sections discharging to aprons comprised of a 2-foot thick layer of NCDOT Class 1 riprap underlain by NCDOT Type 2 geotextile.

The inlets to the culverts located on the north side of the access road were repaired by uncovering and removing any damaged pipe, replacing any damaged pipe, installing HDPE flared end sections, and installing a grouted riprap apron around the inlet.

The culvert extensions were installed in general accordance with the drawings and specifications. The as-built locations of the culvert extensions are provided on Plan Sheet No. 1 in Appendix C.

## SECTION 5.0 PHOTOGRAPHIC DOCUMENTATION

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October 5, 2012 - Stripping vegetation from test pad in Area 1.



October 16, 2012 – Prepared subgrade for test pad.



October 18, 2012 – Placement of first lift of low permeability soil cap in test pad.



October 19, 2012 – Placement of second lift of low permeability soil cap in test pad.



October 30, 2012 – Placement of low permeability soil cap in Areas 1 and 2.



October 30, 2012 – Subgrade preparation in Area 4.



October 30, 2012 – Silt fence at lower edge of closure area.



October 30, 2012 – Strippings from closure area subsequently placed in active face of landfill.



November 13, 2012 – Low permeability cap in Areas 2 and 4 and topsoil stockpiled in Area 3.



November 13, 2012 – Low permeability cap placement in Areas 4 and 5.



November 13, 2012 – On-site borrow area.



November 27, 2012 – Bench cap termination.



November 27, 2012 – Topsoil and vegetation stripped from closure area.



November 27, 2012 – Subgrade preparation in Area 10.



November 27, 2012 – Placement of first lift of low permeability soil in Area 11.



November 27, 2012 – Low permeability soil being excavated from on-site borrow area.



December 18, 2012 – Subgrade preparation in Area 8.



December 18, 2012 – Existing culverts in Area 6.



December 18, 2012 – Extending existing culvert in Area 8.



December 18, 2012 – Tie-in of cap at toe of slope in Area 10.



December 18, 2012 – Tie-in of cap at access road.



December 18, 2012 – Edge of low permeability soil cap in Area 5.



January 8, 2013 – Culvert extensions in Areas 6 and 7.



January 8, 2013 – Placement of topsoil over low permeability soil.



January 8, 2013 – Tie-in to existing culverts in Area 6.



January 8, 2013 – Low permeability soil cap in Areas 11 and 12.



January 8, 2013 – Placing topsoil in Area 1.



January 22, 2013 – Topsoil placement completed in Area 1.



January 22, 2013 – Low permeability soil placement in Area 3.



January 22, 2013 - Placing topsoil in Area 10.



January 22, 2013 – Culvert extensions in Area 6.



January 30, 2013 – Subgrade preparation in Areas 6, 7, and 8.



January 30, 2013 – Low permeability soil placement in Area 9.



January 30, 2013 – Topsoil in place in Areas 11 and 12.



February 5, 2013 – Placing topsoil in Area 5.



February 5, 2013 – Toe of slope cap termination after placement of topsoil.



February 5, 2013 – Subgrade preparation in Areas 6, 7, and 8.



February 5, 2013 – Low permeability soil cap in Area 9.



February 19, 2013 – Placing low permeability soil cap in Area 8.



February 19, 2013 – Overview of closure area.



March 12, 2013 – Completed cap with topsoil in place.



March 12, 2013 – Riprap outlet protection in Area 6.



March 12, 2013 – Riprap outlet protection in Area 7.



March 12, 2013 – Riprap outlet protection in Area 8.



March 12, 2013 – Toe of slope cap termination in Area 10.



March 12, 2013 – Bench cap termination in Areas 3 and 4.



April 2, 2013 – Bench cap termination with erosion control matting in Areas 1 and 2.



April 2, 2013 – Completed lower slope with erosion control matting.



April 2, 2013 – Check dams along access road.



April 2, 2013 – Grouted riprap inlet protection in Area 2.



May 16, 2013 – Completed closure with vegetation starting to grow.



May 16, 2013 – Access road swale and grouted riprap inlet protection.



May 16, 2013 – Vegetated slope.



May 16, 2013 – Vegetated bench cap termination.

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## CQC Testing (ECS Carolinas, LLP)

Field Reports

Borrow Source Characterization Study

Test Summary

Hydraulic Conductivity



## CQC Testing (ECS Carolinas, LLP)

Field Reports





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

August 5, 2012

J.R. Lynch & Sons, Inc.  
PO Drawer BB  
Pilot Mountain, NC 27041

ATTN: Mr. Daniel Lynch

RE: **White Street Landfill Phase II Partial Closure**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

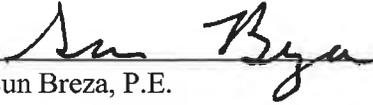
- Materials Engineering Division Reports
- For your use
- As requested

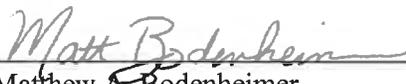
ENCL:

Field Report # 1

08/02/2012

SPU

  
Sun Breza, P.E.  
Construction Services Manager

  
Matthew A. Bodenheimer  
Field Services Manager





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 10, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 3

10/05/2012

Soil Density

Ronald R. Newman, CWI  
Corporate NDT Level III

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 10/05/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 58°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-13    Description: Tan Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 105.10    pcf    Uncorrected Opt. MC: 16.10    %  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 10ft SW from corner of test strip	0.00	5.430	1.100	4.330	.0342	126.6	200.00	174.00	14.9	110.1	D4S-13	104.7	95	F
2	Tested 20ft S 20ft E from NW corner	0.00	5.510	1.100	4.410	.0342	129.0	200.00	170.00	17.6	109.6	D4S-13	104.3	95	F
3	Tested 20ft N, 25ft W from SE corner	0.00	5.450	1.100	4.350	.0342	127.2	200.00	176.00	13.6	111.9	D4S-13	106.5	95	F

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 16, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

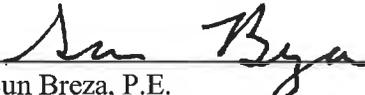
- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 5

10/15/2012

Cancellation

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 19, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 6	10/18/2012	Test Strip Density
Field Report # 7	10/18/2012	Site Observation

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 10/18/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 72°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Procto Method (ASTM D-698) Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
4	23ft N, 10ft West from SW corner of strip	-1.00	5.100	1.100	4.000	.0342	117.0	200.00	155.00	29.0	90.6	D4S-12	99.3	95	P
5	20ftN, 5ft West from SE corner of strip	-1.00	4.730	1.100	3.630	.0342	106.1	200.00	158.00	26.5	83.8	D4S-12	91.8	95	F
6	Retest of #5	-1.00	5.110	1.100	4.010	.0342	117.3	200.00	156.00	28.2	91.4	D4S-12	100.2	95	P
7	18ft S, 4ft E from NW corner of strip	-1.00	5.190	1.130	4.060	.0341	119.1	200.00	158.00	26.5	94.0	D4S-12	103.0	95	F
8	15ft E, 35ft S from NW cor of strip	-1.00	5.190	1.130	4.060	.0341	119.1	200.00	157.00	27.3	93.4	D4S-12	102.4	95	F
9	10ft S, 6ft W from NE corner of strip	-1.00	4.820	1.130	3.690	.0341	108.2	200.00	157.00	27.3	84.9	D4S-12	93.0	95	F

\*reobservation

Additional comments: Sample D4S-12 Test 5: Rerolled area. ----- Sample D4S-12 Test 7:

Moisture low. Need to add water. ----- Sample D4S-12 Test 8: Moisture too low. Need

to add water. ----- Sample D4S-12 Test 9: Compaction and moisture are low. Need to



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 10/18/12 Thursday  
**Weather / Temp:** 72°F Sunny

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: Standard Procto Method (ASTM D-698) Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 % SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	20ft N, 25ft W from SE cor of test strip	0.00	5.570	1.100	4.470	.0342	130.7	200.00	172.00	16.2	112.4	D4S-13	106.9	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 5: Rerolled area. ----- Sample D4S-12 Test 7: Moisture low. Need to add water. ----- Sample D4S-12 Test 8: Moisture too low. Need to add water. ----- Sample D4S-12 Test 9: Compaction and moisture are low. Need to



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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 22, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 8

10/19/2012

Test Strip Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 10/19/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 72°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698)  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Retest of #7 from 10-18-12	-1.60	5.030	1.130	3.900	.0341	114.4	200.00	152.00	31.5	86.9	D4S-12	95.2	95	P
2	Retest of #8 on 10-18-12	-1.60	5.140	1.130	4.010	.0341	117.6	200.00	154.30	29.6	90.7	D4S-12	99.3	95	P
3	Retest of #9 on 10-18-12	-1.60	5.010	1.130	3.880	.0341	113.8	200.00	154.00	29.8	87.6	D4S-12	95.9	95	P
4	Start of lift #2, 1st test 10ft N,5ft E from SW corner	-0.50	4.990	1.100	3.890	.0342	113.7	200.00	155.10	28.9	88.1	D4S-12	96.5	95	P
5	20ft N, 6ft W, from SE corner	-1.00	5.090	1.130	3.960	.0341	116.1	200.00	155.20	28.8	90.0	D4S-12	98.6	95	P
6	48ft N, 10ft W, from SE corner	-0.50	4.860	1.130	3.730	.0341	109.4	200.00	154.30	29.6	84.4	D4S-12	92.4	95	F
7	Retest of #6 48ft N, 10ft W from SE corner	-0.50	5.050	1.130	3.920	.0341	115.0	200.00	152.60	31.0	87.7	D4S-12	96.1	95	P
8	10ft W, 12ft S from NE corner	-0.50	5.080	1.130	3.950	.0341	115.8	200.00	154.60	29.3	89.5	D4S-12	98.0	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 6: Had area rolled more. ----- Sample D4S-12

Test 10: Had area rerolled. ----- Sample D4S-12 Test 14: Moisture low, added water and rerolled.

Print Name: Terry G. Chrisco

ECS CAROLINAS, LLP



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 10/19/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 72°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
9	15' E, 10' S from NW cor.	-0.50	5.040	1.100	3.940	.0342	115.2	200.00	152.80	30.8	88.0	D4S-12	96.3	95	P
10	Start of lift #3, 18ft N, 11ft E from SW corner	0.00	5.170	1.560	3.610	.0333	108.4	200.00	154.70	29.2	83.8	D4S-12	91.8	95	F
11	Retest for #10	0.00	4.970	1.090	3.880	.0333	116.5	200.00	155.70	28.4	90.6	D4S-12	99.3	95	P
12	21ft N, 7ft W from SE corner	0.00	5.010	1.090	3.920	.0333	117.7	200.00	155.10	28.9	91.2	D4S-12	99.9	95	P
13	48ft N, 9ft E from SW corner	0.00	4.990	1.090	3.900	.0333	117.1	200.00	155.40	28.7	90.9	D4S-12	99.6	95	P
14	18ft S, 11ft E from NW corner	0.00	5.130	1.090	4.040	.0333	121.3	200.00	156.60	27.7	94.9	D4S-12	104.0	95	F
15	8ft S, 11ft W from NE corner	0.00	5.050	1.090	3.960	.0333	118.9	200.00	155.90	28.2	92.6	D4S-12	101.5	95	P
16	Retest of #14	0.00	5.110	1.090	4.020	.0333	120.7	200.00	155.50	28.6	93.8	D4S-12	102.7	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 6: Had area rolled more. ----- Sample D4S-12

Test 10: Had area rerolled. ----- Sample D4S-12 Test 14: Moisture low, added water and rerolled.

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 25, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

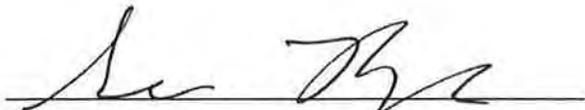
- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 9

10/22/2012

Proofroll

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 26, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

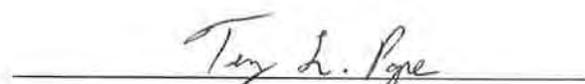
We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 10	10/24/2012	Density/Proofroll
Field Report # 11	10/25/2012	Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager







# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 10/24/12  
**Weather / Temp:** 51°F Sunny

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: ASTM D 698-07 Method A    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
Standard

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 51ft N, 8ft E from SW corner of quadrant #1	-1.00	5.130	1.100	4.030	.0339	118.9	200.00	155.60	28.5	92.5	D4S-12	101.3	95	P
2	Tested 211 ft N, 20ft E from SW corner of quadrant #1	-1.00	4.950	1.090	3.860	.0333	115.9	200.00	151.40	32.1	87.7	D4S-12	96.0	95	P

\*reobservation

Additional comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 10/25/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 57°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: ASTM D-698 Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 69ft S, 25ft W from NE corner quadrant #1	-1.00	4.870	1.100	3.770	.0339	111.2	200.00	151.50	32.0	84.2	D4S-12	92.2	95	F
2	Tested 55ft N, 42ft W from SE corner quadrant #1	-1.00	5.070	1.100	3.970	.0339	117.1	200.00	153.60	30.2	89.9	D4S-12	98.5	95	P
3	Retest of #1	-1.00	4.990	1.100	3.890	.0339	114.8	200.00	152.70	30.9	87.6	D4S-12	96.0	95	P
10	Tested 141ft N, 21ft E from SW corner quadrant #3	-0.50	5.160	1.100	4.060	.0339	119.8	200.00	161.00	24.2	96.4	D4S-12	105.6	95	F
11	Retest of #10.	-0.50	5.100	1.100	4.000	.0339	118.0	200.00	155.00	29.0	91.4	D4S-12	100.1	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Had operator roll area more. ----- Sample D4S-12 Test 10: Moisture too low, also checked moisture on soils coming from bar pit. This moisture is low also. soils are being watered down. ----- Sample D4S-13 Test 4:



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 10/25/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 57°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: ASTM D 698-07 Method A Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %  
Standard  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
4	Tested 60ft N, 40ft W from SE corner quadrant #3	-1.50	4.840	1.100	3.740	.0339	110.3	200.00	175.30	14.0	96.6	D4S-13	91.9	95	F
5	Tested 40ft S, 40 W from NE corner quadrant #3	-1.50	5.100	1.100	4.000	.0339	118.0	200.00	169.30	18.1	99.8	D4S-13	95.0	95	P
6	Tested 30ft E, 40ft S from NW corner quadrant #3	-1.50	5.310	1.100	4.210	.0339	124.2	200.00	172.50	15.9	107.1	D4S-13	101.9	95	P
7	Tested 25ft E, 80ft N from SW corner quadrant #3	-1.50	4.970	1.100	3.870	.0339	114.2	200.00	172.00	16.2	98.2	D4S-13	93.4	95	F
8	Retest of #7	-1.50	5.080	1.100	3.980	.0339	117.4	200.00	172.00	16.2	100.9	D4S-13	96.0	95	P
9	Retest of #4	-1.50	5.130	1.100	4.030	.0339	118.9	200.00	169.40	18.0	100.7	D4S-13	95.8	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Had operator roll area more. ----- Sample

D4S-12 Test 10: Moisture too low, also checked moisture on soils coming from bar pit.

This moisture is low also. soils are being watered down. ----- Sample D4S-13 Test 4:

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150  
(336) 856-7160

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 29, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

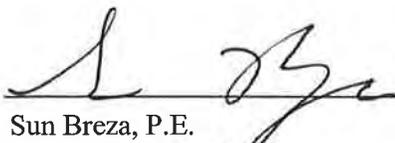
- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 12

10/26/2012

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 10/26/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 75°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: ASTM D 698-07 Method A    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
Standard  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	200ft N 75ft E of SW corner of area 1	-0.50	5.100	1.120	3.980	.0342	116.4	200.00	153.50	30.2	89.3	D4S-12	97.8	95	P
2	325ft N 150ft E of SW corner of area 1	-0.50	4.980	1.120	3.860	.0342	112.9	200.00	154.60	29.3	87.2	D4S-12	95.5	95	P
3	150ft N 200ft E of SW corner of area 1	-0.50	5.060	1.120	3.940	.0342	115.2	200.00	155.30	28.7	89.4	D4S-12	97.9	95	P
4	75ft N 25ft E of SW corner of area 3	-1.00	4.970	1.120	3.850	.0342	112.6	200.00	154.40	29.5	86.9	D4S-12	95.2	95	P

\*reobservation

Additional comments:

Print Name: Travis K. Smith  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

October 30, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

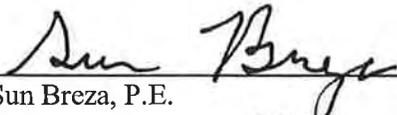
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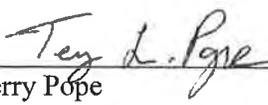
Field Report # 13

10/29/2012

Soil Density

Non Compliance

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 10/29/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 46°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 33ft S, 27ft E from NW corner of #3	1.00	4.950	1.100	3.850	.0339	113.6	200.00	162.00	23.4	92.0	D4S-12	100.7	95	F
2	Tested 17ft S, 70ft W from NE corner of #3	1.50	5.030	1.100	3.930	.0339	115.9	200.00	158.00	26.5	91.5	D4S-12	100.2	95	F
3	Tested at 45ft N, 65ft W from SE corner of #3	1.50	5.150	1.100	4.050	.0339	119.5	200.00	154.00	29.8	92.0	D4S-12	100.7	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Moisture low, needs to be watered. -----

Sample D4S-12 Test 2: Moisture low, needs to be watered.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 1, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

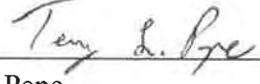
ENCL:

Field Report # 14

10/31/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 10/31/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: SILT

Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Retest of #1 on 10-29-12 on quadrant #3	-1.00	5.010	1.110	3.900	.0341	114.4	200.00	152.00	31.5	86.9	D4S-12	95.2	95	P
2	Retest of #2 on 10-29-12 on quadrant #3	-1.00	5.030	1.110	3.920	.0341	115.0	200.00	152.00	31.5	87.4	D4S-12	95.7	95	P
3	76ft S, 17ft E from NW corner of pad #1	0.00	5.020	1.110	3.910	.0341	114.7	200.00	154.00	29.8	88.3	D4S-12	96.7	95	P

\*reobservation

Additional comments:

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 5, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

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ENCL:

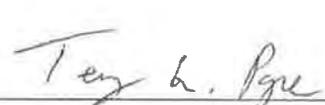
Field Report # 15

11/01/2012

Soil Density

Non Compliance

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/01/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 55°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: ASTM D 698-07 Method A Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
Standard

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Quadrant #1 Tested 80ft N, 20ft E of SW corner	-0.50	4.820	1.090	3.730	.0333	112.0	200.00	156.00	28.2	87.3	D4S-12	95.6	95	P
2	80ft S, 25ft W of NE corner	0.00	5.040	1.090	3.950	.0333	118.6	200.00	158.00	26.5	93.6	D4S-12	102.6	95	F
3	Retest of #2	0.00	4.900	1.090	3.810	.0333	114.4	200.00	156.00	28.2	89.2	D4S-12	97.7	95	P
4	Tested 80ft N, 15ft W of SE corner	0.00	4.980	1.090	3.890	.0333	116.8	200.00	156.00	28.2	91.1	D4S-12	99.7	95	P
5	Tested 120ft N, 75ft W of SE corner	0.00	5.060	1.090	3.970	.0333	119.2	200.00	154.00	29.8	91.7	D4S-12	100.5	95	P
6	Tested 106ft N, 12ft E of SW corner	0.00	4.710	1.090	3.620	.0333	108.7	200.00	154.00	29.8	83.6	D4S-12	91.6	95	F
7	Retest of #6	0.00	4.870	1.090	3.780	.0333	113.5	200.00	162.00	23.4	91.9	D4S-12	100.6	95	F

\*reobservation

Additional comments: Sample D4S-12 Test 2: Moisture low, Added water. ----- Sample

D4S-12 Test 6: Roll area more. ----- Sample D4S-12 Test 7: Moisture too low. needs watering.

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 5, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
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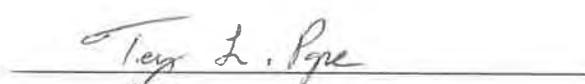
ENCL:

Field Report # 16

11/03/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 11/03/12 Saturday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 55°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-11 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 27.50 %  
(ASTM D-698)

SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Center of Quadrant 1	-1.00	5.110	1.120	3.990	.0342	116.7	200.00	155.10	28.9	90.5	D4S-11	98.9	95	P
2	Center Quadrant 2	-1.00	5.120	1.100	4.020	.0342	117.5	200.00	155.10	28.9	91.1	D4S-11	99.5	95	P
3	Center Quadrant 3	-1.00	5.090	1.120	3.970	.0342	116.1	200.00	155.00	29.0	89.9	D4S-11	98.3	95	P

\*reobservation

Additional comments:

Print Name: Chad L. Helms  
ECS CAROLINAS, LLP

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Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 6, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

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- For your use
- As requested

ENCL:

Field Report # 17

11/05/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/05/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 5°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698)

SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Retest of #6 on 11-1-12, quad #1	0.00	4.980	1.110	3.870	.0341	113.5	200.00	153.00	30.7	86.8	D4S-12	95.1	95	P
2	Tested 25ft W, 20ft N from SE corner of quad #3	-1.00	4.780	1.110	3.670	.0341	107.6	200.00	150.00	33.3	80.7	D4S-12	88.3	95	F
3	Retest of #2, quad #3	-1.00	4.900	1.110	3.790	.0341	111.1	200.00	156.00	28.2	86.6	D4S-12	94.9	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 2: Had area rolled more. ----- Sample D4S-12

Test 3: Rounded up.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 8, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

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- Materials Engineering Division Reports
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ENCL:

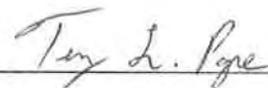
Field Report # 18

11/06/2012

Soil Density



Sun Breza, P.E.  
Construction Services Manager



Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/06/12 Tuesday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 33°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Procto Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
(ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 20ft E, 46ft N from SW corner of quad #3	-0.50	4.870	1.110	3.760	.0341	110.3	200.00	155.40	28.7	85.7	D4S-12	93.8	95	F
2	Retest of #1, 20ft E, 48ft E from SW corner of quad #3	-0.50	4.920	1.110	3.810	.0341	111.7	200.00	156.40	27.8	87.3	D4S-12	95.6	95	P
3	Tested 96ft N, 72ft E from SW corner of quad #3	-0.50	4.960	1.110	3.850	.0341	112.9	200.00	156.00	28.2	88.0	D4S-12	96.4	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Recommended additional compactive effort.





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 9, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

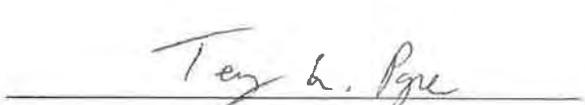
ENCL:

Field Report # 19

11/07/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/07/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 33°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-13    Description: Tan Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 105.10    pcf    Uncorrected Opt. MC: 16.10    %  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	44ft N, 70ft W from SE corner of quadrant #4	-1.50	4.850	1.090	3.760	.0333	112.9	200.00	177.20	12.8	100.0	D4S-13	95.1	95	P
2	Tested 22ft W, 32ft N from SE corner of quadrant #5	-1.50	4.780	1.090	3.690	.0333	110.8	200.00	169.20	18.2	93.7	D4S-13	89.1	95	F
3	Tested 32ft E, 54ft N from SW corner of quadrant #5	-1.50	4.960	1.090	3.870	.0333	116.2	200.00	181.60	10.1	105.5	D4S-13	100.3	95	P
4	Tested 27ft S, 48ft W from NE corner of quadrant #5	-1.50	5.260	1.110	4.150	.0341	121.7	200.00	178.20	12.2	108.4	D4S-13	103.1	95	P
5	Tested 10ft S, 32ft E from NW corner of quadrant #5	-1.50	5.190	1.110	4.080	.0341	119.7	200.00	168.60	18.6	100.9	D4S-13	96.0	95	P
6	Tested 30ft S, 53ft W from NE	-1.50	5.040	1.110	3.930	.0341	115.3	200.00	172.60	15.8	99.5	D4S-13	94.6	95	P

\*reobservation

Additional comments: Sample D4S-13 Test 2: Rolled area more.



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 11/07/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 33°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-13    Description: Tan Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 105.10    pcf    Uncorrected Opt. MC: 16.10    %  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
	corner of quadrant #4														
7	Retest of #2, quadrant #5	-1.50	5.220	1.090	4.130	.0333	124.0	200.00	163.70	22.1	101.4	D4S-13	96.5	95	P
8	Retest of #6 in quadrant #4	-1.50	5.160	1.090	4.070	.0333	122.2	200.00	170.20	17.5	103.9	D4S-13	98.9	95	P

\*reobservation

Additional comments: Sample D4S-13 Test 2: Rolled area more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 9, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
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- As requested

ENCL:

Field Report # 20

11/08/2012

Soil Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/08/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 54°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 % SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	28ft W, 61ft S from NE corner of pad 3	-0.50	4.740	1.900	2.840	.0333	85.3	200.00	156.00	28.2	66.5	D4S-12	72.8	95	F
2	88ft W, 77ft N from SE corner of pad 3	-0.50	4.810	1.090	3.720	.0333	111.7	200.00	151.60	31.9	84.6	D4S-12	92.7	95	F
3	Retest of #1	-0.50	4.970	1.090	3.880	.0333	116.5	200.00	162.40	23.1	94.5	D4S-12	103.6	95	F
4	Retest of #2	-0.50	4.970	1.090	3.880	.0333	116.5	200.00	150.00	33.3	87.3	D4S-12	95.7	95	P
5	Retest of #1	-0.50	4.930	1.090	3.840	.0333	115.3	200.00	156.00	28.2	89.9	D4S-12	98.5	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Area needs to be rolled more. ----- Sample D4S-12 Test 2: This area needs to be rolled more. ----- Sample D4S-12 Test 3: This area needs to be watered and rolled again.

