Permit No.	Date	Document ID No.
18-04	February 20, 2009	6847

Fac/Perm/Co ID # 8-04 Date 2 20 09 Doc ID# 6847

CORPORATE EHS SERVICES

Duke Energy Corporation
526 South Church St.
Charlotte, NC 28202

Mailing Address:
EC13K / PO Box 1006
Charlotte, NC 28201-1006

RECEIVED
February 10, 2009
Solid Waste Section
Asheville Regional Office

February 9, 2009

North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
Asheville Regional Office
2090 US Highway 70
Swannanoa, N.C. 28778

Attention: Mr. Larry Frost

Subject: Duke Energy - Marshall Steam Station
Industrial Landfill - Solid Waste Facility Permit No: 18-04
Asbestos and C&D Landfill Closure Certification Reports

Dear Mr. Frost:

Attached are the Closure Construction Certification Reports for the Asbestos landfill as well as the C&D landfill at Duke Energy's Marshall Steam Station. Both landfills are permitted under Permit No. 18-04. Also, included is an electronic copy of each report.

Both of these landfills stopped receiving waste on or prior to June 30, 2008. Construction of the closure cover system began on October 21, 2008 and was substantially completed by December 23, 2008.

As approved in your letter of February 29, 2008, disposal of asbestos and site C&D material is now occurring in the on-site FGD landfill, Permit No: 18-09.

Please let me know if any questions or if additional information is needed. I can be reached at 980-373-7892.

Sincerely,

Christopher D. Hallman

Christopher D. Hallman
Principal Environmental Specialist
Duke Energy Corporate EHS

RECEIVED
FEB 10 2009
SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

Attachments

cc (w/att): Mr. Ed Mussler (NCDENR – Raleigh)

cc (wo/att): Donna Burrell Bill McCabe

Permit No.	Date	Document ID No.
18-04	**February 20, 2009**	**6847**

RECEIVED
February 10, 2009
Solid Waste Section
Asheville Regional Office

CONSTRUCTION CERTIFICATION REPORT
MARSHALL STEAM STATION ASBESTOS LANDFILL
CATAWBA COUNTY, NORTH CAROLINA

S&ME Project No. 1356-08-107

Prepared for:
Duke Energy
526 South Church Street
Charlotte, North Carolina, 28202

Prepared by:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

January 16, 2009

S&ME

Celebrating 35 Years
1973 • 2008

January 16, 2009

Duke Energy Carolinas, LLC
P.O. Box 1006 / EC10C
Charlotte, NC 28201-1006

Attention: Randy McClamrock

Reference: **Construction Certification Report**
Marshall Steam Station Asbestos Landfill
Catawba County, NC
S&ME Project No. 1356-08-107

Dear Mr. McClamrock:

S&ME is pleased to submit the *Construction Certification Report* for the Asbestos Landfill at Duke Energy's Marshall Steam Station in Catawba County, North Carolina. The Construction Certification Report was completed in general accordance with S&ME's *Proposal for Landfill Design and Permit Services* (S&ME Proposal No. CIV-097-08) dated April 17, 2008 and Duke Energy's approved P.O. MSW01.0000030349 dated April 22, 2008 and approved revisions. This report is provided for your use and/or authorization for final submittal.

S&ME sincerely appreciates the continued opportunity to be of service to Duke Energy. Please contact us at your convenience if you have any questions. Thank you for choosing S&ME.

Respectfully submitted,

S&ME, Inc.

Jason S. Reeves, P.E.
Senior Project Engineer

Kenneth R. Daly, PE
Senior Project Engineer

Attachments: Construction Certification Report – Marshall Steam Station Asbestos Landfill

TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 General 1
1.2 Project Information 1
2. CLOSURE AREA 2
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4. CONSTRUCTION 3
5. COVER THICKNESS VERIFICATION 4
6. CERTIFICATION 4

APPENDICES

Appendix I Figure 1 – Site Vicinity Map
Drawing 1 of 6 – Existing Conditions Map (From Closure and Post-Closure Report)
Appendix II Topographic Survey (Revised November 20, 2008) by WSP-Sells
Topographic Survey (Revised December 30, 2008) by WSP-Sells
Grid Fill Verification (Dated January 9, 2009) by WSP-Sells
Appendix III Construction Materials Testing Services report (Dated January 9, 2009) by ESP Associates, P.A.
Appendix IV Construction Certification Statement

1. INTRODUCTION

1.1 General

Closure of the Marshall Steam Station Asbestos Landfill was recently completed in general accordance with the "Closure and Post-Closure Plan" prepared by S&ME, Inc. dated September 3, 2008. Closure activities generally occurred between October 21, 2008 with substantial completion around December 23, 2008. The Closure and Post-Closure Plan was prepared in general accordance with Title 15A Subchapter 13B of the North Carolina Administrative Code (NCAC) Rules .0501 through .0510. Closure requirement were previously outlined in the North Carolina Department of Human Resources Permit No. 18-04 amendment letter dated March 1, 1988. Duke Energy will also use the Closure and Post-Closure Plan prepared by S&ME to provide post-closure maintenance and monitoring during the post-closure care period.

S&ME also developed an Erosion and Sediment Control Plan for the site dated September 10, 2008. A Letter of Approval dated September 30, 2008 was issued by NCDENR for the Erosion and Sediment Control Plan. S&ME issued an Erosion and Sediment Control Plan Addendum on October 9, 2008 to increase the total disturbed area to 22.0 acres.

1.2 Project Information

Marshall Steam Station is located on 8320 East Highway 150 in Terrell, North Carolina. The Asbestos landfill is located on the Duke Energy property to northwest of the Closed Ash Landfill as shown on **Figure 1 – Site Vicinity Map**. The Asbestos landfill is bordered to the north by a previously grassed area, a wooded area to the south, an ash basin to the west, the Closed Ash Landfill to the southeast, and the Construction and Demolition (C&D) Landfill to the east. A dirt/gravel access road is located between the Asbestos Landfill and the Closed Ash Landfill. The landfill site and surrounding vicinity are illustrated on **Figure 1** included in Appendix I. A more detailed illustration of the site conditions prior to closure activities is provided on **Drawing 1 of 6 – Existing Conditions Map** also included in **Appendix I** from the Closure and Post-Closure Plan.

The Asbestos landfill on Duke Energy property is a part of the North Carolina Department of Environment and Natural Resources (NCDENR) landfill permit No. 18-04, issued in 1983. Landfill permit No. 18-04 encompasses 3 areas. Area 1 consists of a 58-acre flyash landfill, located to the south of the Asbestos landfill, which was closed in 2001. Area 2 consists of an asbestos landfill located to the northwest of the ash landfill with an original permitted area of 38.1 acres. Area 3 consists of the C&D landfill which has an original permitted area of 2.9 acres. Surface drainage from the Asbestos landfill flows to an existing ash basin (NPDES Permit No. NC0004987).

The NCDENR Solid Waste Section issued revised regulations for the closure of existing C&D landfills in January 2007 in North Carolina Administrative Code Title 15A Chapter

13B Section .0532 through .0547. These rules contain more extensive closure requirements than the previous rules for closure found in Section .0510. The revised rules state that C&D landfills that receive no waste after June 30, 2008 can be closed under the requirements of Section .0510 and the conditions of the existing permit. The existing Asbestos landfill was permitted as a modification to landfill permit No. 18-04. The Marshall Asbestos Landfill operations stopped on or before June 30, 2008 and the landfill was closed in December 2008 in accordance with Section .0510 and the conditions of the existing permit.

The limit of waste for the Asbestos Landfill was previously located by Duke Energy representatives during preparation of the Closure and Post-Closure Plan. During silt fence installation by Morgan Corporation on October 21, 2008, asbestos material was encountered a few feet north of the delineated limit of waste boundary along the northeastern corner of the Asbestos Landfill.

Between October 27 and October 29, 2008, an S&ME Certified Asbestos Technician assisted by an S&ME engineer performed hand auger borings at selected locations along the north, northwest, and west Asbestos Landfill perimeter to further define the limit of waste boundary. The hand auger boring locations and revised waste limits line delineated by S&ME in the explored locations were surveyed by Morgan Corporation personnel. Based on the revised field delineated limit of waste, minor field modifications were made to the subgrade and final grading contours in areas where the limit of waste was revised.

The field modifications generally included extending the cover system further north along the northern landfill perimeter; extending the required 3 feet cover to the western limit of waste; and shifting the site cover grading to the north along the southwestern landfill perimeter to the revised limit of waste line. These grading changes are reflected on the revised November 20, 2008 "**Topographic Survey"** (as-built cover system subgrade survey) and revised December 30, 2008 and **"Topographic Survey"** (as-built final cover survey) by WSP-Sells included in **Appendix II.** The revised limit of waste line and surveyed cover system elevations are indicated on the January 9, 2009 **"Grid Fill Verification Survey"** by WSP-Sells also included in **Appendix II**.

2. CLOSURE AREA

Based on the "Topographic Survey" by WSP-Sells updated on December 30, 2008, the closure area for the Marshall Asbestos Landfill encompasses approximately 6.9 acres. The Asbestos landfill is bordered to the north by a previously grassed area, a wooded area to the south, an ash basin to the west, the Closed Ash Landfill to the southeast, and the Construction and Demolition (C&D) Landfill to the east. Grading was performed in general accordance with the "Proposed Final Cover Plan" – Drawing 3 of the Closure and Post-Closure Plan with minor field modifications based on the revised limit of waste partially delineated by S&ME. Construction activities within the closure area for the Asbestos Landfill generally included earthwork required to reach the soil cover system subgrade, compacted soil cover grading, geotextile and riprap slope protection installation, drainage structure installation, soil amendment, seeding, matting, and installation of stormwater structures and erosion and sediment control measures. The final closure grades

and associated drainage structures are shown on the revised December 30, 2008 **"Topographic Survey"** by WSP-Sells included in **Appendix II**.

3. BORROW AREAS

Two borrow areas were utilized as sources for structural fill and topsoil for the cover system subgrade and cover system grading. These areas consisted of the 4-acre primary borrow area to the north of the Asbestos Landfill and the 7-acre topsoil borrow area to the northwest of the Asbestos Landfill. Construction activities within the Borrow Areas generally consisted of excavation, grading for drainage, installation of erosion control measures, soil amendment, and seeding.

Laboratory testing of the borrow materials was performed by ESP Associates. These tests included laboratory standard Proctor moisture-density, grain-size analysis, and Atterberg Limits. Based on the results of the laboratory testing, the borrow materials used for the project meet the project Technical Specification for the borrow material. Please refer to the **Construction Materials Testing Services"** report by ESP Associates dated January 9, 2009 included in **Appendix III** for more detailed information.

4. CONSTRUCTION

Construction of the Marshall Steam Station Asbestos Landfill closure cover system was performed by Morgan Corporation. Construction of the closure cover system began around October 21, 2008 and was substantially complete by December 23, 2008. Monitoring of the site construction activities was primarily performed by Duke Energy representatives. As previously mentioned, S&ME personnel performed additional waste delineation services prior to the subgrade grading activites and partially revised the waste limit boundary. S&ME personnel also attended a construction progress meeting on December 23, 2008 with representatives of Duke Energy and Morgan Corporation to review the substantially completed work items. Quality control laboratory soil testing, field density testing, proofrolling observations, and cover thickness verification by the use of hand auger borings were performed by ESP Associates, P.A. on behalf of Morgan Corporation to verify conformance with the Technical Specifications for the closure cover system. The results of these testing and observation services are summarized in the **"Construction Materials Testing Services"** report by ESP Associates dated January 9, 2009 included in **Appendix III**.

The cover system consisted of a 3-foot thick soil layer including a 6-inch topsoil/vegetative layer. Additional structural subgrade fill was placed on the existing landfill prior to the closure cover system construction to generally provide minimum 2 percent slopes and maximum 3 horizontal to 1 vertical slopes, with the exception of the western slope area that was constructed at up to 2.2 horizontal to 1 vertical along the western slope toe with 8-ounce non-woven geotextile filter fabric and riprap protection. The as-built closure cover system subgrade and final closure cover system grades are

shown on the attached November 20, 2008 "**Topographic Survey"** (as-built cover system subgrade survey) and revised December 30, 2008 and **"Topographic Survey"** (as-built final cover system survey) by WSP-Sells included in **Appendix II.**

The results of the laboratory soil testing and field density testing performed by others indicates that the closure cover system materials met the soil classification and density requirements outlined in the Technical Specifications. Please refer to the attached **"Construction Materials Testing Services"** report for additional information.

5. COVER THICKNESS VERIFICATION

The design closure Landfill consists of a 3-foot layer of soil fill including a 6-inch topsoil/vegetative layer. The specified tolerance for the cover system thickness was +/- 0.1 foot. As previously mentioned, surveying of the site was performed prior to construction, after cover system subgrade grading, and after final cover system grading by WSP-Sells.

Thickness verifications for the closure cover system were verified primarily by comparing the difference in elevations between the cover system subgrade elevations within the Asbestos Landfill closure area on a 50-foot grid spacing to the final as-built closure cover system elevations at the same grid locations as shown on the **"Grid Fill Verification Survey"** included in **Appendix II**. The results of the surveying indicate that the minimum cover system thickness of 3 feet was present in the majority of the grid locations with the exceptions of grid points 1447, 1471, 1511, 1548, 1551, 1564, 1567, and 1635 that indicated surveyed subgrade to final cover grade differences of 2.6 to 2.8 feet. However, a comparison of the original ground surface elevations from the pre-construction site survey to the final cover elevations, as well as the hand auger boring cover thickness verifications performed in these general areas by ESP Associates presented in **Table 1** of the **"Construction Materials Testing Services"** report, a minimum of 3 feet of soil cover appears to be present in these locations.

6. CERTIFICATION

Results of cover thickness verification, as-built post-closure survey, our observations during the December 23, 2008 substantial completion meeting, field and laboratory quality control testing results provided by Morgan Corporation, correspondence from Duke Energy related to construction activities, the closure cover system and temporary drainage control measures were constructed in general accordance with the Closure and Post-Closure Plan. A Construction Certification Statement signed and sealed by an engineer registered in the state of North Carolina is included in **Appendix IV**.

APPENDIX I

SITE VICINITY MAP
AND EXISTING CONDITIONS MAP

SCALE:	1-IN:1600-FT
DATE:	1-12-2009
DRAWN BY:	WMH
PROJECT NO:	1356-08-107

S&ME
WWW.SMEINC.COM

SITE VICINITY MAP
ASBESTOS LANDFILL CLOSURE
DUKE ENERGY-MARSHALL STEAM STATION
CATAWBA COUNTY, NC

FIGURE NO.
1

G:\1356\DUKE ENERGY\08-106 Marshall C&DLF Closure\FIGURE1.dwg

APPENDIX II

TOPOGRAPHIC SURVEYS
AND GRID FILL VERIFICATION SURVEY

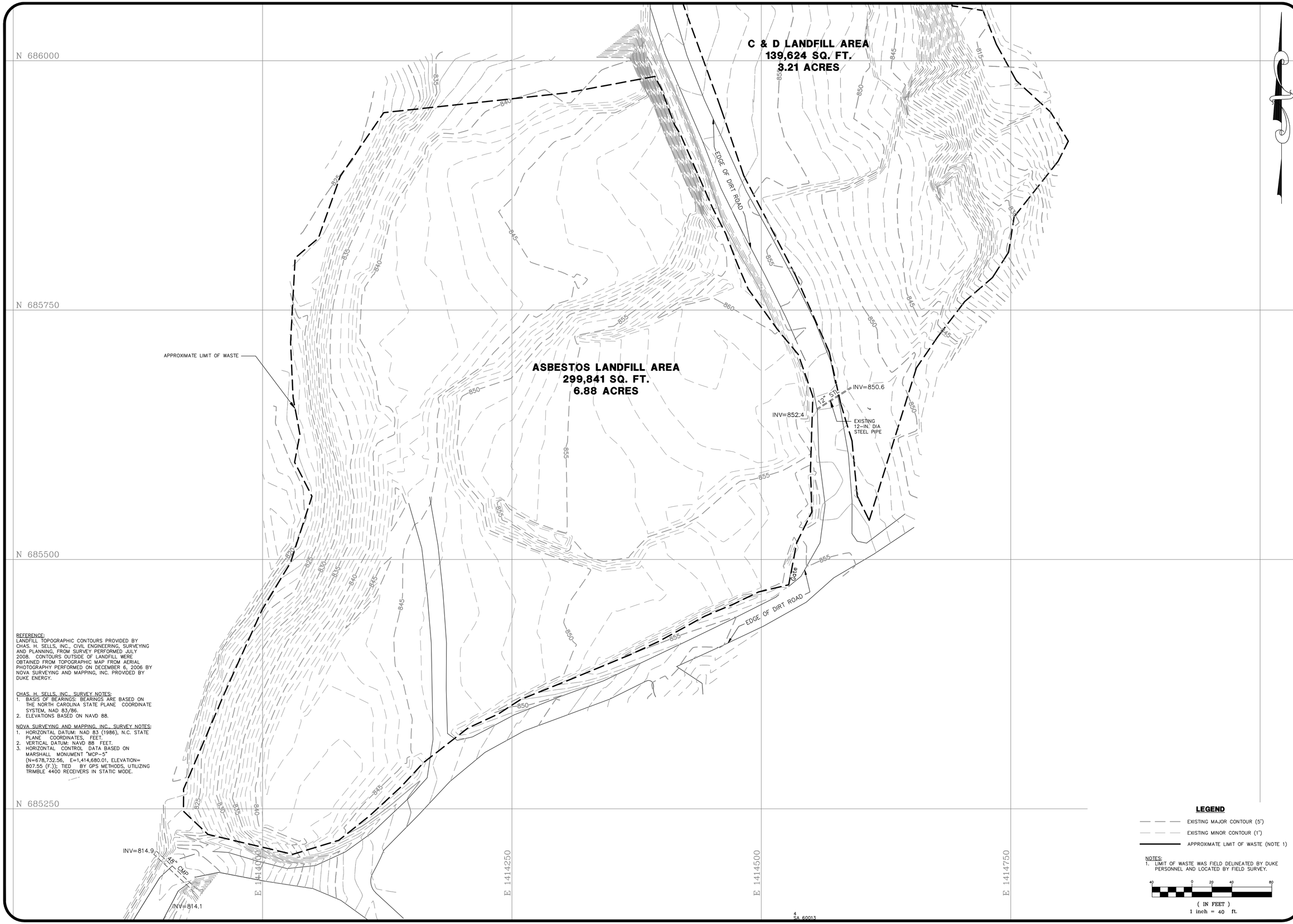
SCALE:	1-IN:1600-FT
DATE:	1-12-2009
DRAWN BY:	WMH
PROJECT NO:	1356-08-107

S&ME
WWW.SMEINC.COM

SITE VICINITY MAP
ASBESTOS LANDFILL CLOSURE
DUKE ENERGY-MARSHALL STEAM STATION
CATAWBA COUNTY, NC

FIGURE NO.
1

G:\1356\DUKE ENERGY\08-106 Marshall C&DLF Closure\FIGURE1.dwg



REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC., CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

CHAS. H. SELLS, INC., SURVEY NOTES:
1. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
2. ELEVATIONS BASED ON NAVD 88.

NOVA SURVEYING AND MAPPING, INC., SURVEY NOTES:
1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
2. VERTICAL DATUM: NAVD 88 FEET.
3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5" (N=678,732.56, E=1,414,680.01, ELEVATION= 807.55 (F.)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

LEGEND

- EXISTING MAJOR CONTOUR (5')
- EXISTING MINOR CONTOUR (1')
- APPROXIMATE LIMIT OF WASTE (NOTE 1)

NOTES:
1. LIMIT OF WASTE WAS FIELD DELINEATED BY DUKE PERSONNEL AND LOCATED BY FIELD SURVEY.

40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

4
SA 60013

Duke Energy ©

S&ME
WWW.SMEINC.COM

NORTH CAROLINA PROFESSIONAL SEAL 032 ENGINEER KENNETH R. PRINCE

NO.	DATE	DESCRIPTION	BY
--	10-10-08	ISSUED FOR CONSTRUCTION	

EXISTING CONDITIONS MAP

ASBESTOS LADFILL CLOSURE
DUKE ENERGY - MARSHALL STEAM STATION
CATAWBA COUNTY, NORTH CAROLINA

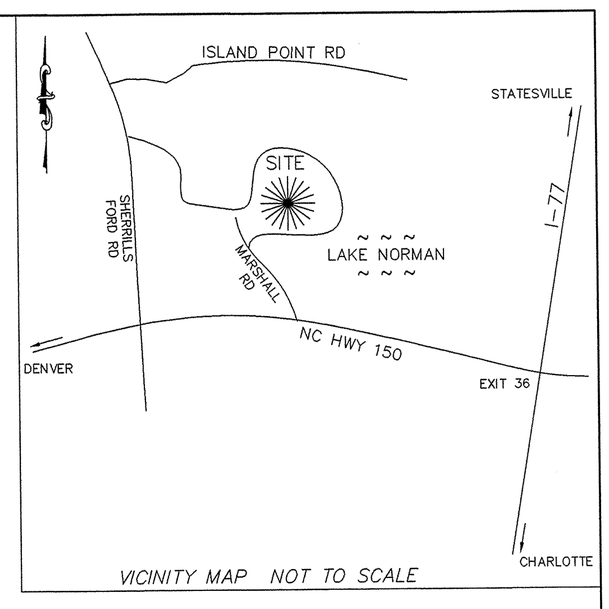
DRAWN BY: CLD	CHECKED BY: KRD
DESIGNED BY: CLD	APPROVED BY: KRD
PROJECT NUMBER: 1356-08-107	
SCALE: AS SHOWN	DATE: 10-10-08
DRAWING: 1	OF: 6

DRAWING PATH: Q:\DCS\DUKE ENERGY\SHP\7 MARSHALL ASBESTOS LF CLOSURE\DWG\F\DUKE-PTC LAND DESIGN.DWG

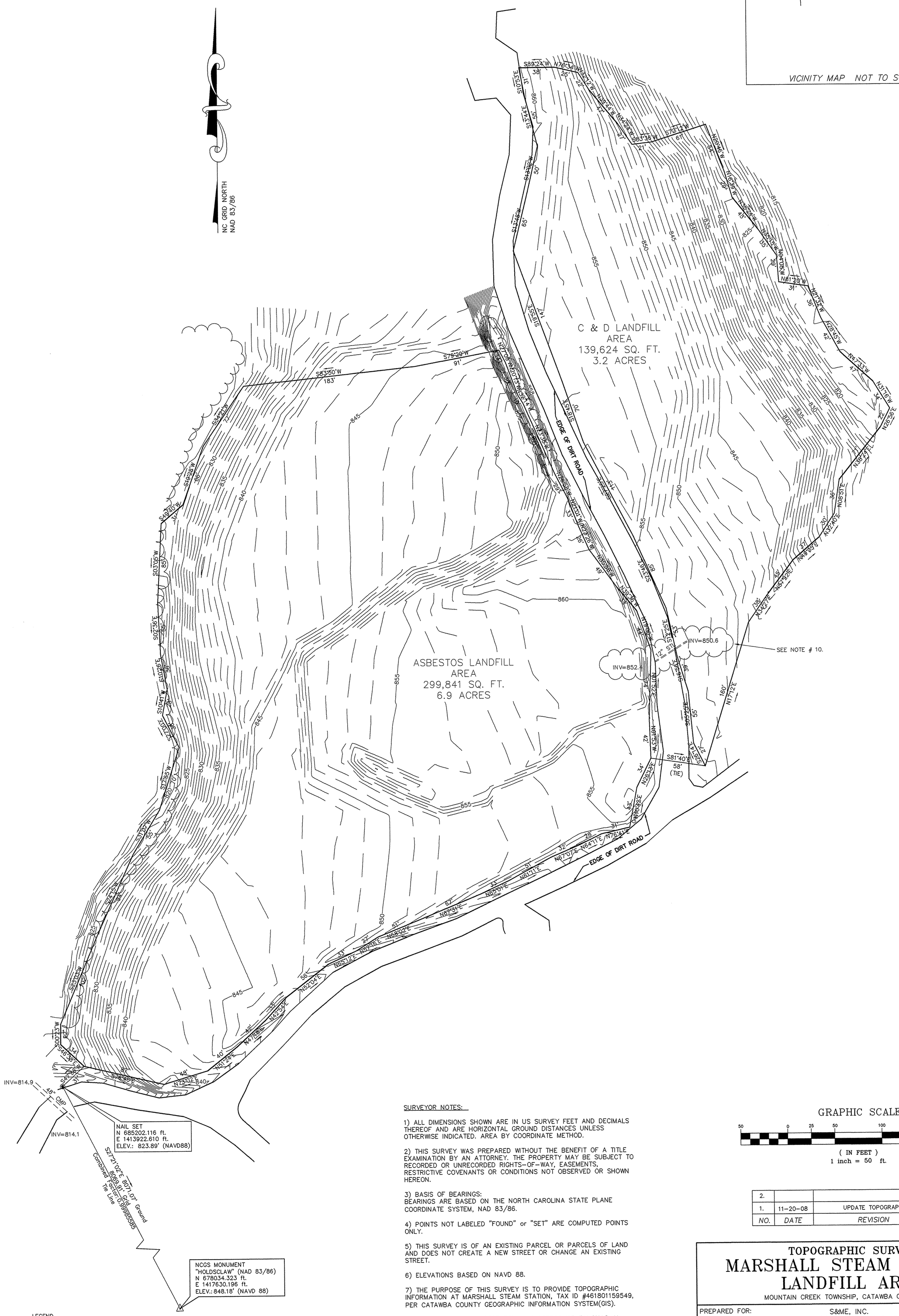
I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL DATE 7/25/2008

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

Elev. = Elevation

◉ = Nail Set

Inv = Invert

= Not To Scale

= Treeline

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

3) BASIS OF BEARINGS:
BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.

4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.

5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.

6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY CHAS. H. SELLS, INC. TO DETERMINE OR VERIFY ANY BOUNDARY LINES.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPH UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.			
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY

MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:

S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

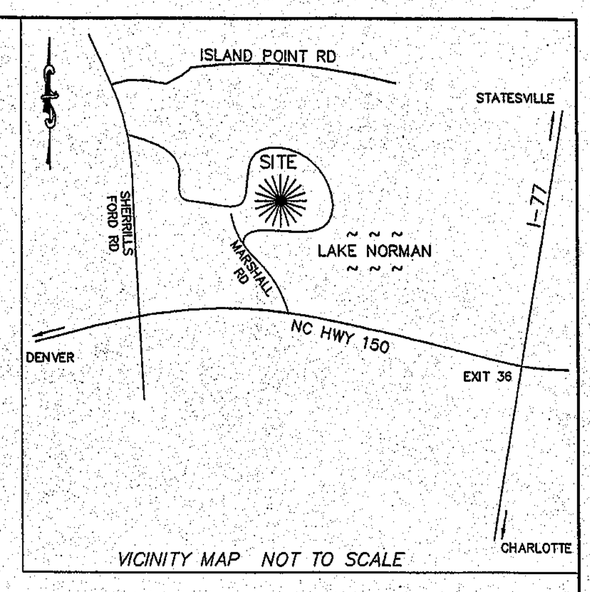
WSP • SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO

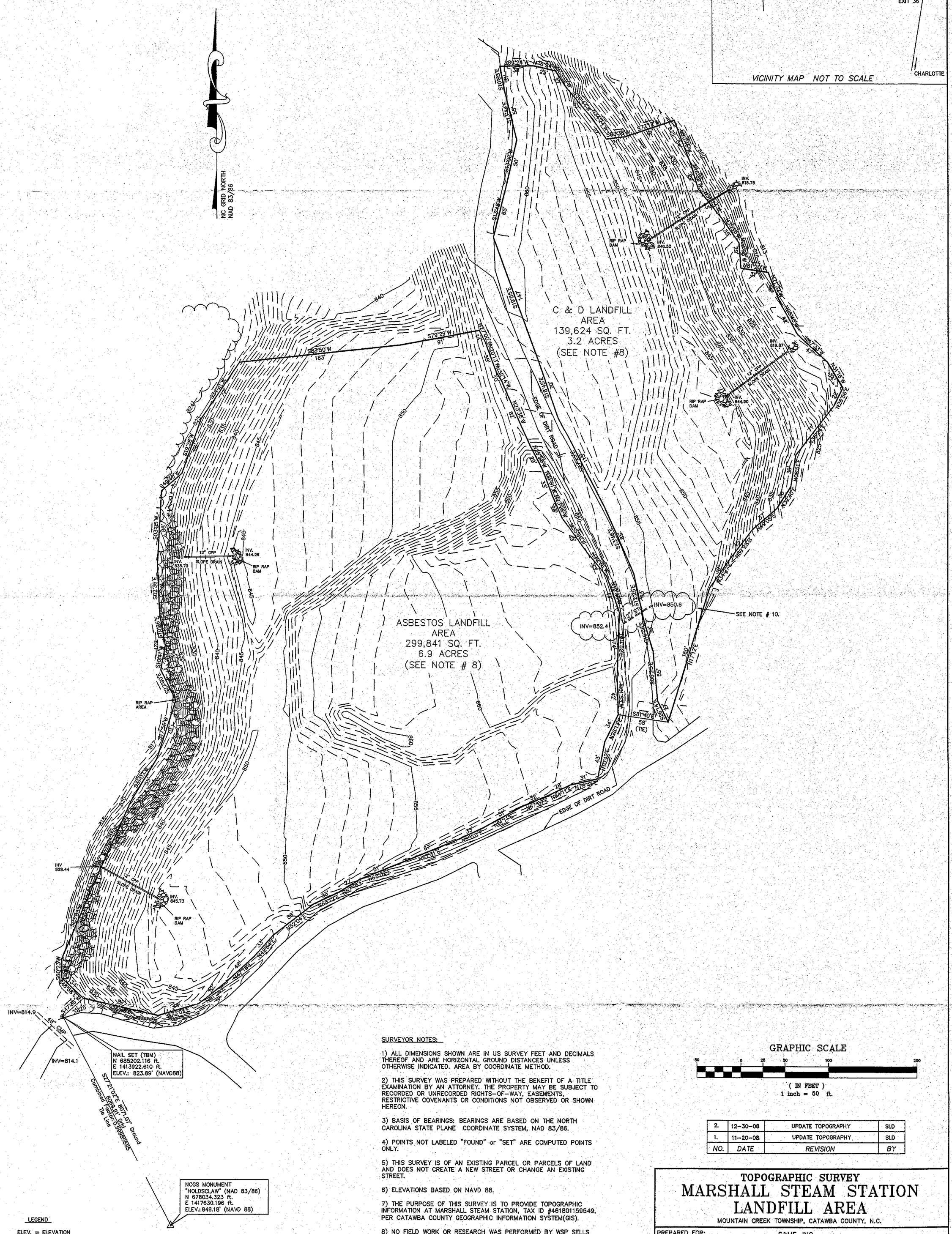
I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 12/30/2008

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

ELEV. = ELEVATION

◉ = NAIL SET

—/\/— = NOT TO SCALE

⌒⌒⌒ = TREELINE

INV = INVERT

▨ = RIP RAP

TBM = TEMPORARY BENCHMARK

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

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6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. PERIMETER METES AND BOUNDS AND AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPHY UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.	12-30-08	UPDATE TOPOGRAPHY	SLD
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:

S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

WSP · SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO

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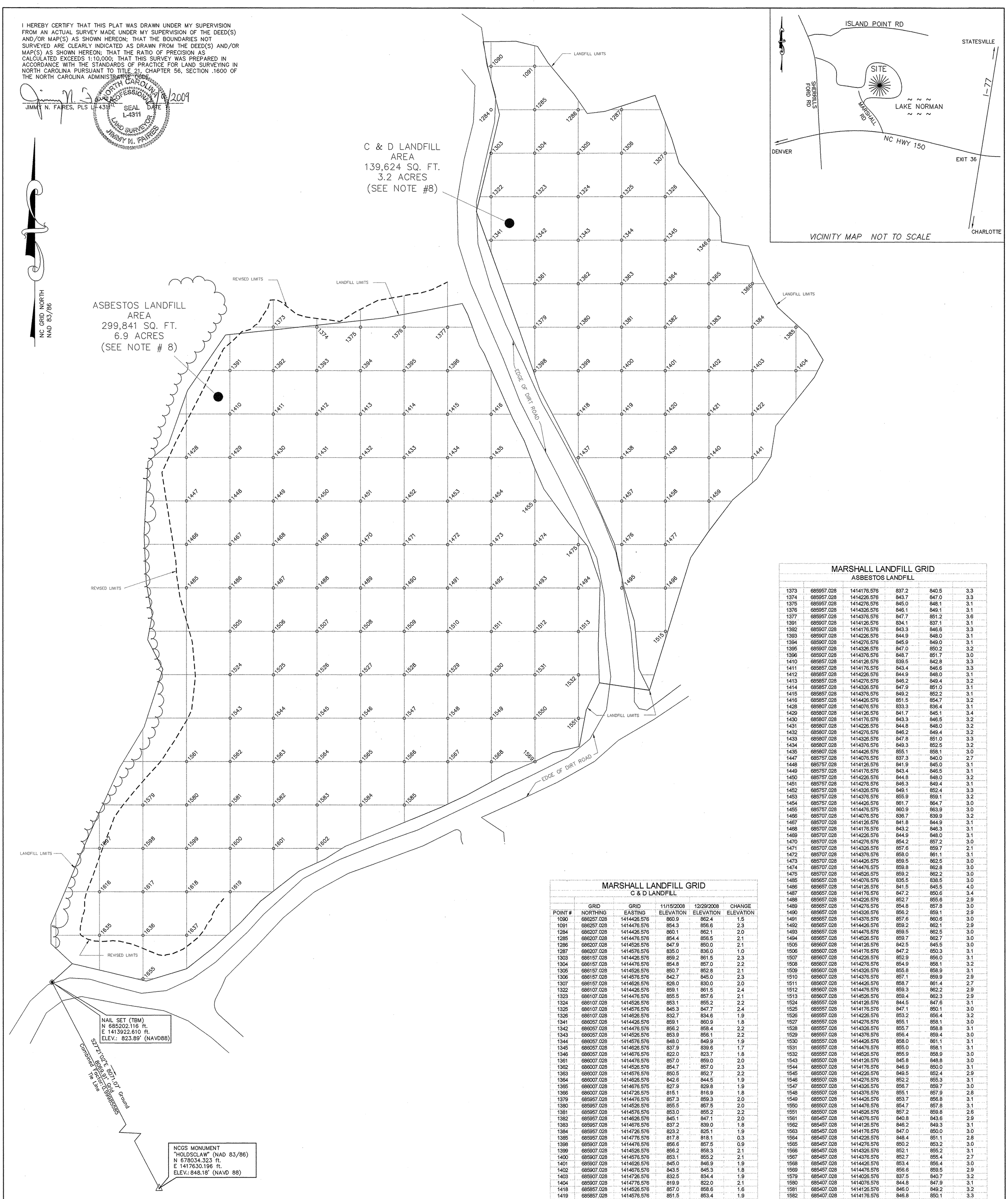
JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 1/9/2009

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



MARSHALL LANDFILL GRID
C & D LANDFILL

POINT #	GRID NORTHING	GRID EASTING	11/15/2008 ELEVATION	12/29/2008 ELEVATION	CHANGE ELEVATION
1090	686257.028	1414426.576	860.9	862.4	1.5
1091	686257.028	1414476.576	854.3	856.6	2.3
1284	686207.028	1414426.576	860.1	862.1	2.0
1285	686207.028	1414476.576	854.4	856.5	2.1
1286	686207.028	1414526.576	847.9	850.0	2.1
1287	686207.028	1414576.576	835.0	836.0	1.0
1303	686157.028	1414426.576	859.2	861.5	2.3
1304	686157.028	1414476.576	854.8	857.0	2.2
1305	686157.028	1414526.576	850.7	852.8	2.1
1306	686157.028	1414576.576	842.7	845.0	2.3
1307	686157.028	1414626.576	828.0	830.0	2.0
1322	686107.028	1414426.576	859.1	861.5	2.4
1323	686107.028	1414476.576	855.5	857.6	2.1
1324	686107.028	1414526.576	853.1	855.2	2.2
1325	686107.028	1414576.576	845.3	847.7	2.4
1326	686107.028	1414626.576	832.7	834.6	1.9
1341	686057.028	1414426.576	859.1	860.9	1.8
1342	686057.028	1414476.576	856.2	858.4	2.2
1343	686057.028	1414526.576	853.9	856.1	2.2
1344	686057.028	1414576.576	848.0	849.9	1.9
1345	686057.028	1414626.576	837.9	839.6	1.7
1346	686057.028	1414676.576	822.0	823.7	1.8
1361	686007.028	1414476.576	857.0	859.0	2.0
1362	686007.028	1414526.576	854.7	857.0	2.3
1363	686007.028	1414576.576	850.5	852.7	2.2
1364	686007.028	1414626.576	842.6	844.5	1.9
1365	686007.028	1414676.575	827.9	829.8	1.9
1366	686007.028	1414726.575	815.1	816.9	1.8
1379	685957.028	1414476.576	857.3	859.3	2.0
1380	685957.028	1414526.576	855.5	857.5	2.0
1381	685957.028	1414576.576	853.0	855.2	2.2
1382	685957.028	1414626.576	845.1	847.1	2.0
1383	685957.028	1414676.576	837.2	839.0	1.8
1384	685957.028	1414726.576	823.2	825.1	1.9
1385	685957.028	1414776.576	817.8	818.1	0.3
1398	685907.028	1414476.576	856.6	857.5	0.9
1399	685907.028	1414526.576	856.2	858.3	2.1
1400	685907.028	1414576.576	853.1	855.2	2.1
1401	685907.028	1414626.576	845.0	846.9	1.9
1402	685907.028	1414676.576	843.5	845.3	1.8
1403	685907.028	1414726.576	832.5	834.4	1.9
1404	685907.028	1414776.576	819.9	822.0	2.1
1418	685857.028	1414526.576	857.0	858.6	1.6
1419	685857.028	1414576.576	851.5	853.4	1.9
1420	685857.028	1414626.576	845.7	847.7	2.0
1421	685857.028	1414676.576	844.3	846.2	1.9
1422	685857.028	1414726.576	837.2	839.0	1.8
1437	685807.028	1414526.576	855.3	857.1	1.9
1438	685807.028	1414576.576	851.3	853.3	2.0
1439	685807.028	1414626.576	847.6	849.5	1.9
1440	685807.028	1414676.576	845.3	847.2	1.9
1441	685807.028	1414726.576	834.2	835.6	1.4
1457	685757.028	1414576.576	853.3	855.1	1.9
1458	685757.028	1414626.576	850.1	852.1	2.0
1459	685757.028	1414676.576	846.4	848.4	2.0
1476	685707.028	1414576.576	853.0	855.2	2.2
1477	685707.028	1414626.576	851.6	853.5	1.9
1495	685657.028	1414576.576	853.6	855.6	2.0
1496	685657.028	1414626.576	851.4	853.4	2.0
1515	685607.028	1414626.576	851.7	853.9	2.2

MARSHALL LANDFILL GRID
ASBESTOS LANDFILL

1373	685957.028	1414176.576	837.2	840.5	3.3
1374	685957.028	1414226.576	843.7	847.0	3.3
1375	685957.028	1414276.576	845.0	848.1	3.1
1376	685957.028	1414326.576	846.1	849.1	3.1
1377	685957.028	1414376.576	847.7	851.2	3.6
1391	685907.028	1414126.576	834.1	837.1	3.1
1392	685907.028	1414176.576	843.3	846.6	3.3
1393	685907.028	1414226.576	844.9	848.0	3.1
1394	685907.028	1414276.576	845.9	849.0	3.1
1395	685907.028	1414326.576	847.0	850.2	3.2
1396	685907.028	1414376.576	848.7	851.7	3.0
1410	685857.028	1414126.576	839.5	842.8	3.3
1411	685857.028	1414176.576	843.4	846.6	3.3
1412	685857.028	1414226.576	844.9	848.0	3.1
1413	685857.028	1414276.576	846.2	849.4	3.2
1414	685857.028	1414326.576	847.9	851.0	3.1
1415	685857.028	1414376.576	849.2	852.2	3.1
1416	685857.028	1414426.576	851.5	854.7	3.2
1428	685807.028	1414076.576	833.3	836.4	3.1
1429	685807.028	1414126.576	841.7	845.1	3.4
1430	685807.028	1414176.576	843.3	846.5	3.2
1431	685807.028	1414226.576	844.8	848.0	3.2
1432	685807.028	1414276.576	846.2	849.4	3.2
1433	685807.028	1414326.576	847.8	851.0	3.3
1434	685807.028	1414376.576	849.3	852.5	3.2
1435	685807.028	1414426.576	855.1	858.1	3.0
1447	685757.028	1414076.576	837.3	840.0	2.7
1448	685757.028	1414126.576	841.9	845.0	3.1
1449	685757.028	1414176.576	843.4	846.5	3.1
1450	685757.028	1414226.576	844.8	848.0	3.2
1451	685757.028	1414276.576	846.3	849.4	3.1
1452	685757.028	1414326.576	849.1	852.4	3.3
1453	685757.028	1414376.576	855.9	859.1	3.2
1454	685757.028	1414426.576	861.7	864.7	3.0
1455	685757.028	1414476.575	860.9	863.9	3.0
1466	685707.028	1414076.576	836.7	839.9	3.2
1467	685707.028	1414126.576	841.8	844.9	3.1
1468	685707.028	1414176.576	843.2	846.3	3.1
1469	685707.028	1414226.576	844.9	848.0	3.1
1470	685707.028	1414276.576	854.2	857.2	3.0
1471	685707.028	1414326.576	857.6	859.7	2.1
1472	685707.028	1414376.576	858.0	861.1	3.1
1473	685707.028	1414426.575	859.5	862.5	3.0
1474	685707.028	1414476.575	859.8	862.8	3.0
1475	685707.028	1414526.575	859.2	862.2	3.0
1485	685657.028	1414076.576	835.5	838.5	3.0
1486	685657.028	1414126.576	841.5	845.5	4.0
1487	685657.028	1414176.576	847.2	850.6	3.4
1488	685657.028	1414226.576	852.7	855.6	2.9
1489	685657.028	1414276.576	854.8	857.8	3.0
1490	685657.028	1414326.576	856.2	859.1	2.9
1491	685657.028	1414376.576	857.6	860.6	3.0
1492	685657.028	1414426.576	859.2	862.1	2.9
1493	685657.028	1414476.576	859.5	862.5	3.0
1494	685657.028	1414526.576	859.7	862.7	3.0
1505	685607.028	1414126.576	842.5	845.5	3.0
1506	685607.028	1414176.576	847.2	850.3	3.1
1507	685607.028	1414226.576	852.9	856.0	3.1
1508	685607.028	1414276.576	854.9	858.1	3.2
1509	685607.028	1414326.576	855.8	858.9	3.1
1510	685607.028	1414376.576	857.1	859.9	2.9
1511	685607.028	1414426.576	858.7	861.4	2.7
1512	685607.028	1414476.576	859.3	862.2	2.9
1513	685607.028	1414526.576	859.4	862.3	2.9
1524	685557.028	1414126.576	844.5	847.6	3.1
1525	685557.028	1414176.576	847.1	850.1	3.0
1526	685557.028	1414226.576	853.2	856.4	3.2
1527	685557.028	1414276.576	855.1	858.1	3.0
1528	685557.028	1414326.576	855.7	858.8	3.1
1529	685557.028	1414376.576	856.4	859.4	3.0
1530	685557.028	1414426.576	858.0	861.1	3.1
1531	685557.028	1414476.576	855.0	858.1	3.1
1532	685557.028	1414526.576	855.9	858.9	3.0
1543	685507.028	1414126.576	845.8	848.8	3.0
1544	685507.028	1414176.576	846.9	850.0	3.1
1545	685507.028	1414226.576	849.5	852.4	2.9
1546	685507.028	1414276.576	852.2	855.3	3.1
1547	685507.028	1414326.576	856.7	859.7	3.0
1548	685507.028	1414376.576	855.1	857.9	2.8
1549	685507.028	1414426.576	853.7	856.8	3.1
1550	685507.028	1414476.576	854.7	857.8	3.1
1551	685507.028	1414526.576	857.2	859.8	2.6
1561	685457.028	1414076.576	840.8	843.6	2.9
1562	685457.028	1414126.576	846.2	849.3	3.1
1563	685457.028	1414176.576	847.0	850.0	3.0
1564	685457.028	1414226.576	848.4	851.1	2.8
1565	685457.028	1414276.576	850.2	853.2	3.0
1566	685457.028	1414326.576	852.1	855.2	3.1
1567	685457.028	1414376.576	852.7	855.4	2.7
1568	685457.028	1414426.576	853.4	856.4	3.0
1569	685457.028	1414476.576	856.6	859.5	2.9
1579	685407.028	1414026.576	837.5	840.7	3.2
1580	685407.028	1414076.576	844.8	847.9	3.1
1581	685407.028	1414126.576	846.0	849.2	3.2
1582	685407.028	1414176.576	846.8	850.1	3.3
1583	685407.028	1414226.576	848.5	851.6	3.1
1584	685407.028	1414276.576	850.4	853.6	3.2
1585	685407.028	1414326.576	852.2	855.1	2.9
1597	685357.028	1413976.575	830.9	834.0	3.1
1598	685357.028	1414026.576	843.0	846.2	3.2
1599	685357.028	1414076.576	844.4	847.5	3.1
1600	685357.028	1414126.576	845.5	848.4	2.9
1601	685357.028	1414176.576	846.9	850.1	3.2
1602	685357.028	1414226.576	849.0	851.9	2.9
1616	685307.028	1413976.576	835.2	838.3	3.1
1617	685307.028	1414026.576	842.7	846.3	3.6
1618	685307.028	1414076.576	843.9	846.8	2.9
1619	685307.028	1414126.576	845.0	848.0	3.0
1635	685257.028	1413976.576	837.3	840.1	2.8
1636	685257.028	1414026.576	842.5	846.6	4.1
1637	685257.028	1414076.576	843.5	846.5	3.0

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.
2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.
3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.
5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.
6) ELEVATIONS BASED ON NAVD 88.
7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).
8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.
9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

LEGEND

ELEV. = ELEVATION
◉ = NAIL SET
—/\/— = NOT TO SCALE
⌒⌒⌒ = TREELINE
TBM = TEMPORARY BENCHMARK

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

GRID FILL VERIFICATION SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:
S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

WSP • SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	NOVEMBER/DECEMBER 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JANUARY 9, 2009	1 of 1	056234-001-GRID

APPENDIX III

CONSTRUCTION MATERIALS TESTING SERVICES REPORT

ESP Associates, P.A.

January 9, 2009

Morgan Corporation
P.O. Box 480130
Charlotte, North Carolina 28269

Attention: Mr. Craig Greeson

Reference: **CONSTRUCTION MATERIALS TESTING SERVICES**
Marshall Steam Station
Terrell, North Carolina
ESP Project No. E4-WJ13.300 (Report #1)

Dear Mr. Greeson:

As requested, ESP Associates, P.A. (ESP), provided construction materials testing services on a part-time, on-call basis for the referenced project. Our services were coordinated with you and Mr. Alan Ramsey with Morgan Corporation. This letter summarizes our field density testing, subgrade evaluation and cover thickness evaluation for the period beginning October 30, 2008 through December 23, 2008. Horizontal and vertical control was provided in the field by Morgan Corporation.

FIELD DENSITY TESTING

During this reporting period, an engineering technician from our office visited the site and performed fifty-eight (58) field density tests. The field density tests were performed on fill materials placed to achieve the design subgrade elevations and cover thickness elevations within the asbestos and C&D landfills and on fill materials placed to construct diversion berms within the asbestos and C&D landfills. The tests performed indicate densities equaling or exceeding 90 percent of the soil's maximum dry density based on a Standard Proctor moisture-density relationship. The results of the field density tests, laboratory Standard Proctor moisture-density

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relationships and associated natural moisture content, grain size distribution and Atterberg limits test results performed on the fill materials are enclosed for your review. The test location coordinates and test depth information shown on the attached "Report of Field Density Tests" were provided by Morgan Corporation's surveyors or earthmoving equipment operators using GPS devices incorporated into their equipment.

SUBGRADE EVALUATION

During this reporting period, a representative from our office visited the site to evaluate the design subgrade within the asbestos landfill prior to fill placement required to achieve the cover thickness elevations. Our evaluation consisted of visual observations, probing with a steel probe rod and proofrolling observations. Proofrolling was performed utilizing a loaded pan excavator. Based on our evaluation, two areas appeared unstable. However, the project specifications prohibited undercutting within the asbestos landfill. Therefore, Mr. Jason Reeves, Project Manager with S&ME, recommended the use of a "bridge" lift within the two unstable locations to aid in subgrade stability and to facilitate compaction of subsequent fill placement. ESP observed that a "bridge" lift approximately 1 foot thick was placed at each location in general accordance with S&ME's recommendation. For more detailed information, please refer to the attached "Proofrolling Observations" sheets dated November 19, 2008.

As recommended by Mr. Reeves and/or Mr. Ken Daly, Design Engineer with S&ME, the existing subgrade within the asbestos landfill was not proofrolled prior to fill placement required to achieve the design subgrade elevations due to the project specifications prohibiting undercut in that area. Also as recommended by Mr. Reeves and/or Mr. Daly, the existing subgrade and design subgrade within the C&D landfill was not proofrolled prior to fill placement due to protruding landfill debris that would potentially damage the proofrolling equipment.

LANDFILL COVER THICKNESS EVALUATION

During this reporting period, a representative from our office visited the site to evaluate the asbestos and C&D landfill cover thickness by performing a total of forty-seven (47) hand auger borings upon completion of the grading activities at the designed finished grades. Thirty (30) hand auger borings were performed within the asbestos landfill and were extended to a minimum depth of approximately 3 feet. Seventeen (17) hand auger borings were performed within the C&D landfill and were extended to a minimum depth of approximately 2 feet. The hand auger borings were performed on an approximate 100-foot grid within each landfill.

Based on the results of the hand auger borings, the minimum required cover thickness was encountered at the asbestos and C&D landfills. A summary of the landfill cover thickness evaluation is presented on "Cover Thickness Evaluation, Asbestos Landfill, Table 1" and "Cover Thickness Evaluation, C&D landfill, Table 2" included the appendix. The hand auger boring location coordinates shown on the attached tables were provided by Morgan Corporation's surveyors using GPS devices.

ESP appreciates the opportunity to have assisted you during this project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, P.A.

Jacob L. Sarna, PG
Project Manager

David A. Bixler II, PE
NC Licensure No. 33560

NORTH CAROLINA PROFESSIONAL SEAL 033560 ENGINEER DAVID A. BIXLER II 1/9/09

JLS/DAB

Copies submitted (2)

Attachments: Report of Field Density Tests
Moisture-Density Relationships (S-1 through S-6)
Grain Size Distributions (S-1 through S-6)
Atterberg Limits Results (S-1 through S-6)
Proofrolling Observations Sheets dated November 19, 2008 (2)
Cover Thickness Evaluation, Asbestos Landfill, Table 1
Cover Thickness Evaluation, C&D Landfill, Table 2

ESP Associates, P.A.
3475 Lakemont Blvd
Fort Mill, SC 29708
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Fax: (803) 802-2515
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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	1 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
1	10/30/08	DT	93.2	23.8	108.1	21.4	89.0	95	Asbestos Landfill - 685757.1N and 1414173.7E	approximately proposed design subgrade		
2	10/30/08	DT	93.2	23.8	109.0	22.1	89.3	96	Asbestos Landfill - 685863.2N and 1414218.1E	approximately proposed design subgrade		
3	10/31/08	DT	96.1	21.9	109.0	20.9	90.2	94	Asbestos Landfill - 685811.4N and 1414347.9E	approximately proposed design subgrade		
4	10/31/08	DT	96.1	21.9	108.1	21.4	89.0	93	Asbestos Landfill - 685895.7N and 1414317.0E	approximately proposed design subgrade		
5	10/31/08	DT	96.1	21.9	109.3	21.7	89.8	93	Asbestos Landfill - 685623.5N and 1414141.1E	approximately proposed design subgrade		
6	11/01/08	DT	94.2	23.2	106.6	22.2	87.2	93	Asbestos Landfill - 685431.5N and 1414122.9E	approximately 1 foot below proposed design subgrade		
7	11/01/08	DT	94.2	23.2	107.8	22.6	87.9	93	Asbestos Landfill - 685343.1N and 1414081.3E	approximately 1 foot below proposed design subgrade		
8	11/03/08	DT	96.0	21.8	109.5	19.4	91.7	96	Asbestos Landfill - 685431.8N and 1414278.9E	approximately 1 foot below proposed design subgrade		
10	11/04/08	DT	94.9	22.6	106.6	20.3	88.6	93	Asbestos Landfill - 685565.7N and 1414157.1E	approximately 1 foot below proposed design subgrade		
11	11/04/08	DT	94.9	22.8	107.5	21.2	88.7	93	Asbestos Landfill - 685520.9N and 1414475.9E	approximately proposed design subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

ESP Associates, P.A.
3475 Lakemont Blvd
Fort Mill, SC 29708
Ph: (803) 802-2440
Fax: (803) 802-2515
www.espassociates.com

REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	2 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
12	11/05/08	DT	94.5	23.0	106.0	21.1	87.5	93	Asbestos Landfill - 685301.1N and 1414071.7E	approximately proposed design subgrade		
13	11/05/08	DT	94.5	23.0	106.6	21.6	87.5	93	Asbestos Landfill - 685451.8N and 1414164.8E	approximately proposed design subgrade		
14	11/05/08	DT	94.5	23.0	104.6	20.8	86.8	92	Asbestos Landfill - 685446.5N and 1414309.8E	approximately proposed design subgrade		
15	11/06/08	DT	97.1	23.0	109.8	22.2	89.9	93	Asbestos Landfill - 685624.1N and 1414492.7E	approximately proposed design subgrade		
16	11/06/08	DT	97.1	23.0	110.1	22.5	89.8	93	Asbestos Landfill - 685699.3N and 1414473.9E	approximately proposed design subgrade		
17	11/06/08	DT	97.1	23.0	109.5	22.0	89.8	92	Asbestos Landfill - 685625.9N and 1414359.6E	approximately proposed design subgrade		
18	11/11/08	DT	95.3	22.2	109.8	21.8	90.1	95	Asbestos Landfill - 685960.3N and 1414311.9E	approximately proposed design subgrade		
9	11/14/08	DT	94.9	22.6	104.2	19.7	87.1	92	Asbestos Landfill - 685607.1N and 1414163.0E	approximately 2 feet below proposed design subgrade		
20	11/21/08	DT	93.5	23.6	112.8	21.8	92.6	99	Asbestos Landfill - 685829.2N and 1414149.7E	approximately 2 feet below proposed design subgrade		
19	11/21/08	DT	96.5	23.6	112.2	21.2	92.6	96	Asbestos Landfill - 685803.5N and 1414353.5E	approximately 2 feet below proposed design subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

ESP Associates, P.A.
3475 Lakemont Blvd
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www.espassociates.com

REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	3 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV.DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
21	11/25/08	DT	96.2	21.6	108.7	18.8	91.5	95	Asbestos Landfill - 685503.2N and 1414468.8E	approximately 2 feet below proposed final subgrade		
22	11/25/08	DT	96.2	21.6	110.4	18.7	93.0	97	Asbestos Landfill - 685521.2N and 1414490.5E	approximately 1 foot below proposed final subgrade		
23	11/25/08	DT	96.2	21.6	109.9	18.5	92.7	96	Asbestos Landfill - 685406.5N and 1414241.3E	approximately 2 feet below proposed final subgrade		
24	11/25/08	DT	96.2	21.6	108.7	19.8	90.7	94	Asbestos Landfill - 685384.2N and 1414138.8E	approximately 1 foot below proposed final subgrade		
25	11/25/08	DT	98.5	24.0	116.8	24.6	93.7	95	Asbestos Landfill - 685477.5N and 1414137.8E	approximately 2 feet below proposed final subgrade		
26	11/25/08	DT	96.2	21.6	108.4	20.2	90.2	94	Asbestos Landfill - 685320.6N and 1414028.6E	approximately 1 foot below proposed final subgrade		
27	11/25/08	DT	98.5	24.0	113.4	24.2	91.3	93	Asbestos Landfill - 685863.2N and 1414383.6E	approximately 1 foot below proposed final subgrade		
28	11/25/08	DT	98.5	24.0	115.5	25.2	92.3	94	Asbestos Landfill - 685671.6N and 1414112.5E	approximately 1 foot below proposed final subgrade		
32	12/03/08	DT	97.2	24.8	117.6	26.4	93.0	96	Asbestos Landfill - 685637.3N and 1414296.4E	approximately 2 feet below proposed final subgrade		
33	12/03/08	DT	98.6	22.0	107.8	19.9	89.9	91	Asbestos Landfill - 685682.4N and 1414432.3E	approximately 2 feet below proposed final subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	4 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
29	12/03/08	DT	98.6	22.0	107.2	19.5	89.7	91	Asbestos Landfill - 685530.8N and 1414487.5E	approximately proposed final subgrade		
30	12/03/08	DT	97.2	24.8	118.5	27.0	93.3	96	Asbestos Landfill - 685426.7N and 1414302.6E	approximately proposed final subgrade		
31	12/03/08	DT	97.2	24.8	118.8	26.7	93.8	96	Asbestos Landfill - 685345.4N and 1414104.6E	approximately proposed final subgrade		
34	12/03/08	DT	98.6	22.0	108.4	19.5	90.7	92	Asbestos Landfill - 685912.5N and 1414348.6E	approximately proposed final subgrade		
35	12/03/08	DT	97.2	24.8	112.2	26.5	88.7	91	Asbestos Landfill - 685759.0N and 1414240.8E	approximately proposed final subgrade		
36	12/05/08	DT	94.9	22.6	106.3	19.5	89.0	94	Asbestos Landfill - 685632.2N and 1414287.3E	approximately 1 foot below proposed final subgrade		
37	12/05/08	DT	94.9	22.6	104.5	19.4	87.5	92	Asbestos Landfill - 685685.7N and 1414429.6E	approximately 1 foot below proposed final subgrade		
38	12/05/08	DT	94.9	22.6	103.8	19.3	87.1	92	Asbestos Landfill - 685622.7N and 1414486.9E	approximately proposed final subgrade		
39	12/05/08	DT	94.9	22.6	104.8	19.7	87.6	92	Asbestos Landfill - 685576.5N and 1414397.9E	approximately proposed final subgrade		
48	12/16/08	DT	95.0	22.6	111.3	22.3	91.0	96	Asbestos Landfill Diversion Berms - 685480.8N and 1414122.2E	approximately proposed subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
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TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
49	12/16/08	DT	95.0	22.6	109.3	22.0	89.6	94	Asbestos Landfill Diversion Berms - 685390.8N and 1414057.9E	approximately proposed subgrade		
50	12/16/08	DT	95.0	22.6	110.4	22.4	90.2	95	Asbestos Landfill Diversion Berms - 685282.5N and 1414022.3E	approximately proposed subgrade		
51	12/16/08	DT	95.0	22.6	112.2	23.5	90.9	96	Asbestos Landfill Diversion Berms - 685667.3N and 1414124.9E	approximately proposed subgrade		
52	12/16/08	DT	95.0	22.6	108.7	21.7	89.3	94	Asbestos Landfill Diversion Berms - 685765.6N and 1414124.6E	approximately proposed subgrade		
53	12/16/08	DT	95.0	22.6	110.1	22.6	89.8	95	Asbestos Landfill Diversion Berms - 685669.1N and 1414158.5E	approximately proposed subgrade		
40	12/08/08	DT	94.0	23.3	109.3	22.6	89.2	95	C&D Landfill - 686128.7N and 1414493.5E	approximately 1 foot below proposed final subgrade		
41	12/08/08	DT	94.0	23.3	103.9	21.8	85.3	91	C&D Landfill - 685929.9N and 1414556.6E	approximately 1 foot below proposed final subgrade		
42	12/09/08	DT	94.8	22.5	103.9	19.8	86.7	91	C&D Landfill - 686850.2N and 1414650.0E	approximately 1 foot below proposed final subgrade		
43	12/09/08	DT	94.8	22.5	108.7	23.8	87.8	93	C&D Landfill - 685702.1N and 1414606.6E	approximately 1 foot below proposed final subgrade		
44	12/09/08	DT	94.8	22.5	107.8	23.3	87.4	92	C&D Landfill - 685690.2N and 1414599.4E	approximately proposed final subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

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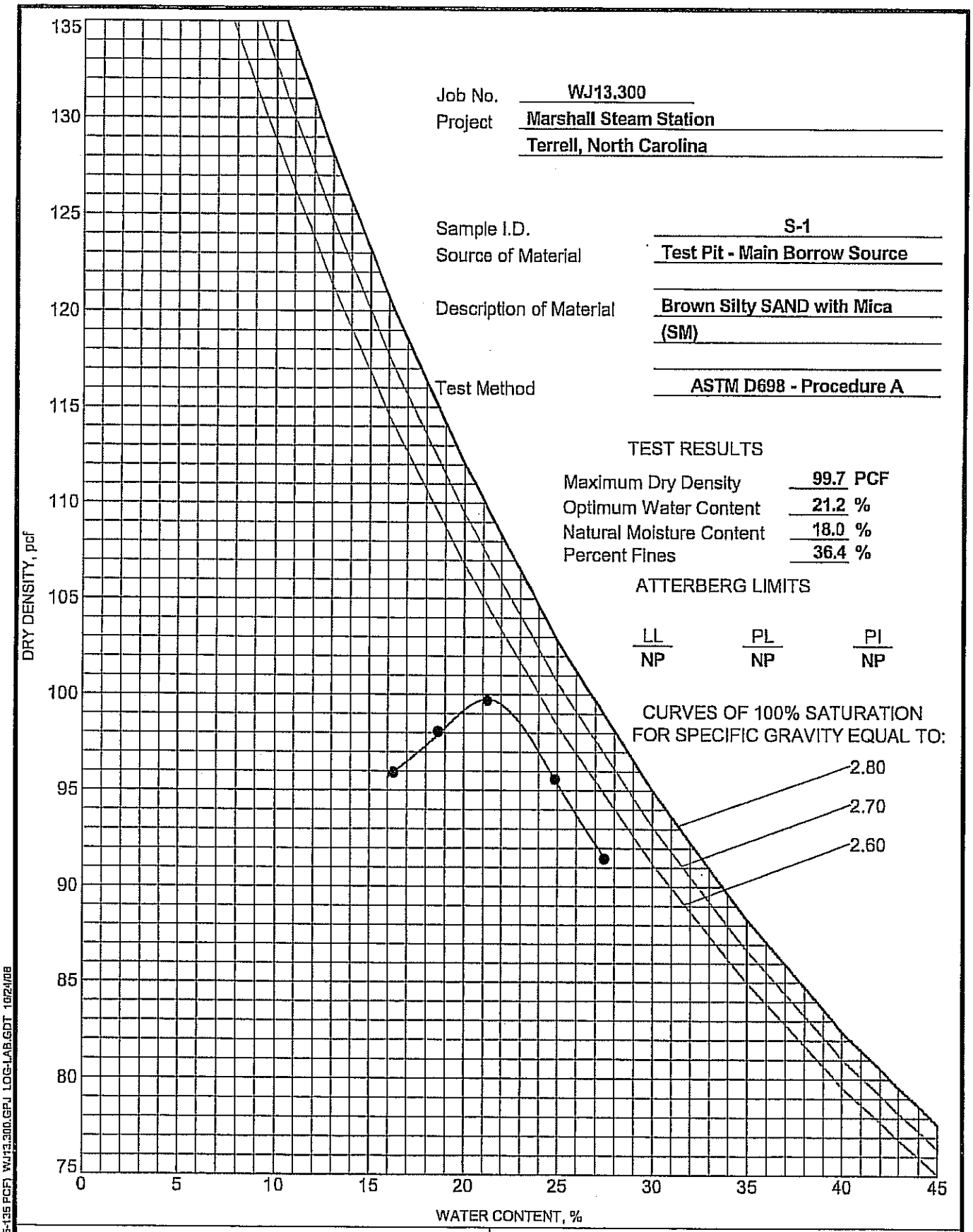
REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	6 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
45	12/09/08	DT	94.8	22.5	104.5	20.3	86.9	92	C&D Landfill - 685841.6N and 1414655.5E	approximately proposed final subgrade		
46	12/09/08	DT	94.8	22.5	109.3	24.1	88.1	93	C&D Landfill - 686102.4N and 1414478.5E	approximately proposed final subgrade		
47	12/09/08	DT	94.8	22.5	105.1	20.8	87.0	92	C&D Landfill - 685956.4N and 1414526.6E	approximately proposed final subgrade		
54	12/22/08	DT	95.0	26.0	111.6	28.2	87.1	92	C&D Landfill Diversion Berms - 686125.8N and 1414574.5E	approximately proposed subgrade		
55	12/22/08	DT	95.0	26.0	109.0	27.3	85.6	90	C&D Landfill Diversion Berms - 686015.6N and 1414605.2E	approximately proposed subgrade		
56	12/22/08	DT	95.0	26.0	108.1	25.5	86.1	91	C&D Landfill Diversion Berms - 685936.5N and 1414660.1E	approximately proposed subgrade		
57	12/22/08	DT	95.0	26.0	110.7	27.7	86.7	91	C&D Landfill Diversion Berms - 685849.2N and 1414696.6E	approximately proposed subgrade		
58	12/22/08	DT	95.0	26.0	108.5	27.1	86.2	91	C&D Landfill Diversion Berms - 685784.3N and 1414660.7E	approximately proposed subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-1

Source of Material Test Pit - Main Borrow Source

Description of Material Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	99.7	PCF
Optimum Water Content	21.2	%
Natural Moisture Content	18.0	%
Percent Fines	36.4	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

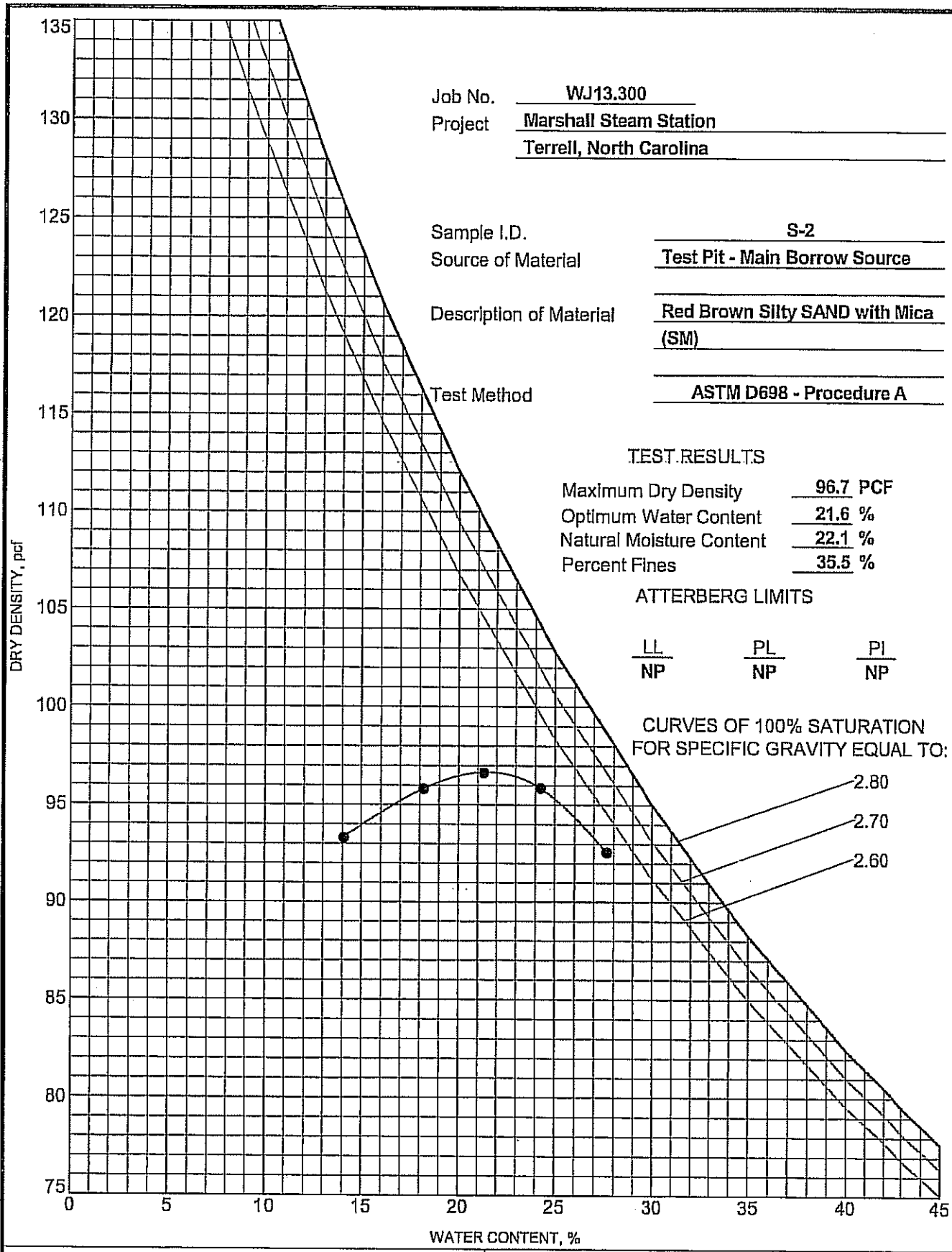
MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

ESP_COMPACTION11 (75-135 PCF) WJ13.300.GPJ LOG-LAB.GDT 10/24/08



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-2

Source of Material Test Pit - Main Borrow Source

Description of Material Red Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	96.7	PCF
Optimum Water Content	21.6	%
Natural Moisture Content	22.1	%
Percent Fines	35.5	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

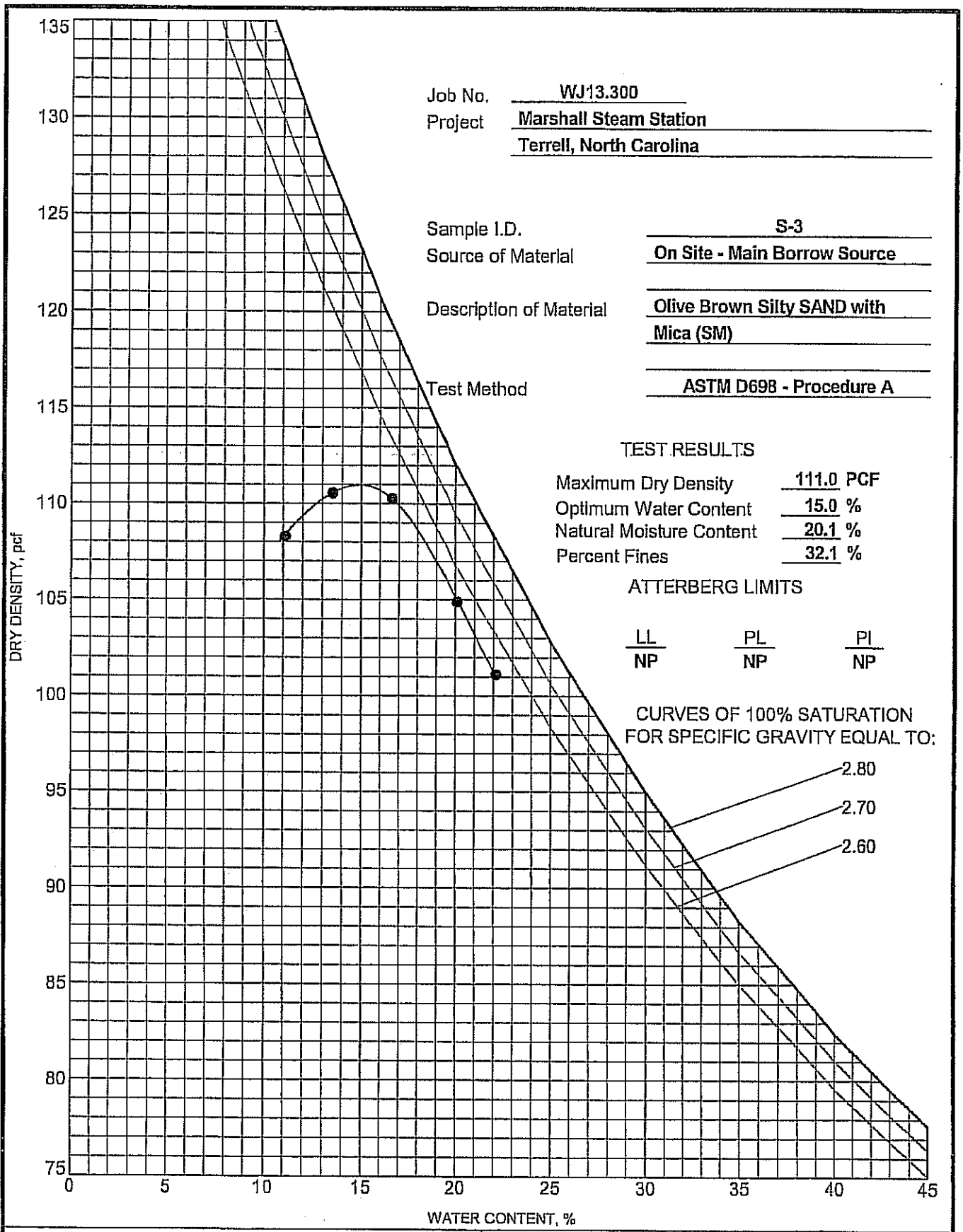
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-3

Source of Material On Site - Main Borrow Source

Description of Material Olive Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	111.0	PCF
Optimum Water Content	15.0	%
Natural Moisture Content	20.1	%
Percent Fines	32.1	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

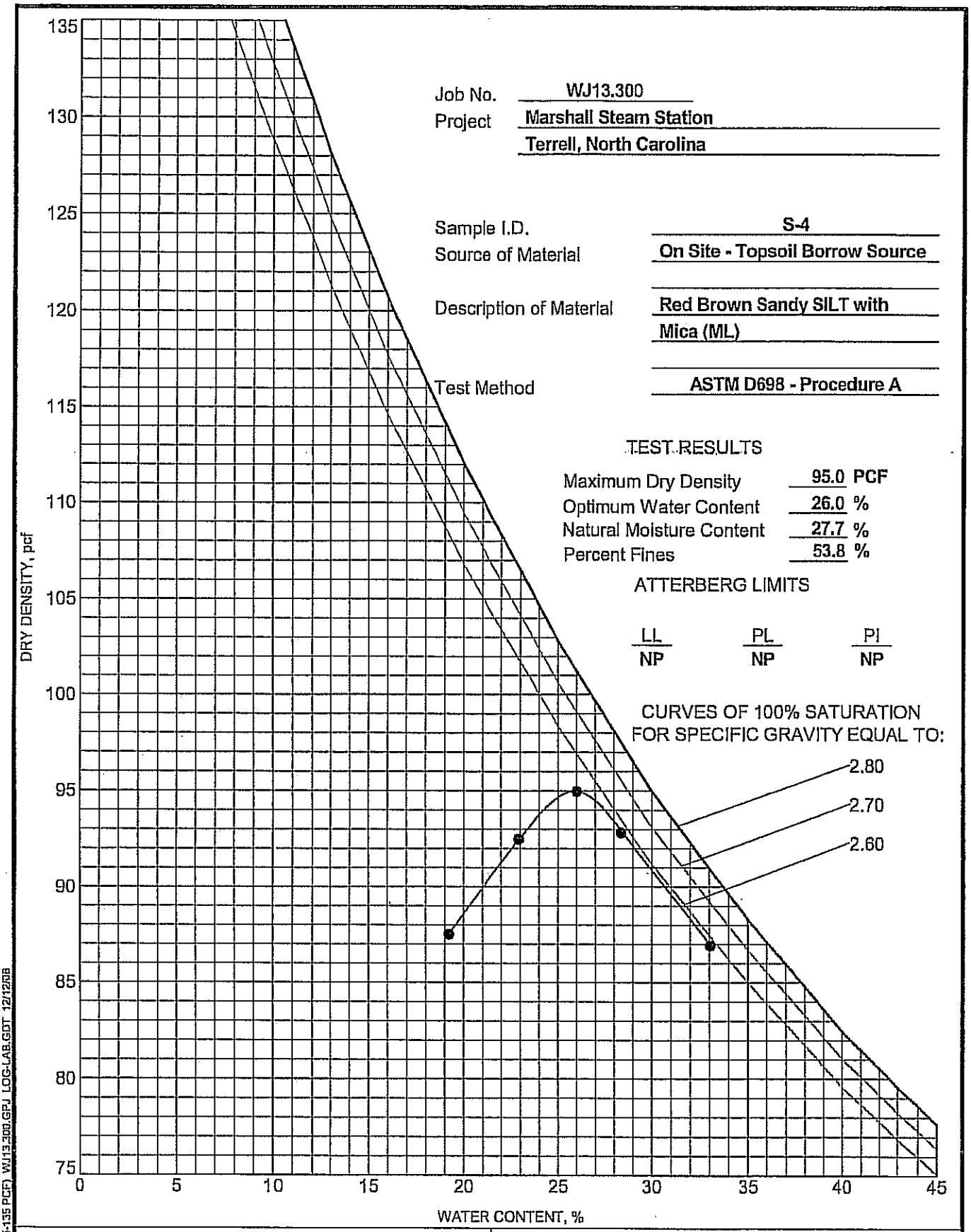
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-4

Source of Material On Site - Topsoil Borrow Source

Description of Material Red Brown Sandy SILT with Mica (ML)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	95.0	PCF
Optimum Water Content	26.0	%
Natural Moisture Content	27.7	%
Percent Fines	53.8	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
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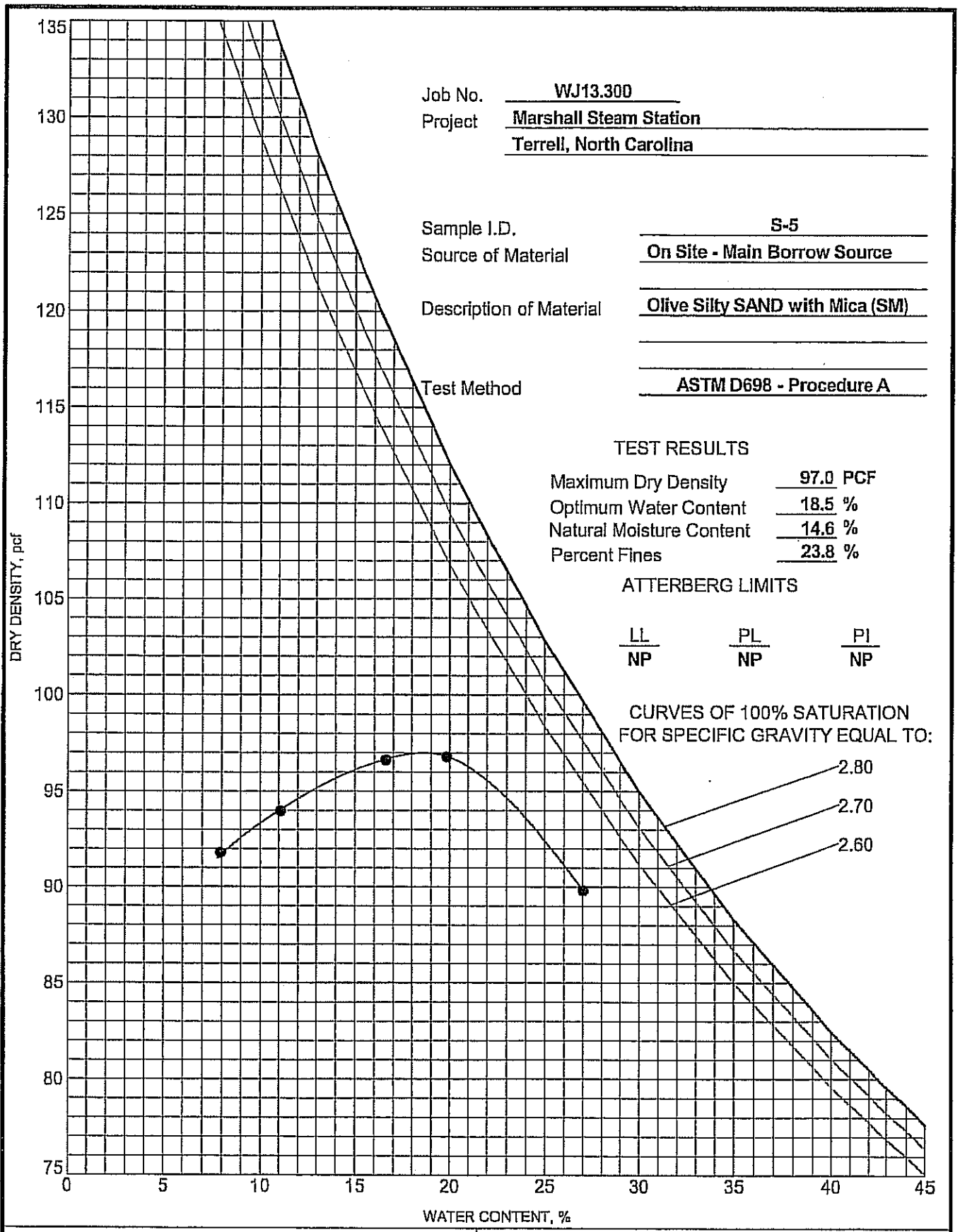
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-5

Source of Material On Site - Main Borrow Source

Description of Material Olive Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	97.0	PCF
Optimum Water Content	18.5	%
Natural Moisture Content	14.6	%
Percent Fines	23.8	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

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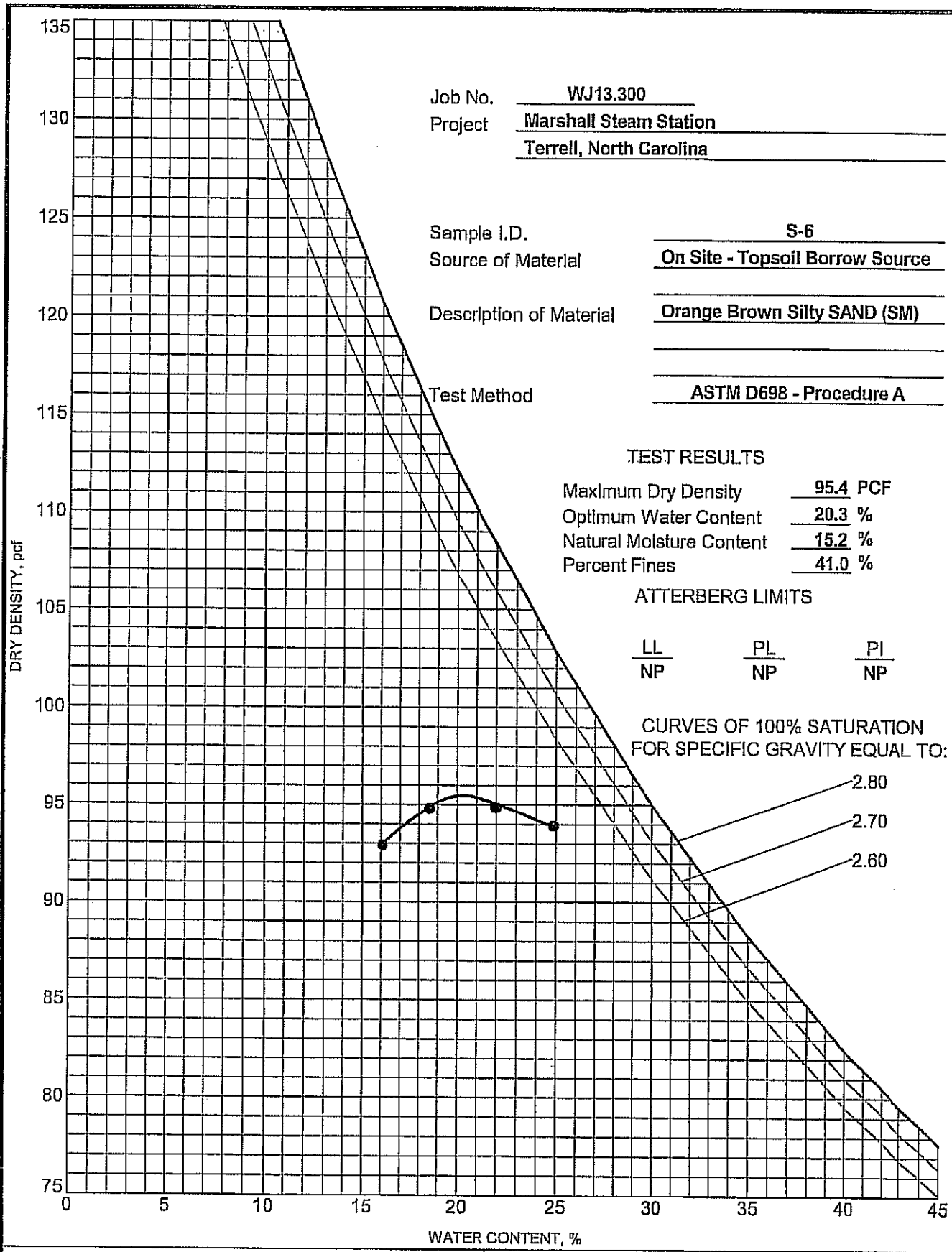
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-6