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 12, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

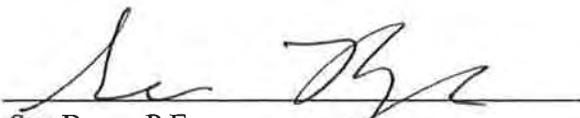
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ENCL:

Field Report # 21

11/09/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 11/09/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 56°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
2	Tested 70ft W, 38ft N from SE corner of quadrat #5	-1.00	5.100	1.120	3.980	.0341	116.7	200.00	156.00	28.2	91.0	D4S-12	99.6	95	F

Sample: D4S-3    Description: Red Brown Fine Sandy SILT    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 82.10    pcf    Uncorrected Opt. MC: 35.50    %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
3	Tested 18ft S, 18ft W from NE corner of quadrat #5	-1.00	4.930	1.120	3.810	.0341	111.7	200.00	146.10	36.8	81.5	D4S-3	99.3	95	P

\*reobservation

Additional comments:

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 13, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

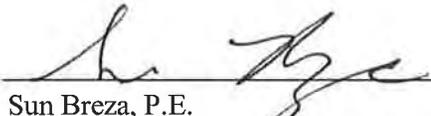
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ENCL:

Field Report # 22

11/12/2012

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 11/12/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 56°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: ASTM D 698-07 Method A Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
Standard

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 32ft N, 114ft W from SE corner of Quad #4	-1.00	4.940	1.120	3.820	.0341	112.0	200.00	155.80	28.3	87.2	D4S-12	95.5	95	P
2	Tested 24ft S, 46ft E from NW corner of quad #5	-1.00	4.900	1.120	3.780	.0341	110.9	200.00	153.10	30.6	84.8	D4S-12	92.9	95	F
3	Retest of #2	-1.00	4.900	1.120	3.780	.0341	110.9	200.00	155.90	28.2	86.4	D4S-12	94.6	95	F
4	2nd retest of #2	-1.00	4.930	1.120	3.810	.0341	111.7	200.00	155.70	28.4	86.9	D4S-12	95.2	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 2: Had area rolled more. ----- Sample D4S-12

Test 3: Rolled more. Not allowed to round up.

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 16, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

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ENCL:

Field Report # 23

11/15/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/15/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 42°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
(ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
2	Tested 51ft S, 24ft N from NE corner of quad 4	-1.00	4.930	1.120	3.810	.0341	111.7	200.00	155.90	28.2	87.0	D4S-12	95.3	95	P
3	Tested 19ft N, 18ft W from SE corner of quad #4	-1.00	5.120	1.120	4.000	.0341	117.3	200.00	155.50	28.6	91.2	D4S-12	99.8	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

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Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 17, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

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ENCL:

Field Report # 24

11/16/2012

Densities

Ronald R. Newman, CWI  
Corporate NDT Level III

Alan L. Raulston  
CMT Project Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/16/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 34°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 3' W, 32'S from NE cor of quad. #5	-0.50	4.860	1.120	3.740	.0341	109.7	200.00	154.90	29.1	84.9	D4S-12	93.0	95	F
2	Retest of tedt #1.	-0.50	5.000	1.120	3.880	.0341	113.8	200.00	155.00	29.0	88.1	D4S-12	96.5	95	P
3	Tested 25' W, 20' N from SE cor of quad #5.	-0.50	5.010	1.120	3.890	.0341	114.1	200.00	153.80	30.0	87.7	D4S-12	96.1	95	P
4	Tested 121' W, 56' N from SE cor of quad. #5	-0.50	4.960	1.120	3.840	.0341	112.6	200.00	155.00	29.0	87.2	D4S-12	95.5	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Had area rolled more

Print Name: Terry G. Chrisco  
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(336) 856-7150 [Phone]  
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**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 19, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

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ENCL:

Field Report # 25

11/19/2012

Soil Density

Ronald R. Newman, CWI  
Corporate NDT Level III

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 11/19/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 44°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy SILT Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 54ft N, 5ft E from SW corner of quad #5	-0.50	4.990	1.120	3.870	.0341	113.5	200.00	156.00	28.2	88.5	D4S-12	96.9	95	P

Sample: D4S-3 Description: Red Brown Fine Sandy SILT Proctor Method: Standard Proctor Method Uncorrected Max. Density: 82.10 pcf Uncorrected Opt. MC: 35.50 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
2	Tested 40ft N, 12ft W from SE corner of quad #4	-0.50	4.980	1.120	3.860	.0341	113.2	200.00	146.00	36.9	82.6	D4S-3	100.6	95	P
3	Retest of #2, 37ft N, 12ft W from SE corner of quad #4	-0.50	4.950	1.120	3.830	.0341	112.3	200.00	145.00	37.9	81.4	D4S-3	99.1	95	P

\*reobservation

Additional comments:

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**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 26, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

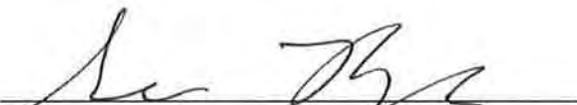
Location: **2503 White Street  
Greensboro, NC**

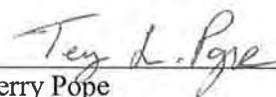
We are enclosing:

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ENCL:

Field Report # 26	11/20/2012	Soil Density
Field Report # 27	11/21/2012	Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/20/12 Tuesday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 55°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested quadrant #4, 74ft N, 26ft E from SW corner	-0.50	4.730	1.090	3.640	.0333	109.3	200.00	157.20	27.2	85.9	D4S-12	94.0	95	F
2	Tested quadrant #5 34ft N, 23ft E from SE corner	0.00	4.880	1.090	3.790	.0333	113.8	200.00	154.50	29.4	87.9	D4S-12	96.2	95	P
3	Tested quadrant #5 27ft N, 107ft W from SE corner	0.00	4.790	1.090	3.700	.0333	111.1	200.00	153.50	30.2	85.2	D4S-12	93.3	95	F
4	Retest of #3	0.00	4.910	1.090	3.820	.0333	114.7	200.00	152.30	31.3	87.3	D4S-12	95.6	95	P
5	Retest of #1	-0.50	4.850	1.090	3.760	.0333	112.9	200.00	155.20	28.8	87.6	D4S-12	95.9	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Moisture and comp. low Added water and rolled more. ----- Sample D4S-12 Test 3: Rolled area more.





**Drive Tube Method  
Field Density Report**

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/21/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 55°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
(ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 100ft E, 10ft S from NW corner of quad #5	0.00	4.860	1.090	3.770	.0333	113.2	200.00	153.80	30.0	87.0	D4S-12	95.3	95	P
2	Tested 28ft S, 52ft E from NW corner of quad #5	0.00	4.800	1.090	3.710	.0333	111.4	200.00	155.80	28.3	86.7	D4S-12	95.0	95	P
3	Tested 23ft S, 58ft W from NE corner of quad #4.	0.00	5.020	1.090	3.930	.0333	118.0	200.00	153.90	29.9	90.8	D4S-12	99.4	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco

ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 26, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
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ENCL:

Field Report # 28

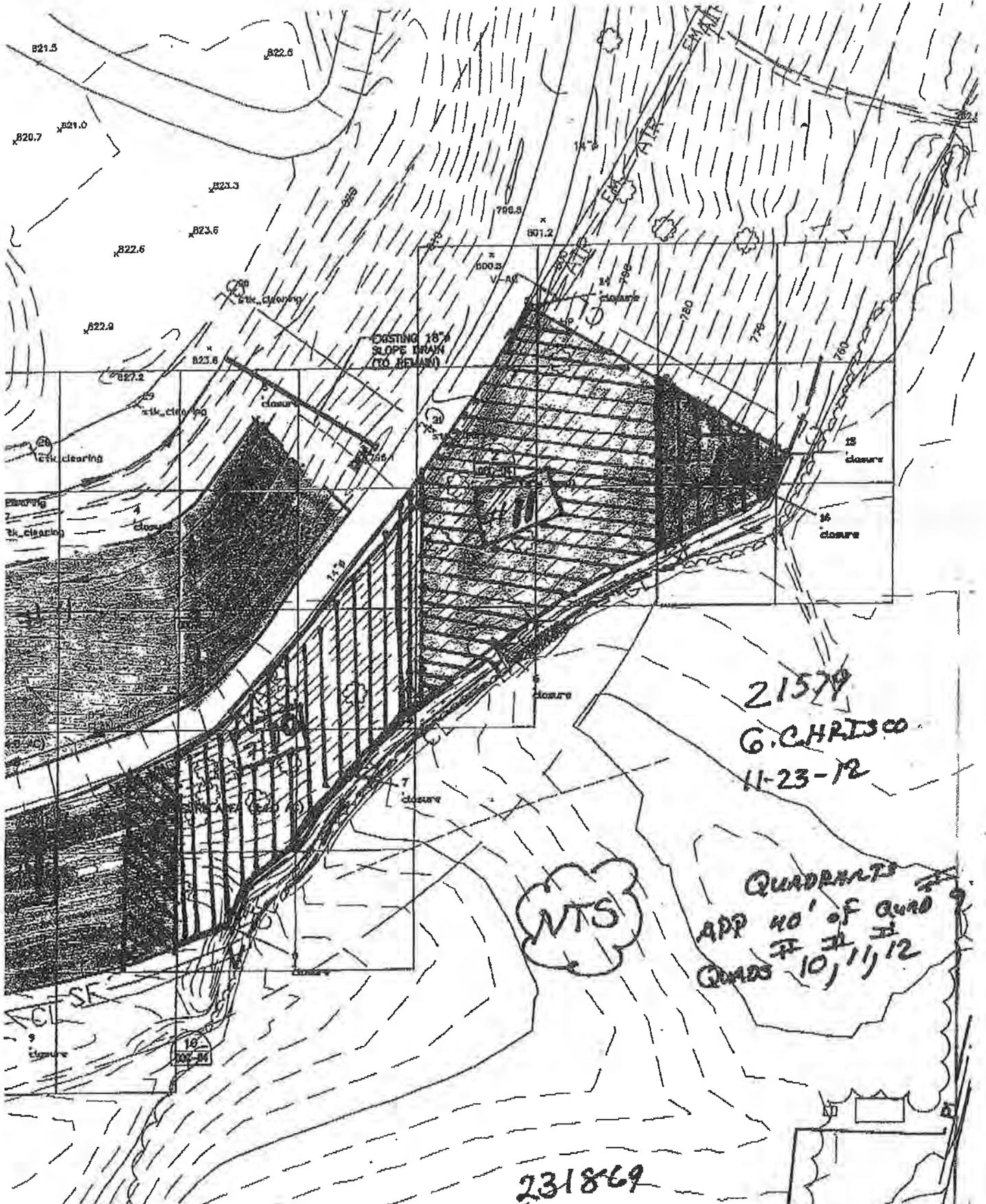
11/23/2012

Soil Density/PR

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager







# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 11/23/12 Friday  
**Weather / Temp:** 56°F Sunny

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
 (ASTM D-698)

SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 18ft N, 84ft W from SE corner of quad #4	0.00	4.860	1.090	3.770	.0333	113.2	200.00	155.20	28.8	87.8	D4S-12	96.2	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

November 29, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

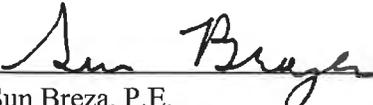
Location: **2503 White Street  
Greensboro, NC**

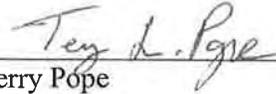
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- For your use
- As requested

ENCL:

Field Report # 29	11/26/2012	Soil Density
Field Report # 31	11/28/2012	Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/26/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 31°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 % (ASTM D-698) SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 39ft N, 17ft W from SE corner of quad #12	-1.50	5.340	1.090	4.250	.0333	127.6	200.00	167.10	19.6	106.6	D4S-13	101.4	95	P
2	Tested 60ft W, 30ft N from SE corner of quad #11	-1.50	5.120	1.090	4.030	.0333	121.0	200.00	174.50	14.6	105.5	D4S-13	100.4	95	P
3	Tested 40ft S, 55ft W from NE corner from quad #11	-1.50	4.900	1.090	3.810	.0333	114.4	200.00	176.90	13.0	101.1	D4S-13	96.2	95	P
4	Tested 63ft N, 104ft W from SE corner of quad #11	-1.50	5.030	1.090	3.940	.0333	118.3	200.00	170.60	17.2	100.9	D4S-13	96.0	95	P
5	62ft S, 94ft E from NW corner of quad #11	-1.50	5.240	1.090	4.150	.0333	124.6	200.00	169.70	17.8	105.7	D4S-13	100.5	95	P
6	Tested 35ft W, 17ft S from NE	-1.50	4.760	1.090	3.670	.0333	110.2	200.00	167.90	19.1	92.5	D4S-13	88.0	95	F

\*reobservation

Additional comments: Sample D4S-13 Test 6: Roll area more. ----- Sample D4S-13 Test

7: Roll area more.



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/26/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 31°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %  
(ASTM D-698) SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
	corner of quad #10														
7	Tested 33ft N, 31ft E from SW corner of quad #10.	-1.50	4.790	1.090	3.700	.0333	111.1	200.00	174.70	14.4	97.0	D4S-13	92.3	95	F
10	Retest of #6	-1.50	4.850	1.100	3.750	.0334	112.3	200.00	179.20	11.6	100.6	D4S-13	95.7	95	P
11	Retest of #7	-1.50	4.830	1.100	3.730	.0334	111.7	200.00	182.20	9.7	101.7	D4S-13	96.8	95	P

\*reobservation

Additional comments: Sample D4S-13 Test 6: Roll area more. ----- Sample D4S-13 Test

7: Roll area more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/26/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 31°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-19 Description: Tan Brown Silty Fine to Medium SAND Proctor Method: Standard Proctor Method Uncorrected Max. Density: 111.40 pcf Uncorrected Opt. MC: 14.50 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
8	Tested 3ft E, 40ft N from SW corner of quad #10	-1.50	5.270	1.090	4.180	.0333	125.5	200.00	176.00	13.6	110.4	D4S-19	99.1	95	P
9	Tested 7ft E, 43ft N from SW corner of quad #10	-1.50	5.250	1.100	4.150	.0334	124.3	200.00	179.20	11.6	111.3	D4S-19	99.9	95	P

\*reobservation

Additional comments: Sample D4S-13 Test 6: Roll area more. ----- Sample D4S-13 Test

7: Roll area more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 11/28/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 50°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
(ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 25ft S, 28ft W from NE corner of quad 11	-1.00	5.050	1.110	3.940	.0341	115.5	200.00	155.50	28.6	89.8	D4S-12	98.3	95	P
2	Tested 20ft S, 29ft E from NW corner of quad 11	-1.00	4.950	1.110	3.840	.0341	112.6	200.00	154.50	29.4	86.9	D4S-12	95.2	95	P
3	Tested 45ft N, 10ft W from SE corner of quad 11	-1.00	4.850	1.110	3.740	.0341	109.7	200.00	157.60	26.9	86.4	D4S-12	94.6	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 3, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

Materials Engineering Division Reports

For your use

As requested

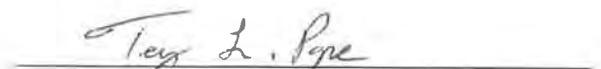
ENCL:

Field Report # 33

11/30/2012

Moisture Testing

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 3, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 32	11/29/2012	Soil Density
Field Report # 34	12/01/2012	Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/29/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 51°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-10 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 88.10 pcf Uncorrected Opt. MC: 29.80 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
												D4S-10			

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 45ft N, 10ft W from SE corner of quad #11	-1.50	4.780	1.110	3.670	.0341	107.6	200.00	161.60	23.7	86.9	D4S-12	95.2	95	F
2	CAP 35ft N, 21ft W from SE corner of quad #12	-1.50	5.030	1.110	3.920	.0341	115.0	200.00	157.50	26.9	90.5	D4S-12	99.1	95	F
3	CAP Retest of #1, Same failed area	-1.00	4.800	1.110	3.690	.0341	108.2	200.00	161.10	24.1	87.1	D4S-12	95.4	95	F

\*reobservation

Additional comments: Sample D4S-12 Test 1: moisture low, needs more water. -----

Sample D4S-12 Test 2: Moisture low , needs more water. ----- Sample D4S-12 Test 3:

Moisture low



## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 11/29/12 Thursday  
**Weather / Temp:** 51°F Sunny

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
 (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
8	11-28-12 CAP Retest of #3.	-1.00	4.920	1.110	3.810	.0341	111.7	200.00	156.00	28.2	87.1	D4S-12	95.4	95	P

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %  
 (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
5	SUB Tested 25ft S, 48ft W from NE corner of quad #9	-1.50	5.300	1.110	4.190	.0341	122.9	200.00	170.90	17.0	105.0	D4S-13	99.9	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: moisture low, needs more water. -----

Sample D4S-12 Test 2: Moisture low, needs more water. ----- Sample D4S-12 Test 3:

Moisture low



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 11/29/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 51°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-14    Description: Tan Brown Fine to Medium SAND    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 111.40    pcf    Uncorrected Opt. MC: 8.30    %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
4	SUB Tested 51ft N, 40ft W from SE corner of quad 10	-1.50	5.390	1.110	4.280	.0341	125.5	200.00	176.10	13.5	110.5	D4S-14	99.1	95	P
6	SUB Tested 60ft N, 15ft W from SE corner of quad #9	-1.50	5.330	1.110	4.220	.0341	123.8	200.00	176.70	13.1	109.3	D4S-14	98.1	95	P

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy SILT    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
7	CAP Retest of #2	-1.00	4.950	1.110	3.840	.0341	112.6	200.00	158.40	26.2	89.1	D4S-6	97.4	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: moisture low, needs more water. -----

Sample D4S-12 Test 2: Moisture low, needs more water. ----- Sample D4S-12 Test 3:

Moisture low

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 12/01/12 Saturday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 53°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
SILT    (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP Tested 16ft S, 43ft W from NE corner of quad #10	-1.00	5.040	1.110	3.930	.0341	115.3	200.00	155.20	28.8	89.4	D4S-12	97.9	95	P
2	CAP Tested 63ft N, 18ft W from SE corner of quad #10	-1.00	5.110	1.110	4.000	.0341	117.3	200.00	159.10	25.7	93.3	D4S-12	102.2	95	F
3	CAP Retest of #2	-1.00	5.080	1.110	3.970	.0341	116.4	200.00	155.10	28.9	90.2	D4S-12	98.8	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 2: Moisture too low, add water, roll and retest.

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 7, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

Materials Engineering Division Reports

For your use

As requested

ENCL:

Field Report # 35	12/04/2012	Soil Density
Field Report # 36	12/05/2012	Soil Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 12/04/12 Tuesday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 65°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698) SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 20ft S, 10ft E from NW corner of quad #10	-1.00	4.880	1.110	3.770	.0341	110.6	200.00	162.40	23.1	89.8	D4S-12	98.3	95	F
2	CAP 25ft N, 11ft E from SW corner of quad #10	-1.00	4.970	1.110	3.860	.0341	113.2	200.00	155.70	28.4	88.1	D4S-12	96.5	95	P
3	Retest of #1 in quad #10	-1.00	5.040	1.110	3.930	.0341	115.3	200.00	156.00	28.2	89.9	D4S-12	98.5	95	P
4	CAP 40ft E, 17ft S from NW corner of quad #9	-1.00	4.940	1.110	3.830	.0341	112.3	200.00	159.70	25.2	89.6	D4S-12	98.2	95	F
5	CAP 50ft N, 50ft W from SE corner of quad #9	-1.00	5.080	1.110	3.970	.0341	116.4	200.00	155.70	28.4	90.6	D4S-12	99.2	95	P
6	Retest of #4 in quad #9	-1.00	5.080	1.110	3.970	.0341	116.4	200.00	156.00	28.2	90.7	D4S-12	99.4	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Moisture low, needs water. ----- Sample

D4S-12 Test 4: Moisture low, area needs water.





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 12/05/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 59°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 55ft N, 18ft W from SE corner of quad 12	-0.50	5.050	1.110	3.940	.0341	115.5	200.00	160.30	24.7	92.5	D4S-12	101.3	95	F
2	CAP 74ft N, 11ft W from SE corner of quad 11	0.50	5.010	1.110	3.900	.0341	114.4	200.00	161.20	24.0	92.2	D4S-12	100.9	95	F
3	47ft S, 10ft W from NE corner of quad 11	-0.50	5.160	1.110	4.050	.0341	118.8	200.00	154.70	29.2	91.8	D4S-12	100.6	95	P
4	Retest of #1	-0.50	5.030	1.110	3.920	.0341	115.0	200.00	155.30	28.7	89.2	D4S-12	97.8	95	P
5	Retest of #2	-0.50	5.060	1.110	3.950	.0341	115.8	200.00	151.30	32.1	87.6	D4S-12	95.9	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Moisture low, needs watering. ----- Sample D4S-12 Test 2: Moisture low, needs watering.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 7, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

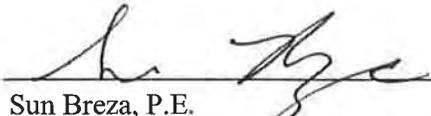
ENCL:

Field Report # 37

12/06/2012

Soil Density

Non Compliance

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 12/06/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 24ft S 44ft E from NW corner of quad 11	-0.50	5.130	1.110	4.020	.0341	117.9	200.00	160.90	24.3	94.8	D4S-12	103.8	95	F
2	CAP Retest of 1 after watering.	-0.50	5.100	1.110	3.990	.0341	117.0	200.00	154.40	29.5	90.3	D4S-12	98.9	95	P
3	CAP 22ft E, 58ft N from SW cor of quad 11	-0.50	4.970	1.120	3.850	.0341	112.9	200.00	154.80	29.1	87.3	D4S-12	95.7	95	P
4	CAP 15ft S, 15ft W from NE corner of quad 10	-0.50	5.120	1.110	4.010	.0341	117.6	200.00	156.30	27.9	91.9	D4S-12	100.6	95	P
5	CAP 15ft S, 19ft W from NE corner of quad 10	-0.50	4.990	1.110	3.880	.0341	113.8	200.00	154.90	29.1	88.1	D4S-12	96.5	95	P
6	CAP 46ft N, 120ft W from SE corner of quad 10	-0.50	4.990	1.120	3.870	.0341	113.5	200.00	159.60	25.3	90.5	D4S-12	99.2	95	F

\*reobservation

Additional comments: Sample D4S-12 Test 1: compaction high, moisture low needs watering. ----- Sample D4S-12 Test 6: Moisture low needs more water. ----- Sample D4S-12 Test 7: Moisture low, needs more water



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 12/06/12 Thursday  
**Weather / Temp:** 38°F Sunny

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698)

SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
7	CAP 40ft N, 11ft W from SE corner of quad 10	-0.50	5.120	1.120	4.000	.0341	117.3	200.00	157.80	26.7	92.5	D4S-12	101.3	95	F

\*reobservation

Additional comments: Sample D4S-12 Test 1: compaction high, moisture low needs watering. ----- Sample D4S-12 Test 6: Moisture low needs more water. ----- Sample D4S-12 Test 7: Moisture low, needs more water

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 10, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 38	12/07/2012	Soil Density
Field Report # 39	12/08/2012	Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 12/07/12 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 50°F Rain

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.30    pcf    Uncorrected Opt. MC: 28.00    %  
(ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Retest of #7 on 12-6-12 on quad #10	-0.50	4.930	1.120	3.810	.0341	111.7	200.00	155.70	28.4	86.9	D4S-12	95.2	95	P
2	Retest of #8 on 12-6-12 on quad #10	-0.50	5.020	1.120	3.900	.0341	114.4	200.00	156.00	28.2	89.2	D4S-12	97.7	95	P
3	CAP 23ft E, 35ft S from NW corner of quad #10	-0.50	5.000	1.120	3.880	.0341	113.8	200.00	156.20	28.0	88.8	D4S-12	97.3	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP





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**ECS Carolinas, LLP**

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Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 11, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 40

12/10/2012

Soil Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 12/10/12 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 58°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 24ft W, 40ft N from SE corner of quad 11	0.00	4.950	1.120	3.830	.0341	112.3	200.00	160.80	24.3	90.2	D4S-6	98.6	95	F
2	CAP 35ft N, 48ft W from SE corner of quad 12	0.00	5.040	1.120	3.920	.0341	115.0	200.00	159.70	25.2	91.8	D4S-6	100.3	95	F
3	Retest of #2	0.00	4.990	1.120	3.870	.0341	113.5	200.00	156.30	27.9	88.7	D4S-6	96.9	95	P
4	Retest of #1	0.00	5.000	1.120	3.880	.0341	113.8	200.00	157.60	26.9	89.6	D4S-6	98.0	95	P

\*reobservation

Additional comments: Sample D4S-6 Test 1: Moisture low. lift needs watering. -----

Sample D4S-6 Test 2: Moisture low. lift needs watering.

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**ECS Carolinas, LLP**

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(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 13, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 41	12/11/2012	Soil Density
Field Report # 42	12/12/2012	Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 12/11/12 Tuesday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 58°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    % (ASTM D-698)    SILT															
1	CAP 28ft S, 37ft E from NW corner of quad #11	0.00	4.970	1.120	3.850	.0341	112.9	200.00	156.50	27.7	88.3	D4S-6	96.5	95	P
2	CAP 76ft N, 14ft E from NW corner of quad #11	0.00	5.050	1.120	3.930	.0341	115.3	200.00	155.70	28.4	89.7	D4S-6	98.0	95	P
3	CAP 26ft W, 13ft S from NE corner of quad #10.	0.00	5.140	1.120	4.020	.0341	117.9	200.00	155.00	29.0	91.3	D4S-6	99.8	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 12/12/12

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 45°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 51ft N, 100ft W from NE corner of quad #10	0.00	4.950	1.120	3.830	.0341	112.3	200.00	157.30	27.1	88.3	D4S-6	96.5	95	P
2	CAP 31ft S, 44ft E from NW corner of quad #10	0.00	4.910	1.120	3.790	.0341	111.1	200.00	156.30	27.9	86.8	D4S-6	94.8	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

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**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 16, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

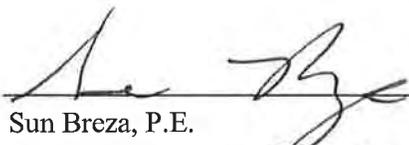
- Materials Engineering Division Reports
- For your use
- As requested

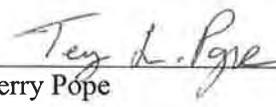
ENCL:

Field Report # 43

12/13/2012

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 12/13/12 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 77ft N, 18ft E from SW corner of quad 10	0.00	4.920	1.120	3.800	.0341	111.4	200.00	152.00	31.5	84.6	D4S-6	92.5	95	F
2	CAP 12ft W, 55ft N from SE corner of quad 9	0.00	4.810	1.120	3.690	.0341	108.2	200.00	154.00	29.8	83.3	D4S-6	91.0	95	F
3	Retest of #1	0.00	4.890	1.120	3.770	.0341	110.6	200.00	157.60	26.9	87.1	D4S-6	95.2	95	P
4	Retest of #2	0.00	4.870	1.120	3.750	.0341	110.0	200.00	158.40	26.2	87.1	D4S-6	95.2	95	P

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %

SILT

\*reobservation

Additional comments: Sample D4S-6 Test 1: Compaction low, roll area more. -----

Sample D4S-6 Test 2: Compaction low, roll area more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

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**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 21, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 44

12/19/2012

Cancellation

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

December 21, 2012

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

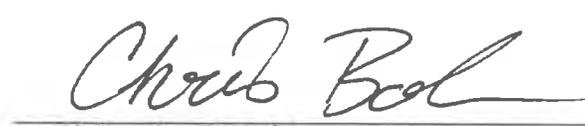
We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 45	12/20/2012	Proofroll
Field Report # 46	12/21/2012	Proofroll/Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Christopher K. Bolen  
Team Leader



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**FIELD REPORT**

Project **White Street Landfill Phase II 12.040**  
Location **Greensboro, NC**  
Client **Triangle Grading and Paving, Inc. - Steve Martin**  
Contractor **Triangle Grading and Paving, Inc. - Steve Martin**

Project No. **09:21579**  
Report No. **45**  
Day & Date **Thursday 12/20/2012**  
Weather **47°/ Cloudy**  
On-Site Time **3.00**  
Lab Time **0.00**  
Travel Time\* **1.00**  
Total **4.00**  
Re Obs.Time **0.00**

Remarks **Proofroll**

Trip Charges*	Tolls/Parking*	Mileage*	<b>52</b>	Times of Arrival	Departure
				<b>08:15A</b>	<b>08:45A</b>
Chargeable Items				<b>01:00P</b>	<b>03:30P</b>

\* Travel time and mileage will be billed in accordance with the contract.

**Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.**

The undersigned arrived on site, as requested, to observe the proofrolling of quadrants 6 and 7.

These areas were still too wet and the proofroll was scheduled for later in the day.

The undersigned returned to the site to observe the proofrolling a section of quadrant 2. Please see the attached sketch for locations of proofroll.

Using a 544-C frontend loader with the bucket fully loaded, the identified area was proofrolled and no visible signs of pumping or rutting were observed.



SUBGRADE QUAD #2  
PROFFER

PHASE II  
MIS

21079  
G CHAISSA  
12-20-12  
233157

EXISTING 12' x 4'  
SLOPE (TO REMAIN)

EXISTING 12' x 4'  
SLOPE (TO REMAIN)

CLOSURE AREA (4.40)

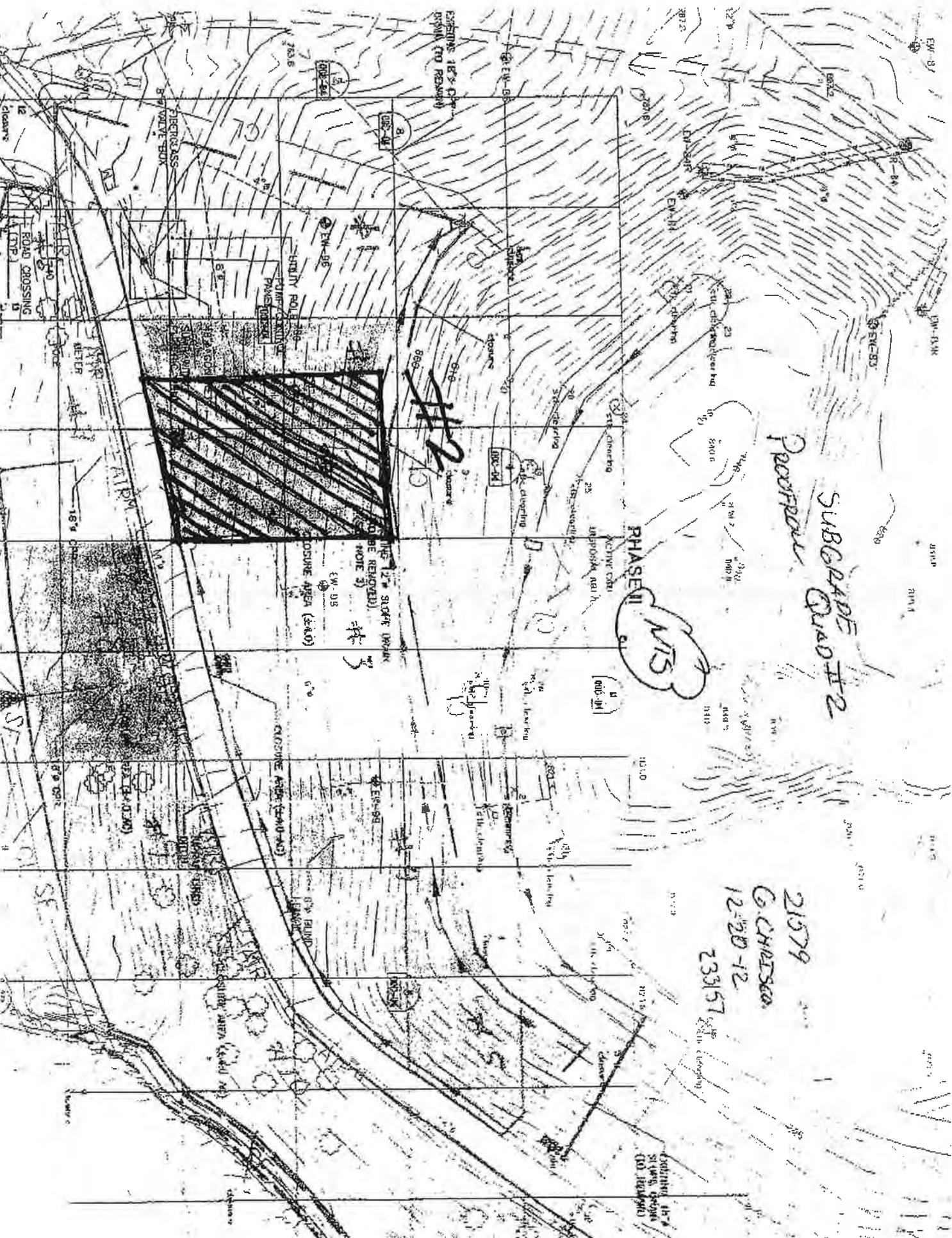
CLOSURE AREA (240.40)

CLOSURE AREA (4.40)

CLOSURE AREA (4.40)

CLOSURE AREA (4.40)

CLOSURE AREA (4.40)







# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 12/21/12 Friday  
**Weather / Temp:** 42°F Cloudy

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
2	Tested 57ft N, 32ft E from SW corner of quadrant #2 Subgrade	-1.50	5.270	1.070	4.200	.0342	122.8	200.00	166.60	20.0	102.2	D4S-13	97.3	95	P

Sample: D4S-19 Description: Tan Brown Silty Fine to Medium SAND Proctor Method: Standard Proctor Uncorrected Max. Density: 111.40 pcf Uncorrected Opt. MC: 14.50 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Tested 141ft N, 14ft E from SW corner of quadrant #2 Subgrade	-1.50	5.420	1.070	4.350	.0342	127.2	200.00	171.70	16.4	109.2	D4S-19	98.0	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 7, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

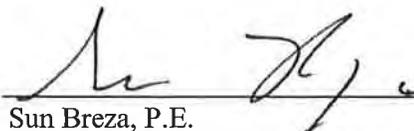
Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 47	01/04/2013	Soil Density
Field Report # 48	01/05/2013	Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/04/13 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 28°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Silty Proctor Method: Standard Proctor Method Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
2	Subgrade 56ft N, 25ft W from SE corner of quadrant #2	-18.00	5.260	1.070	4.190	.0342	122.5	200.00	166.40	20.1	101.9	D4S-13	96.9	95	P

Sample: D4S-19 Description: Tan Brown Silty Fine to Medium SAND Proctor Method: Standard Proctor Uncorrected Max. Density: 111.40 pcf Uncorrected Opt. MC: 14.50 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	Subgrade 134ft N, 68ft W from SE corner of quadrant #2	-18.00	5.460	1.070	4.390	.0342	128.4	200.00	177.90	12.4	114.2	D4S-19	102.5	95	P

\*reobservation

Additional comments:





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/05/13 Saturday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 28°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 62ft S, 22ft E from NW corner of quadrant #2	-1.50	4.990	1.070	3.920	.0342	114.6	200.00	155.70	28.4	89.2	D4S-12	97.7	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

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(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 8, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 49

01/07/2013

Density/Proofroll

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager







# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 01/07/13 Monday  
**Weather / Temp:** 38°F Sunny

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %

SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
2	CAP 79ft E, 50ft N from SW corner of quad #2	-1.00	4.970	1.070	3.900	.0342	114.0	200.00	154.00	29.8	87.7	D4S-12	96.1	95	P
3	CAP 70ft W, 60ft N from SE corner of quad #2	-1.00	5.060	1.070	3.990	.0342	116.7	200.00	159.60	25.3	93.1	D4S-12	102.0	95	F
4	Retest of #3	-1.00	4.980	1.070	3.910	.0342	114.3	200.00	154.50	29.4	88.2	D4S-12	96.7	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 3: Moisture low needs watering. ----- Sample D4S-13 Test 5: Had area rolled more.

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP



## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/07/13 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Silty SAND Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
5	SG 58ft E, 107ft N from SW corner of quad #4	-1.50	4.930	1.070	3.860	.0342	112.9	200.00	165.70	20.7	93.5	D4S-13	88.9	95	F
7	Retest of #5	-1.50	5.220	1.070	4.150	.0342	121.4	200.00	169.10	18.2	102.6	D4S-13	97.6	95	P

Sample: D4S-19 Description: Tan Brown Silty Fine to Medium SAND Proctor Method: ASTM D 698-07 Method A Standard Uncorrected Max. Density: 111.40 pcf Uncorrected Opt. MC: 14.50 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
6	SG 32ft E, 48ft N from SW corner of quad #4	-1.50	5.450	1.070	4.380	.0342	128.1	200.00	166.00	20.4	106.3	D4S-19	95.4	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 3: Moisture low needs watering. ----- Sample D4S-13 Test 5: Had area rolled more.



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 01/07/13 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-3      Description: Red Brown Fine Sandy SILT      Proctor Method: Standard Proctor Method      Uncorrected Max. Density: 82.10      pcf      Uncorrected Opt. MC: 35.50      %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 57ft S, 20ft W from NE corner of quad #2	-1.00	4.750	1.070	3.680	.0342	107.6	200.00	147.00	36.0	79.0	D4S-3	96.3	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 3: Moisture low needs watering. ----- Sample D4S-13 Test 5: Had area rolled more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 10, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

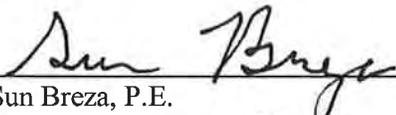
Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 50	01/08/2013	Soil Density
Field Report # 51	01/09/2013	Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 01/08/13 Tuesday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 54°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
(ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 90ft N, 19ft E from SW corner of quad #2	-0.50	4.940	1.070	3.870	.0342	113.2	200.00	159.20	25.6	90.1	D4S-6	98.4	95	P
2	CAP 63ft S, 65ft E from NW corner of quad #2	-0.50	4.950	1.070	3.880	.0342	113.5	200.00	158.90	25.8	90.1	D4S-6	98.5	95	P
3	CAP 60ft N, 62ft W from SE corner of quad #2	-0.50	4.980	1.070	3.910	.0342	114.3	200.00	159.30	25.5	91.0	D4S-6	99.4	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP





ECS CAROLINAS, LLP

# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 01/09/13

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 40°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
SILT    (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 32ft N, 43ft W from SE corner of quad #2	-0.50	4.920	1.070	3.850	.0342	112.6	200.00	158.90	25.8	89.4	D4S-6	97.7	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 12, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 52

01/10/2013

Soil Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 01/10/13 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 50°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 39ft S, 32ft E from NW corner of quadrant #2	0.00	4.900	1.100	3.800	.0341	111.4	200.00	159.30	25.5	88.7	D4S-6	96.9	95	P
2	CAP 33ft N, 98ft E from SW corner of quadrant #2	0.00	4.690	1.100	3.590	.0341	105.3	200.00	156.90	27.4	82.6	D4S-6	90.2	95	F
3	Retest of #2	0.00	5.040	1.100	3.940	.0341	115.5	200.00	158.50	26.1	91.5	D4S-6	100.0	95	P
4	CAP 50ft S, 22ft W from NE corner of quadrant #2	0.00	4.960	1.100	3.860	.0341	113.2	200.00	154.80	29.1	87.6	D4S-6	95.7	95	P
5	CAP 55ft N, 65ft W from SE corner of quadrant #2	0.00	5.000	1.100	3.900	.0341	114.4	200.00	157.30	27.1	89.9	D4S-6	98.3	95	P

\*reobservation

Additional comments: Sample D4S-6 Test 2: Had area rolled again.

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 15, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

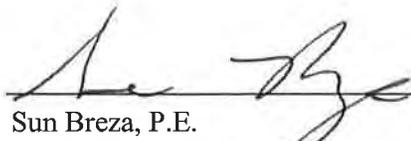
- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 53

01/14/2013

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/14/13 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 60°F Rain

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
(ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 28ft N, 23ft W from SE corner of quadrant #4	-1.00	5.030	1.100	3.930	.0341	115.3	200.00	155.80	28.3	89.8	D4S-6	98.1	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 24, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

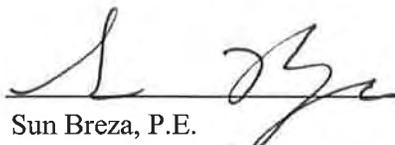
- Materials Engineering Division Reports
- For your use
- As requested

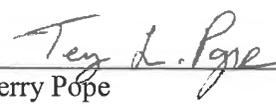
ENCL:

Field Report # 54

01/22/2013

Soil Density/PR

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager







# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 01/22/13 Tuesday  
**Weather / Temp:** 32°F Sunny

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
SILT    (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 30ft S, 20ft W from NW corner of quadrant #4	-1.00	4.930	1.100	3.830	.0341	112.3	200.00	149.50	33.7	83.9	D4S-6	91.7	95	F
2	Retest of #1	-1.00	4.990	1.100	3.890	.0341	114.1	200.00	156.80	27.5	89.4	D4S-6	97.7	95	P
3	CAP 65ft E, 25ft N from SW corner of quadrant #4	-0.50	5.020	1.100	3.920	.0341	115.0	200.00	154.60	29.3	88.8	D4S-6	97.1	95	P
4	CAP 20ft N, 25ft E from SW corner of quadrant #4	-0.50	5.050	1.100	3.950	.0341	115.8	200.00	156.60	27.7	90.6	D4S-6	99.0	95	P

\*reobservation

Additional comments: Sample D4S-6 Test 1: Soils wet/ low compaction. Mike with Triangle pushed off the wet soils and put dryer soil back in.



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 24, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

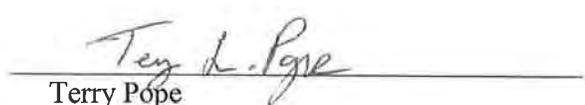
ENCL:

Field Report # 55

01/23/2013

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/23/13

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 30°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-13 Description: Tan Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 105.10 pcf Uncorrected Opt. MC: 16.10 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
3	Subgrade 62ft S, 76ft E from NW corner of quad #9	-1.50	5.270	1.100	4.170	.0341	122.3	200.00	168.70	18.5	103.1	D4S-13	98.1	95	P
4	Subgrade 36ft N, 35ft E from SW corner of quadrant #9	-1.50	5.310	1.100	4.210	.0341	123.5	200.00	168.70	18.5	104.1	D4S-13	99.1	95	P
5	Subgrade 94ft W, 32ft N from SE corner of quadrant #9	-1.50	5.270	1.100	4.170	.0341	122.3	200.00	163.60	22.2	100.0	D4S-13	95.1	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 01/23/13

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 30°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
(ASTM D-698)

SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 98ft N, 62ft W from SE corner of quad #4	0.00	5.050	1.100	3.950	.0341	115.8	200.00	154.80	29.1	89.6	D4S-6	97.9	95	P
2	CAP 19ft E, 74ft N from SW corner of quad #4	0.00	5.010	1.100	3.910	.0341	114.7	200.00	156.80	27.5	89.9	D4S-6	98.2	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 25, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

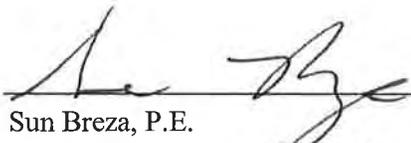
- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 56

01/24/2013

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/24/13 Thursday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 30°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 30ft N, 60ft W from SE corner of quad #9	-1.00	4.920	1.100	3.820	.0341	112.0	200.00	156.20	28.0	87.4	D4S-6	95.5	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 28, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

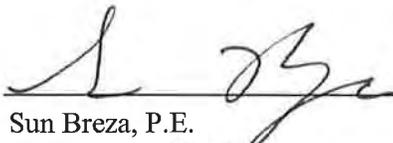
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- As requested

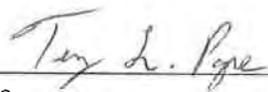
ENCL:

Field Report # 57

01/25/2013

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/25/13 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 23°F Snow

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
SILT    (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 50ft E, 30ft N from SW corner of quadrant #9	-1.00	4.870	1.100	3.770	.0341	110.6	200.00	158.30	26.3	87.5	D4S-6	95.6	95	P
2	CAP 80ft E, 20ft S from NW corner of quadrant #9	-1.00	5.110	1.100	4.010	.0341	117.6	200.00	155.30	28.7	91.3	D4S-6	99.7	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

January 31, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

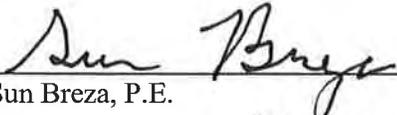
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ENCL:

Field Report # 58

01/30/2013

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 01/30/13

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 64°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 60ft S, 70ft W from NE corner of quadrant 9	-0.50	5.050	1.100	3.950	.0341	115.8	200.00	157.00	27.3	90.9	D4S-6	99.3	95	P
2	CAP 55ft S, 69ft E from NW corner of quadrant 9	-5.00	4.940	1.100	3.840	.0341	112.6	200.00	158.80	25.9	89.4	D4S-6	97.7	95	P
3	CAP 79ft S, 22ft E from NW corner of quadrant 9	-0.50	4.960	1.100	3.860	.0341	113.2	200.00	157.50	26.9	89.1	D4S-6	97.4	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 1, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

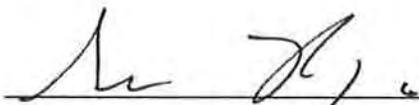
- Materials Engineering Division Reports
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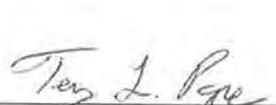
ENCL:

Field Report # 59

01/31/2013

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 6, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

Materials Engineering Division Reports

For your use

As requested

ENCL:

Field Report # 60

02/04/2013

Soil Density/PR

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

## FIELD REPORT

Project No. **09:21579**

Report No. **60**

Day & Date **Monday 02/04/2013**

Project **White Street Landfill Phase II 12.040**

---

location.

A site meeting will be held on February 5, 2013 to discuss the wet areas that proofrolled poorly.

A permeability test tube was taken today 63ft west and 70ft south from northeast corner of quadrant #9 and returned the ECS laboratory for testing.



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 02/04/13 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 29°F Cloudy

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

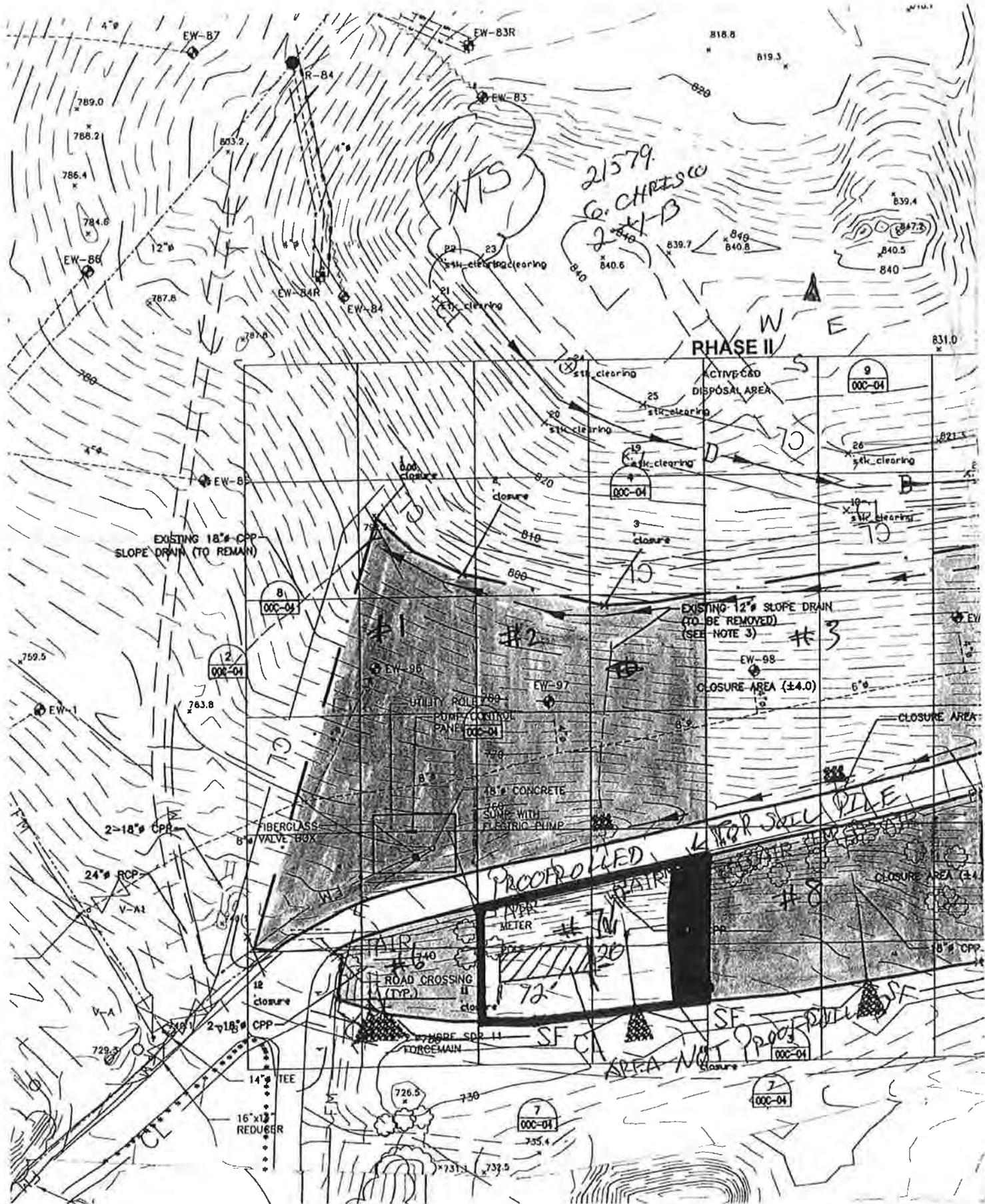
Sample: D4S-19 Description: Tan Brown Silty Fine to Medium SAND Proctor Method: ASTM D 698-07 Method A Standard Uncorrected Max. Density: 111.40 pcf Uncorrected Opt. MC: 14.50 %

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	SG 80ft S, 78ft W from NE corner of quadrant #8	-1.50	5.400	1.100	4.300	.0341	126.1	200.00	171.90	16.3	108.3	D4S-19	97.2	95	P
2	SG 25ft N, 32ft E from SW corner of quadrant #8	-1.50	5.310	1.100	4.210	.0341	123.5	200.00	177.90	12.4	109.8	D4S-19	98.6	95	P

\*reobservation

Additional comments:

Print Name: Terry G. Chrisko  
ECS CAROLINAS, LLP



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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 8, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

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- For your use
- As requested

ENCL:

Field Report # 61

02/07/2013

Bridge Lift

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**FIELD REPORT**

Project **White Street Landfill Phase II 12.040**  
Location **Greensboro, NC**  
Client **Triangle Grading and Paving, Inc. - Steve Martin**  
Contractor **Triangle Grading and Paving, Inc. - Steve Martin**

Project No. **09:21579**  
Report No. **61**  
Day & Date **Thursday 02/07/2013**  
Weather **38°/ Cloudy**  
On-Site Time **1.75**  
Lab Time **0.00**  
Travel Time\* **1.00**  
Total **2.75**  
Re Obs.Time **0.00**

Remarks **Bridge Lift**

Trip Charges*	Tolls/Parking*	Mileage*	<b>28</b>	Times of Arrival	Departure
				<b>07:45A</b>	<b>08:45A</b>
Chargeable Items				<b>03:30P</b>	<b>04:15P</b>

\* Travel time and mileage will be billed in accordance with the contract.

**Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.**

The undersigned arrived on site, as requested, to observe placement of bridge material on quadrants 7 and 8. Upon arrival, the undersigned observed the placement of material in two nine inch lifts with tracked equipment.

The undersigned returned to the site to observe progress, and both quadrants were completed. The soils were placed in nine inch lifts and appeared stable.



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 18, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

Materials Engineering Division Reports

For your use

As requested

ENCL:

Field Report # 62

02/15/2013

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 02/15/13 Friday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 55°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 70ft S, 25ft W from NE corner of quadrant #8	-1.00	5.100	1.100	4.000	.0341	117.3	200.00	158.00	26.5	92.6	D4S-6	101.2	95	P

\*reobservation

Additional comments:

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Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 19, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

Materials Engineering Division Reports

For your use

As requested

ENCL:

Field Report # 63

02/18/2013

Soil Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.** 21579

**Location:** Greensboro

**Day/Date:** 02/18/13 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
(ASTM D-698) SIL.T

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
3	CAP 33ft S, 23ft E from NW corner of quadrant #8	-1.00	5.010	1.100	3.910	.0341	114.7	200.00	148.50	34.6	85.1	D4S-12	93.2	95	F
4	Retest of #3	-1.00	5.020	1.100	3.920	.0341	115.0	200.00	151.70	31.8	87.2	D4S-12	95.5	95	P
7	CAP 30ft S, 75ft E from NW corner of quadrant #8	-0.50	4.980	1.100	3.880	.0341	113.8	200.00	154.60	29.3	87.9	D4S-12	96.3	95	P
8	CAP 60ft S, 23ft E from NW corner of quadrant #8	-0.50	5.000	1.100	3.900	.0341	114.4	200.00	152.60	31.0	87.2	D4S-12	95.6	95	P
9	CAP 55ft S, 25ft W from NE corner of quadrant #8	0.00	5.020	1.100	3.920	.0341	115.0	200.00	154.90	29.1	89.0	D4S-12	97.5	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 3: Had this area rolled more and retested.