Source of Material On Site - Topsoil Borrow Source

Description of Material Orange Brown Silty SAND (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	95.4	PCF
Optimum Water Content	20.3	%
Natural Moisture Content	15.2	%
Percent Fines	41.0	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
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Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

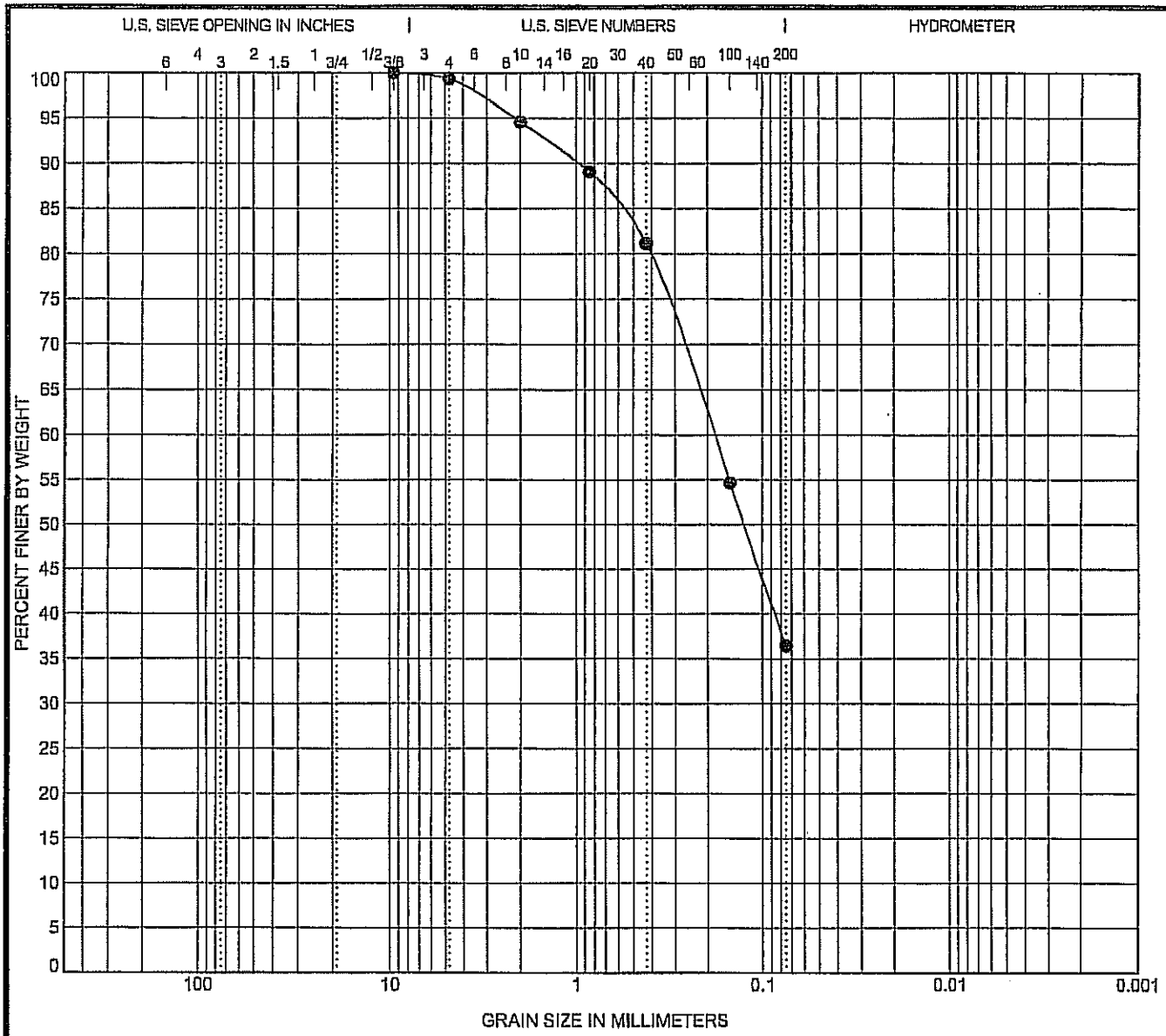
MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

ESP_COMPACTION1 (75-135 PCF) WJ13.300.GPJ LOG-LAB.GDT 12/15/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-1	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-1	9.5	0.185			0.6	62.9	36.4	

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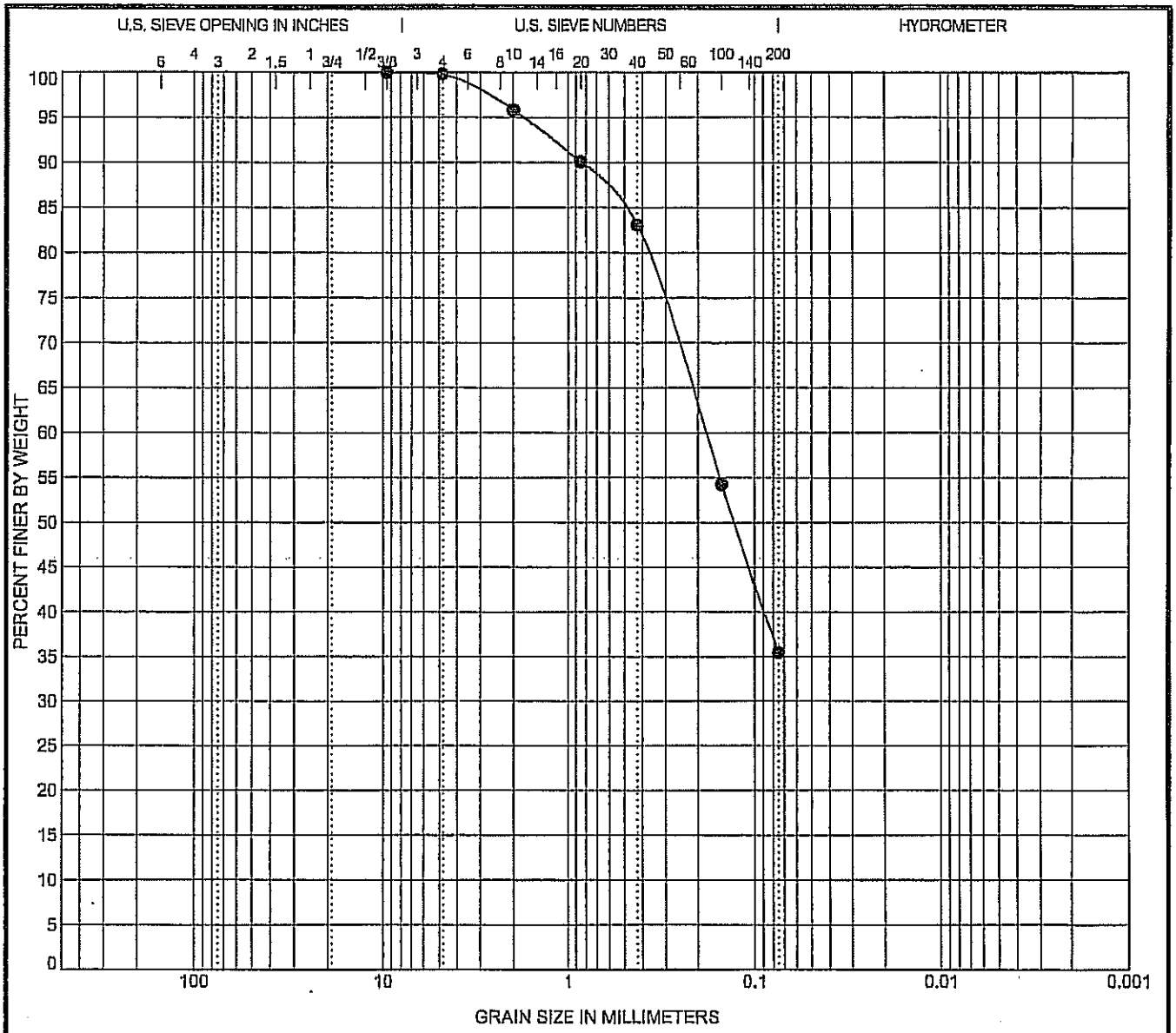
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-2	**SILTY SAND SM**	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-2	9.5	0.185			0.2	64.3	35.5	

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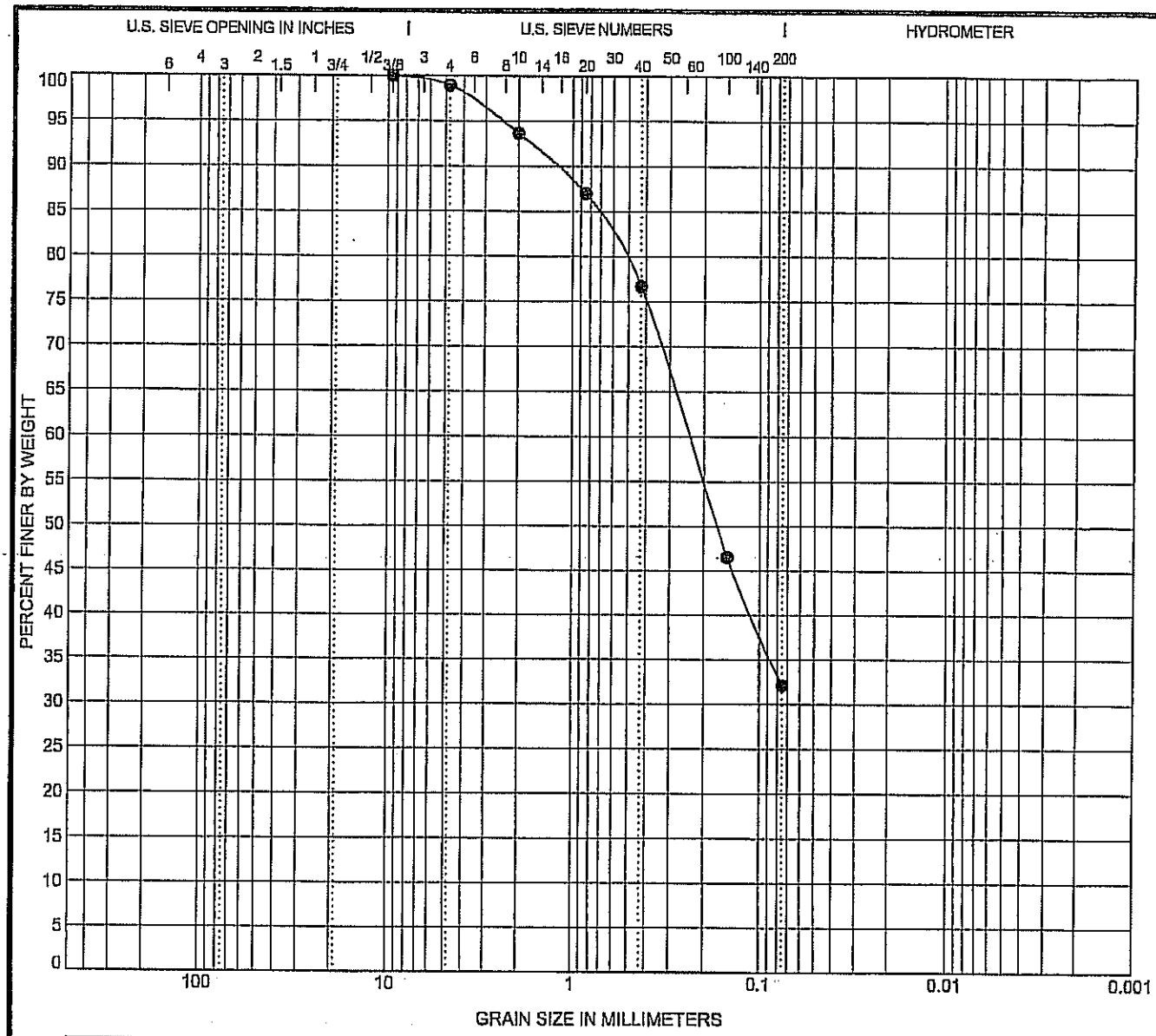
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-3	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-3	9.5	0.239			1.0	66.9	32.1	

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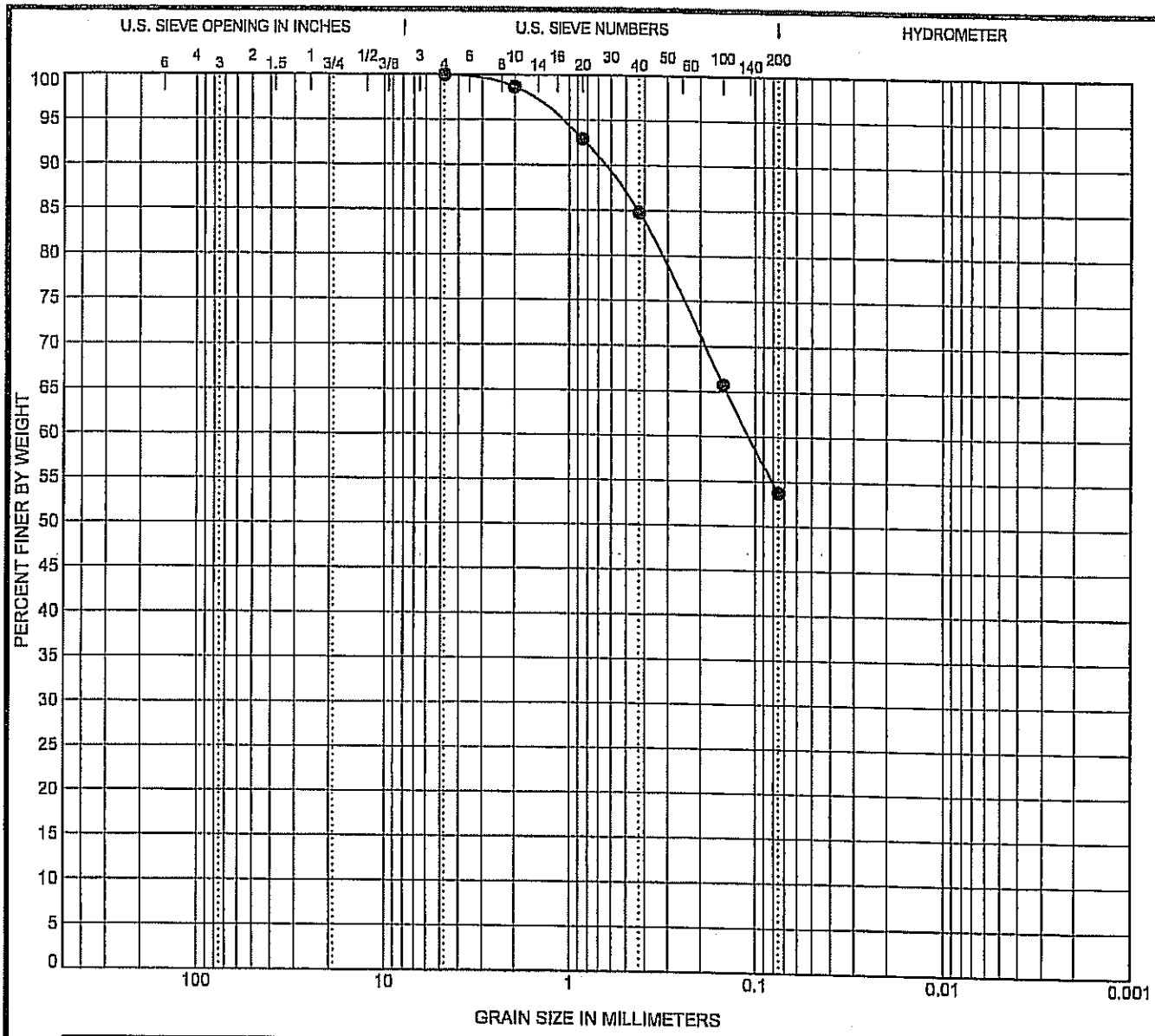
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-4	**SANDY SILT ML**	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-4	4.75	0.108			0.0	46.2	53.8	

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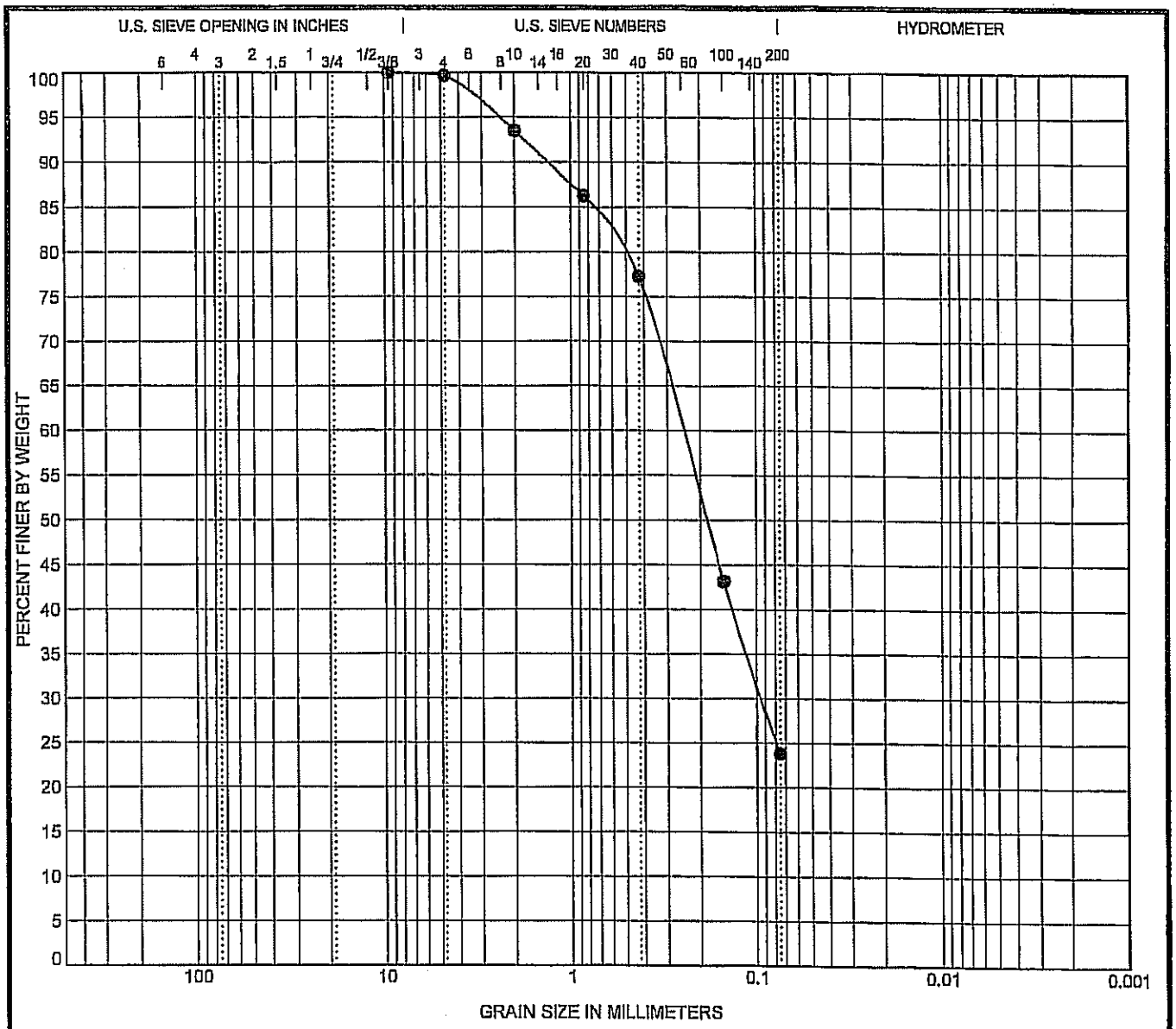
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-5	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-5	9.5	0.251	0.094		0.3	75.8	23.8	

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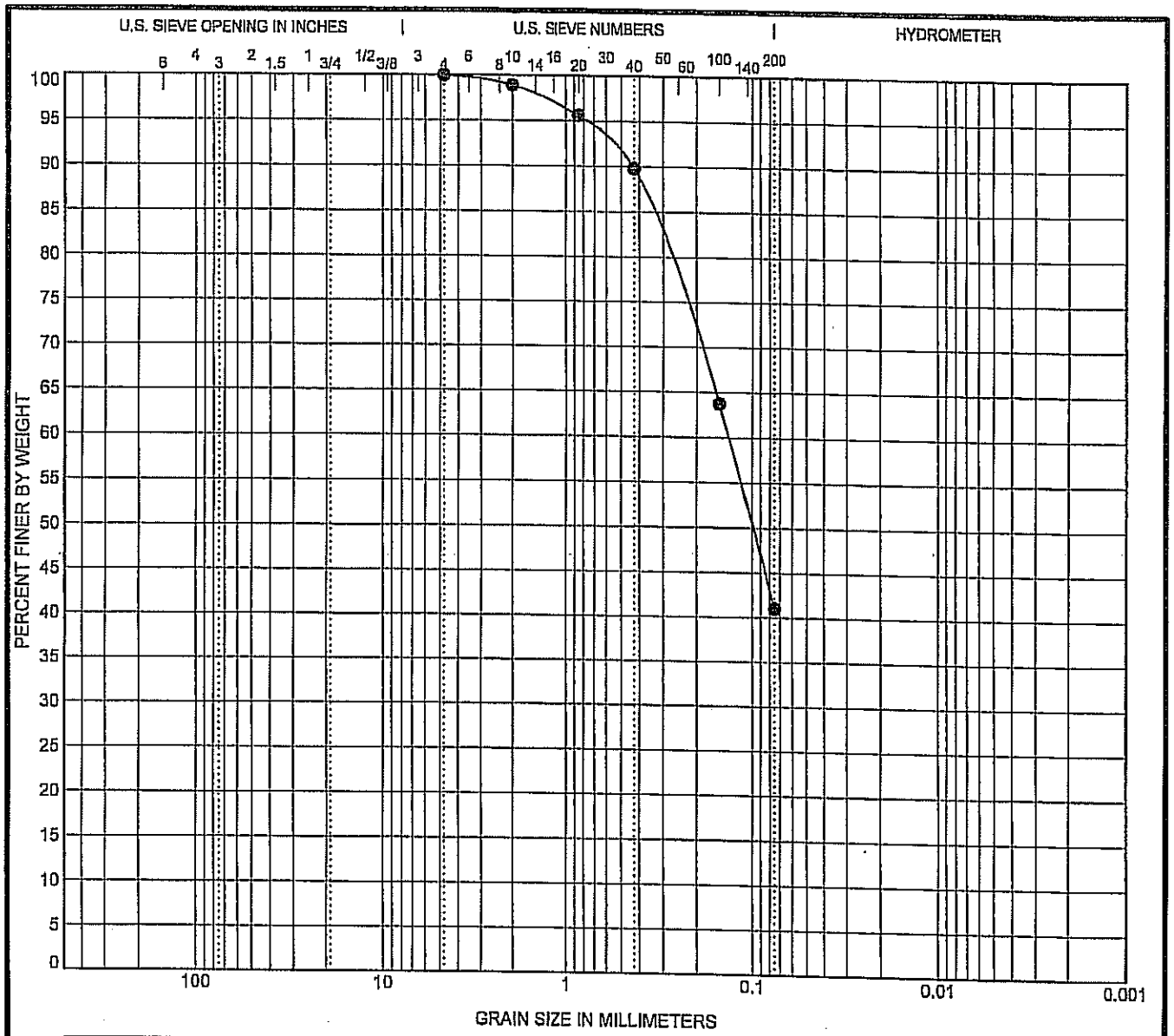
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-6	**SILTY SAND SM**	**NP**	**NP**	**NP**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-6	**4.75**	**0.134**			**0.0**	**59.0**	**41.0**	

ESP Associates, P.A.
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Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

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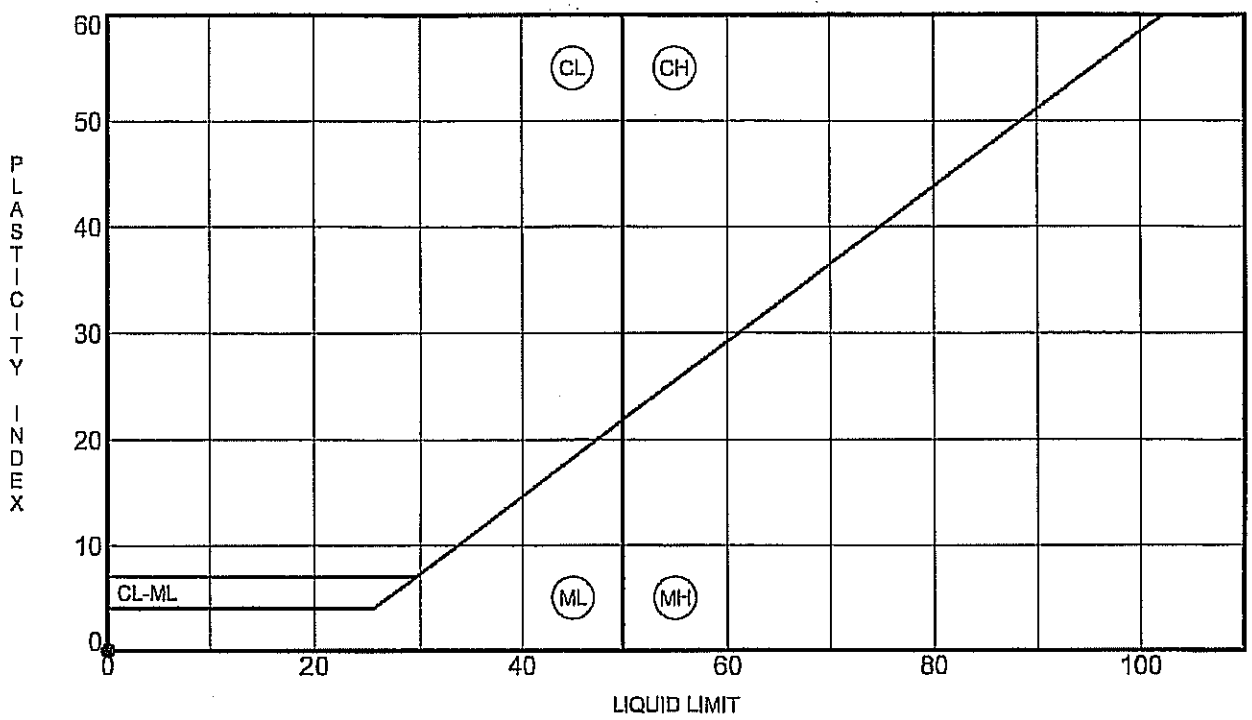

	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-1	NP	NP	NP	36.4	SILTY SAND SM