Moisture high.



## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 02/18/13 Monday

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 38°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
 (ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 22ft S, 75ft W from NE corner of quadrant #8	-1.00	5.020	1.100	3.920	.0341	115.0	200.00	157.30	27.1	90.4	D4S-6	98.8	95	P
2	CAP 60ft S, 75ft E from NW corner of quadrant #8	-1.00	5.010	1.100	3.910	.0341	114.7	200.00	152.60	31.0	87.5	D4S-6	95.6	95	P
5	CAP 60ft S, 25ft W from NE corner of quadrant #8	-0.50	4.990	1.100	3.890	.0341	114.1	200.00	158.30	26.3	90.3	D4S-6	98.6	95	P
6	CAP 20ft N, 74ft W from SE corner of quadrant #8	-0.50	5.050	1.100	3.950	.0341	115.8	200.00	158.40	26.2	91.7	D4S-6	100.2	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 3: Had this area rolled more and retested.  
 Moisture high.

Print Name: Terry G. Chrisco  
 ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 21, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 64

02/20/2013

Soil Density

Sun Breza, P.E.  
Construction Services Manager

Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040

**Project No.:** 21579

**Location:** Greensboro

**Day/Date:** 02/20/13

**Client:** Triangle Grading and Paving, Inc.

**Weather / Temp:** 44°F Sunny

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6    Description: Red Brown Fine to Medium Sandy    Proctor Method: Standard Proctor Method    Uncorrected Max. Density: 91.50    pcf    Uncorrected Opt. MC: 25.90    %  
 (ASTM D-698)    SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 80ft W, 8ft S from NE corner of quadrant #8	0.00	4.830	1.100	3.730	.0341	109.4	200.00	163.00	22.6	89.1	D4S-6	97.4	95	F
2	CAP 75ft E, 40ft N from SW corner of quadrant #8	0.00	4.810	1.100	3.710	.0341	108.8	200.00	154.50	29.4	84.0	D4S-6	91.8	95	F
3	CAP 25ft E, 25ft S from NW corner of quadrant #8	0.00	4.780	1.100	3.680	.0341	107.9	200.00	157.00	27.3	84.7	D4S-6	92.5	95	F
4	Retest of #3	0.00	4.920	1.100	3.820	.0341	112.0	200.00	156.10	28.1	87.4	D4S-6	95.5	95	P
5	Retest of #2	0.00	5.000	1.100	3.900	.0341	114.4	200.00	153.60	30.2	87.8	D4S-6	96.0	95	P
6	Retest of #1	0.00	4.920	1.100	3.820	.0341	112.0	200.00	157.70	26.8	88.3	D4S-6	96.5	95	P
7	CAP Tested 73ft W, 24ft S from NE corner of quadrant #7	0.00	4.890	1.100	3.790	.0341	111.1	200.00	162.60	23.0	90.3	D4S-6	98.7	95	F

\*reobservation

Additional comments: Sample D4S-6 Test 1: Moisture low, area Needs to be watered. -----

Sample D4S-6 Test 2: Area needs to be rolled more. ----- Sample D4S-6 Test 3: Roll

area more. ----- Sample D4S-6 Test 7: Moisture low, area needs watering.

Print Name: Terry G. Chrisco  
 ECS CAROLINAS, LLP



ECS CAROLINAS, LLP

# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 02/20/13  
**Weather / Temp:** 44°F Sunny

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

\*reobservation

Additional comments: Sample D4S-6 Test 1: Moisture low, area Needs to be watered. -----  
Sample D4S-6 Test 2: Area needs to be rolled more. ----- Sample D4S-6 Test 3: Roll  
area more. ----- Sample D4S-6 Test 7: Moisture low, area needs watering.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 25, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

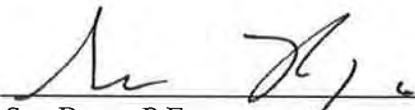
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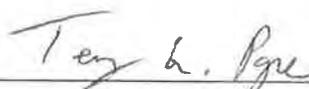
ENCL:

Field Report # 65

02/21/2013

Soil Density/PR

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager

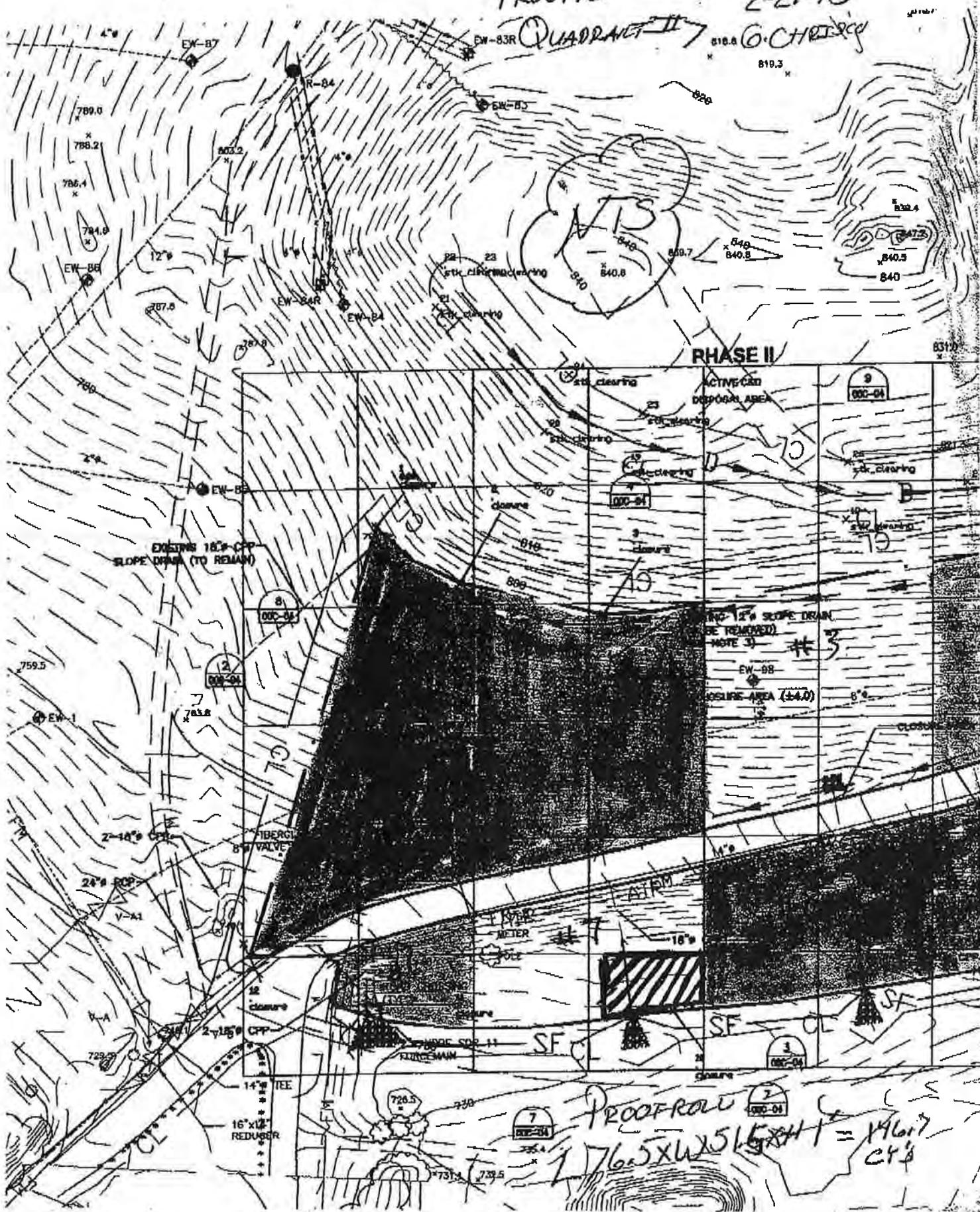


WHITE ST PROOFROLL

21579  
2-21-13

QUADRANT II

G. CHRISCO  
810.3





## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 02/21/13 Thursday  
**Weather / Temp:** 52°F Sunny

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
8	CAP 48ft S, 19ft E from NW corner of quad #6	-0.50	4.890	1.100	3.790	.0341	111.1	200.00	154.20	29.7	85.6	D4S-12	93.8	95	F
10	Retest of #8.	-0.50	4.990	1.100	3.890	.0341	114.1	200.00	153.30	30.4	87.4	D4S-12	95.7	95	P
12	CAP 17ft S, 78ft E from NW corner of quad #7	-0.50	5.070	1.100	3.970	.0341	116.4	200.00	152.10	31.4	88.5	D4S-12	96.9	95	P

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
 (ASTM D-698)  
 SILT

\*reobservation

Additional comments: Sample D4S-12 Test 8: Had area rolled more. ----- Sample D4S-6

Test 2: Had area rolled more. ----- Sample D4S-6 Test 3: Had area rolled more.



## Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 02/21/13 Thursday  
**Weather / Temp:** 52°F Sunny

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer. Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
 SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 15ft S, 20ft W from NE corner of quad #6	-1.00	5.050	1.100	3.950	.0341	115.8	200.00	157.80	26.7	91.3	D4S-6	99.8	95	P
2	CAP 61ft S, 10ft E from SW corner of quad #6	-1.00	4.880	1.100	3.780	.0341	110.9	200.00	155.30	28.7	86.1	D4S-6	94.1	95	F
3	CAP 10ft S, 14ft E from NW corner of quad #6	-1.00	4.890	1.100	3.790	.0341	111.1	200.00	153.20	30.5	85.1	D4S-6	93.0	95	F
4	Retest of #2	-1.00	4.920	1.100	3.820	.0341	112.0	200.00	155.00	29.0	86.8	D4S-6	94.8	95	P
5	Retest of #3	-1.00	5.040	1.100	3.940	.0341	115.5	200.00	152.40	31.2	88.0	D4S-6	96.1	95	P
6	Tested 73ft W, 24ft S from NE corner of quad #7	-1.00	5.030	1.100	3.930	.0341	115.3	200.00	158.00	26.5	91.0	D4S-6	99.5	95	P
7	CAP 18ft W, 18ft N from SE corner	-1.00	5.070	1.100	3.970	.0341	116.4	200.00	156.90	27.4	91.3	D4S-6	99.7	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 8: Had area rolled more. ----- Sample D4S-6

Test 2: Had area rolled more. ----- Sample D4S-6 Test 3: Had area rolled more.



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro

**Project No.** 21579  
**Day/Date:** 02/21/13 Thursday  
**Weather / Temp:** 52°F Sunny

**Client:** Triangle Grading and Paving, Inc.

**Permits:**

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method (ASTM D-698) Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 % SILT

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
	of quad #7														
9	CAP 8ft W, 18ft S from NE corner of quad #6	-0.50	5.100	1.100	4.000	.0341	117.3	200.00	157.00	27.3	92.0	D4S-6	100.6	95	P
11	CAP 22ft E, 30ft S from NW corner of quad #7	-0.50	5.100	1.100	4.000	.0341	117.3	200.00	157.10	27.3	92.1	D4S-6	100.6	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 8: Had area rolled more. ----- Sample D4S-6

Test 2: Had area rolled more. ----- Sample D4S-6 Test 3: Had area rolled more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 26, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

- Materials Engineering Division Reports
- For your use
- As requested

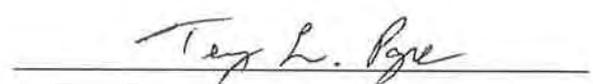
ENCL:

Field Report # 66

02/25/2013

Soil Density

  
Sun Breza, P.E.  
Construction Services Manager

  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 02/25/13 Monday  
**Weather / Temp:** 33°F Cloudy

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:  
 These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 %  
 SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 24ft S, 73ft W from NE corner of quad #7	-0.50	4.890	1.100	3.790	.0341	111.1	200.00	162.60	23.0	90.3	D4S-12	98.9	95	F
2	Retest of #1	-0.50	4.980	1.100	3.880	.0341	113.8	200.00	152.70	30.9	86.8	D4S-12	95.1	95	P
3	CAP 18ft S, 18ft W from NE corner of quad #7	0.00	5.000	1.100	3.900	.0341	114.4	200.00	152.80	30.8	87.4	D4S-12	95.7	95	P
6	CAP 78ft E, 50ft S from NW corner of quad #7	0.00	4.950	1.100	3.850	.0341	112.9	200.00	154.20	29.7	87.0	D4S-12	95.3	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Moisture low watered. ----- Sample D4S-6

Test 4: Rolled area more.

Print Name: Terry G. Chrisco  
 ECS CAROLINAS, LLP



# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 02/25/13 Monday  
**Weather / Temp:** 33°F Cloudy

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-6 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.50 pcf Uncorrected Opt. MC: 25.90 %  
 (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
4	CAP 30ft N, 24ft W from SE corner of quad #7	-0.50	4.890	1.100	3.790	.0341	111.1	200.00	144.50	38.4	80.2	D4S-6	87.7	95	F
5	Retest of #4.	-0.50	4.850	1.100	3.750	.0341	110.0	200.00	158.20	26.4	87.0	D4S-6	95.0	95	P
7	CAP 14ft N, 17ft E from SW corner of quad #7	0.00	4.960	1.100	3.860	.0341	113.2	200.00	155.70	28.4	88.1	D4S-6	96.3	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 1: Moisture low watered. ----- Sample D4S-6

Test 4: Rolled area more.

Print Name: Terry G. Chrisco  
 ECS CAROLINAS, LLP



**ECS Carolinas, LLP**

4811 Koger Boulevard  
Greensboro, NC 27407  
(336) 856-7150 [Phone]  
(336) 856-7160 [Fax]

**LETTER OF TRANSMITTAL**

NC Registered Engineering Firm # F-1078

February 28, 2013

Triangle Grading and Paving, Inc.  
PO Box 2570  
Burlington, NC 27216-2570

ATTN: Mr. Steve Martin

RE: **White Street Landfill Phase II 12.040**

ECS Job # **09:21579**

Permits:

Location: **2503 White Street  
Greensboro, NC**

We are enclosing:

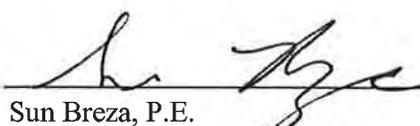
- Materials Engineering Division Reports
- For your use
- As requested

ENCL:

Field Report # 67

02/28/2013

Soil Density

  
\_\_\_\_\_  
Sun Breza, P.E.  
Construction Services Manager

  
\_\_\_\_\_  
Terry Pope  
Lab Manager





# Drive Tube Method Field Density Report

**Project:** White Street Landfill Phase II 12.040  
**Location:** Greensboro  
**Client:** Triangle Grading and Paving, Inc.  
**Permits:**

**Project No.** 21579  
**Day/Date:** 02/28/13 Thursday  
**Weather / Temp:** 33°F Sunny

The undersigned arrived on site, as requested, to perform compaction testing on soils utilizing the Drive Tube Method (ASTM D-2937). The locations and results of the tests performed on this date are as follows:

These results are preliminary until signed by an ECS Engineer, Field data, locations, and depths are estimates.

Sample: D4S-12 Description: Red Brown Fine to Medium Sandy Proctor Method: Standard Proctor Method Uncorrected Max. Density: 91.30 pcf Uncorrected Opt. MC: 28.00 % SILT (ASTM D-698)

Test No.	Test Location	Depth from Subgrade	Tube & Soil Weight	Tube Weight	Soil Weight	Tube Volume	Wet Unit Weight	Wet Weight	Dry Weight	Moisture	Dry Unit Weight	Proctor Number	Actual %	Spec. %	Pass or Fail
1	CAP 18ft W, 28ft N from SE corner of quad #7	-0.50	5.000	1.070	3.930	.0342	114.9	200.00	154.20	29.7	88.5	D4S-12	97.0	95	P
2	CAP 43ft S, 75ft W from NE corner of quad #7	0.00	4.900	1.070	3.830	.0342	112.0	200.00	151.50	32.0	84.8	D4S-12	92.9	95	F
3	Retest of #2	0.00	4.950	1.070	3.880	.0342	113.5	200.00	155.20	28.8	88.0	D4S-12	96.4	95	P
4	CAP 19ft W, 30ft N from SE corner of quad #7	0.00	4.950	1.070	3.880	.0342	113.5	200.00	153.70	30.1	87.2	D4S-12	95.5	95	P

\*reobservation

Additional comments: Sample D4S-12 Test 2: Rolled area more.

Print Name: Terry G. Chrisco  
ECS CAROLINAS, LLP

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## CQC Testing (ECS Carolinas, LLP)

Borrow Source Characterization Study



## Laboratory Testing Summary

Sample Source	Sample Number	Depth (inches)	MC <sup>1</sup> (%)	Soil Type <sup>2</sup>	Atterberg Limits <sup>3</sup>			Percent Passing No. 200 Sieve <sup>4</sup>	Moisture - Density (Corr.) <sup>5</sup>		CBR Value <sup>6</sup>	Permeability
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
On Site #13												
	D4S-3	30.00 - 30.00		MH	69	46	23	90.6	82.1	35.5		1.6E-07
On Site #7												
	D4S-2	30.00 - 30.00		MH	63	41	22	78.2	88.8	29.0		7.2E-07
On Site #2												
	D4S-1	30.00 - 30.00		MH	60	39	21	85.9	87.9	30.4		8.7E-08
On Site #16												
	D4S-4	30.00 - 30.00		MH	75	42	33	83.8	87.2	31.6		1.2E-07
On Site #11												
	D4S-10	30.00 - 30.00		CH	68	31	37	84.6	88.1	29.8		2.3E-07
On Site #6												
	D4S-7	36.00 - 36.00		MH	69	41	28	77.4	83.9	30.6		2.3E-07
On Site #1												
	D4S-5	24.00 - 24.00		MH	68	43	25	96.2	82.5	33.3		7.2E-08
On Site #9												
	D4S-8	36.00 - 36.00		CH	50	27	23	64.4	103.4	19.9		2.1E-07
On Site #3												
	D4S-6	30.00 - 30.00		MH	66	34	32	77.2	91.5	25.9		2.2E-06
On Site #15												
	D4S-12	0.00 - 0.00		MH	70	38	32	86.4	91.3	28.0		8.9E-07
On Site #10												
	D4S-9	30.00 - 30.00		MH	66	35	31	83.8	88.4	29.5		6.7E-07
On Site												

**Notes:** 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method  
**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 21579  
 Project Name: White Street Landfill Phase II 12.040  
 PM: Terry Pope  
 PE: Sun Breza  
 Printed On: Tuesday, October 02, 2012



**ECS Carolinas, LLP**  
  
Greensboro, NC

## Laboratory Testing Summary

Sample Source	Sample Number	Depth (inches)	MC <sup>1</sup> (%)	Soil Type <sup>2</sup>	Atterberg Limits <sup>3</sup>			Percent Passing No. 200 Sieve <sup>4</sup>	Moisture - Density (Corr.) <sup>5</sup>		CBR Value <sup>6</sup>	Permeability
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
#14	D4S-11	0.00 - 0.00		MH	64	34	30	75.1	91.5	27.5		2.5E-07

**Notes:** 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method  
**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

**Project No.** 21579  
**Project Name:** White Street Landfill Phase II 12.040  
**PM:** Terry Pope  
**PE:** Sun Breza  
**Printed On:** Tuesday, October 02, 2012



**ECS Carolinas, LLP**  
  
Greensboro, NC

## CQC Testing (ECS Carolinas, LLP)

### Test Summary



# Laboratory Testing Summary

Sample Source	Sample Number	Depth (feet)	MC <sup>1</sup> (%)	Soil Type <sup>2</sup>	Atterberg Limits <sup>3</sup>			Percent Passing No. 200 Sieve <sup>4</sup>	Moisture - Density (Corr.) <sup>5</sup>		CBR Value <sup>6</sup>	Permeability
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
Land Fill Test # 1												
	D4S-14	0.00 - 0.00	28.9	MH	52	36	16	63.7	109.3	16.9		
Lift 2 B-2												
	D4S-18	0.00 - 0.00	29.0	MH	59	40	19	70.0				
Lift 2 B-4												
	D4S-15	0.00 - 0.00	27.2	MH	61	36	25	74.5				
Lift 3 B-3												
	D4S-17	0.00 - 0.00	30.5	MH	54	38	16	70.6				
Lift 3 B-5												
	D4S-16	0.00 - 0.00	32.2	MH	54	35	19	77.2				
On Site												
	D4S-19	0.00 - 0.00	8.3	SM					111.4	14.5		
SOIL CAP												
	D4S-21	0.00 - 0.00		MH	50	37	13	72.4				
	D4S-20	0.00 - 0.00		MH	53	38	15	82.7				
	D4S-22	0.00 - 0.00		MH	51	39	12	73.5				

**Notes:** 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 21579  
 Project Name: White Street Landfill Phase II 12.040  
 PM: Terry Pope  
 PE: Sun Breza  
 Printed On: Tuesday, April 09, 2013



**ECS Carolinas, LLP**  
  
Greensboro, NC

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## CQC Testing (ECS Carolinas, LLP)

Hydraulic Conductivity





**ECS Carolinas, LLP**  
4811 Koger Blvd  
Greensboro, NC 27407  
Phone: (336) 856-7150  
Fax: (336) 856-7160  
www.ecslimited.com

**Measurement of Hydraulic Conductivity ASTM D 5084**

**JOB INFORMATION**

**NAME** White Street Landfill  
**NUMBER** 09-21579  
**DATE** 2/19/2013  
**ENGINEER** S. Breza

**SAMPLE INFORMATION**

**DESCRIPTION** Red Brown Fine Sandy SILT  
**LOCATION** Quadrant #8  
**BORING** Tube  
**DEPTH** Full Liner Test

**Sample Dimentions**

Diameter (in) 4.00  
Height (in) 4.58  
Area (in<sup>2</sup>) 12.566  
Volume (ft<sup>3</sup>) 0.033

**Proctor Values**

Max Dry  $\rho$  (lb/ft<sup>3</sup>)  
91.3  
Optimum Moisture %  
28.00%

**Percent Compaction**

96.1%

**Specific Gravity**

2.6

**Confining Pressure (psi)** 48.09  
**Top Burette Pressure (psi)** 45.60  
**Base Burette Pressure (psi)** 40.16

**Permeant Liquid**  
Water

**Average Hydraulic Conductivity (cm/sec)**  
3.7E-07



**ECS Carolinas, LLP**  
4811 Koger Blvd  
Greensboro, NC 27407  
Phone: (336) 856-7150  
Fax: (336) 856-7160  
www.ecslimited.com

**Measurement of Hydraulic Conductivity ASTM D 5084**

**JOB INFORMATION**

**NAME** White Street Landfill  
**NUMBER** 09-21579  
**DATE** 11/8/2012  
**ENGINEER** S. Breza

**SAMPLE INFORMATION**

**DESCRIPTION** Red Brown Fine Sandy SILT  
**LOCATION** Test Strip  
**BORING** Tube  
**DEPTH** Full Liner Test

**Sample Dimentions**

Diameter (in) 2.800  
Height (in) 5.250  
Area (in<sup>2</sup>) 6.158  
Volume (ft<sup>3</sup>) 0.019

**Proctor Values**

Max Dry  $\rho$  (lb/ft<sup>3</sup>)  
91.3  
Optimum Moisture %  
28.00%

**Percent Compaction**

96.1%

**Specific Gravity**

2.6

**Confining Pressure (psi)** 48.09  
**Top Burette Pressure (psi)** 45.12  
**Base Burette Pressure (psi)** 40.03

**Permeant Liquid**  
Water

**Average Hydraulic Conductivity (cm/sec)**  
3.4E-07



**ECS Carolinas, LLP**  
4811 Koger Blvd  
Greensboro, NC 27407  
Phone: (336) 856-7150  
Fax: (336) 856-7160  
www.ecslimited.com

**Measurement of Hydraulic Conductivity ASTM D 5084**

**JOB INFORMATION**

**NAME** White Street Landfill  
**NUMBER** 09-21579  
**DATE** 10/29/2012  
**ENGINEER** S. Breza

**SAMPLE INFORMATION**

**DESCRIPTION** Red Brown Fine Sandy SILT  
**LOCATION** Test Strip  
**BORING** Bulk  
**DEPTH** First Layer

<b>Sample Dimentions</b>		<b>Proctor Values</b>	<b>Remolded Values</b>	<b>Percent Compaction</b>
Diameter (in)	2.817	Max Dry $\rho$ (lb/ft <sup>3</sup> )	Dry $\rho$ (lb/ft <sup>3</sup> )	99.12%
Height (in)	5.621	91.3	90.5	<b>Specific Gravity</b>
Area (in <sup>2</sup> )	6.233	Optimum Moisture %	Optimum Moisture %	
Volume (ft <sup>3</sup> )	0.020	28.00%	28.38%	2.6
		<b>Confining Pressure (psi)</b>	48.37	
		<b>Top Burette Pressure (psi)</b>	44.83	
		<b>Base Burette Pressure (psi)</b>	39.90	
<b>Permeant Liquid</b>			<b>Average Hydraulic Conductivity (cm/sec)</b>	
Water			2.7E-07	



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Greensboro, NC 27407  
Phone: (336) 856-7150  
Fax: (336) 856-7160  
www.ecslimited.com

**Measurement of Hydraulic Conductivity ASTM D 5084**

**JOB INFORMATION**

**NAME** White Street Landfill  
**NUMBER** 09-21579  
**DATE** 10/29/2012  
**ENGINEER** S. Breza

**SAMPLE INFORMATION**

**DESCRIPTION** Red Brown Fine Sandy SILT  
**LOCATION** Test Strip  
**BORING** Bulk  
**DEPTH** Second Layer

<b>Sample Dimentions</b>		<b>Proctor Values</b>	<b>Remolded Values</b>	<b>Percent Compaction</b>
Diameter (in)	2.817	Max Dry $\rho$ (lb/ft <sup>3</sup> )	Dry $\rho$ (lb/ft <sup>3</sup> )	98.58%
Height (in)	5.621	91.3	90.0	<b>Specific Gravity</b>
Area (in <sup>2</sup> )	6.233	Optimum Moisture %	Optimum Moisture %	
Volume (ft <sup>3</sup> )	0.020	28.00%	28.00%	2.6
<b>Confining Pressure (psi)</b>			47.02	
<b>Top Burette Pressure (psi)</b>			45.05	
<b>Base Burette Pressure (psi)</b>			39.83	
<b>Permeant Liquid</b>		<b>Average Hydraulic Conductivity (cm/sec)</b>		
Water		9.7E-07		



**ECS Carolinas, LLP**  
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**Measurement of Hydraulic Conductivity ASTM D 5084**

**JOB INFORMATION**

**NAME** White Street Landfill  
**NUMBER** 09-21579  
**DATE** 10/29/2012  
**ENGINEER** S. Breza

**SAMPLE INFORMATION**

**DESCRIPTION** Red Brown Fine Sandy SILT  
**LOCATION** Test Strip  
**BORING** Bulk  
**DEPTH** Third Layer

<b>Sample Dimentions</b>		<b>Proctor Values</b>	<b>Remolded Values</b>	<b>Percent Compaction</b>
Diameter (in)	4.000	Max Dry $\rho$ (lb/ft <sup>3</sup> )	Dry $\rho$ (lb/ft <sup>3</sup> )	98.35%
Height (in)	4.580	91.3	89.8	<b>Specific Gravity</b>
Area (in <sup>2</sup> )	12.566	Optimum Moisture %	Optimum Moisture %	2.6
Volume (ft <sup>3</sup> )	0.033	28.00%	28.38%	
		<b>Confining Pressure (psi)</b>	47.93	
		<b>Top Burette Pressure (psi)</b>	45.23	
		<b>Base Burette Pressure (psi)</b>	40.35	
<b>Permeant Liquid</b>			<b>Average Hydraulic Conductivity (cm/sec)</b>	
Water			5.7E-07	

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## CQA Testing (HDR, Geotechnics)

Field Reports

Atterberg Limits

Moisture Content

Sieve Analysis

Hydraulic Conductivity



## CQA Testing (HDR, Geotechnics)

Field Reports





# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: 04/02/13	Day: Tuesday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 50	Min. 40	Clear	Other	None

**Contractor's Employees: Triangle Grading & Paving****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
0	No work performed today. Essentially complete.	0		
		0	Grand Total	

**Work Being Done**

Work Observed: Substantial Completion inspection today, therefore no work taking place. All slopes appear to be complete and have been recently seeded and covered with erosion control mat. Borrow area has been rough graded and seeded and mulched to satisfaction of City.

Work Not Observed, But in Progress:  
None

**Requested Revisions and/or Interpretations:**

None

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day:**

- Contractor to remove extra black pipe near lower slope.
- Contractor installed temporary mat instead of permanent mat in roadside ditch.
- Uncover buried pipe inlet at NW corner of Area 1.
- Remove and dispose of construction waste.
- Replace signs moved/damaged by construction.

**Remarks (over)**

None

HDR Field Representative: Tom Yanoschak

Distribution:  File  Project Manager  Resident



# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: 03/12/13	Day: Tuesday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 50	Min. 40	Clear	Other	None

**Contractor's Employees: Triangle Grading & Paving****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
0	No work due to recent rain.	0		
		0	Grand Total	

**Work Being Done**

Work Observed: No work taking place due to recent rain. Clay and topsoil placement is completed as well as drain extensions.

Work Not Observed, But in Progress:  
None

**Requested Revisions and/or Interpretations:**

None

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

Observed small erosion rills in topsoil in a few places and ponded water in upper terraces. Also observed red soil and no topsoil at tie-in along lower slope. These were brought up during progress meeting and Contractor indicated he would fix them.

**Remarks (over)**

None

HDR Field Representative: Tom Yanoschak

Distribution:  File  Project Manager  Resident



# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: 02/05/13	Day: Tuesday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 60	Min. 40	Overcast	Other	None

**Contractor's Employees: Triangle Grading & Paving****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
6	Grading and excavating.	2	Busy Black Trucking	Hauling
			Grand Total	7

**Work Being Done**

Work Observed: Clay is being placed in Area 2 and the remaining 1/2 of Area 4. Topsoil is being placed in Areas 10 and 11. Downdrains are being extended on the lower slope. Entire lower slope has been stripped. Soft/wet areas exist at base of slope that do not allow proofrolling. Observed borrow area and everything looks neat and orderly.

Work Not Observed, But in Progress:  
None

**Requested Revisions and/or Interpretations (over)**

City, HDR, and contractor discussed wet areas on lower slope and agreed to put 18" bridge lift to allow firm base to be constructed before the placement of clay. Bridge lift will have no density requirement but first lift of clay over bridge lift will have to meet density.

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

None.

**Remarks (over)**

None

HDR Field Representative: Tom Yanoschak

Distribution:  File  Project Manager  Resident



# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: 01/22/13	Day: Tuesday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 30	Min. 25	Clear/Cold	Other	None

**Contractor's Employees: Triangle Grading & Paving****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
6	Grading and excavating.	2	Busy Black Trucking	Hauling
			Grand Total	2

**Work Being Done**

Work Observed: Clay placement within Area 2 and the remaining 1/2 of Area 4. Topsoil being placed in areas where clay thickness has been certified (Areas 1,4,5, 10, 11, and 12). Recent rain has made much of site muddy, particularly the lower part of Areas 6, 7, and 8. Due to cold weather, ground is frozen in some areas. Contractor is waiting for sun to melt the ground before working in an area. The recent rains have overflowed the silt fence in areas but fence appears to be adequately repaired and contractor has removed sediment from behind silt fence and in areas where it has flowed past the silt fence. Some exposed clay has formed small rills due to rain. Contractor does not believe he can work tomorrow due to extreme cold.

**Work Not Observed, But in Progress:**

Borrow pit excavation.

**Requested Revisions and/or Interpretations (over)**

Gary Smith of Triangle showed me the wet areas within Areas 6, 7, and 8. We agreed that by next progress meeting a resolution will have to be developed to allow placement of the final cover in these wet areas.

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

Reported to contractor that small rills in exposed clay will have to be repaired before topsoil could be placed. Contractor agreed.

**Remarks (over)**

None

HDR Field Representative: Tom Yanoschak

Distribution:  File  Project Manager  Resident



# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: 01/08/13	Day: Tuesday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 60	Min. 40	Overcast	Other	None

**Contractor's Employees: Triangle Grading & Paving****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
6	Grading and excavating.	2	Busy Black Trucking	Hauling
			Grand Total	1

**Work Being Done**

Work Observed: Clay placement taking place in Area 2. Topsoil placement on upper slope in areas where clay thickness has been achieved. Exposed clay and topsoil appears to be in good condition considering recent rains. Topsoil being spread appears to meet spec with very little trash, debris, or oversize rocks. Lower slope in areas 6, 7, 8, and 9 is very wet and can not be worked in current condition. Downdrain pipes have been extended but not covered.

Work Not Observed, But in Progress:  
Borrow pit excavation.

**Requested Revisions and/or Interpretations (over)**

None

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

None. Contractor has repaired sedimentation at bottom of slope to satisfaction of City.

**Remarks (over)**

None

HDR Field Representative: Tom Yanoschak

Distribution:  File  Project Manager  Resident





# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: 11/27/12	Day: Tuesday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 55	Min. 50	Overcast	Other	None

**Contractor's Employees: Triangle Grading & Paving****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
2	Grading/excavation	1	Busy Black Trucking	Hauling
			Grand Total	1

**Work Being Done**

Work Observed: Clay placement is essentially complete in Areas 1, 3, ½ of 4, and 5. Areas 10, 11, and 12 have been stripped and proofrolled. Placement of first lift of clay beginning in areas 11 and 12. Triangle is waiting on Proctor for Area 10 before placement of clay within this area. Exposed clay looked to be in good condition with a few desiccation cracks observed. Told Mike Johnson surface of clay will have to be reworked to remove cracks before placement of topsoil. Observed stockpile area which appeared to be in good condition.

Work Not Observed, But in Progress:  
None

**Requested Revisions and/or Interpretations (over)**

None

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

Desiccation cracks observed in completed areas. Told Mike Johnson surface of clay will have to be reworked to remove cracks before placement of topsoil.

**Remarks (over)**

None

HDR Field Representative: Tom Yanoschak

Distribution:  File  Project Manager  Resident















# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: October 15, 2012	Day: Monday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 70	Min. 65	Clear X	Other	0.4"

**Contractor's Employees: Triangle Grading****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
6	Earthwork	1	ECS	CQC
			Grand Total	7

**Work Being Done**

Work Observed:

Hauling in fill material from the borrow source area, but no placement today due to rain. CQC agency attempted 2 density tests on subgrade but was unable to complete them due to the rain.

Work Not Observed, But in Progress:

None

**Requested Revisions and/or Interpretations (over)**

None

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

None

**Remarks (over)**

As contractor was beginning to place fill, heavy rain started in the AM. After a short waiting period, it was clear that the test pad subgrade was too wet and soft for fill placement so the contractor opted to stop test pad construction for the day and reschedule it. Contractor asked about the extent and depth of clay soil liner placement along the roadway ditch and how to handle the above grade drainage line inside the closure area. Contractor was informed later in the day that the above grade pipe is to be removed as shown in the plans and that the clay soil liner must extend to at least the centerline of the ditch with 18" thickness and taper out on the far side of the ditch to allow drainage.

HDR Field Representative: Mike Batten, EI

Distribution:  File  Project Manager  Resident





# Daily Field Report

Project Name: White Street Landfill Phase II Partial Closure	Date: October 5, 2012	Day: Friday
Project Owner: City of Greensboro	Contractor: Triangle Grading and Paving	
HDR Project No. 00018 109019 006	Address: 2503 White Street, Greensboro, NC	

**Weather Conditions:**

Temperature		Phenomena		Precipitation
Max. 70	Min. 58	Clear X	Other	0"

**Contractor's Employees: Triangle Grading****Subcontractor's Employees:**

No.	Craft	No.	Name	Craft
6	Earthwork	1	ECS	CQC
			Grand Total	7

**Work Being Done**

Work Observed:

Stripping of test pad area and proofroll of test pad subgrade.

Work Not Observed, But in Progress:

None

**Requested Revisions and/or Interpretations (over)**

None

**Construction Deficiencies Reported to Gen. Contractor This Day and/or Corrected This Day**

None

**Remarks (over)**

Discussed clay liner soil and testing specifications at length with Contractor and QC firm. Proofroll was performed with a fully loaded 10 wheel tandem axle dump truck. Intermediate cover subgrade soils appear stable during proofroll. Test pad construction was stopped once the Contractor determined that the QC firm does not have Proctor test results from the subgrade intermediate cover soil and the 95% compaction requirement could not be verified prior to fill placement on the test pad. Test pad construction is scheduled to resume Monday morning after Proctor test results have been completed on intermediate cover subgrade soil sampled today by QC firm.

HDR Field Representative: *Thomas M. Ganoschak*

Distribution:  File  Project Manager  Resident

## CQA Testing (HDR, Geotechnics)

Atterberg Limits



# TEST PAD



## ATTERBERG LIMITS

ASTM D 4318-10

Client	HDR ENGINEERING, INC.	Boring No.	NA
Client Reference	CITY OF GREENSBORO WHITE ST.	Depth (ft)	NA
Project No.	2012-753-01	Sample No.	B-1
Lab ID	2012-753-01-01	Soil Description	<b>RED ELASTIC SILT</b>

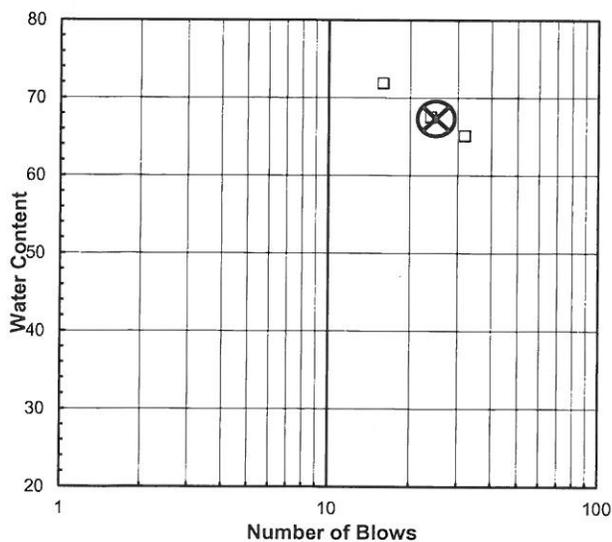
*Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.* (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	1	2	3	MULTIPOINT
Tare Number	M	P	H	
Wt. of Tare & WS (gm)	25.31	27.79	29.89	
Wt. of Tare & DS (gm)	21.31	22.74	23.71	
Wt. of Tare (gm)	15.16	15.25	15.10	
Wt. of Water (gm)	4.0	5.1	6.2	
Wt. of DS (gm)	6.2	7.5	8.6	
<b>Moisture Content (%)</b>	<b>65.0</b>	<b>67.4</b>	<b>71.8</b>	
<b>Number of Blows</b>	<b>32</b>	<b>24</b>	<b>16</b>	

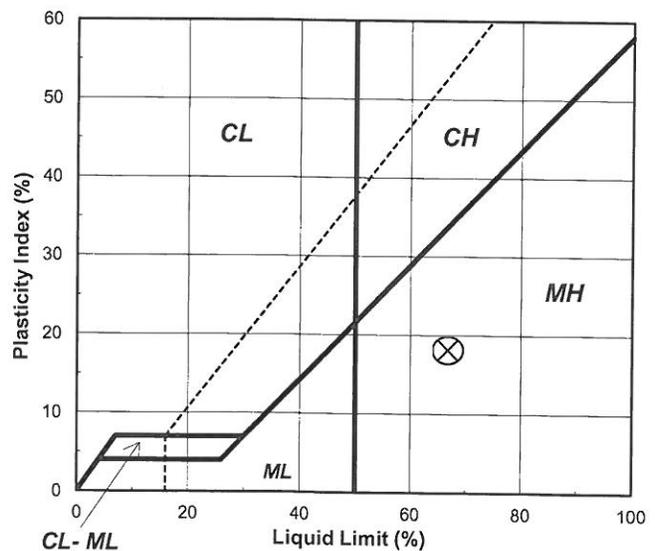
Plastic Limit Test	1	2	Range	Test Results
Tare Number	T	R		Liquid Limit (%) 67
Wt. of Tare & WS (gm)	23.37	22.70		Plastic Limit (%) 49
Wt. of Tare & DS (gm)	20.69	20.24		Plasticity Index (%) 18
Wt. of Tare (gm)	15.21	15.16		USCS Symbol MH
Wt. of Water (gm)	2.7	2.5		
Wt. of DS (gm)	5.5	5.1		
<b>Moisture Content (%)</b>	<b>48.9</b>	<b>48.4</b>	<b>0.5</b>	

*Note: The acceptable range of the two Moisture contents is ± 2.6*

Flow Curve



Plasticity Chart



Tested By BS Date 11.2.12 Checked By JRB Date 11-5-12

# TEST PAD



## ATTERBERG LIMITS

ASTM D 4318-10

Client	HDR ENGINEERING, INC.	Boring No.	NA
Client Reference	CITY OF GREENSBORO WHITE ST.	Depth (ft)	NA
Project No.	2012-753-01	Sample No.	B-2
Lab ID	2012-753-01-02	Soil Description	<b>RED ELASTIC SILT</b>

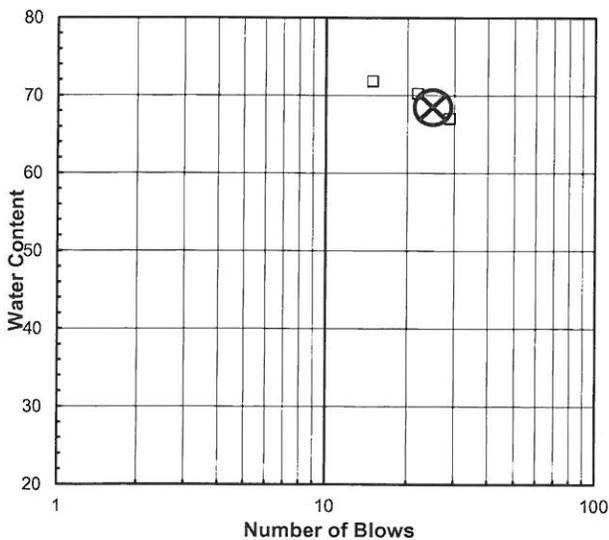
*Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus No. 40 sieve material, Airdried)*  
*See the "Sieve and Hydrometer Analysis" graph page for the complete material description.*

Liquid Limit Test	1	2	3	
Tare Number	17	Z-4	K	<b>M U L T I P O I N T</b>
Wt. of Tare & WS (gm)	27.76	28.75	26.45	
Wt. of Tare & DS (gm)	22.84	23.32	21.75	
Wt. of Tare (gm)	15.49	15.58	15.20	
Wt. of Water (gm)	4.9	5.4	4.7	
Wt. of DS (gm)	7.4	7.7	6.6	
<b>Moisture Content (%)</b>	<b>66.9</b>	<b>70.2</b>	<b>71.8</b>	<b>N</b>
<b>Number of Blows</b>	<b>29</b>	<b>22</b>	<b>15</b>	<b>T</b>

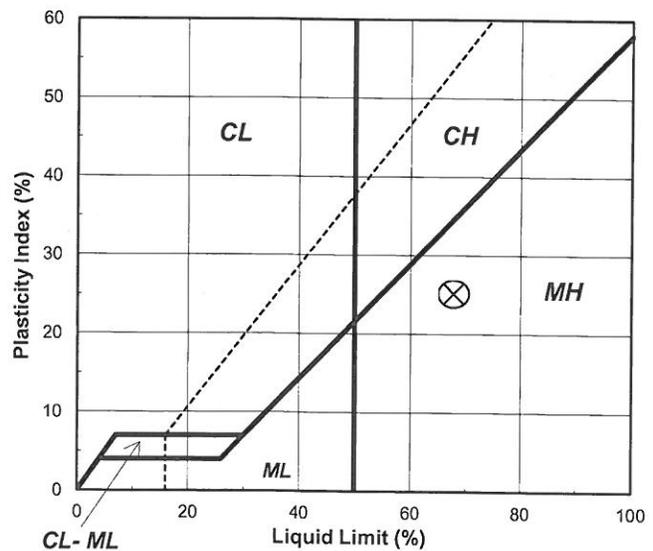
Plastic Limit Test	1	2	Range	Test Results	
Tare Number	V-2	A-O		Liquid Limit (%)	68
Wt. of Tare & WS (gm)	21.45	22.94		Plastic Limit (%)	43
Wt. of Tare & DS (gm)	19.71	20.69		Plasticity Index (%)	25
Wt. of Tare (gm)	15.64	15.41		USCS Symbol	MH
Wt. of Water (gm)	1.7	2.3			
Wt. of DS (gm)	4.1	5.3			
<b>Moisture Content (%)</b>	<b>42.8</b>	<b>42.6</b>	<b>0.1</b>		

*Note: The acceptable range of the two Moisture contents is ± 2.6*

Flow Curve



Plasticity Chart



Tested By BS Date 11.2.12 Checked By JRB Date 11.5.12

### ATTERBERG LIMITS

ASTM D 4318-10

Client	HDR ENGINEERING, INC.	Boring No.	2/18/13
Client Reference	GREENSBORO	Depth (ft)	NA
Project No.	2013-625-01	Sample No.	QUAD #8
Lab ID	2013-625-01-01	Soil Description	<b>RED ELASTIC SILT</b>

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

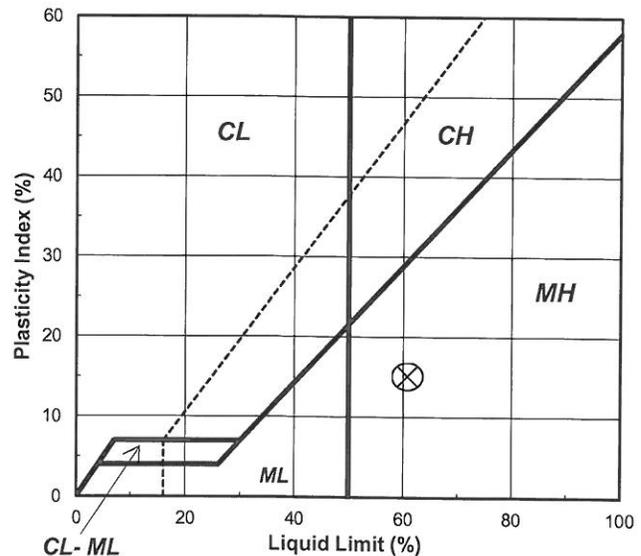
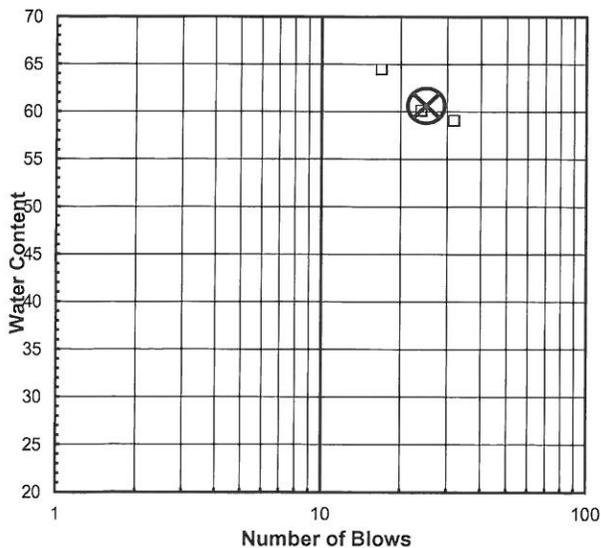
Liquid Limit Test	1	2	3	
Tare Number	1	W	S	M U L T I P O I N T
Wt. of Tare & WS (gm)	28.00	28.68	26.70	
Wt. of Tare & DS (gm)	23.42	23.61	22.20	
Wt. of Tare (gm)	15.66	15.17	15.21	
Wt. of Water (gm)	4.6	5.1	4.5	
Wt. of DS (gm)	7.8	8.4	7.0	
<b>Moisture Content (%)</b>	<b>59.0</b>	<b>60.1</b>	<b>64.4</b>	
<b>Number of Blows</b>	<b>32</b>	<b>24</b>	<b>17</b>	

Plastic Limit Test	1	2	Range	Test Results								
Tare Number	B3	1M		<table border="0"> <tr> <td>Liquid Limit (%)</td> <td>61</td> </tr> <tr> <td>Plastic Limit (%)</td> <td>46</td> </tr> <tr> <td>Plasticity Index (%)</td> <td>15</td> </tr> <tr> <td>USCS Symbol</td> <td>MH</td> </tr> </table>	Liquid Limit (%)	61	Plastic Limit (%)	46	Plasticity Index (%)	15	USCS Symbol	MH
Liquid Limit (%)	61											
Plastic Limit (%)	46											
Plasticity Index (%)	15											
USCS Symbol	MH											
Wt. of Tare & WS (gm)	22.16	22.01										
Wt. of Tare & DS (gm)	20.17	20.11										
Wt. of Tare (gm)	15.87	15.91										
Wt. of Water (gm)	2.0	1.9										
Wt. of DS (gm)	4.3	4.2										
<b>Moisture Content (%)</b>	<b>46.3</b>	<b>45.2</b>	<b>1.0</b>									

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

Flow Curve

Plasticity Chart



Tested By BS Date 2/22/13 Checked By GAM Date 2-25-13

page 1 of 1 DCN: CT-S4B DATE: 6/24/10 REVISION: 4

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## CQA Testing (HDR, Geotechnics)

Moisture Content



## MOISTURE CONTENT

ASTM D 2216-10

Client HDR ENGINEERING  
Client Reference CITY OF GREENSBORO WHITE ST.  
Project No. 2012-753-01

Lab ID	.001	.002
Boring No.	NA	NA
Depth (ft)	NA	NA
Sample No.	B-1	B-2
Tare Number	831	839
Wt. of Tare & WS (gm)	753.18	700.87
Wt. of Tare & DS (gm)	646.12	600.68
Wt. of Tare (gm)	262.31	257.66
Wt. of Water (gm)	107.06	100.19
Wt. of DS (gm)	383.81	343.02
<b>Water Content (%)</b>	<b>27.9</b>	<b>29.2</b>

Notes : NA

Tested By DW Date 10/31/2012 Checked By GEM Date 11-1-12

page 1 of 1

DCN: CT-S1 DATE 6-30-98 REVISION: 2

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## CQA Testing (HDR, Geotechnics)

### Sieve Analysis



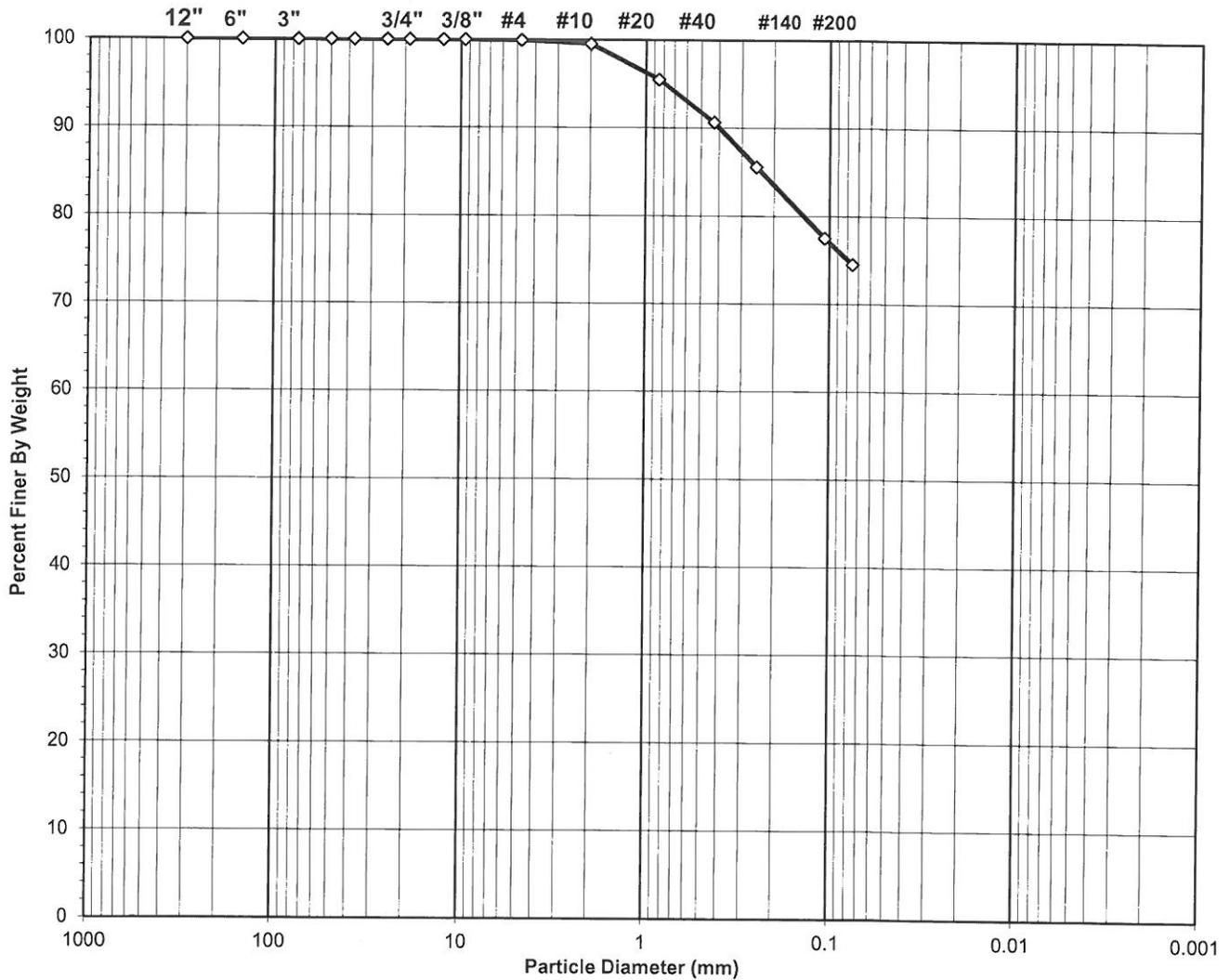
# TEST PAD



## SIEVE ANALYSIS ASTM D 422-63 (2007)

Client	HDR ENGINEERING, INC.	Boring No.	NA
Client Reference	CITY OF GREENSBORO WHITE ST.	Depth (ft)	NA
Project No.	2012-753-01	Sample No.	B-1
Lab ID	2012-753-01-01	Soil Color	RED