ESP Associates, P.A.
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Charlotte, NC 28241
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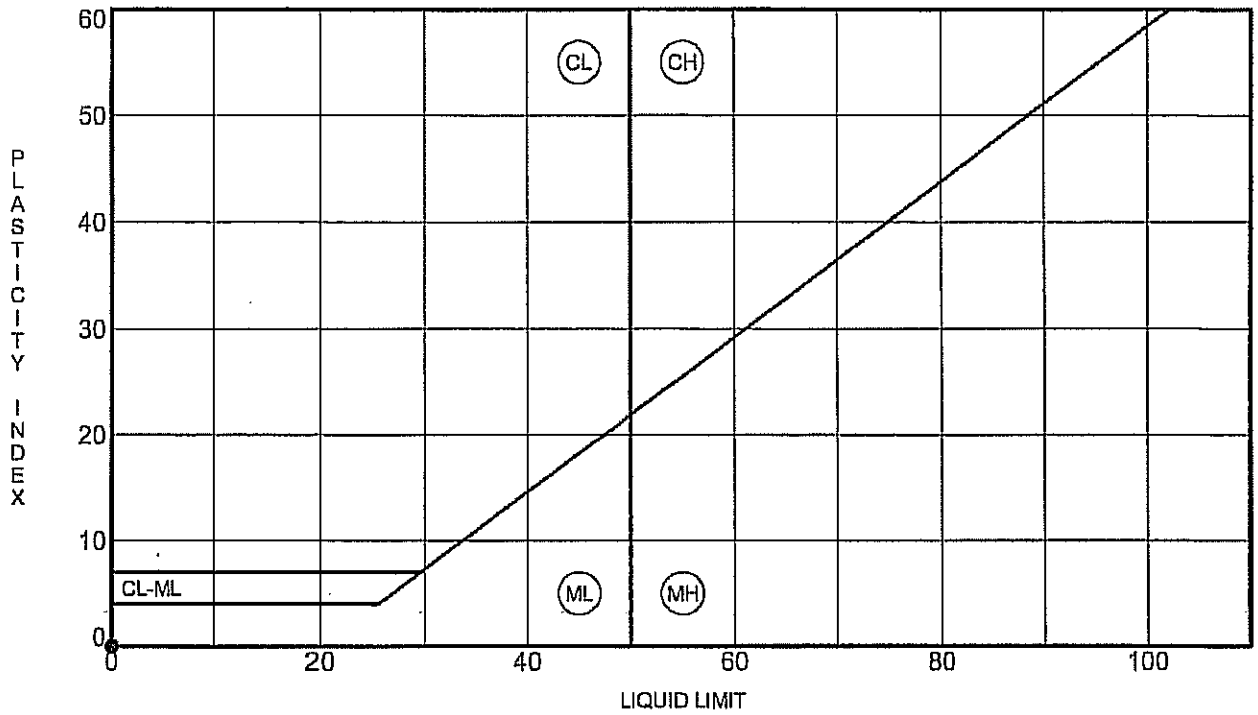
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-2	NP	NP	NP	35.5	SILTY SAND SM

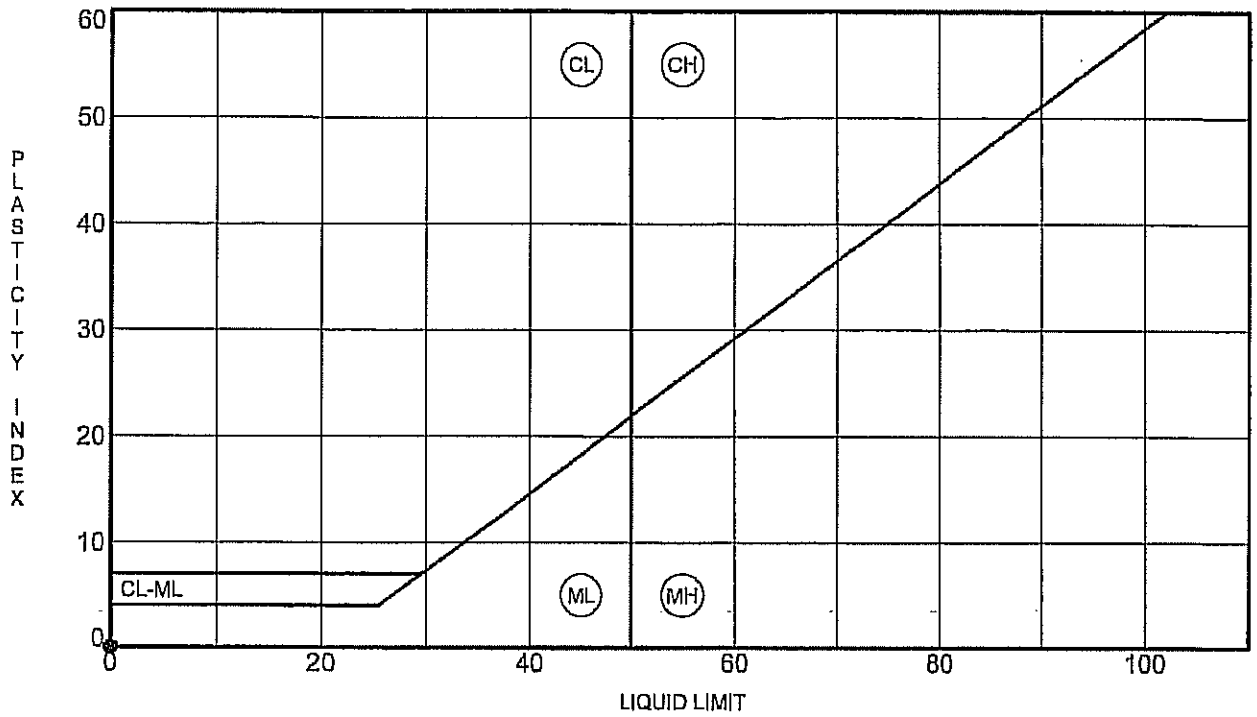
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-3	NP	NP	NP	32.1	SILTY SAND SM

ESP Associates, P.A.
P.O. Box 7030
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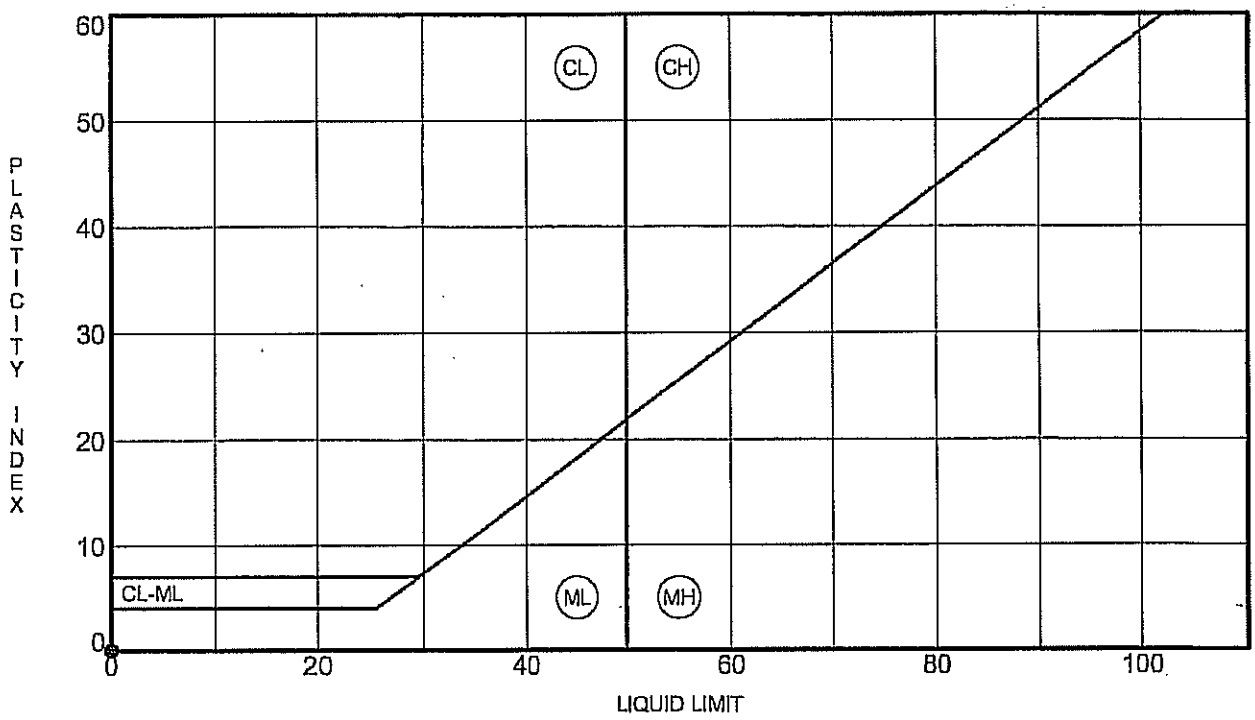
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-4	NP	NP	NP	53.8	SANDY SILT (ML)

ESP Associates, P.A.
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Charlotte, NC 28241
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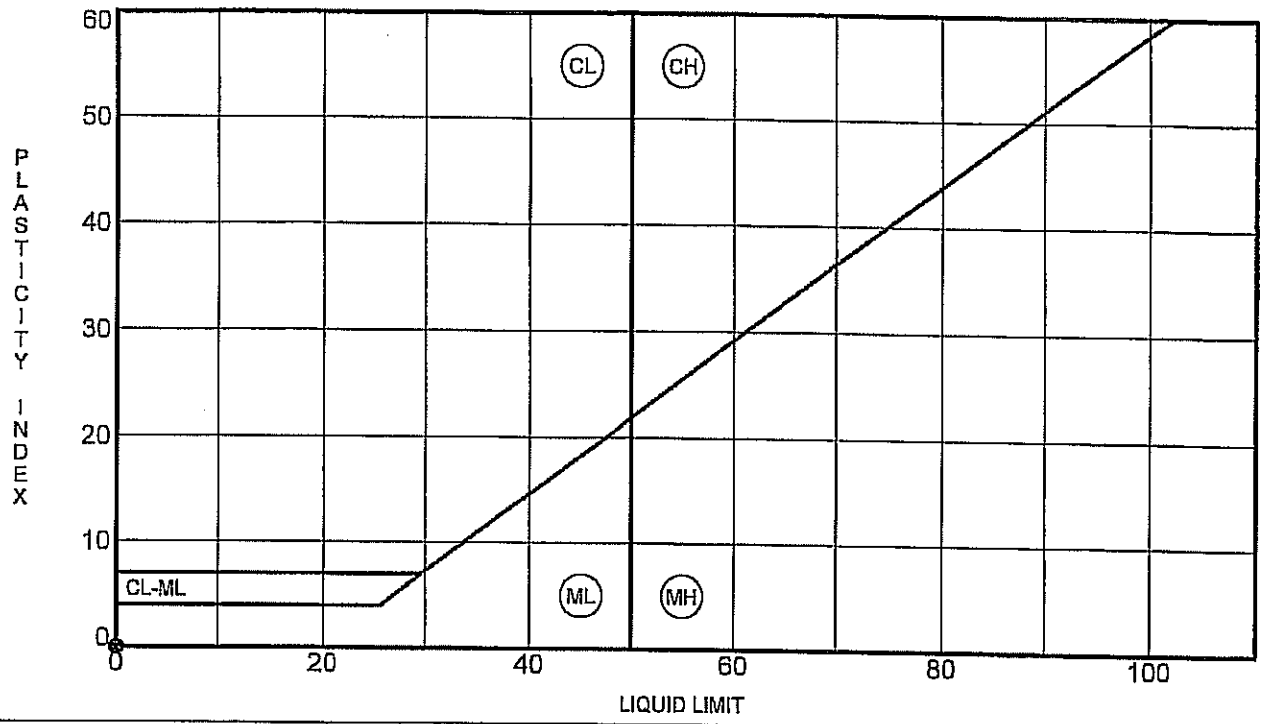
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-5	NP	NP	NP	23.8	SILTY SAND SM

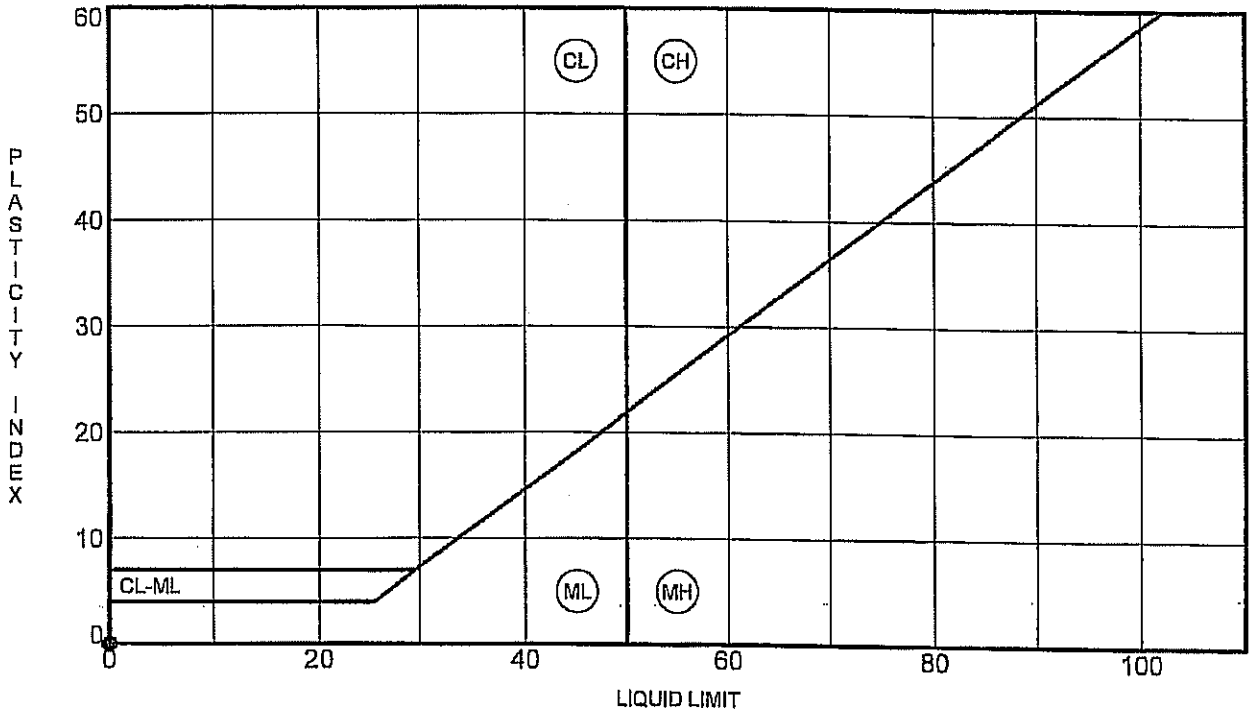
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-6	NP	NP	NP	41.0	SILTY SAND SM

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

1 of 2

PROOFROLLING OBSERVATIONS

ESP ASSOCIATES, P.A.
engineering • surveying • planning

Asbestos @ Design Subgrade

Project Name: Marshall Steam Station

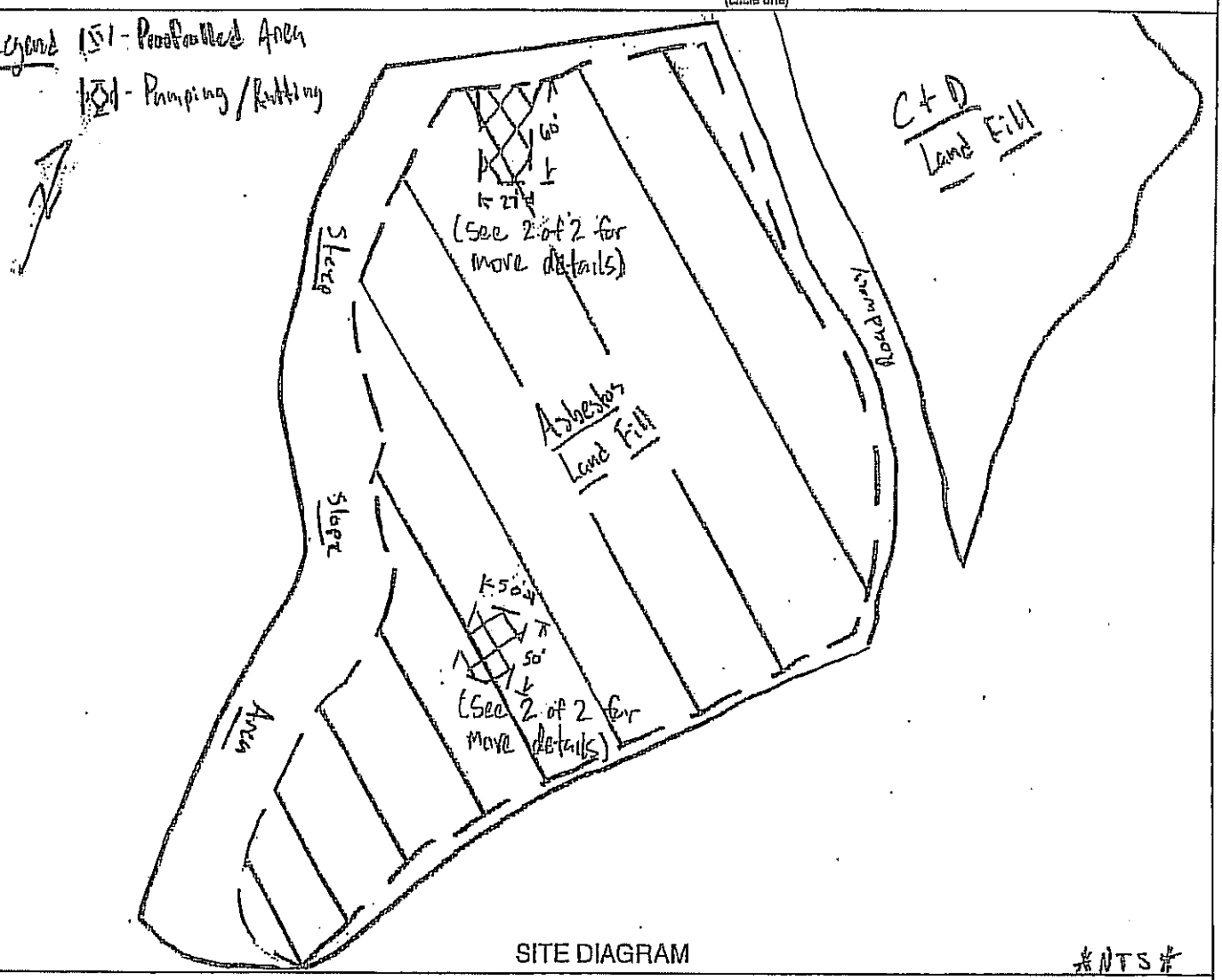
Date: 11/19/08 Project Number: WJ-13,300

~~Engineer~~/Tech: Jason F

Location: Terrell, NC

Weather: Clear

Proofrolling Vehicle: Loaded Pan / Scraper Soil Subgrade / Aggregate Base Course
(circle one)



SITE DIAGRAM

NTS

COMMENTS/RECOMMENDATIONS: Tech on-site to proofroll above noted Design Subgrade of Asbestos Land Fill. Some movement was observed in noted areas, but as a whole area appeared to be stable / suitable @ Design Subgrade. Note: STAGE indicated to Jake S. that the use of a "bridge" lift is acceptable to stabilize the two areas depicted above. JKS

Signature

2 of 2

PROOFROLLING OBSERVATIONS

ESP ASSOCIATES, P.A.
engineering • surveying • planning

Project Name: Marshall Steam Station

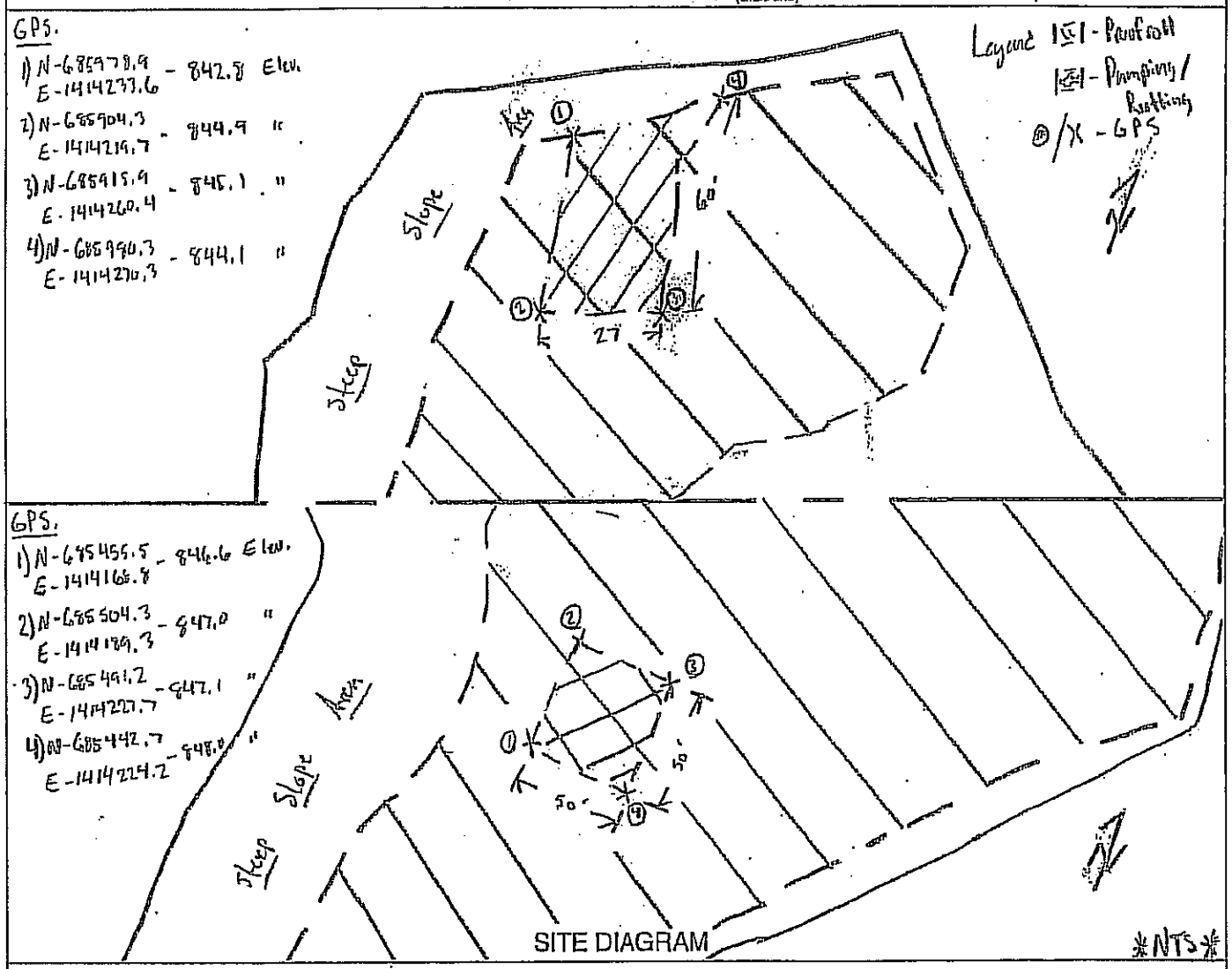
Date: 11/19/08 Project Number: WJ-13,300

~~Engineer~~/Tech: Jason F.

Asbestos @ Design Subgrade

Location: Terrell, NC Weather: clear

Proofrolling Vehicle: Loaded Pan / Scraper (Soil Subgrade / Aggregate Base Course) (circle one)



COMMENTS/RECOMMENDATIONS: Tech on-site to proofroll Asbestos Land Fill Area. Above noted area's showed pumping / movement under loaded equipment and was then noted by reporting documentation.

Signature

COVER SYSTEM THICKNESS EVALUATION
ASBESTOS LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 1

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
1	N685494.77 E1414504.80	3.0	Yes
2	N685452.72 E1414416.45	3.0	Yes
3	N685409.76 E1414326.56	3.0	Yes
4	N685512.20 E1414303.09	3.0	Yes
5	N685565.28 E1414399.85	3.0	Yes
6	N685614.53 E1414494.12	3.0	Yes
7	N685715.56 E1414484.66	3.0	Yes
8	N685675.85 E1414388.40	3.0	Yes
9	N685631.00 E1414293.62	3.0	Yes
10	N685604.62 E1414198.95	3.0	Yes
11	N685470.38 E1414208.37	3.0	Yes
12	N685373.82 E1414236.44	3.0	Yes
13	N685361.70 E1414133.61	3.0	Yes
14	N685278.92 E1414071.02	3.0	Yes
15	N685380.58 E1414043.36	3.0	Yes
16	N685487.07 E1414118.33	3.0	Yes
17	N685599.08 E1414126.64	3.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

COVER SYSTEM THICKNESS EVALUATION
ASBESTOS LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 1 (continued)

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
18	N685693.97 E1414110.02	3.0	Yes
19	N685716.35 E1414193.96	3.0	Yes
20	N685745.53 E1414296.50	3.0	Yes
21	N685782.62 E1414378.12	3.0	Yes
22	N685809.97 E1414453.35	3.0	Yes
23	N685879.46 E1414339.53	3.0	Yes
24	N685847.39 E1414245.54	3.0	Yes
25	N685832.45 E1414149.77	3.0	Yes
26	N685957.63 E1414176.10	3.0	Yes
27	N685967.95 E1414251.41	3.0	Yes
28	N685975.45 E1414323.87	3.0	Yes
29	N685995.20 E1414371.96	3.0	Yes
30	N685887.97 E1414403.65	3.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

COVER SYSTEM THICKNESS EVALUATION
C&D LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 2

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
1	N686234.44 E1414456.75	2.0	Yes
2	N686127.37 E1414447.37	2.0	Yes
3	N686151.75 E1414544.44	2.0	Yes
4	N686195.38 E1414614.15	2.0	Yes
5	N686033.85 E1414485.90	2.0	Yes
6	N686071.08 E1414504.87	2.0	Yes
7	N686103.58 E1414663.03	2.0	Yes
8	N685927.90 E1414511.03	2.0	Yes
9	N685964.49 E1414602.90	2.0	Yes
10	N686007.54 E1414686.74	2.0	Yes
11	N685833.34 E1414578.82	2.0	Yes
12	N685886.55 E1414673.27	2.0	Yes
13	N685923.56 E1414747.47	2.0	Yes
14	N685740.08 E1414574.58	2.0	Yes
15	N685793.23 E1414653.80	2.0	Yes
16	N685642.85 E1414608.16	2.0	Yes
17	N685806.83 E1414721.48	2.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

APPENDIX IV

CONSTRUCTION CERTIFICATION STATEMENT

CONSTRUCTION CERTIFICATION STATEMENT
FOR
MARSHALL STEAM STATION ASBESTOS LANDFILL

OWNER: DUKE ENERGY
OPERATOR: DUKE ENERGY

by:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273-5560

Based on review of the survey information by WSP-Sells, cover system thickness verification and construction materials testing by ESP Associates, P.A., and our observations of the as-built cover system, I hereby certify that the landfill closure cover system thickness and cover system materials were constructed in general accordance with the project specifications and construction drawings and with the NCDENR - Division of Waste Management guidelines as set forth in the Closure Plan and Post-Closure Plan. The minor modifications made during construction are as documented in the As-Built Topographic Survey drawings enclosed in this document.

NORTH CAROLINA PROFESSIONAL SEAL 024486 ENGINEER JASON S. REEVES

Jason S. Reeves, P.E. 1/16/09
N.C. Registration No. 024486

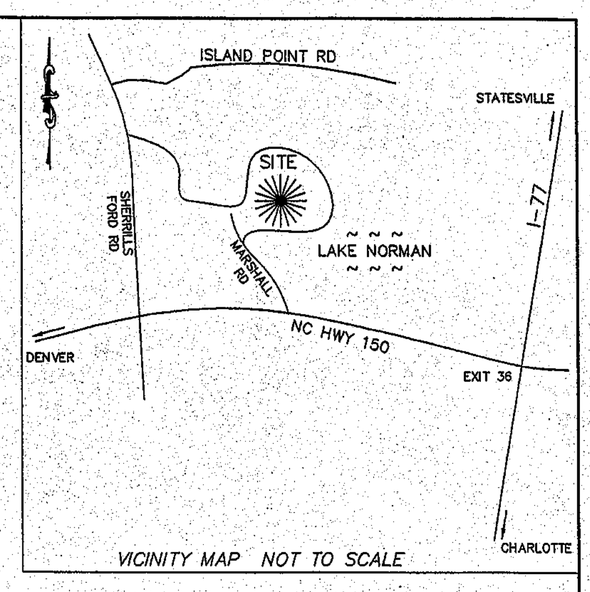
NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

Kenneth R. Daly, P.E. 1/16/09
N.C. Registration No. 032153

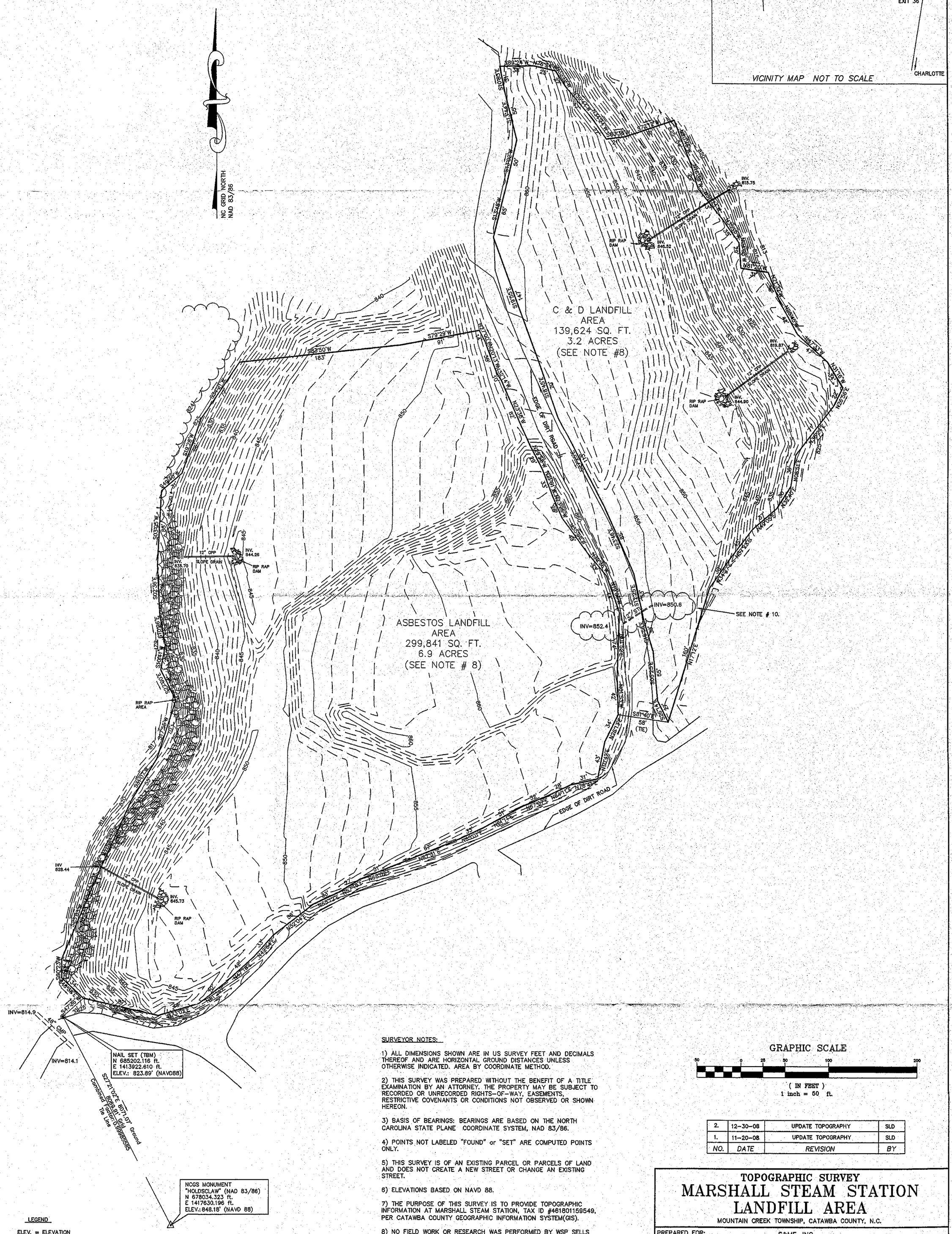
I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 12/30/2008

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

ELEV. = ELEVATION

◉ = NAIL SET

—/\/— = NOT TO SCALE

⌒⌒⌒ = TREELINE

INV = INVERT

▨ = RIP RAP

TBM = TEMPORARY BENCHMARK

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.

4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.

5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.

6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. PERIMETER METES AND BOUNDS AND AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPHY UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.	12-30-08	UPDATE TOPOGRAPHY	SLD
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:

S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

WSP · SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

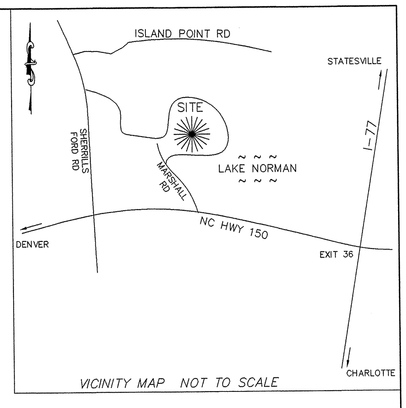
Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO

I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

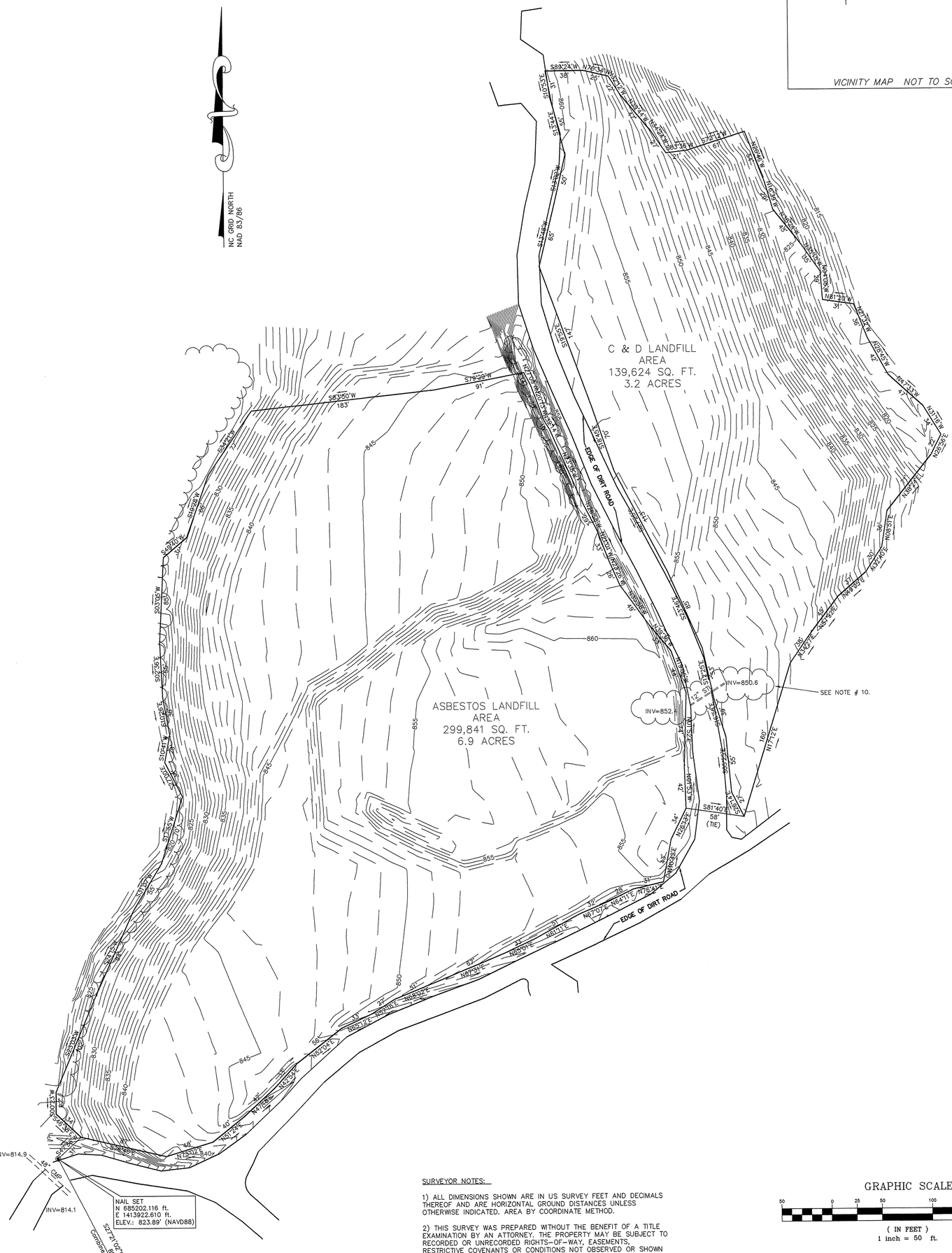
JIMMY N. FAIRES, PLS L-4311 11/25/2008

SEAL L-4311 DATE

NORTH CAROLINA PROFESSIONAL SEAL LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

Elev. = Elevation

◉ = Nail Set

Inv = Invert

= Not To Scale

= Treeline

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

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6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY CHAS. H. SELLS, INC. TO DETERMINE OR VERIFY ANY BOUNDARY LINES.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPH UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.			
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY

MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR: S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

WSP • SELLS
Transportation & Infrastructure
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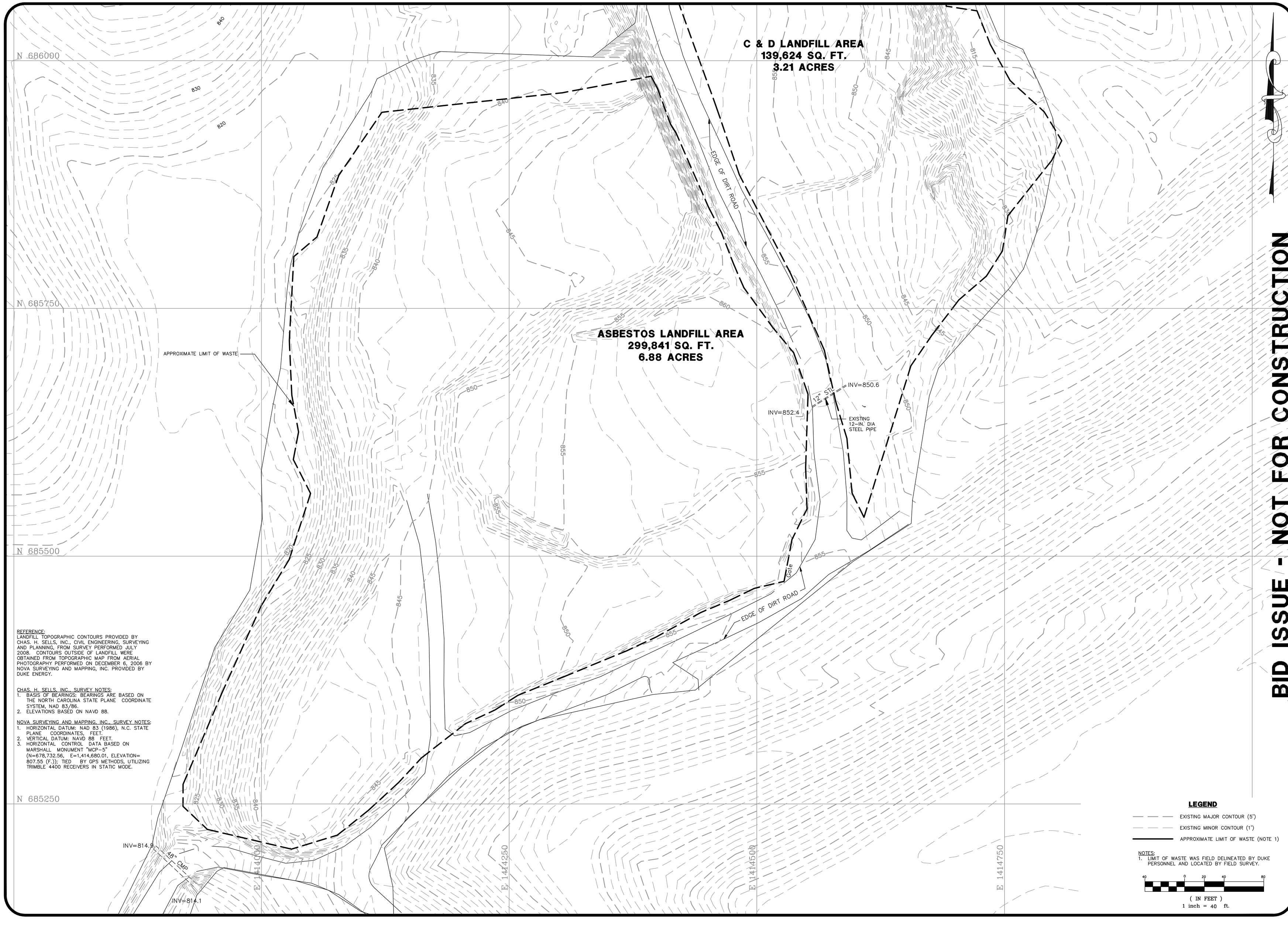
Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO



REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC., CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

CHAS. H. SELLS, INC., SURVEY NOTES:
1. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
2. ELEVATIONS BASED ON NAVD 88.

NOVA SURVEYING AND MAPPING, INC., SURVEY NOTES:
1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
2. VERTICAL DATUM: NAVD 88 FEET.
3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5" (N=678,732.56, E=1,414,680.01, ELEVATION= 807.55 (F.)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

BID ISSUE - NOT FOR CONSTRUCTION

Duke Energy ©

S&ME
WWW.SMEINC.COM

NORTH CAROLINA PROFESSIONAL SEAL 022138 ENGINEER

NO.	DATE	DESCRIPTION	BY

EXISTING CONDITIONS MAP

ASBESTOS LADFILL CLOSURE
DUKE ENERGY - MARSHALL STEAM STATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY: KRD
DESIGNED BY: CLD	APPROVED BY: KRD
PROJECT NUMBER: 1356-08-107	
SCALE: AS SHOWN	DATE: 9-4-08
DRAWING: 1	OF: 6

DRAWING PATH: S:\1356\DUKE ENERGY\08-107 MARSHALL ASBESTOS LF CLOSURE\DWG\LAND DESIGN.DWG

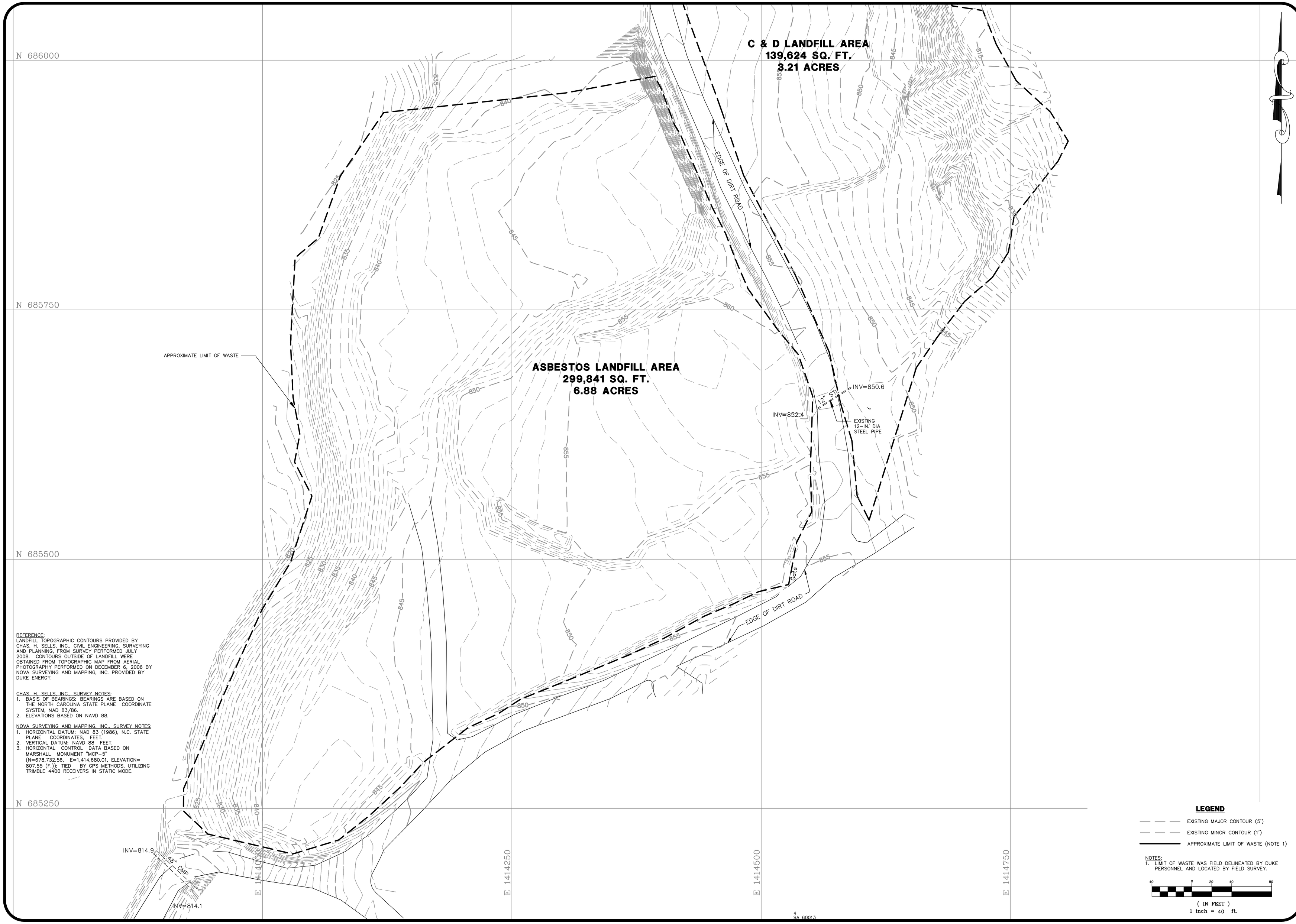
SCALE:	1-IN:1600-FT
DATE:	1-12-2009
DRAWN BY:	WMH
PROJECT NO:	1356-08-107

S&ME
WWW.SMEINC.COM

SITE VICINITY MAP
ASBESTOS LANDFILL CLOSURE
DUKE ENERGY-MARSHALL STEAM STATION
CATAWBA COUNTY, NC

FIGURE NO.
1

G:\1356\DUKE ENERGY\08-106 Marshall C&DLF Closure\FIGURE1.dwg



REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC., CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

CHAS. H. SELLS, INC., SURVEY NOTES:
1. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
2. ELEVATIONS BASED ON NAVD 88.

NOVA SURVEYING AND MAPPING, INC., SURVEY NOTES:
1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
2. VERTICAL DATUM: NAVD 88 FEET.
3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5" (N=678,732.56, E=1,414,680.01, ELEVATION= 807.55 (F.)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

LEGEND

- EXISTING MAJOR CONTOUR (5')
- EXISTING MINOR CONTOUR (1')
- APPROXIMATE LIMIT OF WASTE (NOTE 1)

NOTES:
1. LIMIT OF WASTE WAS FIELD DELINEATED BY DUKE PERSONNEL AND LOCATED BY FIELD SURVEY.

40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

4
SA 60013

Duke Energy ©

S&ME
WWW.SMEINC.COM

NORTH CAROLINA PROFESSIONAL SEAL 032 ENGINEER KENNETH R. WILKIE

NO.	DATE	DESCRIPTION	BY
--	10-10-08	ISSUED FOR CONSTRUCTION	

EXISTING CONDITIONS MAP

ASBESTOS LADFILL CLOSURE
DUKE ENERGY - MARSHALL STEAM STATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY: KRD
DESIGNED BY: CLD	APPROVED BY: KRD
PROJECT NUMBER: 1356-08-107	
SCALE: AS SHOWN	DATE: 10-10-08
DRAWING: 1	OF: 6

DRAWING PATH: Q:\1356-DUKE ENERGY\08-107 MARSHALL ASBESTOS LF CLOSURE\DWG\F\DUKE-DTC LAND BESIGN.DWG

CONSTRUCTION CERTIFICATION STATEMENT
FOR
MARSHALL STEAM STATION ASBESTOS LANDFILL

OWNER: DUKE ENERGY
OPERATOR: DUKE ENERGY

by:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273-5560

Based on review of the survey information by WSP-Sells, cover system thickness verification and construction materials testing by ESP Associates, P.A., and our observations of the as-built cover system, I hereby certify that the landfill closure cover system thickness and cover system materials were constructed in general accordance with the project specifications and construction drawings and with the NCDENR - Division of Waste Management guidelines as set forth in the Closure Plan and Post-Closure Plan. The minor modifications made during construction are as documented in the As-Built Topographic Survey drawings enclosed in this document.

NORTH CAROLINA PROFESSIONAL SEAL 024486 ENGINEER JASON S. REEVES

Jason S. Reeves, P.E. 1/16/09
N.C. Registration No. 024486

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

Kenneth R. Daly, P.E. 1/16/09
N.C. Registration No. 032153

ESP Associates, P.A.

January 9, 2009

Morgan Corporation
P.O. Box 480130
Charlotte, North Carolina 28269

Attention: Mr. Craig Greeson

Reference: **CONSTRUCTION MATERIALS TESTING SERVICES**
Marshall Steam Station
Terrell, North Carolina
ESP Project No. E4-WJ13.300 (Report #1)

Dear Mr. Greeson:

As requested, ESP Associates, P.A. (ESP), provided construction materials testing services on a part-time, on-call basis for the referenced project. Our services were coordinated with you and Mr. Alan Ramsey with Morgan Corporation. This letter summarizes our field density testing, subgrade evaluation and cover thickness evaluation for the period beginning October 30, 2008 through December 23, 2008. Horizontal and vertical control was provided in the field by Morgan Corporation.

FIELD DENSITY TESTING

During this reporting period, an engineering technician from our office visited the site and performed fifty-eight (58) field density tests. The field density tests were performed on fill materials placed to achieve the design subgrade elevations and cover thickness elevations within the asbestos and C&D landfills and on fill materials placed to construct diversion berms within the asbestos and C&D landfills. The tests performed indicate densities equaling or exceeding 90 percent of the soil's maximum dry density based on a Standard Proctor moisture-density relationship. The results of the field density tests, laboratory Standard Proctor moisture-density

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relationships and associated natural moisture content, grain size distribution and Atterberg limits test results performed on the fill materials are enclosed for your review. The test location coordinates and test depth information shown on the attached "Report of Field Density Tests" were provided by Morgan Corporation's surveyors or earthmoving equipment operators using GPS devices incorporated into their equipment.

SUBGRADE EVALUATION

During this reporting period, a representative from our office visited the site to evaluate the design subgrade within the asbestos landfill prior to fill placement required to achieve the cover thickness elevations. Our evaluation consisted of visual observations, probing with a steel probe rod and proofrolling observations. Proofrolling was performed utilizing a loaded pan excavator. Based on our evaluation, two areas appeared unstable. However, the project specifications prohibited undercutting within the asbestos landfill. Therefore, Mr. Jason Reeves, Project Manager with S&ME, recommended the use of a "bridge" lift within the two unstable locations to aid in subgrade stability and to facilitate compaction of subsequent fill placement. ESP observed that a "bridge" lift approximately 1 foot thick was placed at each location in general accordance with S&ME's recommendation. For more detailed information, please refer to the attached "Proofrolling Observations" sheets dated November 19, 2008.

As recommended by Mr. Reeves and/or Mr. Ken Daly, Design Engineer with S&ME, the existing subgrade within the asbestos landfill was not proofrolled prior to fill placement required to achieve the design subgrade elevations due to the project specifications prohibiting undercut in that area. Also as recommended by Mr. Reeves and/or Mr. Daly, the existing subgrade and design subgrade within the C&D landfill was not proofrolled prior to fill placement due to protruding landfill debris that would potentially damage the proofrolling equipment.

LANDFILL COVER THICKNESS EVALUATION

During this reporting period, a representative from our office visited the site to evaluate the asbestos and C&D landfill cover thickness by performing a total of forty-seven (47) hand auger borings upon completion of the grading activities at the designed finished grades. Thirty (30) hand auger borings were performed within the asbestos landfill and were extended to a minimum depth of approximately 3 feet. Seventeen (17) hand auger borings were performed within the C&D landfill and were extended to a minimum depth of approximately 2 feet. The hand auger borings were performed on an approximate 100-foot grid within each landfill.

Based on the results of the hand auger borings, the minimum required cover thickness was encountered at the asbestos and C&D landfills. A summary of the landfill cover thickness evaluation is presented on "Cover Thickness Evaluation, Asbestos Landfill, Table 1" and "Cover Thickness Evaluation, C&D landfill, Table 2" included the appendix. The hand auger boring location coordinates shown on the attached tables were provided by Morgan Corporation's surveyors using GPS devices.

ESP appreciates the opportunity to have assisted you during this project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, P.A.

Jacob L. Sarna, PG
Project Manager

David A. Bixler II, PE
NC Licensure No. 33560

NORTH CAROLINA PROFESSIONAL SEAL 033560 ENGINEER DAVID A. BIXLER II 1/9/09

JLS/DAB

Copies submitted (2)

Attachments: Report of Field Density Tests
Moisture-Density Relationships (S-1 through S-6)
Grain Size Distributions (S-1 through S-6)
Atterberg Limits Results (S-1 through S-6)
Proofrolling Observations Sheets dated November 19, 2008 (2)
Cover Thickness Evaluation, Asbestos Landfill, Table 1
Cover Thickness Evaluation, C&D Landfill, Table 2

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	1 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
1	10/30/08	DT	93.2	23.8	108.1	21.4	89.0	95	Asbestos Landfill - 685757.1N and 1414173.7E	approximately proposed design subgrade		
2	10/30/08	DT	93.2	23.8	109.0	22.1	89.3	96	Asbestos Landfill - 685863.2N and 1414218.1E	approximately proposed design subgrade		
3	10/31/08	DT	96.1	21.9	109.0	20.9	90.2	94	Asbestos Landfill - 685811.4N and 1414347.9E	approximately proposed design subgrade		
4	10/31/08	DT	96.1	21.9	108.1	21.4	89.0	93	Asbestos Landfill - 685895.7N and 1414317.0E	approximately proposed design subgrade		
5	10/31/08	DT	96.1	21.9	109.3	21.7	89.8	93	Asbestos Landfill - 685623.5N and 1414141.1E	approximately proposed design subgrade		
6	11/01/08	DT	94.2	23.2	106.6	22.2	87.2	93	Asbestos Landfill - 685431.5N and 1414122.9E	approximately 1 foot below proposed design subgrade		
7	11/01/08	DT	94.2	23.2	107.8	22.6	87.9	93	Asbestos Landfill - 685343.1N and 1414081.3E	approximately 1 foot below proposed design subgrade		
8	11/03/08	DT	96.0	21.8	109.5	19.4	91.7	96	Asbestos Landfill - 685431.8N and 1414278.9E	approximately 1 foot below proposed design subgrade		
10	11/04/08	DT	94.9	22.6	106.6	20.3	88.6	93	Asbestos Landfill - 685565.7N and 1414157.1E	approximately 1 foot below proposed design subgrade		
11	11/04/08	DT	94.9	22.8	107.5	21.2	88.7	93	Asbestos Landfill - 685520.9N and 1414475.9E	approximately proposed design subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	2 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
12	11/05/08	DT	94.5	23.0	106.0	21.1	87.5	93	Asbestos Landfill - 685301.1N and 1414071.7E	approximately proposed design subgrade		
13	11/05/08	DT	94.5	23.0	106.6	21.6	87.5	93	Asbestos Landfill - 685451.8N and 1414164.8E	approximately proposed design subgrade		
14	11/05/08	DT	94.5	23.0	104.6	20.8	86.8	92	Asbestos Landfill - 685446.5N and 1414309.8E	approximately proposed design subgrade		
15	11/06/08	DT	97.1	23.0	109.8	22.2	89.9	93	Asbestos Landfill - 685624.1N and 1414492.7E	approximately proposed design subgrade		
16	11/06/08	DT	97.1	23.0	110.1	22.5	89.8	93	Asbestos Landfill - 685699.3N and 1414473.9E	approximately proposed design subgrade		
17	11/06/08	DT	97.1	23.0	109.5	22.0	89.8	92	Asbestos Landfill - 685625.9N and 1414359.6E	approximately proposed design subgrade		
18	11/11/08	DT	95.3	22.2	109.8	21.8	90.1	95	Asbestos Landfill - 685960.3N and 1414311.9E	approximately proposed design subgrade		
9	11/14/08	DT	94.9	22.6	104.2	19.7	87.1	92	Asbestos Landfill - 685607.1N and 1414163.0E	approximately 2 feet below proposed design subgrade		
20	11/21/08	DT	93.5	23.6	112.8	21.8	92.6	99	Asbestos Landfill - 685829.2N and 1414149.7E	approximately 2 feet below proposed design subgrade		
19	11/21/08	DT	96.5	23.6	112.2	21.2	92.6	96	Asbestos Landfill - 685803.5N and 1414353.5E	approximately 2 feet below proposed design subgrade		