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol **MH, TESTED**

USCS Classification **ELASTIC SILT WITH SAND**

Tested By **DW** Date **10/30/2012** Checked By **JRB** Date **11-5-12**

### WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	HDR ENGINEERING, INC.	Boring No.	NA
Client Reference	CITY OF GREENSBORO WHITE ST.	Depth (ft)	NA
Project No.	2012-753-01	Sample No.	B-1
Lab ID	2012-753-01-01	Soil Color	RED

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	831	Tare No.	NA
Wgt. Tare + Wet Specimen (gm)	753.18	Wgt. Tare + Wet Specimen (gm)	NA
Wgt. Tare + Dry Specimen (gm)	646.12	Wgt. Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	262.31	Weight of Tare (gm)	NA
Weight of Water (gm)	107.06	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	383.81	Weight of Dry Soil (gm)	NA
<b>Moisture Content (%)</b>	<b>27.9</b>	<b>Moisture Content (%)</b>	<b>NA</b>

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	383.81
Dry Weight - 3/4" Sample (gm)	97.8	Weight of minus #200 material (gm)	285.99
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	97.82
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	0.25	0.1	0.1	99.9	99.9
#10	2.00	1.51	0.4	0.5	99.5	99.5
#20	0.850	15.44	4.0	4.5	95.5	95.5
#40	0.425	18.67	4.9	9.3	90.7	90.7
#60	0.250	19.40	5.1	14.4	85.6	85.6
#140	0.106	31.02	8.1	22.5	77.5	77.5
#200	0.075	11.53	3.0	25.5	74.5	74.5
Pan	-	285.99	74.5	100.0	-	-

Tested By **DW** Date **10/30/2012** Checked By **JRB** Date **11-5-12**

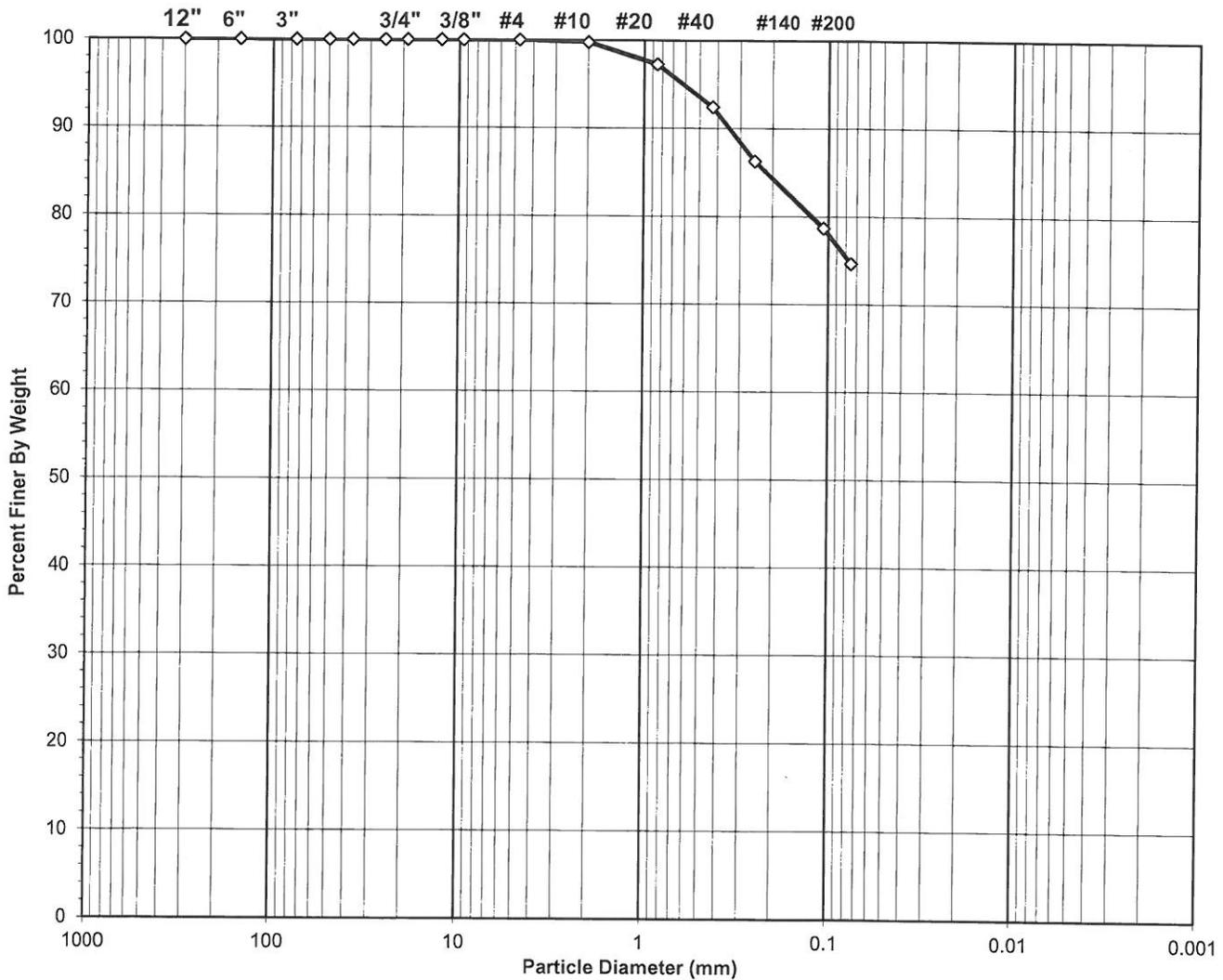
# TEST PAD



## SIEVE ANALYSIS ASTM D 422-63 (2007)

Client	HDR ENGINEERING, INC.	Boring No.	NA
Client Reference	CITY OF GREENSBORO WHITE ST.	Depth (ft)	NA
Project No.	2012-753-01	Sample No.	B-2
Lab ID	2012-753-01-02	Soil Color	RED

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol **MH, TESTED**

USCS Classification **ELASTIC SILT WITH SAND**

Tested By **SFS** Date **10/31/2012** Checked By **JPB** Date **11.5.12**



## WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	HDR ENGINEERING, INC.	Boring No.	NA
Client Reference	CITY OF GREENSBORO WHITE ST.	Depth (ft)	NA
Project No.	2012-753-01	Sample No.	B-2
Lab ID	2012-753-01-02	Soil Color	RED

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	839	Tare No.	NA
Wgt. Tare + Wet Specimen (gm)	700.87	Wgt. Tare + Wet Specimen (gm)	NA
Wgt. Tare + Dry Specimen (gm)	600.68	Wgt. Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	257.66	Weight of Tare (gm)	NA
Weight of Water (gm)	100.19	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	343.02	Weight of Dry Soil (gm)	NA
<b>Moisture Content (%)</b>	<b>29.2</b>	<b>Moisture Content (%)</b>	<b>NA</b>

Wet Weight -3/4" Sample (gm)	833.61	Weight of the Dry Specimen (gm)	343.02
Dry Weight - 3/4" Sample (gm)	87.0	Weight of minus #200 material (gm)	256.05
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	86.97
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

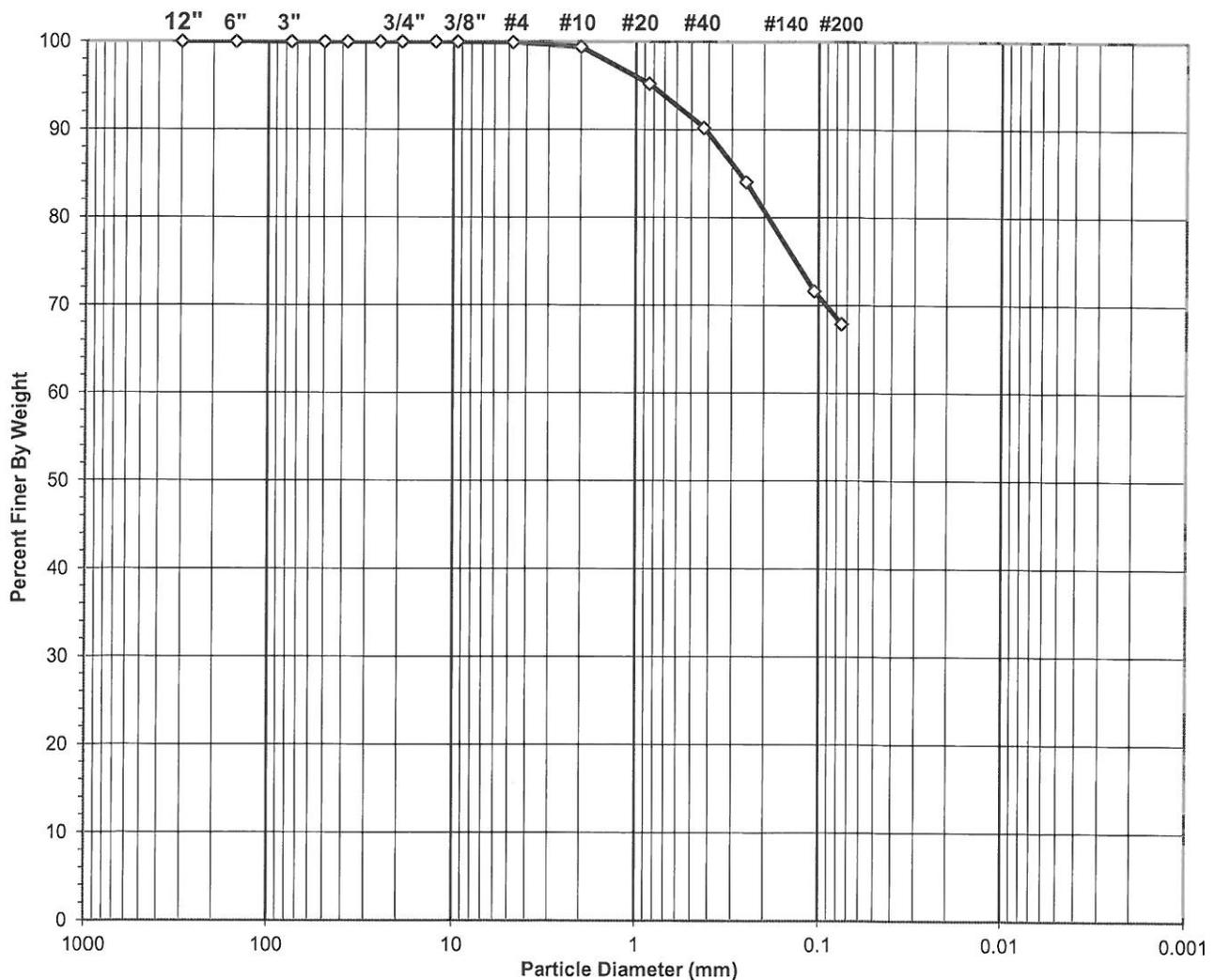
Sieve Size	Sieve Opening (mm)	Wgt. of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.0	0.0	100.0	100.0
6"	150	0.00	0.0	0.0	100.0	100.0
3"	75	0.00	0.0	0.0	100.0	100.0
2"	50	0.00	0.0	0.0	100.0	100.0
1 1/2"	37.5	0.00	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	0.00	0.0	0.0	100.0	100.0
#10	2.00	0.74	0.2	0.2	99.8	99.8
#20	0.850	8.59	2.5	2.7	97.3	97.3
#40	0.425	16.64	4.9	7.6	92.4	92.4
#60	0.250	21.11	6.2	13.7	86.3	86.3
#140	0.106	26.04	7.6	21.3	78.7	78.7
#200	0.075	13.85	4.0	25.4	74.6	74.6
Pan	-	256.05	74.6	100.0	-	-

Tested By SFS Date 10/31/2012 Checked By JPB Date 11.5.12

**SIEVE ANALYSIS**  
ASTM D 422-63 (2007)

Client	HDR ENGINEERING, INC.	Boring No.	2/18/13
Client Reference	GREENSBORO	Depth (ft)	NA
Project No.	2013-625-01	Sample No.	QUAD #8
Lab ID	2013-625-01-01	Soil Color	RED

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



**USCS Symbol**      **MH, TESTED**

**USCS Classification** **SANDY ELASTIC SILT**

Tested By **BS**      Date **2/21/13**      Checked By **Cam**      Date **2-25-13**

## WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client	HDR ENGINEERING, INC.	Boring No.	2/18/13
Client Reference	GREENSBORO	Depth (ft)	NA
Project No.	2013-625-01	Sample No.	QUAD #8
Lab ID	2013-625-01-01	Soil Color	RED

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	214	Tare No.	NA
Wgt. Tare + Wet Specimen (gm)	837.85	Wgt. Tare + Wet Specimen (gm)	NA
Wgt. Tare + Dry Specimen (gm)	700.27	Wgt. Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	171.05	Weight of Tare (gm)	NA
Weight of Water (gm)	137.58	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	529.22	Weight of Dry Soil (gm)	NA
<b>Moisture Content (%)</b>	<b>26.0</b>	<b>Moisture Content (%)</b>	<b>NA</b>

Wet Weight - 3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	529.22
Dry Weight - 3/4" Sample (gm)	169.8	Weight of minus #200 material (gm)	359.42
Wet Weight + 3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	169.80
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	0.37	0.1	0.1	99.9	99.9
#10	2.00	2.67	0.5	0.6	99.4	99.4
#20	0.850	22.11	4.2	4.8	95.2	95.2
#40	0.425	26.59	5.0	9.8	90.2	90.2
#60	0.250	32.61	6.2	15.9	84.1	84.1
#140	0.106	65.71	12.4	28.4	71.6	71.6
#200	0.075	19.74	3.7	32.1	67.9	67.9
Pan	-	359.42	67.9	100.0	-	-

Tested By BS Date 2/21/13 Checked By *GEM* Date *2-25-13*

## CQA Testing (HDR, Geotechnics)

Hydraulic Conductivity



# TEST PAD

## FLEXIBLE WALL PERMEABILITY TEST PERMOMETER METHOD ASTM D 5084-03

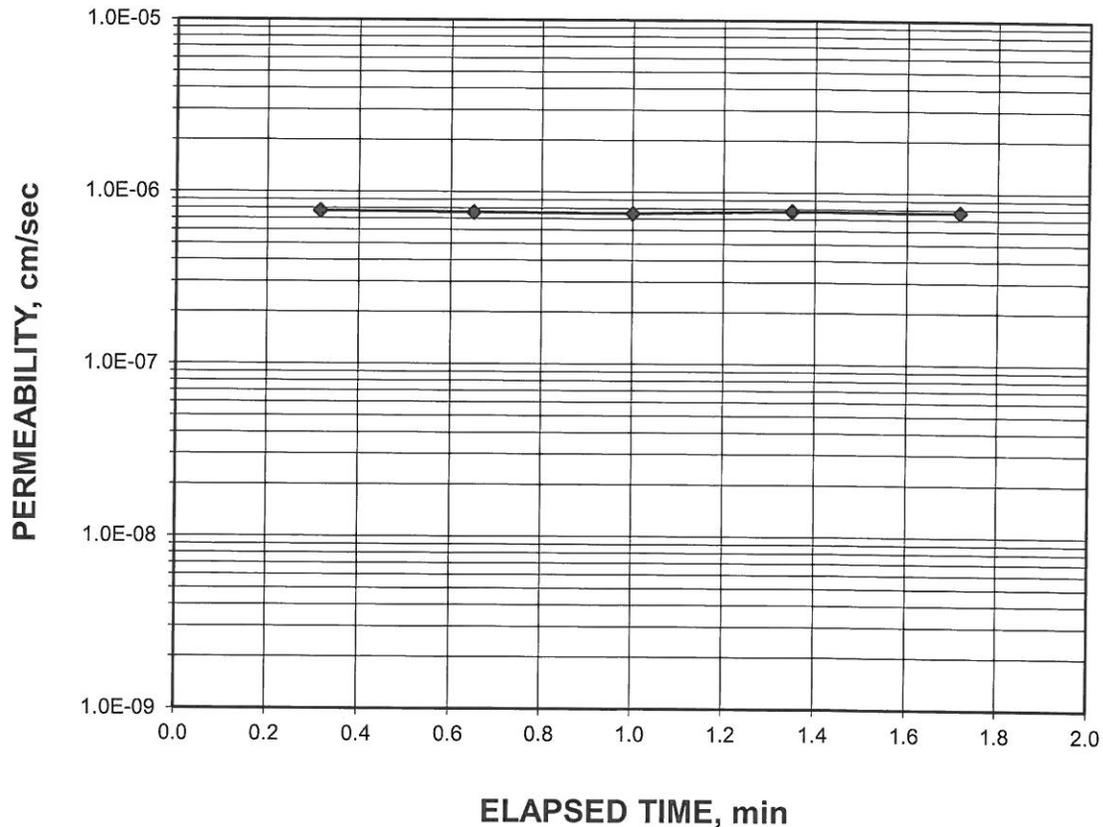


Client	HDR ENGINEERING	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST.	Depth (ft.)	NA
Project No.	2012-753-01	Sample No.	P-1
Lab ID No.	2012-753-01-03		

Visual Description: RED CLAY

AVERAGE PERMEABILITY =  $7.7E-07$  cm/sec @ 20°C  
AVERAGE PERMEABILITY =  $7.7E-09$  m/sec @ 20°C

### PERMEABILITY vs. TIME



Tested By: BW Date: 10/29/2012 Checked By: CAM Date: 11-2-12

**FLEXIBLE WALL PERMEABILITY TEST**  
**PERMOMETER METHOD**  
 ASTM D 5084-10

Client	HDR ENGINEERING	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST.	Depth (ft.)	NA
Project No.	2012-753-01	Sample No.	P-1
Lab ID No.	2012-753-01-03		
	Specific Gravity	2.70	Assumed
	Sample Condition		Undisturbed

Visual Description: RED CLAY

<b>MOISTURE CONTENT:</b>	<b>BEFORE TEST</b>	<b>AFTER TEST</b>
Tare Number	824	823
Wt. of Tare & WS (gm.)	348.49	368.03
Wt. of Tare & DS (gm.)	300.96	313.78
Wt. of Tare (gm.)	136.12	136.67
Wt. of Water (gm.)	47.53	54.25
Wt. of DS (gm.)	164.84	177.11
Moisture Content (%)	<b>28.8</b>	<b>30.6</b>

<b>SPECIMEN:</b>	<b>BEFORE TEST</b>	<b>AFTER TEST</b>
Wt. of Tube & WS (gm.)	588.38	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	588.38	596.59
Length 1 (in.)	2.970	2.992
Length 2 (in.)	3.044	3.006
Length 3 (in.)	2.959	2.958
Top Diameter (in.)	2.876	2.875
Middle Diameter (in.)	2.858	2.869
Bottom Diameter (in.)	2.867	2.882
Average Length (in.)	2.99	2.99
Average Area (in. <sup>2</sup> )	6.46	6.49
Sample Volume (cm <sup>3</sup> )	316.42	317.66
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.859	1.878
Unit Wet Wt. (pcf)	116.1	117.2
Unit Dry Wt. (pcf)	90.1	89.7
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.443	1.438
Void Ratio, e	0.871	0.878
Porosity, n	0.465	0.468
Pore Volume (cm <sup>3</sup> )	147.3	148.5
Total Wt. Of Sample After Test		600.11

Tested By: BW

Date: 10/29/2012

Checked By: *GAM* Date: *11-2-12*

## FLEXIBLE WALL PERMEABILITY TEST PERMOMETER METHOD

ASTM D 5084-10

Client	HDR ENGINEERING	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST.	Depth (ft.)	NA
Project No.	2012-753-01	Sample No.	P-1
Lab ID No.	2012-753-01-03		

### Test Pressures

Cell Pressure(psi)	50.0
Back Pressure(psi)	40.0
Eff. Cons. Pressure(psi)	10.0
Response (%)	95

### Final Sample Dimensions

Sample Length (cm), L	7.58
Sample Area (cm <sup>2</sup> ), A	41.89
Pipette Area (cm <sup>2</sup> ), a <sub>p</sub>	0.03142
Annulus Area (cm <sup>2</sup> ), a <sub>a</sub>	0.76712
Equilibrium Level (cm), R <sub>eq</sub>	1

**AVERAGE PERMEABILITY = 7.7E-07 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 7.7E-09 m/sec @ 20°C**

DATE		TIME			ELAPSED TIME	PIPETTE READING	INCREMENT GRADIENT	TEMP.	INCREMENTAL PERMEABILITY @ 20°C
(mm/dd/yy)	(hr)	(min)	(sec)	(min)	t	R <sub>p</sub>	i	(°C)	(cm/sec)
10/30/2012	9	17	24	17.40	0.000	7.0	10.3	20.2	NA
10/30/2012	9	17	43	17.72	0.317	6.8	10.0	20.2	7.7E-07
10/30/2012	9	18	3	18.05	0.650	6.6	9.6	20.2	7.6E-07
10/30/2012	9	18	24	18.40	1.000	6.4	9.3	20.2	7.5E-07
10/30/2012	9	18	45	18.75	1.350	6.2	9.0	20.2	7.8E-07
10/30/2012	9	19	7	19.12	1.717	6.0	8.6	20.2	7.7E-07

Tested By: BW Date: 10/29/2012

Checked By: GJM Date: 11-2-12

# TEST PAD

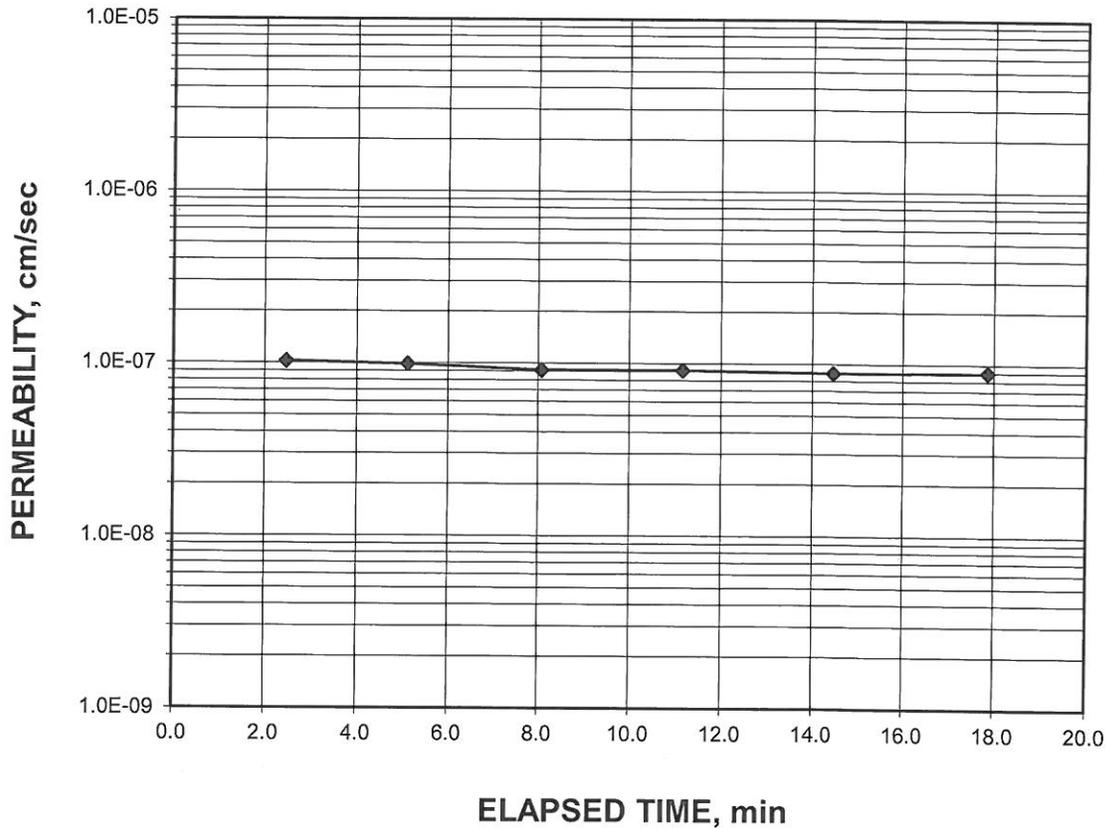
## FLEXIBLE WALL PERMEABILITY TEST PERMOMETER METHOD ASTM D 5084-03

Client	HDR ENGINEERING	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	NA
Project No.	2012-753-01	Sample No.	P-2
Lab ID No.	2012-753-01-04		

Visual Description: RED CLAY

AVERAGE PERMEABILITY = 9.0E-08 cm/sec @ 20°C  
 AVERAGE PERMEABILITY = 9.0E-10 m/sec @ 20°C

### PERMEABILITY vs. TIME



Tested By: BW Date: 10/29/2012 Checked By: GCM Date: 11-2-12

**FLEXIBLE WALL PERMEABILITY TEST**  
**PERMOMETER METHOD**  
 ASTM D 5084-10

Client	HDR ENGINEERING	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST.	Depth (ft.)	NA
Project No.	2012-753-01	Sample No.	P-2
Lab ID No.	2012-753-01-04		
	Specific Gravity	2.70	Assumed
	Sample Condition		Undisturbed