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	3 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV.DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
21	11/25/08	DT	96.2	21.6	108.7	18.8	91.5	95	Asbestos Landfill - 685503.2N and 1414468.8E	approximately 2 feet below proposed final subgrade		
22	11/25/08	DT	96.2	21.6	110.4	18.7	93.0	97	Asbestos Landfill - 685521.2N and 1414490.5E	approximately 1 foot below proposed final subgrade		
23	11/25/08	DT	96.2	21.6	109.9	18.5	92.7	96	Asbestos Landfill - 685406.5N and 1414241.3E	approximately 2 feet below proposed final subgrade		
24	11/25/08	DT	96.2	21.6	108.7	19.8	90.7	94	Asbestos Landfill - 685384.2N and 1414138.8E	approximately 1 foot below proposed final subgrade		
25	11/25/08	DT	98.5	24.0	116.8	24.6	93.7	95	Asbestos Landfill - 685477.5N and 1414137.8E	approximately 2 feet below proposed final subgrade		
26	11/25/08	DT	96.2	21.6	108.4	20.2	90.2	94	Asbestos Landfill - 685320.6N and 1414028.6E	approximately 1 foot below proposed final subgrade		
27	11/25/08	DT	98.5	24.0	113.4	24.2	91.3	93	Asbestos Landfill - 685863.2N and 1414383.6E	approximately 1 foot below proposed final subgrade		
28	11/25/08	DT	98.5	24.0	115.5	25.2	92.3	94	Asbestos Landfill - 685671.6N and 1414112.5E	approximately 1 foot below proposed final subgrade		
32	12/03/08	DT	97.2	24.8	117.6	26.4	93.0	96	Asbestos Landfill - 685637.3N and 1414296.4E	approximately 2 feet below proposed final subgrade		
33	12/03/08	DT	98.6	22.0	107.8	19.9	89.9	91	Asbestos Landfill - 685682.4N and 1414432.3E	approximately 2 feet below proposed final subgrade		

TYPE OF TEST
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REPORT OF FIELD DENSITY TESTS

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Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
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TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
29	12/03/08	DT	98.6	22.0	107.2	19.5	89.7	91	Asbestos Landfill - 685530.8N and 1414487.5E	approximately proposed final subgrade		
30	12/03/08	DT	97.2	24.8	118.5	27.0	93.3	96	Asbestos Landfill - 685426.7N and 1414302.6E	approximately proposed final subgrade		
31	12/03/08	DT	97.2	24.8	118.8	26.7	93.8	96	Asbestos Landfill - 685345.4N and 1414104.6E	approximately proposed final subgrade		
34	12/03/08	DT	98.6	22.0	108.4	19.5	90.7	92	Asbestos Landfill - 685912.5N and 1414348.6E	approximately proposed final subgrade		
35	12/03/08	DT	97.2	24.8	112.2	26.5	88.7	91	Asbestos Landfill - 685759.0N and 1414240.8E	approximately proposed final subgrade		
36	12/05/08	DT	94.9	22.6	106.3	19.5	89.0	94	Asbestos Landfill - 685632.2N and 1414287.3E	approximately 1 foot below proposed final subgrade		
37	12/05/08	DT	94.9	22.6	104.5	19.4	87.5	92	Asbestos Landfill - 685685.7N and 1414429.6E	approximately 1 foot below proposed final subgrade		
38	12/05/08	DT	94.9	22.6	103.8	19.3	87.1	92	Asbestos Landfill - 685622.7N and 1414486.9E	approximately proposed final subgrade		
39	12/05/08	DT	94.9	22.6	104.8	19.7	87.6	92	Asbestos Landfill - 685576.5N and 1414397.9E	approximately proposed final subgrade		
48	12/16/08	DT	95.0	22.6	111.3	22.3	91.0	96	Asbestos Landfill Diversion Berms - 685480.8N and 1414122.2E	approximately proposed subgrade		

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
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ESP Project No:	WJ13.300
Report Date:	January 09, 2009
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TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
49	12/16/08	DT	95.0	22.6	109.3	22.0	89.6	94	Asbestos Landfill Diversion Berms - 685390.8N and 1414057.9E	approximately proposed subgrade		
50	12/16/08	DT	95.0	22.6	110.4	22.4	90.2	95	Asbestos Landfill Diversion Berms - 685282.5N and 1414022.3E	approximately proposed subgrade		
51	12/16/08	DT	95.0	22.6	112.2	23.5	90.9	96	Asbestos Landfill Diversion Berms - 685667.3N and 1414124.9E	approximately proposed subgrade		
52	12/16/08	DT	95.0	22.6	108.7	21.7	89.3	94	Asbestos Landfill Diversion Berms - 685765.6N and 1414124.6E	approximately proposed subgrade		
53	12/16/08	DT	95.0	22.6	110.1	22.6	89.8	95	Asbestos Landfill Diversion Berms - 685669.1N and 1414158.5E	approximately proposed subgrade		
40	12/08/08	DT	94.0	23.3	109.3	22.6	89.2	95	C&D Landfill - 686128.7N and 1414493.5E	approximately 1 foot below proposed final subgrade		
41	12/08/08	DT	94.0	23.3	103.9	21.8	85.3	91	C&D Landfill - 685929.9N and 1414556.6E	approximately 1 foot below proposed final subgrade		
42	12/09/08	DT	94.8	22.5	103.9	19.8	86.7	91	C&D Landfill - 686850.2N and 1414650.0E	approximately 1 foot below proposed final subgrade		
43	12/09/08	DT	94.8	22.5	108.7	23.8	87.8	93	C&D Landfill - 685702.1N and 1414606.6E	approximately 1 foot below proposed final subgrade		
44	12/09/08	DT	94.8	22.5	107.8	23.3	87.4	92	C&D Landfill - 685690.2N and 1414599.4E	approximately proposed final subgrade		

TYPE OF TEST
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REMARKS

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
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ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	6 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
45	12/09/08	DT	94.8	22.5	104.5	20.3	86.9	92	C&D Landfill - 685841.6N and 1414655.5E	approximately proposed final subgrade		
46	12/09/08	DT	94.8	22.5	109.3	24.1	88.1	93	C&D Landfill - 686102.4N and 1414478.5E	approximately proposed final subgrade		
47	12/09/08	DT	94.8	22.5	105.1	20.8	87.0	92	C&D Landfill - 685956.4N and 1414526.6E	approximately proposed final subgrade		
54	12/22/08	DT	95.0	26.0	111.6	28.2	87.1	92	C&D Landfill Diversion Berms - 686125.8N and 1414574.5E	approximately proposed subgrade		
55	12/22/08	DT	95.0	26.0	109.0	27.3	85.6	90	C&D Landfill Diversion Berms - 686015.6N and 1414605.2E	approximately proposed subgrade		
56	12/22/08	DT	95.0	26.0	108.1	25.5	86.1	91	C&D Landfill Diversion Berms - 685936.5N and 1414660.1E	approximately proposed subgrade		
57	12/22/08	DT	95.0	26.0	110.7	27.7	86.7	91	C&D Landfill Diversion Berms - 685849.2N and 1414696.6E	approximately proposed subgrade		
58	12/22/08	DT	95.0	26.0	108.5	27.1	86.2	91	C&D Landfill Diversion Berms - 685784.3N and 1414660.7E	approximately proposed subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
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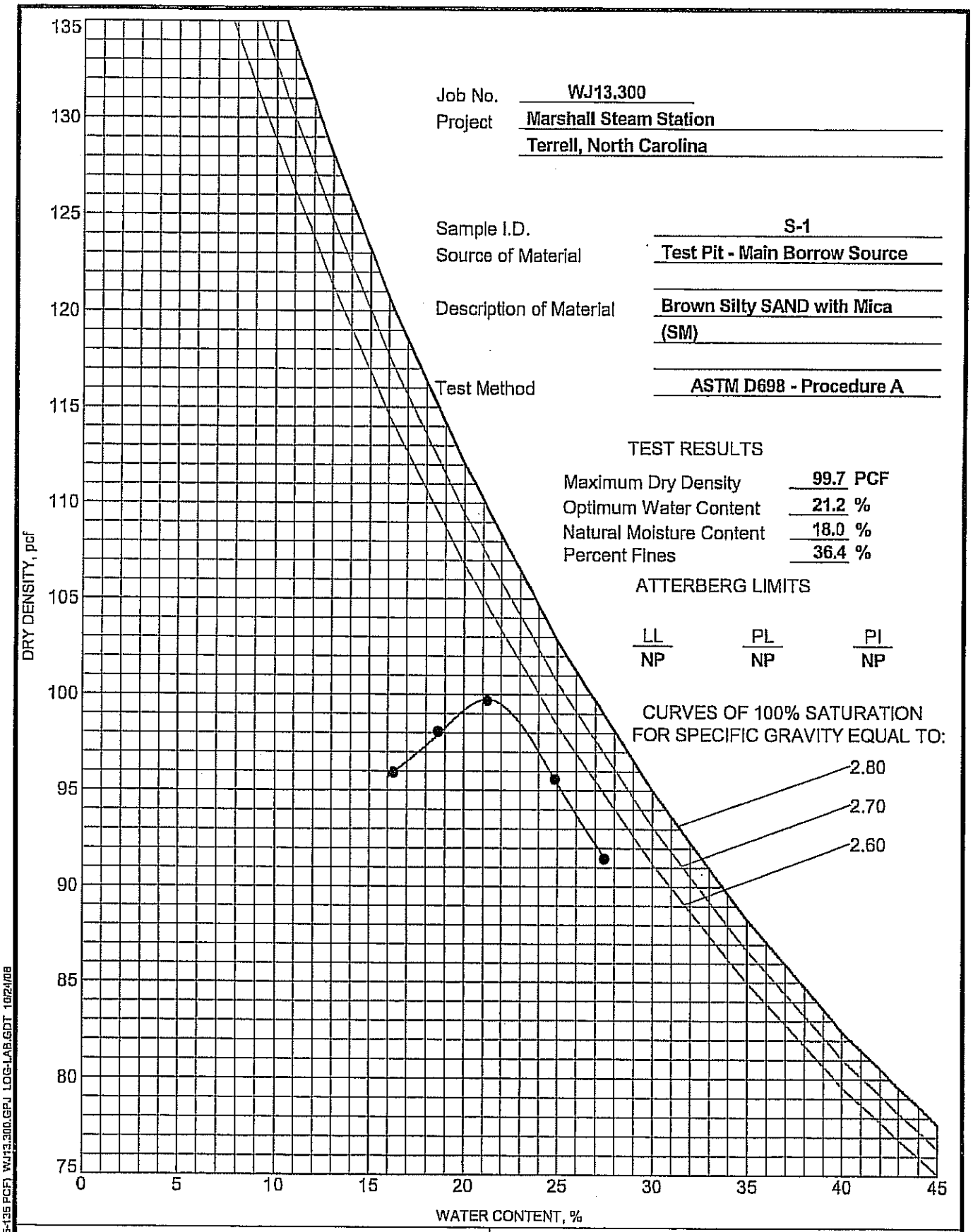
REMARKS



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-1

Source of Material Test Pit - Main Borrow Source

Description of Material Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	99.7	PCF
Optimum Water Content	21.2	%
Natural Moisture Content	18.0	%
Percent Fines	36.4	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

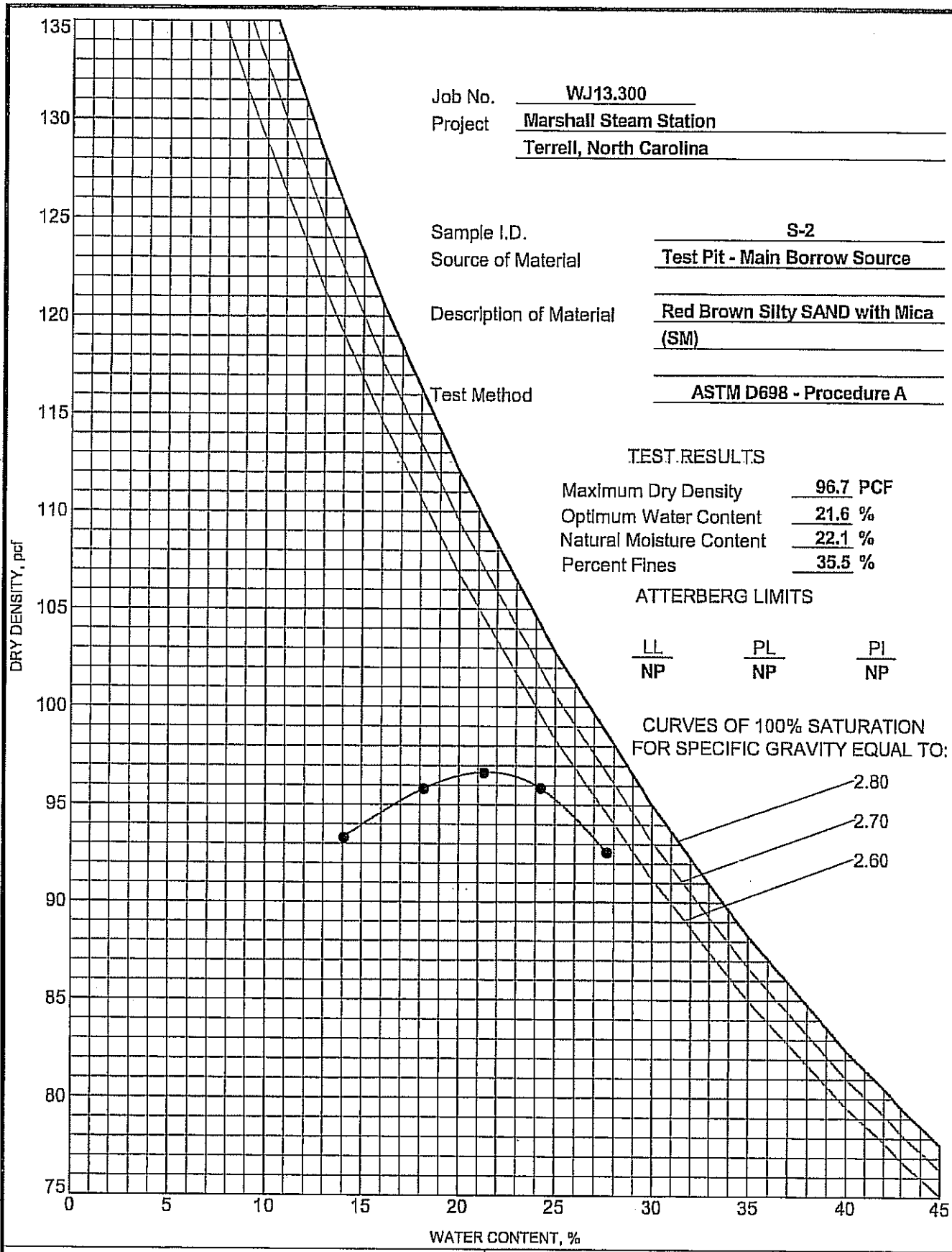
MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

ESP_COMPACTION11 (75-135 PCF) WJ13.300.GPJ LOG-LAB.GDT 10/24/08



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-2

Source of Material Test Pit - Main Borrow Source

Description of Material Red Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	96.7	PCF
Optimum Water Content	21.6	%
Natural Moisture Content	22.1	%
Percent Fines	35.5	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

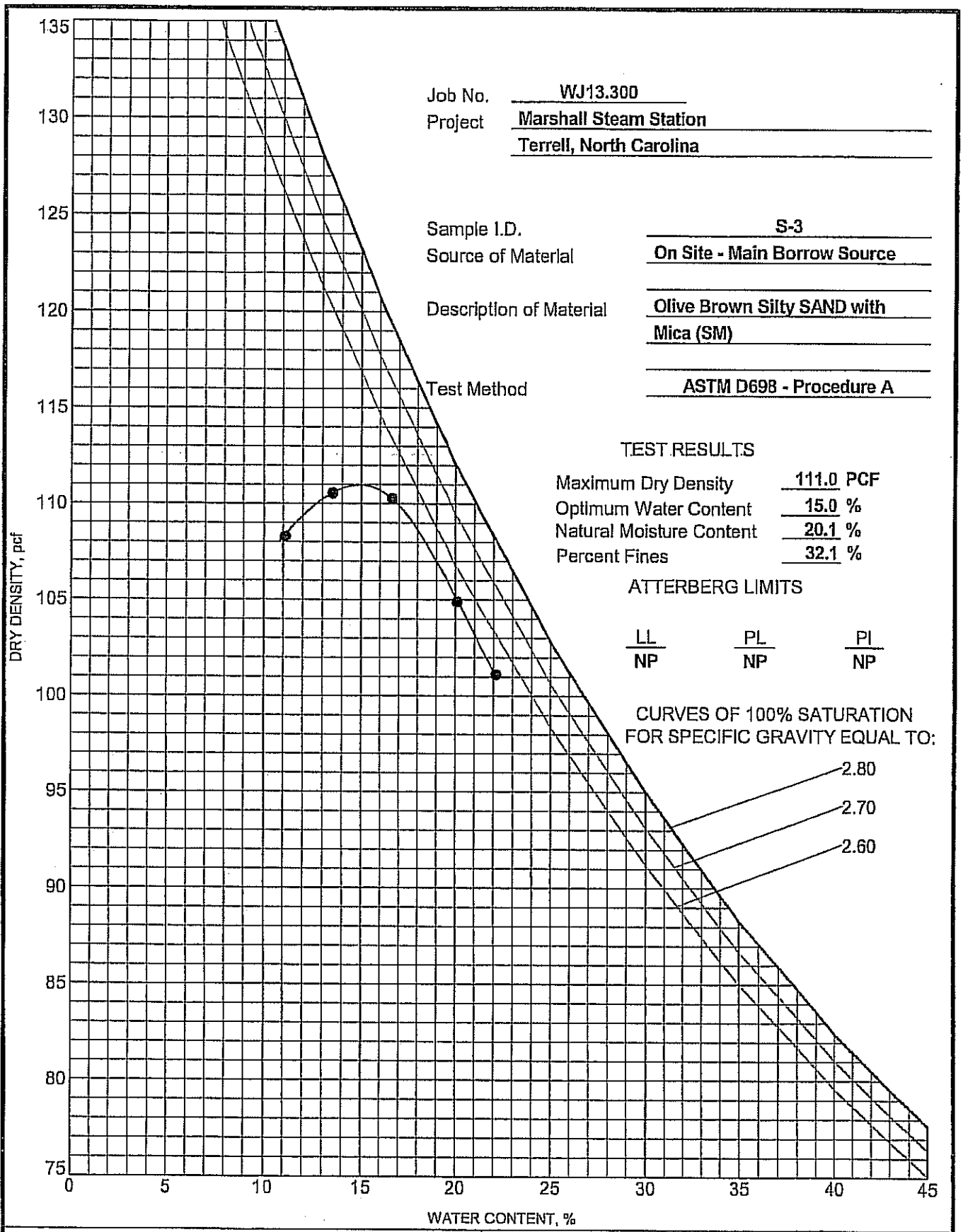
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-3

Source of Material On Site - Main Borrow Source

Description of Material Olive Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	111.0	PCF
Optimum Water Content	15.0	%
Natural Moisture Content	20.1	%
Percent Fines	32.1	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

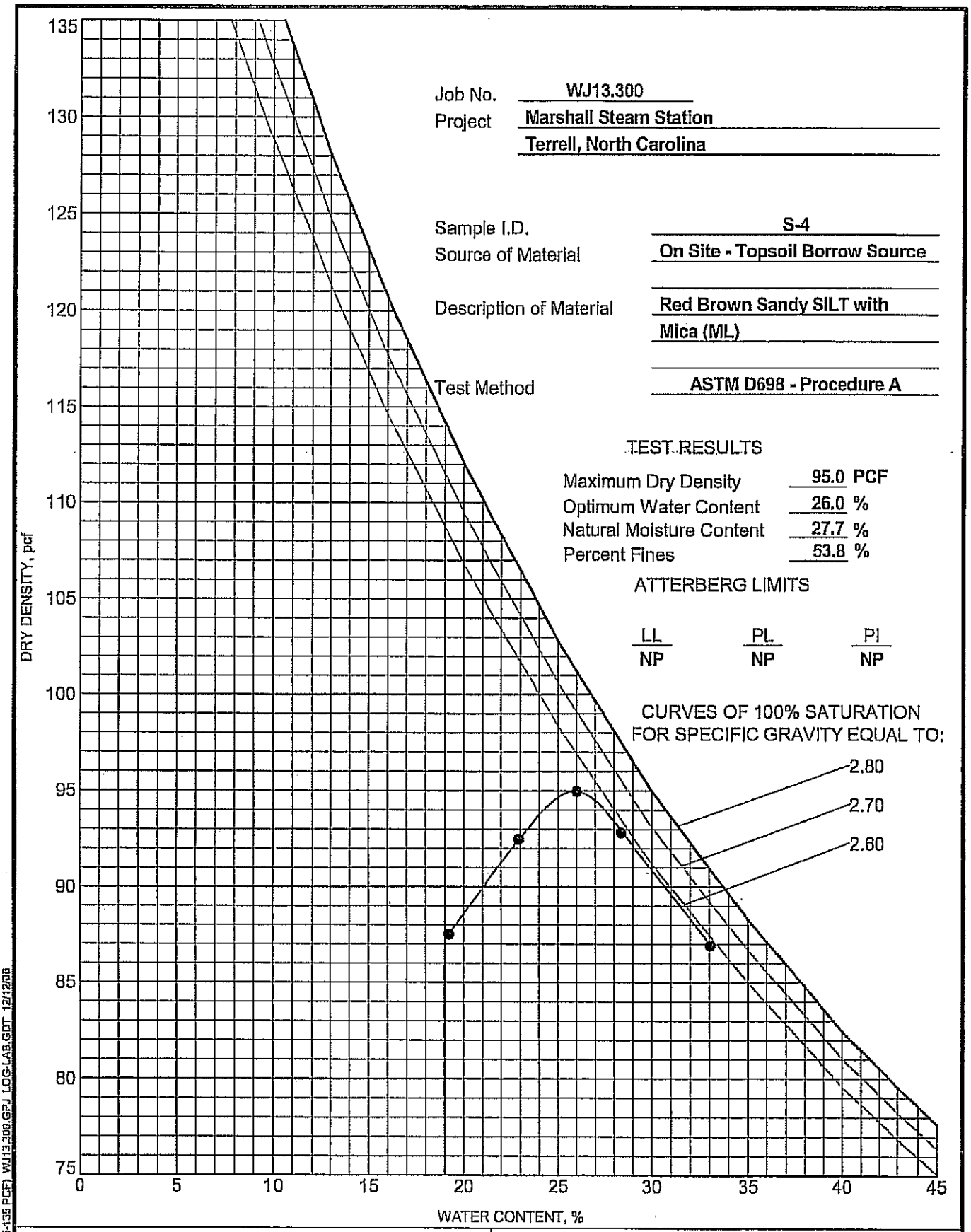
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-4

Source of Material On Site - Topsoil Borrow Source

Description of Material Red Brown Sandy SILT with Mica (ML)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	95.0	PCF
Optimum Water Content	26.0	%
Natural Moisture Content	27.7	%
Percent Fines	53.8	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

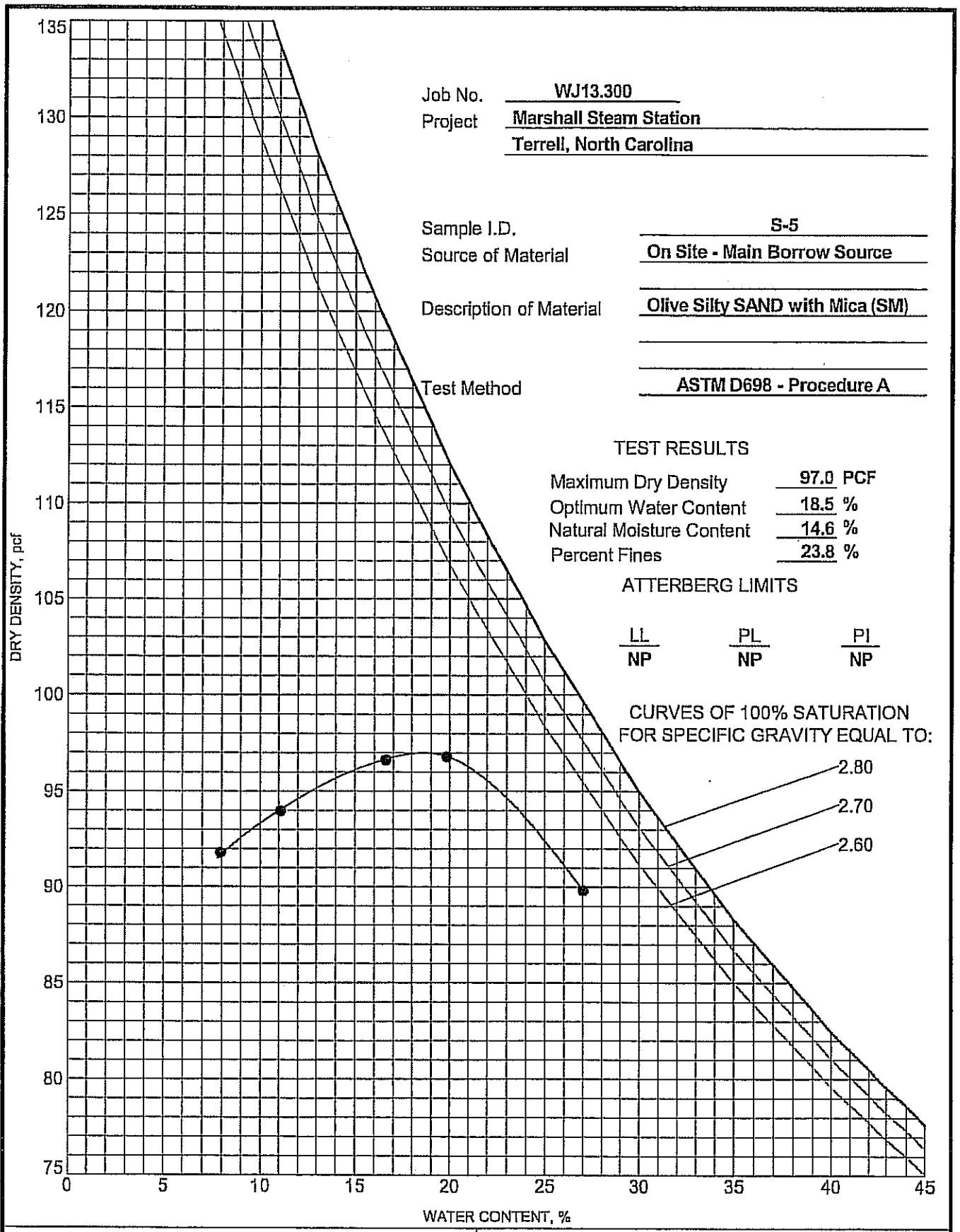
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-5

Source of Material On Site - Main Borrow Source

Description of Material Olive Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	97.0	PCF
Optimum Water Content	18.5	%
Natural Moisture Content	14.6	%
Percent Fines	23.8	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