Visual Description: RED CLAY

<b>MOISTURE CONTENT:</b>	<b>BEFORE TEST</b>	<b>AFTER TEST</b>
Tare Number	811	818
Wt. of Tare & WS (gm.)	367.23	332.81
Wt. of Tare & DS (gm.)	302.18	282.66
Wt. of Tare (gm.)	105.66	137.3
Wt. of Water (gm.)	65.05	50.15
Wt. of DS (gm.)	196.52	145.36
Moisture Content (%)	<b>33.1</b>	<b>34.5</b>

<b>SPECIMEN:</b>	<b>BEFORE TEST</b>	<b>AFTER TEST</b>
Wt. of Tube & WS (gm.)	628.82	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	628.82	635.43
Length 1 (in.)	3.139	3.181
Length 2 (in.)	3.225	3.146
Length 3 (in.)	3.172	3.117
Top Diameter (in.)	2.888	2.918
Middle Diameter (in.)	2.870	2.887
Bottom Diameter (in.)	2.871	2.914
Average Length (in.)	3.18	3.15
Average Area (in. <sup>2</sup> )	6.50	6.63
Sample Volume (cm <sup>3</sup> )	338.47	342.23
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.858	1.857
Unit Wet Wt. (pcf)	116.0	115.9
Unit Dry Wt. (pcf)	87.1	86.2
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.396	1.380
Void Ratio, e	0.934	0.956
Porosity, n	0.483	0.489
Pore Volume (cm <sup>3</sup> )	163.5	167.3
Total Wt. Of Sample After Test		638.28

Tested By: BW

Date: 10/29/2012

Checked By: GEM Date: 11-2-12

## FLEXIBLE WALL PERMEABILITY TEST PERMOMETER METHOD

ASTM D 5084-10

Client	HDR ENGINEERING	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST.	Depth (ft.)	NA
Project No.	2012-753-01	Sample No.	P-2
Lab ID No.	2012-753-01-04		

### Test Pressures

Cell Pressure(psi)	50.0
Back Pressure(psi)	40.0
Eff. Cons. Pressure(psi)	10.0
Response (%)	95

### Final Sample Dimensions

Sample Length (cm), L	8.00
Sample Area (cm <sup>2</sup> ), A	42.80
Pipette Area (cm <sup>2</sup> ), a <sub>p</sub>	0.03142
Annulus Area (cm <sup>2</sup> ), a <sub>a</sub>	0.76712
Equilibrium Level (cm), R <sub>eq</sub>	1

**AVERAGE PERMEABILITY = 9.0E-08 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 9.0E-10 m/sec @ 20°C**

DATE			TIME		ELAPSED TIME	PIPETTE READING	INCREMENT GRADIENT	TEMP.	INCREMENTAL PERMEABILITY
					t	R <sub>p</sub>	i	(°C)	@ 20°C
(mm/dd/yy)	(hr)	(min)	(sec)	(min)	(min)	(cm)	(cm/cm)		(cm/sec)
10/30/2012	8	40	35	40.58	0.000	7.0	9.8	20.1	NA
10/30/2012	8	43	3	43.05	2.467	6.8	9.5	20.1	1.0E-07
10/30/2012	8	45	42	45.70	5.117	6.6	9.1	20.1	9.9E-08
10/30/2012	8	48	40	48.67	8.083	6.4	8.8	20.1	9.2E-08
10/30/2012	8	51	45	51.75	11.167	6.2	8.5	20.1	9.1E-08
10/30/2012	8	55	3	55.05	14.467	6.0	8.2	20.1	8.9E-08
10/30/2012	8	58	27	58.45	17.867	5.8	7.8	20.1	9.0E-08

Tested By: BW Date: 10/29/2012

Checked By: *GAM* Date: 11-2-12

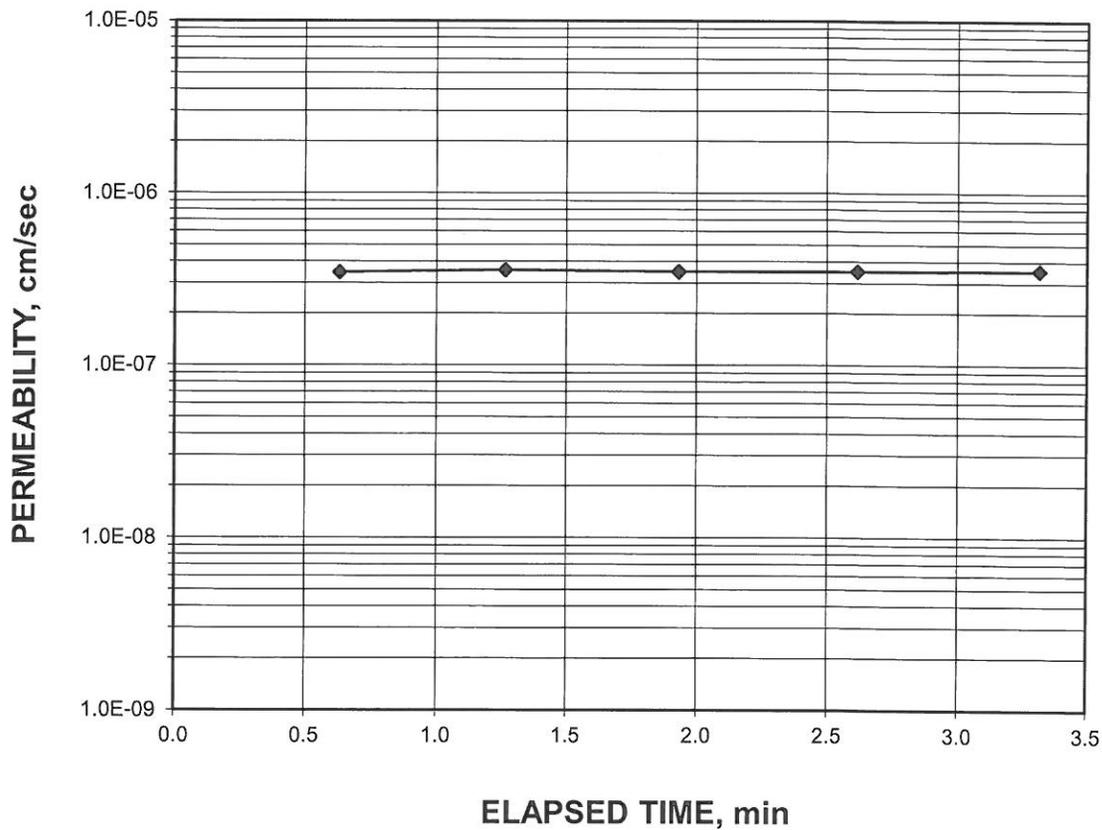
**FLEXIBLE WALL PERMEABILITY TEST**  
**PERMOMETER METHOD**  
 ASTM D 5084-03

Client	HDR Engineering Inc.	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	LIFT 3
Project No.	2012-753-02	Sample No.	QUADRANT #5
Lab ID No.	2012-753-02-01		

Visual Description: RED SILTY CLAY

**AVERAGE PERMEABILITY = 3.5E-07 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 3.5E-09 m/sec @ 20°C**

**PERMEABILITY vs. TIME**



Tested By: BW Date: 11/27/2012 Checked By: *GEM* Date: 11-29-12

**FLEXIBLE WALL PERMEABILITY TEST**  
**PERMOMETER METHOD**  
 ASTM D 5084-10

Client	HDR Engineering Inc.	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	LIFT 3
Project No.	2012-753-02	Sample No.	QUADRANT #5
Lab ID No.	2012-753-02-01		
	Specific Gravity	2.70	Assumed
	Sample Condition		Undisturbed

Visual Description: RED SILTY CLAY

<b>MOISTURE CONTENT:</b>	<b>BEFORE TEST</b>	<b>AFTER TEST</b>
Tare Number	Y-1	821
Wt. of Tare & WS (gm.)	377.73	397.22
Wt. of Tare & DS (gm.)	311.40	329.23
Wt. of Tare (gm.)	94.06	135.88
Wt. of Water (gm.)	66.33	67.99
Wt. of DS (gm.)	217.34	193.35
Moisture Content (%)	<b>30.5</b>	<b>35.2</b>

<b>SPECIMEN:</b>	<b>BEFORE TEST</b>	<b>AFTER TEST</b>
Wt. of Tube & WS (gm.)	629.53	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	629.53	651.94
Length 1 (in.)	3.358	3.385
Length 2 (in.)	3.369	3.366
Length 3 (in.)	3.369	3.374
Top Diameter (in.)	2.876	2.871
Middle Diameter (in.)	2.850	2.895
Bottom Diameter (in.)	2.868	2.892
Average Length (in.)	3.37	3.38
Average Area (in. <sup>2</sup> )	6.45	6.54
Sample Volume (cm <sup>3</sup> )	355.44	361.79
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.771	1.802
Unit Wet Wt. (pcf)	110.6	112.5
Unit Dry Wt. (pcf)	84.7	83.2
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.357	1.333
Void Ratio, e	0.990	1.025
Porosity, n	0.497	0.506
Pore Volume (cm <sup>3</sup> )	176.8	183.2
Total Wt. Of Sample After Test		656.81

Tested By: BW

Date: 11/27/2012

Checked By: *GAN* Date: *11-29-12*

## FLEXIBLE WALL PERMEABILITY TEST PERMOMETER METHOD

ASTM D 5084-10

Client	HDR Engineering Inc.	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	LIFT 3
Project No.	2012-753-02	Sample No.	QUADRANT #5
Lab ID No.	2012-753-02-01		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	50.0	Sample Length (cm), L	8.57
Back Pressure(psi)	40.0	Sample Area (cm <sup>2</sup> ), A	42.20
Eff. Cons. Pressure(psi)	10.0	Pipette Area (cm <sup>2</sup> ), a <sub>p</sub>	0.03142
Response (%)	99	Annulus Area (cm <sup>2</sup> ), a <sub>a</sub>	0.76712
		Equilibrium Level (cm), R <sub>eq</sub>	1

**AVERAGE PERMEABILITY = 3.5E-07 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 3.5E-09 m/sec @ 20°C**

DATE		TIME			ELAPSED TIME	PIPETTE READING	INCREMENT GRADIENT	TEMP.	INCREMENTAL PERMEABILITY @ 20°C
(mm/dd/yy)	(hr)	(min)	(sec)	(min)	t	R <sub>p</sub>	i	(°C)	(cm/sec)
11/28/2012	15	8	31	8.52	0.000	8.0	10.7	23.1	NA
11/28/2012	15	9	9	9.15	0.633	7.8	10.4	23.1	3.5E-07
11/28/2012	15	9	47	9.78	1.267	7.6	10.1	23.1	3.6E-07
11/28/2012	15	10	27	10.45	1.933	7.4	9.8	23.1	3.5E-07
11/28/2012	15	11	8	11.13	2.617	7.2	9.4	23.1	3.5E-07
11/28/2012	15	11	50	11.83	3.317	7.0	9.1	23.1	3.5E-07

Tested By: BW Date: 11/27/2012

Checked By: *GEM* Date: *11-29-12*

# PERMEABILITY TEST

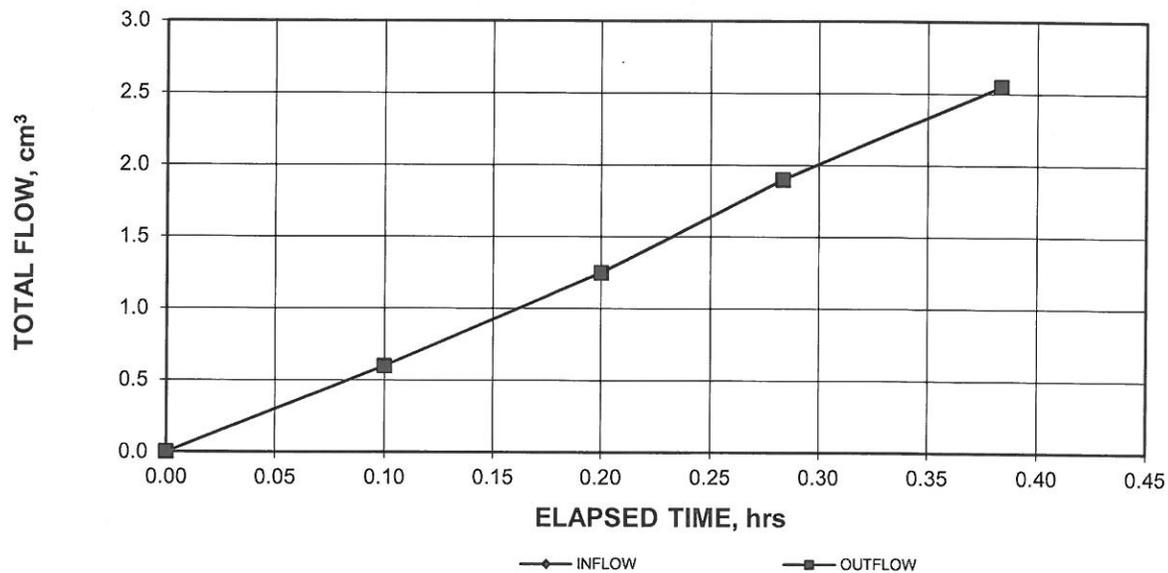
ASTM D 5084-03

Client	HDR Engineering Inc.	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	LIFT 3
Project No.	2012-753-02	Sample No.	QUADRANT #1
Lab ID No.	2012-753-02-02		

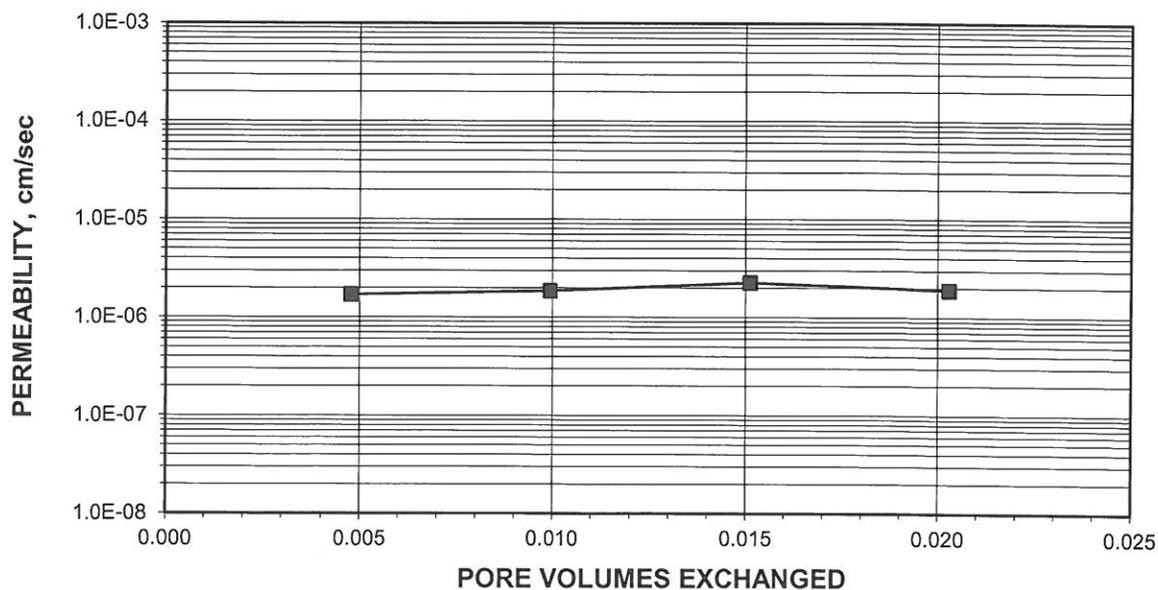
**AVERAGE PERMEABILITY = 1.9E-06 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-08 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME



## PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: BW Date: 11/27/2012 Checked By: *GAN* Date: 11-29-12

# PERMEABILITY TEST

ASTM D 5084-10

Client	HDR Engineering Inc.	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	LIFT 3
Project No.	2012-753-02	Sample No.	QUADRANT #1
Lab ID No.	2012-753-02-02		

Specific Gravity	2.70 Assumed
Sample Condition	Undisturbed

Visual Description: RED SILTY CLAY

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	Z-12	823
Wt. of Tare & WS (gm.)	408.25	324.18
Wt. of Tare & DS (gm.)	347.46	278.11
Wt. of Tare (gm.)	93.67	136.52
Wt. of Water (gm.)	60.79	46.07
Wt. of DS (gm.)	253.79	141.59
Moisture Content (%)	<b>24.0</b>	<b>32.5</b>

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	441.56	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	441.56	472.14
Length 1 (in.)	2.367	2.391
Length 2 (in.)	2.374	2.403
Length 3 (in.)	2.354	2.373
Top Diameter (in.)	2.843	2.900
Middle Diameter (in.)	2.840	2.893
Bottom Diameter (in.)	2.831	2.891
Average Length (in.)	2.37	2.39
Average Area (in. <sup>2</sup> )	6.33	6.58
Sample Volume (cm <sup>3</sup> )	245.16	257.63
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.80	1.83
Unit Wet Wt. (pcf)	112.4	114.4
Unit Dry Wt. (pcf)	90.7	86.3
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.45	1.38
Void Ratio, e	0.86	0.95
Porosity, n	0.46	0.49
Pore Volume (cm <sup>3</sup> )	113.2	125.7
Total Wgt. Of Sample After Test		472.75

Tested By: BW

Date: 11/27/2012 Checked By: 

Date: 11-29-12

# PERMEABILITY TEST

ASTM D 5084-03

Client	HDR Engineering Inc.	Boring No.	NA
Client Project	CITY OF GREENSBORO WHITE ST	Depth (ft.)	LIFT 3
Project No.	2012-753-02	Sample No.	QUADRANT #1
Lab ID No.	2012-753-02-02		

### Pressure Heads (Constant)

Top Cap (psi)	38.5
Bottom Cap (psi)	40.0
Cell (psi)	45.0
Total Pressure Head (cm)	105.5
Hydraulic Gradient	17.38

### Final Sample Dimensions

Sample Length (cm), L	6.07
Sample Diameter (cm)	7.35
Sample Area (cm <sup>2</sup> ), A	42.46
Inflow Burette Area (cm <sup>2</sup> ), a-in	0.897
Outflow Burette Area (cm <sup>2</sup> ), a-out	0.878
B Parameter (%)	100

**AVERAGE PERMEABILITY = 1.9E-06 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-08 m/sec @ 20°C**

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm <sup>3</sup> )	(cm <sup>3</sup> )	h (cm)	( 0 flow ) ( 1 stop )	( °C )	@ 20°C (cm/sec)
11/28/2012	16	34	0.00	0.0	0.0	129.0	0	23.4	NA
11/28/2012	16	40	0.10	0.6	0.6	127.7	0	23.4	1.7E-06
11/28/2012	16	46	0.20	1.3	1.3	126.2	0	23.4	1.9E-06
11/28/2012	16	51	0.28	1.9	1.9	124.8	0	23.4	2.3E-06
11/28/2012	16	57	0.38	2.6	2.6	123.3	1	23.4	1.9E-06

Tested By: BW

Date: 11/27/2012 Checked By: *GEM*

Date: *11-29-12*

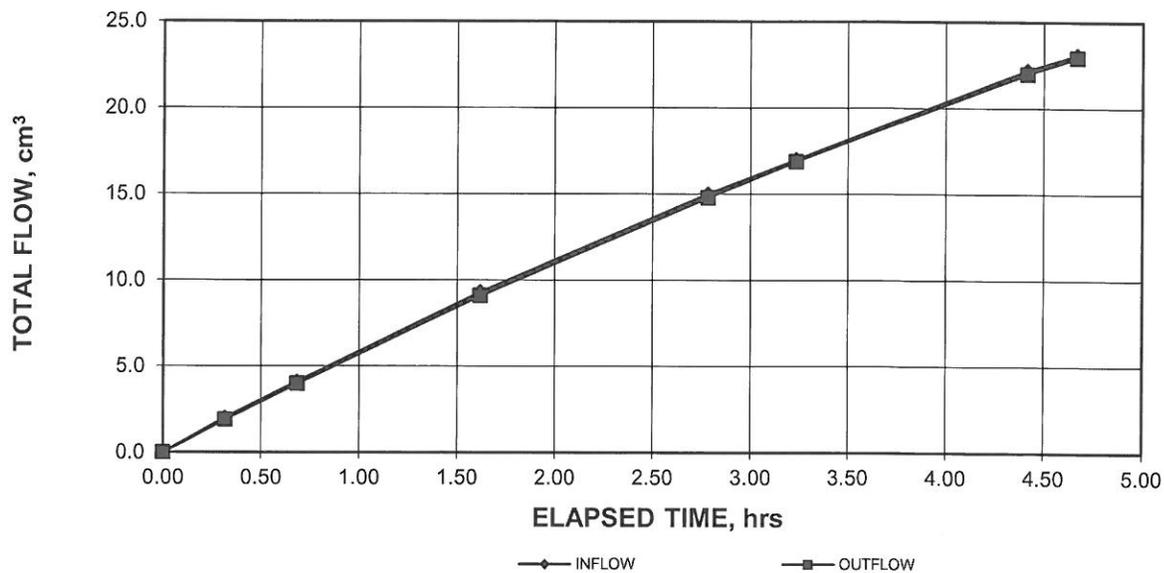
# PERMEABILITY TEST

ASTM D 5084-03

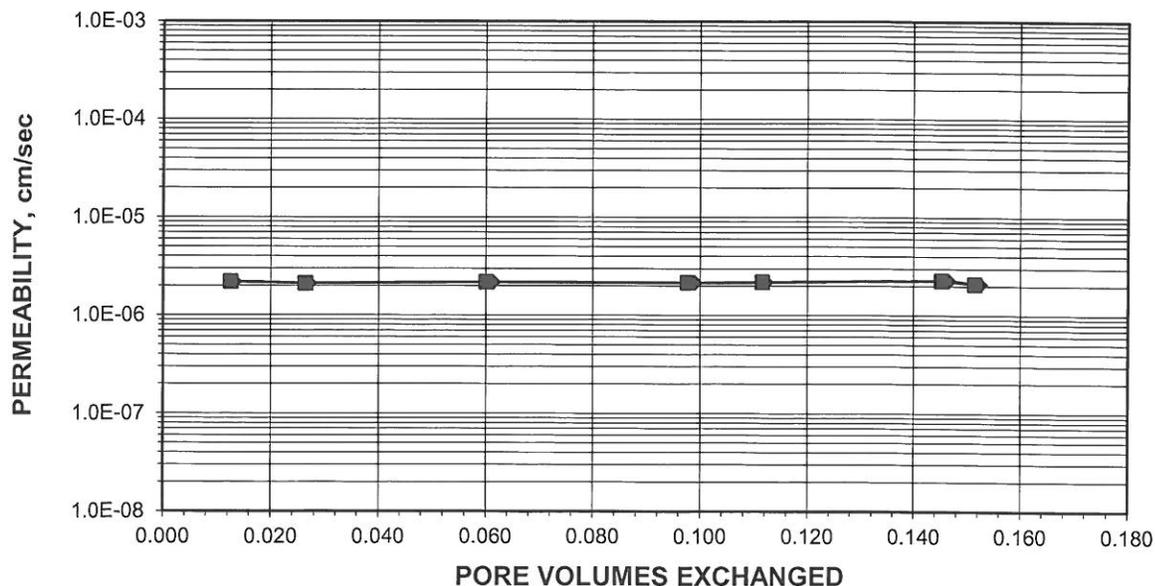
Client	HDR ENGINEERING, INC.	Boring No.	2/18/13
Client Project	GREENSBORO	Depth (ft.)	N/A
Project No.	2013-625-01	Sample No.	QUAD #8
Lab ID No.	2013-625-01-01		

AVERAGE PERMEABILITY = 2.2E-06 cm/sec @ 20°C  
 AVERAGE PERMEABILITY = 2.2E-08 m/sec @ 20°C

## TOTAL FLOW vs. ELAPSED TIME



## PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: SFS Date: 2/20/13 Checked By: *Gar* Date: 2-25-13

# PERMEABILITY TEST

ASTM D 5084-10

Client	HDR ENGINEERING, INC.	Boring No.	2/18/13
Client Project	GREENSBORO	Depth (ft.)	N/A
Project No.	2013-625-01	Sample No.	QUAD #8
Lab ID No.	2013-625-01-01		

Specific Gravity	2.70 Assumed
Sample Condition	Undisturbed

Visual Description: RED SANDY ELASTIC SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	214	211
Wt. of Tare & WS (gm.)	837.85	764.31
Wt. of Tare & DS (gm.)	700.27	618.91
Wt. of Tare (gm.)	171.05	171.02
Wt. of Water (gm.)	137.58	145.40
Wt. of DS (gm.)	529.22	447.89
Moisture Content (%)	<b>26.0</b>	<b>32.5</b>

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	557.42	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	557.42	586.03
Length 1 (in.)	2.958	2.959
Length 2 (in.)	2.943	2.949
Length 3 (in.)	2.971	2.986
Top Diameter (in.)	2.833	2.878
Middle Diameter (in.)	2.835	2.877
Bottom Diameter (in.)	2.834	2.870
Average Length (in.)	2.96	2.96
Average Area (in. <sup>2</sup> )	6.31	6.49
Sample Volume (cm <sup>3</sup> )	305.70	315.39
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.82	1.86
Unit Wet Wt. (pcf)	113.8	116.0
Unit Dry Wt. (pcf)	90.3	87.6
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.45	1.40
Void Ratio, e	0.87	0.92
Porosity, n	0.46	0.48
Pore Volume (cm <sup>3</sup> )	141.8	151.5
Total Wgt. Of Sample After Test		593.78

Tested By: SFS

Date: 2/20/13

Checked By: 

Date: 2-25-13

# PERMEABILITY TEST

ASTM D 5084-03

Client	HDR ENGINEERING, INC.	Boring No.	2/18/13
Client Project	GREENSBORO	Depth (ft.)	N/A
Project No.	2013-625-01	Sample No.	QUAD #8
Lab ID No.	2013-625-01-01		

### Pressure Heads (Constant)

Top Cap (psi)	43.5
Bottom Cap (psi)	45.0
Cell (psi)	50.0
Total Pressure Head (cm)	105.5
Hydraulic Gradient	14.00

### Final Sample Dimensions

Sample Length (cm), L	7.53
Sample Diameter (cm)	7.30
Sample Area (cm <sup>2</sup> ), A	41.88
Inflow Burette Area (cm <sup>2</sup> ), a-in	0.897
Outflow Burette Area (cm <sup>2</sup> ), a-out	0.894
B Parameter (%)	95

**AVERAGE PERMEABILITY = 2.2E-06 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 2.2E-08 m/sec @ 20°C**

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm <sup>3</sup> )	(cm <sup>3</sup> )	h (cm)	( 0 flow ) ( 1 stop )	(°C)	@ 20°C (cm/sec)
2/22/13	10	54	0.00	0.0	0.0	132.2	0	23.1	NA
2/22/13	11	13	0.32	2.0	1.9	127.9	0	23.1	2.2E-06
2/22/13	11	35	0.68	4.1	4.0	123.2	0	23.1	2.1E-06
2/22/13	12	31	1.62	9.3	9.1	111.7	0	23.1	2.2E-06
2/22/13	13	41	2.78	15.0	14.8	99.0	0	23.1	2.2E-06
2/22/13	14	8	3.23	17.0	16.9	94.4	0	23.1	2.2E-06
2/22/13	15	19	4.42	22.2	22.0	82.9	0	23.1	2.3E-06
2/22/13	15	34	4.67	23.1	23.0	80.8	1	23.1	2.1E-06

Tested By: SFS

Date: 2/20/13

Checked By:

*GEM*

Date: 2-25-13

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# APPENDIX C

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## Surveys

Plan Sheet No. 1 – Initial, Clay, Topsoil Topographic Survey

Plan Sheet No. 2 – Initial Topographic Survey

Plan Sheet No. 3 – Topsoil Topographic Survey



**SURVEYOR'S CERTIFICATION**

I hereby certify that the survey prepared by me entitled **WHITE STREET LANDFILL PARTIAL CLOSURE** was actually made upon the ground and that it and the information, courses, and distances are correctly shown.

Executed this 17<sup>th</sup> day of JUNE, 2013

Registration No. L-3731  
**HOMER S. WADE**  
621 EUGENE COURT  
Greensboro, N.C.  
27401

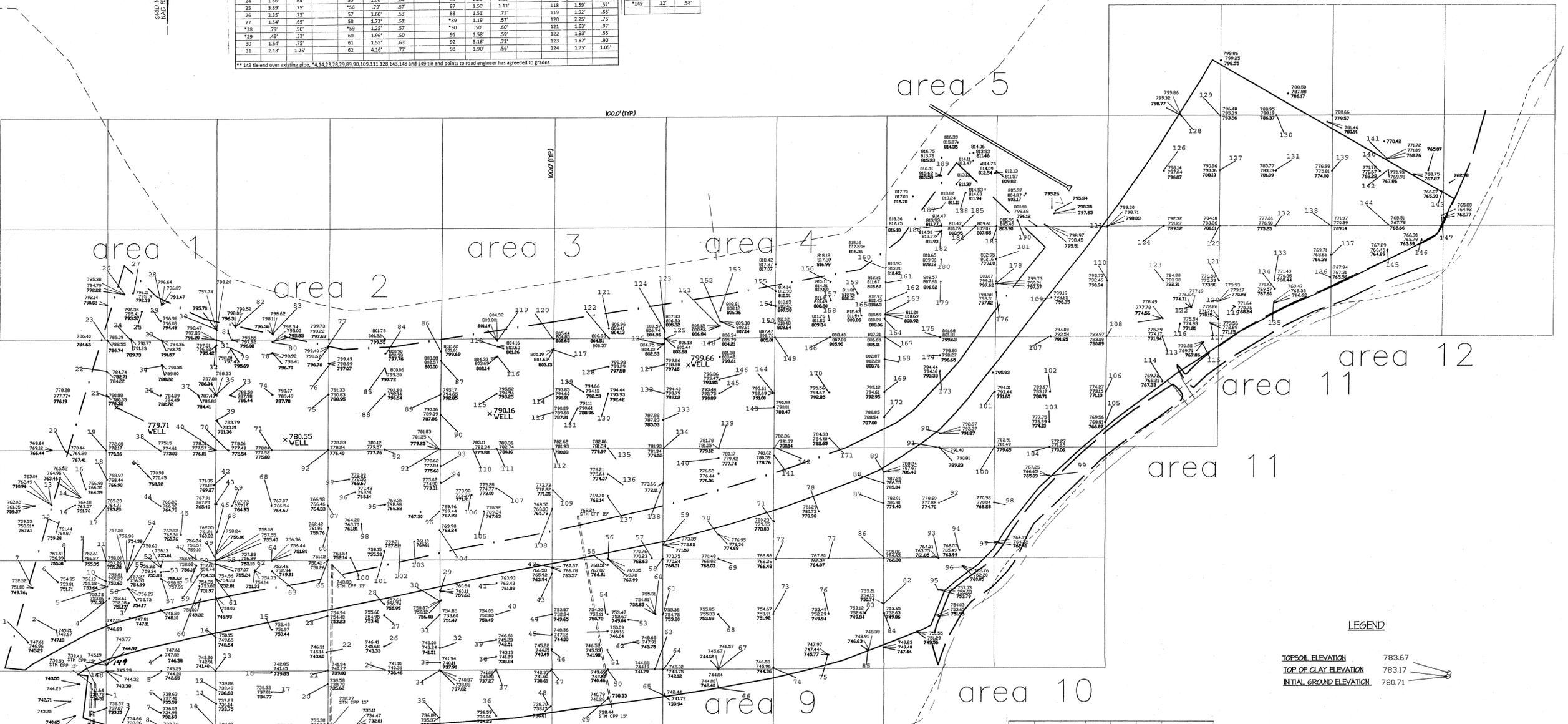


(MAP BY BORUM, WADE AND ASSOCIATES. CHARTS BY TRIANGLE GRADINGS)



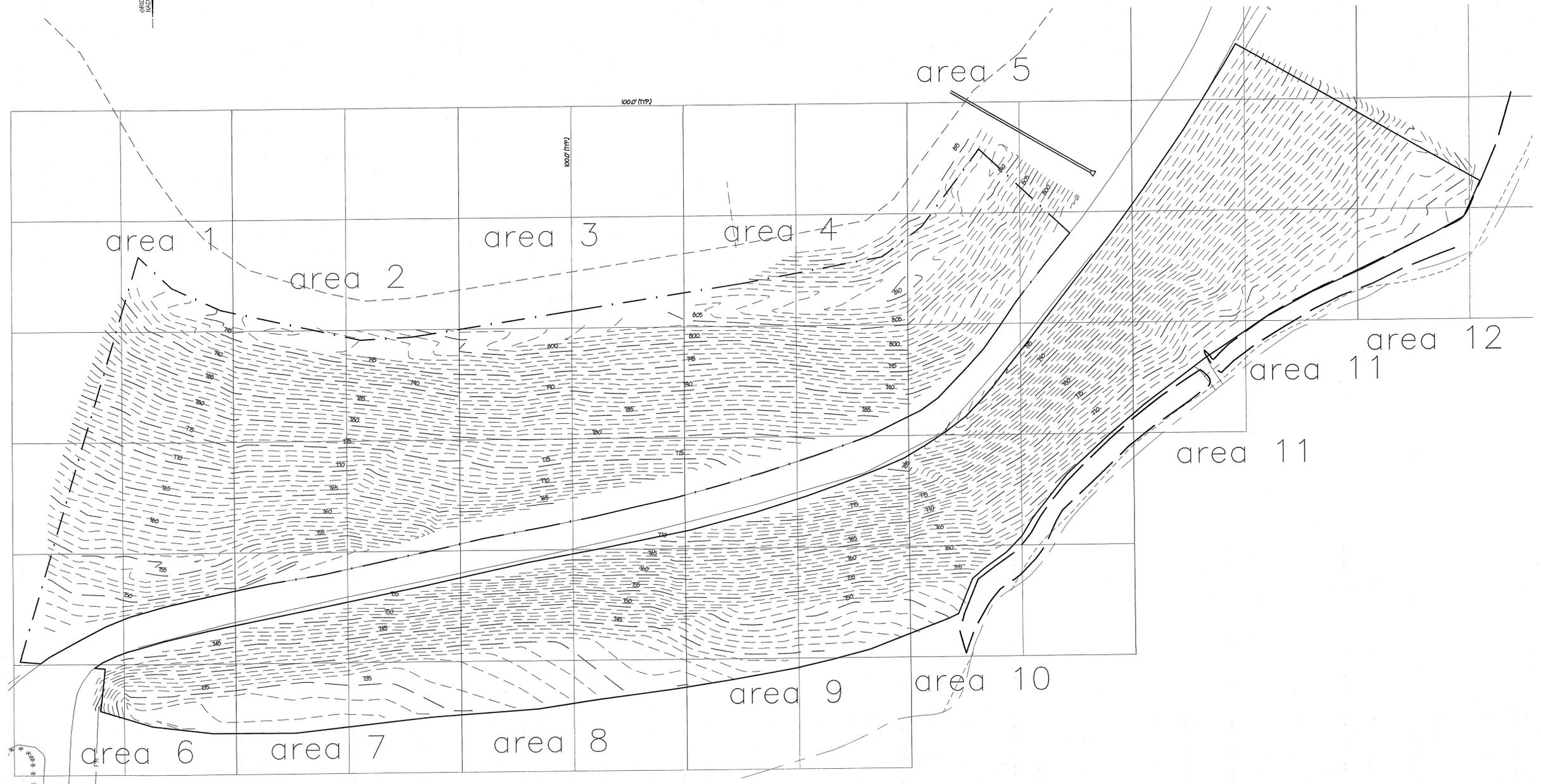
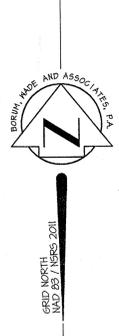
Area 6 thru 12					
Point #	Clay Thickness	Topsoil Thickness	Point #	Clay Thickness	Topsoil Thickness
1	3.92'	1.50'	32	1.73'	1.76'
2	3.92'	1.50'	33	2.21'	1.83'
3	1.92'	.70'	34	1.80'	1.99'
4	.64'	.59'	35	1.94'	.71'
5	1.55'	1.09'	36	1.83'	.53'
6	1.81'	1.23'	37	2.81'	1.00'
7	2.32'	1.06'	38	3.05'	1.24'
8	1.53'	.72'	39	2.72'	1.37'
9	1.53'	.50'	40	2.31'	1.25'
10	1.67'	.62'	41	1.54'	.50'
11	2.39'	1.15'	42	1.21'	.89'
12	1.86'	1.37'	43	1.98'	.66'
13	1.51'	.99'	44	3.19'	1.03'
14	1.11'	.50'	45	3.12'	1.24'
15	1.53'	.51'	46	3.72'	1.01'
16	1.60'	1.40'	47	2.99'	.77'
17	2.24'	1.51'	48	1.56'	.53'
18	1.82'	.60'	49	1.95'	.51'
19	2.03'	.53'	50	2.35'	.88'
20	3.08'	.88'	51	3.55'	.99'
21	1.77'	1.17'	52	3.12'	.93'
22	1.54'	1.17'	53	3.63'	.80'
23	1.17'	.54'	54	2.39'	1.22'
24	1.66'	.84'	55	1.66'	.64'
25	3.89'	.78'	56	.79'	.57'
26	2.35'	.73'	57	1.60'	.53'
27	1.54'	.65'	58	1.73'	.51'
28	1.18'	.79'	59	1.19'	.57'
29	.49'	.53'	60	1.96'	.50'
30	1.64'	.75'	61	1.55'	.69'
31	2.13'	1.25'	62	4.30'	.77'
32	1.73'	1.76'	63	2.40'	.66'
33	2.21'	1.83'	64	1.63'	1.27'
34	1.80'	1.99'	65	1.55'	.65'
35	1.94'	.71'	66	1.60'	.04'
36	1.83'	.53'	67	1.55'	.94'
37	2.81'	1.00'	68	1.74'	.52'
38	3.05'	1.24'	69	1.77'	.66'
39	2.72'	1.37'	70	1.68'	.59'
40	2.31'	1.25'	71	1.62'	.58'
41	1.54'	.50'	72	1.88'	.50'
42	1.21'	.89'	73	1.99'	.76'
43	1.98'	.66'	74	1.60'	.57'
44	3.19'	1.03'	75	1.67'	.53'
45	3.12'	1.24'	76	2.35'	1.20'
46	3.72'	1.01'	77	1.95'	.88'
47	2.99'	.77'	78	1.75'	.56'
48	1.56'	.53'	79	1.92'	1.27'
49	1.95'	.51'	80	2.00'	1.13'
50	2.35'	.88'	81	1.89'	.55'
51	3.55'	.99'	82	3.39'	1.08'
52	3.12'	.93'	83	2.77'	.51'
53	3.63'	.80'	84	2.77'	.51'
54	2.39'	1.22'	85	1.76'	.52'
55	1.66'	.64'	86	2.15'	1.23'
56	.79'	.57'	87	1.50'	1.11'
57	1.60'	.53'	88	1.51'	.71'
58	1.73'	.51'	89	1.19'	.57'
59	1.19'	.57'	90	1.50'	.60'
60	1.96'	.50'	91	1.58'	.59'
61	1.55'	.69'	92	3.18'	.72'
62	4.30'	.77'	93	1.90'	.56'
63	2.40'	.66'	94	1.50'	.58'
64	1.63'	1.27'	95	1.84'	1.40'
65	1.55'	.65'	96	2.15'	.96'
66	1.60'	.04'	97	1.81'	.53'
67	1.55'	.94'	98	1.76'	.94'
68	1.74'	.52'	99	1.56'	.60'
69	1.77'	.66'	100	1.84'	1.02'
70	1.68'	.59'	101	1.79'	.57'
71	1.62'	.58'	102	2.46'	.50'
72	1.88'	.50'	103	2.86'	.76'
73	1.99'	.76'	104	1.59'	.61'
74	1.60'	.57'	105	1.94'	.75'
75	1.67'	.53'	106	2.00'	1.13'
76	2.35'	1.20'	107	1.89'	.55'
77	1.95'	.88'	108	2.20'	.88'
78	1.75'	.56'	109	.60'	.54'
79	1.92'	1.27'	110	1.92'	1.27'
80	2.00'	1.13'	111	.88'	.59'
81	1.89'	.55'	112	3.22'	.71'
82	3.39'	1.08'	113	2.23'	1.31'
83	2.77'	.51'	114	1.88'	.51'
84	2.77'	.51'	115	1.85'	.64'
85	1.76'	.52'	116	3.12'	.61'
86	2.15'	1.23'	117	1.74'	.67'
87	1.50'	1.11'	118	1.59'	.52'
88	1.51'	.71'	119	1.97'	.88'
89	1.19'	.57'	120	1.25'	.76'
90	1.50'	.60'	121	1.63'	.97'
91	1.58'	.59'	122	1.93'	.55'
92	3.18'	.72'	123	1.67'	.90'
93	1.90'	.56'	124	1.72'	1.05'
94	1.50'	.58'	125	1.65'	.84'
95	1.84'	1.40'	126	1.57'	.50'
96	2.15'	.96'	127	1.96'	.90'
97	1.81'	.53'	128	1.81'	.53'
98	1.76'	.94'	129	1.83'	1.01'
99	1.56'	.60'	130	1.82'	.70'
100	1.84'	1.02'	131	1.74'	.64'
101	1.79'	.57'	132	1.65'	.71'
102	2.46'	.50'	133	1.27'	1.06'
103	2.86'	.76'	134	1.93'	1.10'
104	1.59'	.61'	135	1.75'	1.08'
105	1.94'	.75'	136	1.73'	1.17'
106	2.00'	1.13'	137	2.27'	1.06'
107	1.89'	.55'	138	1.75'	1.08'
108	2.20'	.88'	139	1.73'	1.17'
109	.60'	.54'	140	2.45'	1.05'
110	1.92'	1.27'	141	2.33'	.63'
111	.88'	.59'	142	2.12'	1.01'
112	3.22'	.71'	143	2.12'	.77'
113	2.23'	1.31'	144	2.12'	.77'
114	1.88'	.51'	145	1.60'	.80'
115	1.85'	.64'	146	1.80'	.51'
116	3.12'	.61'	147	1.80'	.51'
117	1.74'	.67'	148	0.94'	1.04'
118	1.59'	.52'	149	.22'	.58'
119	1.97'	.88'			
120	1.25'	.76'			
121	1.63'	.97'			
122	1.93'	.55'			
123	1.67'	.90'			
124	1.72'	1.05'			
125	1.65'	.84'			
126	1.57'	.50'			
127	1.96'	.90'			
128	1.81'	.53'			
129	1.83'	1.01'			
130	1.82'	.70'			
131	1.74'	.64'			
132	1.65'	.71'			
133	1.27'	1.06'			
134	1.93'	1.10'			
135	1.75'	1.08'			
136	1.73'	1.17'			
137	2.27'	1.06'			
138	1.75'	1.08'			
139	1.73'	1.17'			
140	2.45'	1.05'			
141	2.33'	.63'			
142	2.12'	1.01'			
143	2.12'	.77'			
144	2.12'	.77'			
145	1.60'	.80'			
146	1.80'	.51'			
147	1.80'	.51'			
148	0.94'	1.04'			
149	.22'	.58'			

\*\* 143 tie end over existing pipe, \*4,14,23,28,29,89,90,100,111,128,143,148 and 149 tie end points to road engineer has agreed to grades



Area 1 thru 5					
Point #	Clay Thickness	Topsoil Thickness	Point #	Clay Thickness	Topsoil Thickness
1	1.67'	0.65'	32	1.50'	.59'
2	1.54'	.54'	33	1.83'	.71'
3	.51'	.53'	34	1.58'	.51'
4	1.69'	.72'	35	1.77'	.50'
5	1.94'	.55'	36	1.76'	.53'
6	2.11'	.54'	37	2.42'	.57'
7	2.04'	.72'	38	1.58'	.54'
8	1.68'	.52'	39	1.85'	.58'
9	1.52'	.74'	40	1.83'	.53'
10	1.67'	.54'	41	1.53'	.53'
11	2.06'	.74'	42	1.55'	.53'
12	1.59'	.57'	43	1.80'	.71'
13	1.53'	.55'	44	1.62'	.50'
14	1.81'	.61'	45	1.54'	.52'
15	1.5'	.50'	46	1.59'	.74'
16	1.91'	.60'	47	2.31'	.53'
17	1.51'	.52'	48	2.24'	.53'
18	1.54'	.53'	49	2.15'	.53'
19	1.81'	.51'	50	1.83'	.71'
20	2.39'	.64'	51	1.90'	.88'
21	2.03'	.53'	52	2.52'	.50'
22	1.51'	.57'	53	2.44'	.58'
23	1.81'	.54'	54	2.60'	.52'
24	1.50'	.54'	55	1.54'	.74'
25	2.04'	.59'	56	1.56'	.57'
26	2.57'	.59'	57	2.34'	.61'
27	2.80'	.88'	58	3.21'	.86'
28	2.62'	.55'	59	1.91'	.89'
29	1.53'	.88'	60	2.85'	.53'
30	2.04'	.54'	61	1.52'	.63'
31	1.69'	.58'	62	2.81'	.59'
63	3.03'	.52'	64	1.80'	.71'
65	0.15'	.71'	66	2.1'	.56'
67	2.13'	.53'	68	1.87'	.53'
68	1.87'	.53'	69	2.20'	.52'
69	2.20'	.52'	70	1.94'	.58'
70	1.94'	.58'	71	1.32'	.52'
71	1.32'	.52'	72	1.84'	.59'
72	1.84'	.59'	73	1.54'	.52'
73	1.54'	.52'	74	1.99'	.58'
74	1.99'	.58'	75	1.88'	.50'
75	1.88'	.50'	76	1.95'	.50'
76	1.95'	.50'	77	1.92'	.73'
77	1.92'	.73'	78	1.72'	.51'
78	1.72'	.51'	79	1.78'	.53'
79	1.78'	.53'	80	2.18'	.51'
80	2.18'	.51'	81	1.84'	.63'
81	1.84'	.63'	82	2.69'	.52'
82	2.69'	.52'	83	1.75'	.51'
83	1.75'	.51'	84	2.63'	.51'
84	2.63'	.51'	85	1.90'	.56'
85	1.90'	.56'	86	1.92'	1.11'
86	1.92'	1.11'	87	1.60'	.71'
87	1.60'	.71'	88	1.60'	.71'
88	1.60'	.71'	89	1.80'	.57'
89	1.80'	.57'	90	1.53'	.67'
90	1.53'	.67'	91	2.00'	.58'
91	2.00'	.58'	92	1.81'	.55'
92	1.81'	.55'	93	2.24'	.78'
93	2.24'	.78'	94	1.78'	.83'

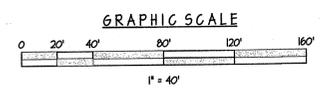
Area 1 thru 5					
Point #	Clay Thickness	Topsoil Thickness	Point #	Clay Thickness	Topsoil Thickness
125	1.76'	0.69'	150	2.77'	.75'
126	1.60'	0.62'	151	2.00'	.54'
127	1.73'	.98'	152	1.82'	.52'
128	1.71'	.69'	153	1.72'	.51'
129	1.76'	.68'	154	2.03'	.50'
130	1.51'	.51'	155	1.59'	.58'
131	1.65'	.50'	156	2.05'	.53'
132	2.13'	.57'	157	1.59'	.51'
133	1.70'	.65'	158	1.68'	.52'
134	1.79'	.59'			



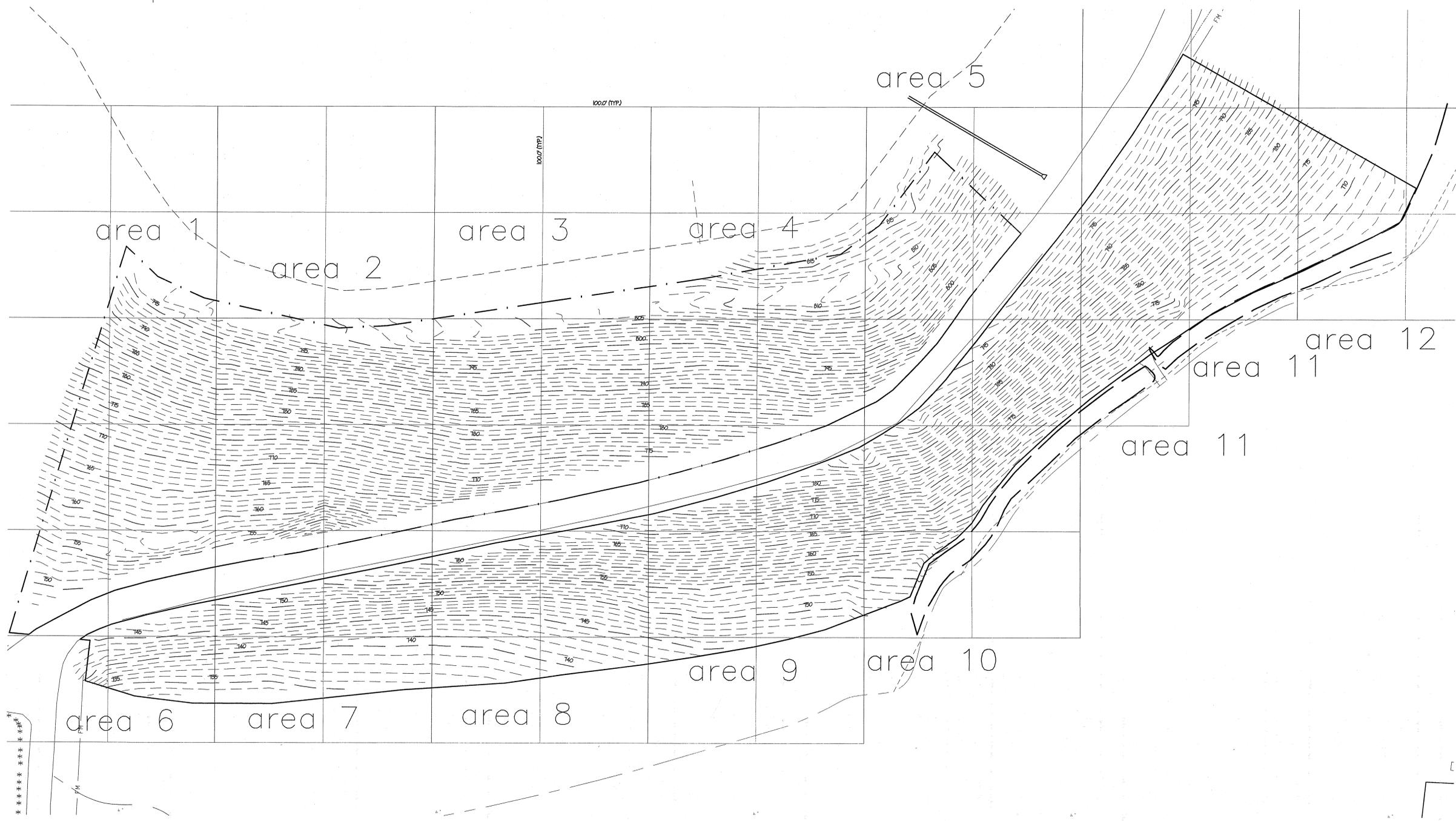
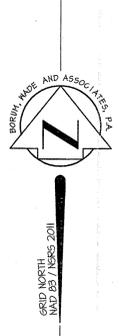
PROJECT:

WHITE STREET LANDFILL  
PARTIAL CLOSURE  
INITIAL TOPOGRAPHIC SURVEY  
MOREHEAD TOWNSHIP, GUILFORD COUNTY  
GREENSBORO, NORTH CAROLINA

OWNER/DEVELOPER:	CITY OF GREENSBORO NORTH CAROLINA
DRAWN BY:	TWB
DATE:	APRIL 8, 2013
REVISIONS:	
SHEET TITLE:	



FILE NO.:	
DRAWING SCALE:	1"=40'
PLAN SHEET NO.:	2



PROJECT:

WHITE STREET LANDFILL  
PARTIAL CLOSURE  
TOPSOIL TOPOGRAPHIC SURVEY  
MOREHEAD TOWNSHIP, GUILFORD COUNTY  
GREENSBORO, NORTH CAROLINA

OWNER/DEVELOPER:

CITY OF GREENSBORO  
NORTH CAROLINA

DRAWN BY: TMB

DATE: APRIL 8, 2013

REVISIONS:

SHEET TITLE:

FILE NO:

DRAWING SCALE: 1"=40'

PLAN SHEET NO. 3