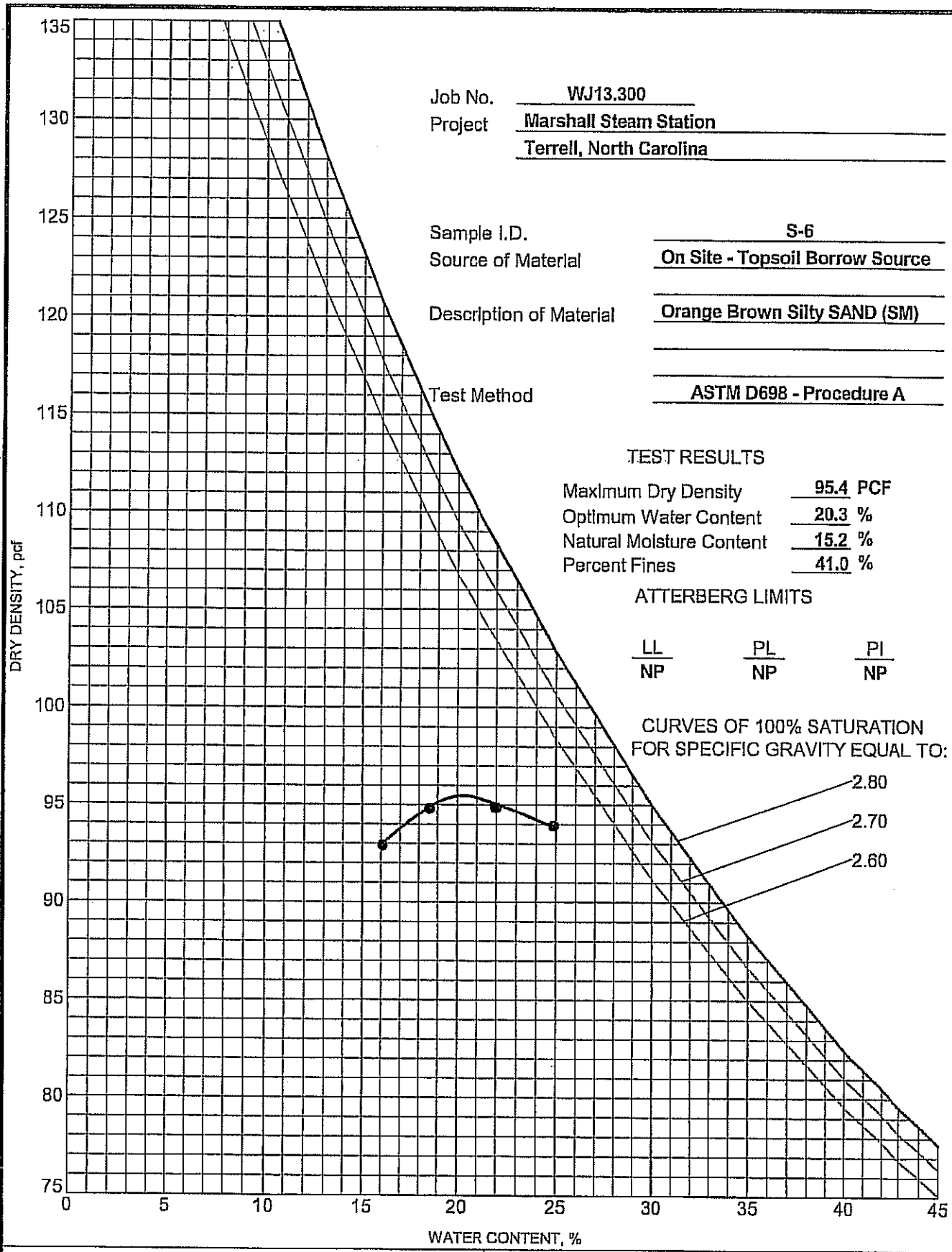
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-6

Source of Material On Site - Topsoil Borrow Source

Description of Material Orange Brown Silty SAND (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	95.4	PCF
Optimum Water Content	20.3	%
Natural Moisture Content	15.2	%
Percent Fines	41.0	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

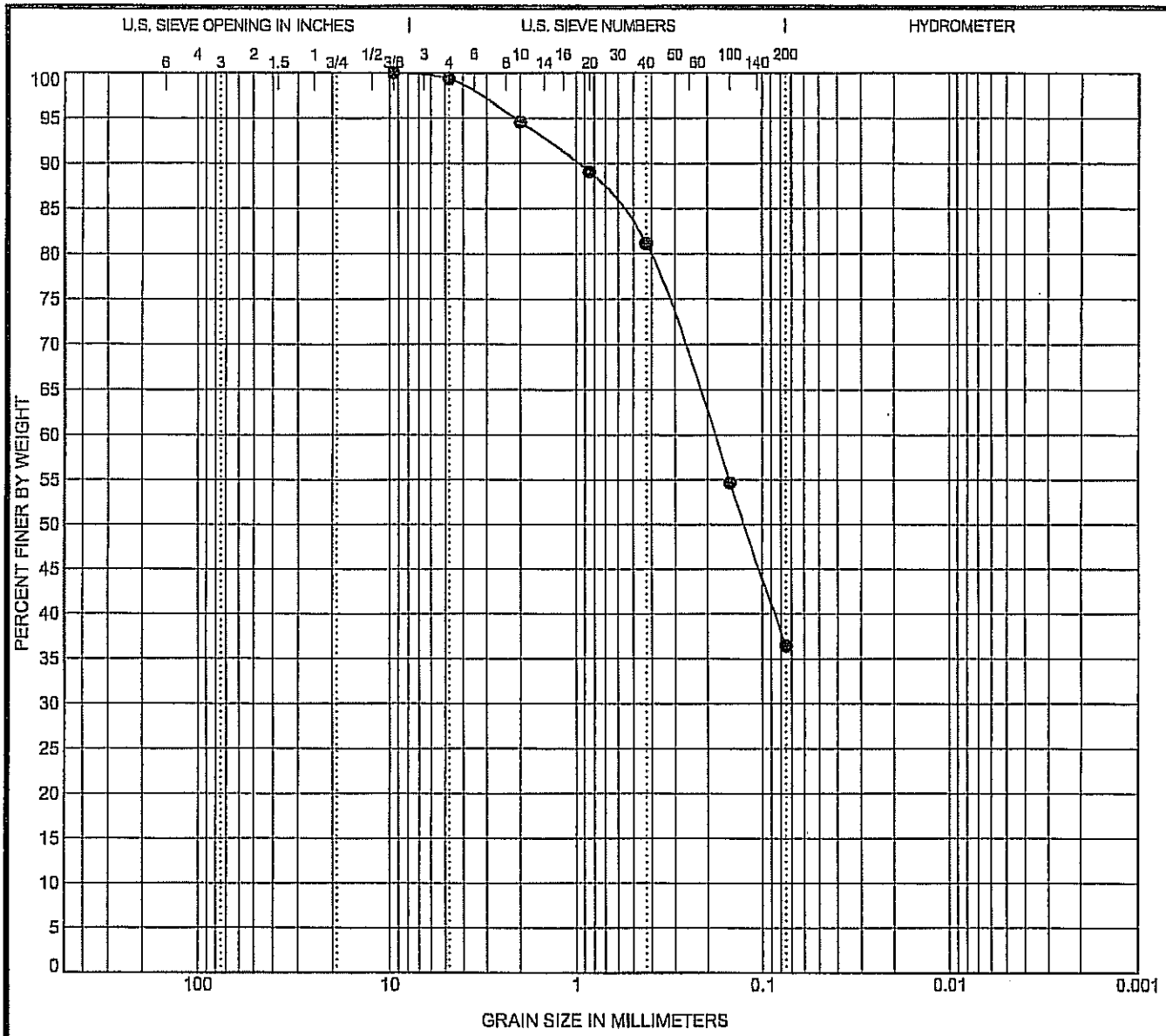
MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

ESP_COMPACTION1 (75-135 PCF) WJ13.300.GPJ LOG-LAB.GDT 12/15/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-1	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-1	9.5	0.185			0.6	62.9	36.4	

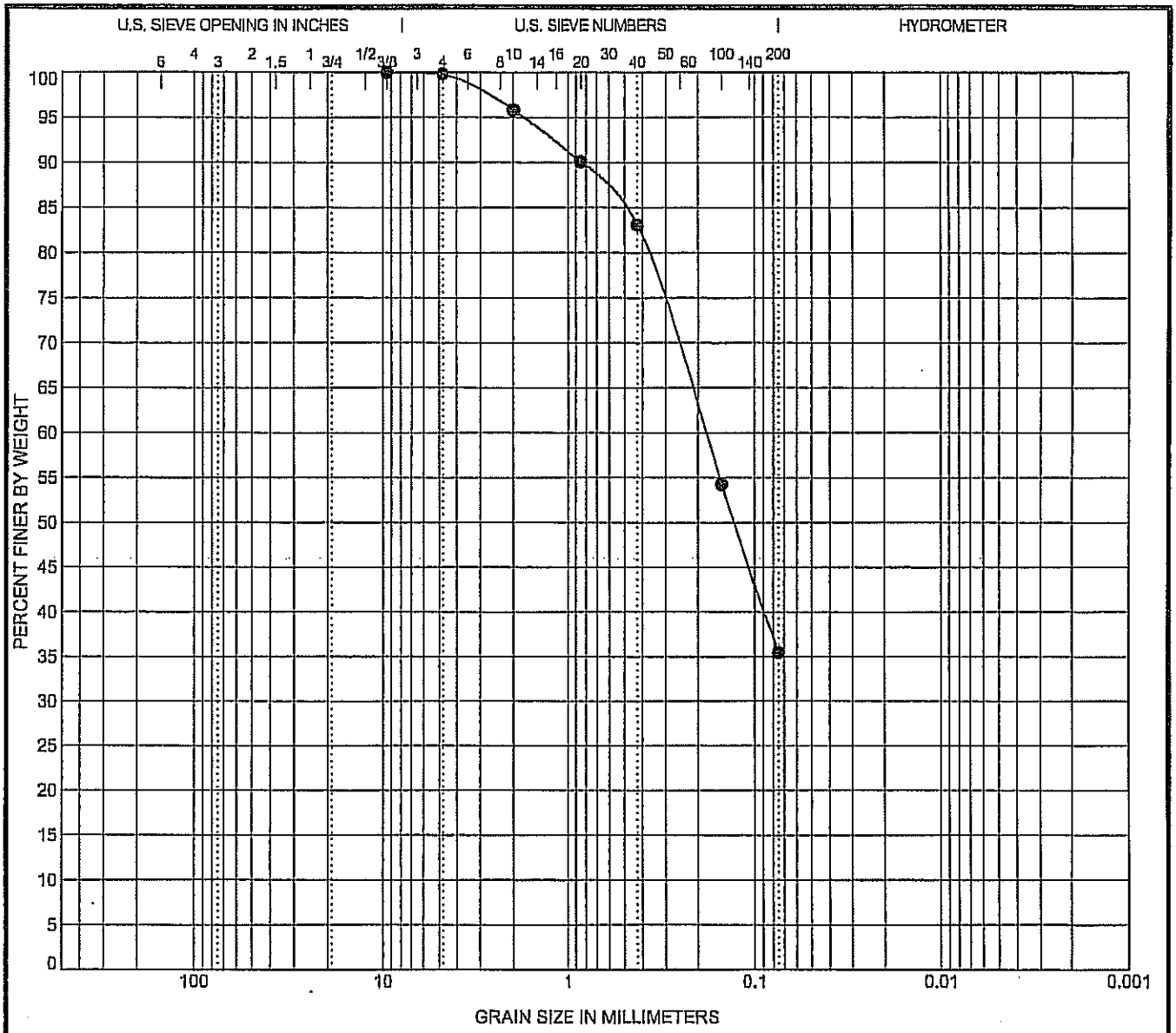
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-2	**SILTY SAND SM**	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-2	9.5	0.185			0.2	64.3	35.5	

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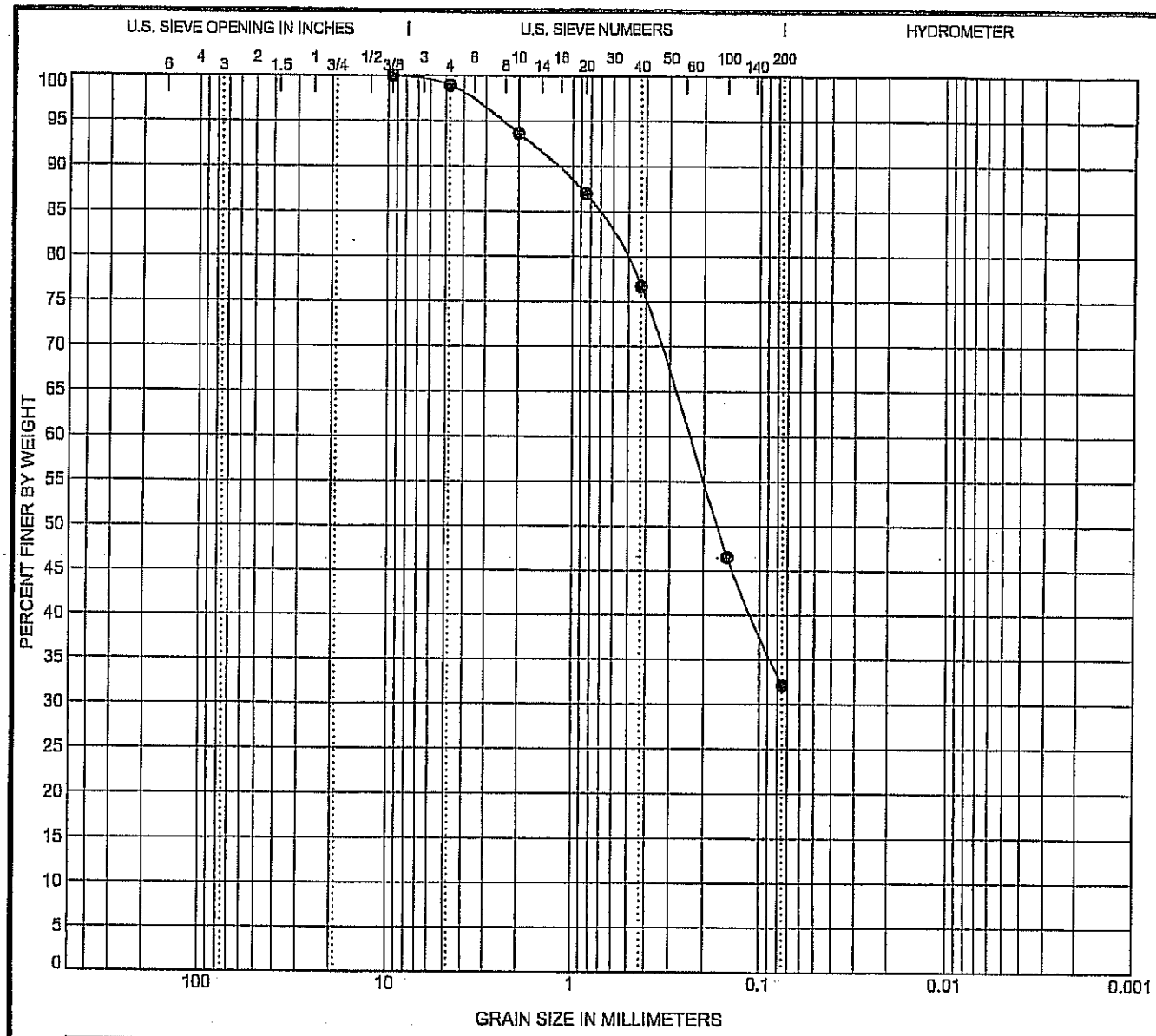
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-3	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-3	9.5	0.239			1.0	66.9	32.1	

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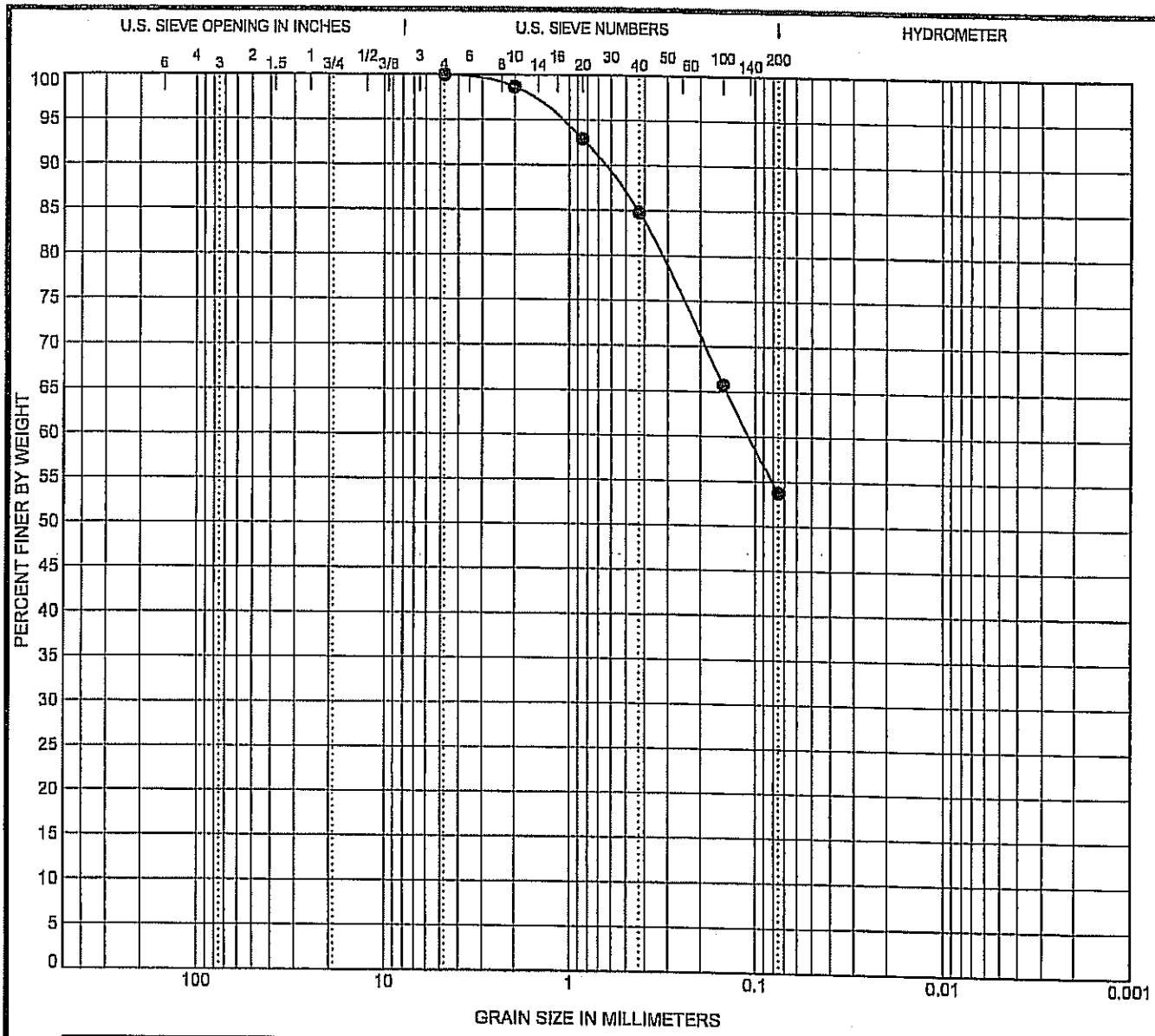
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-4	**SANDY SILT ML**	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-4	4.75	0.108			0.0	46.2	53.8	

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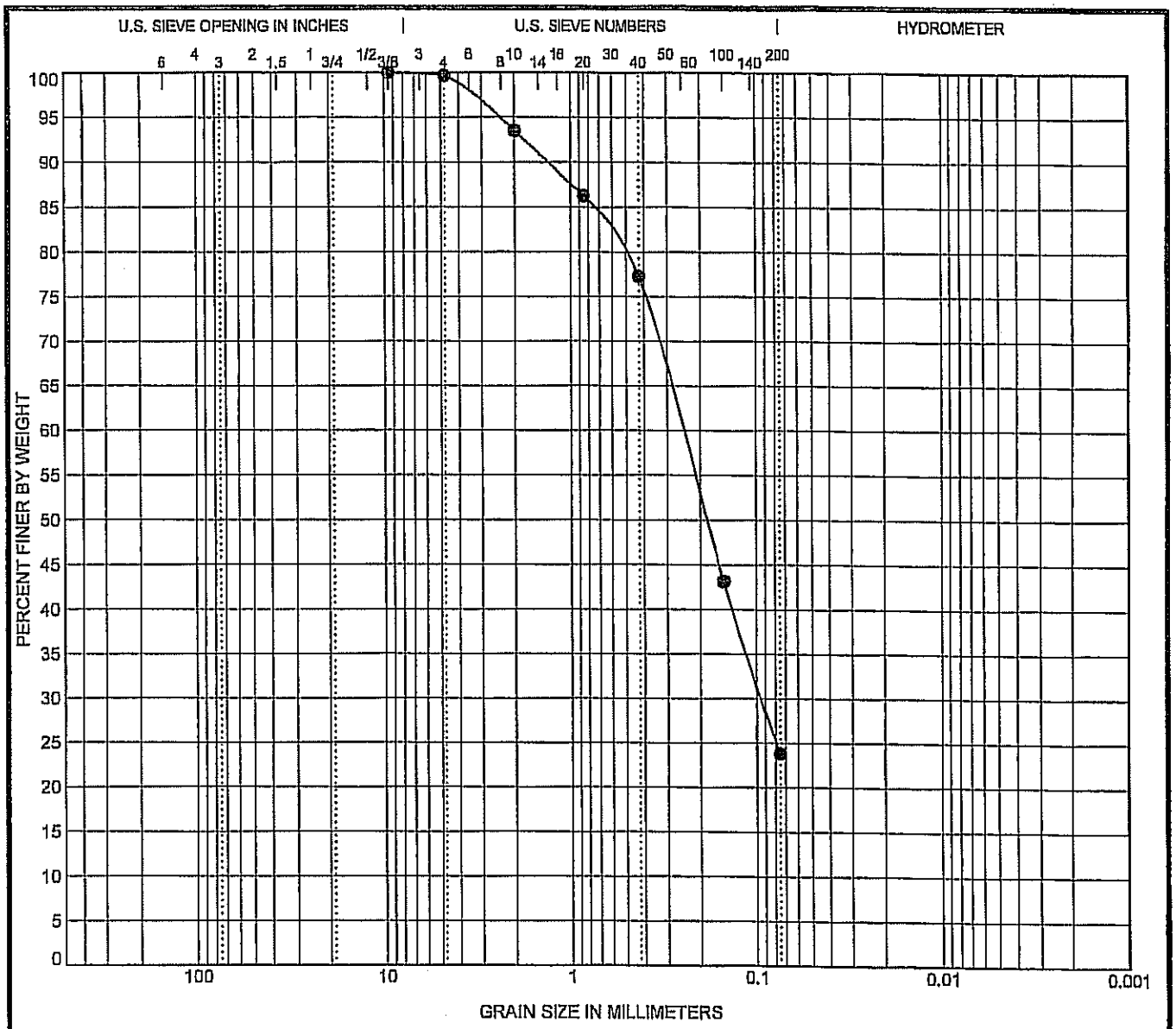
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-5	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-5	9.5	0.251	0.094		0.3	75.8	23.8	

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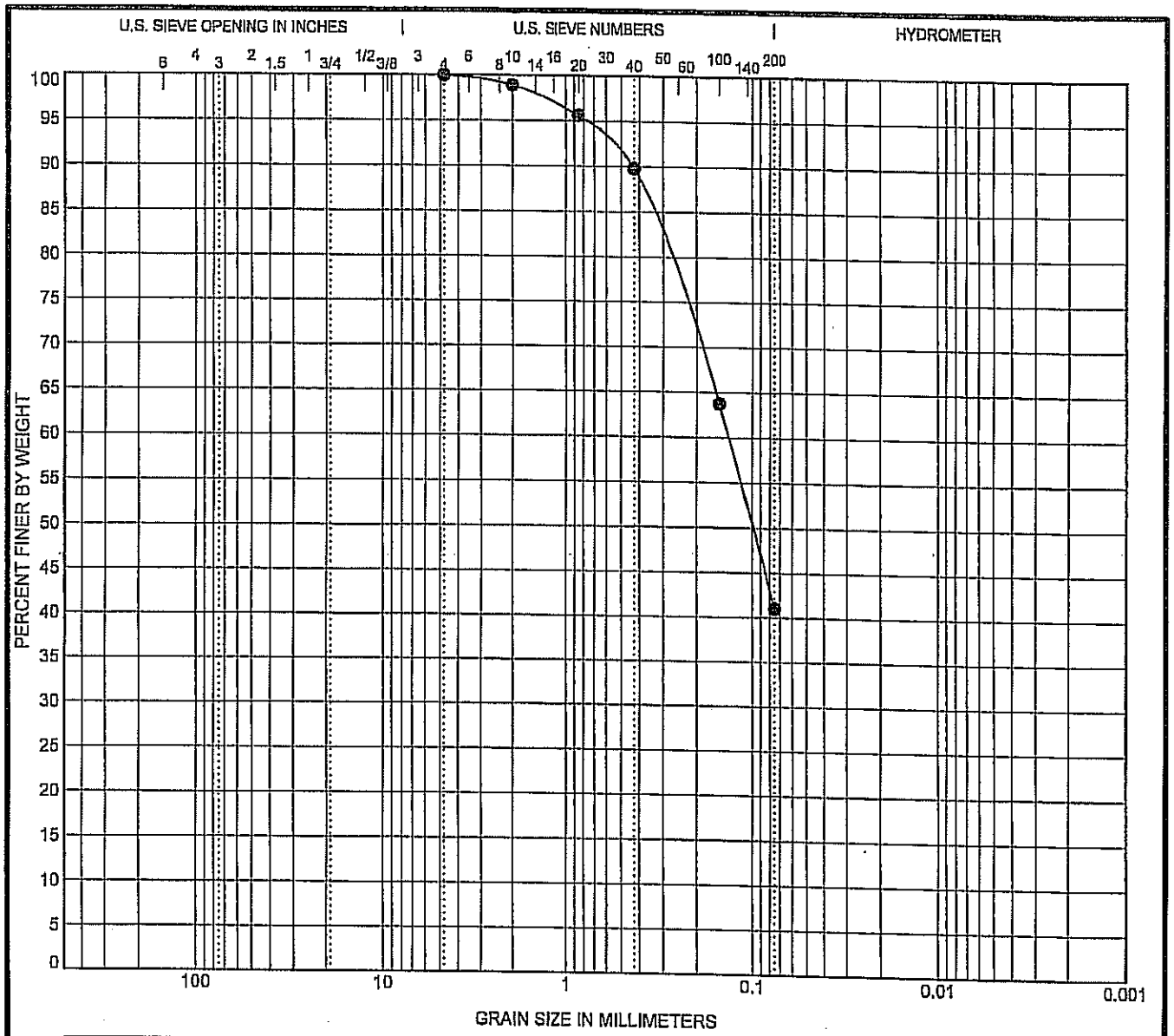
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-6	**SILTY SAND SM**	**NP**	**NP**	**NP**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-6	**4.75**	**0.134**			**0.0**	**59.0**	**41.0**	

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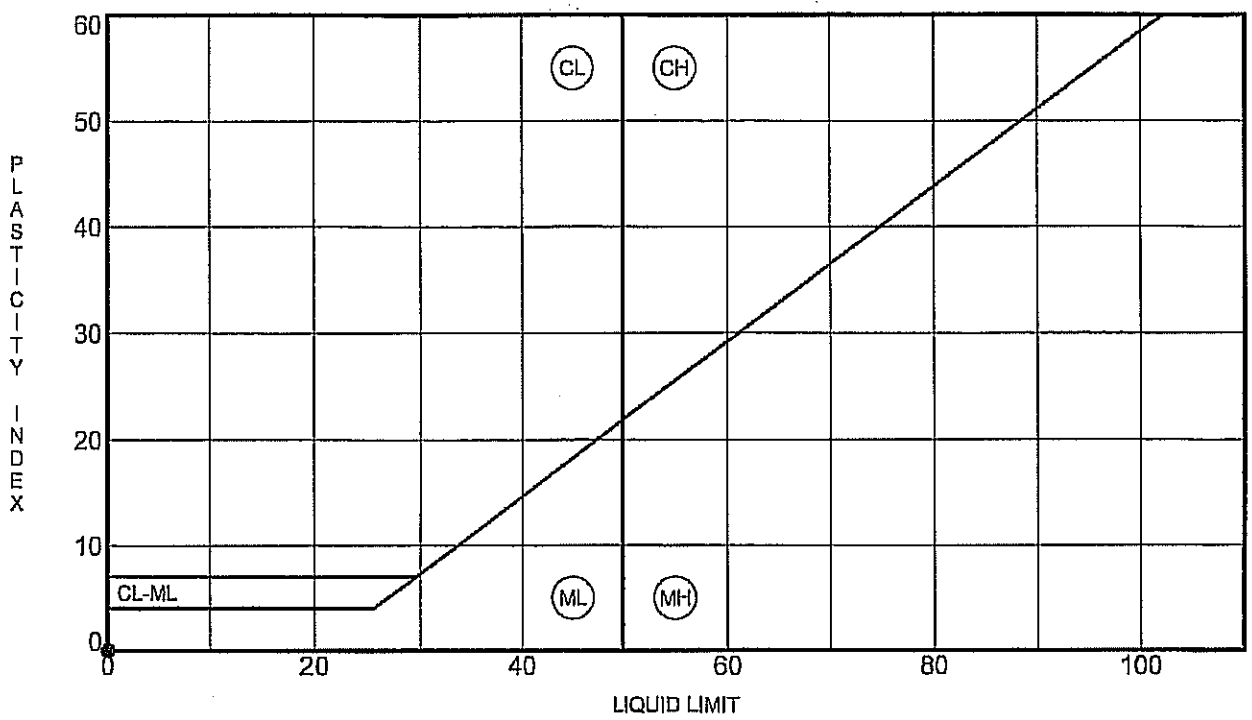
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-1	NP	NP	NP	36.4	SILTY SAND SM

ESP Associates, P.A.
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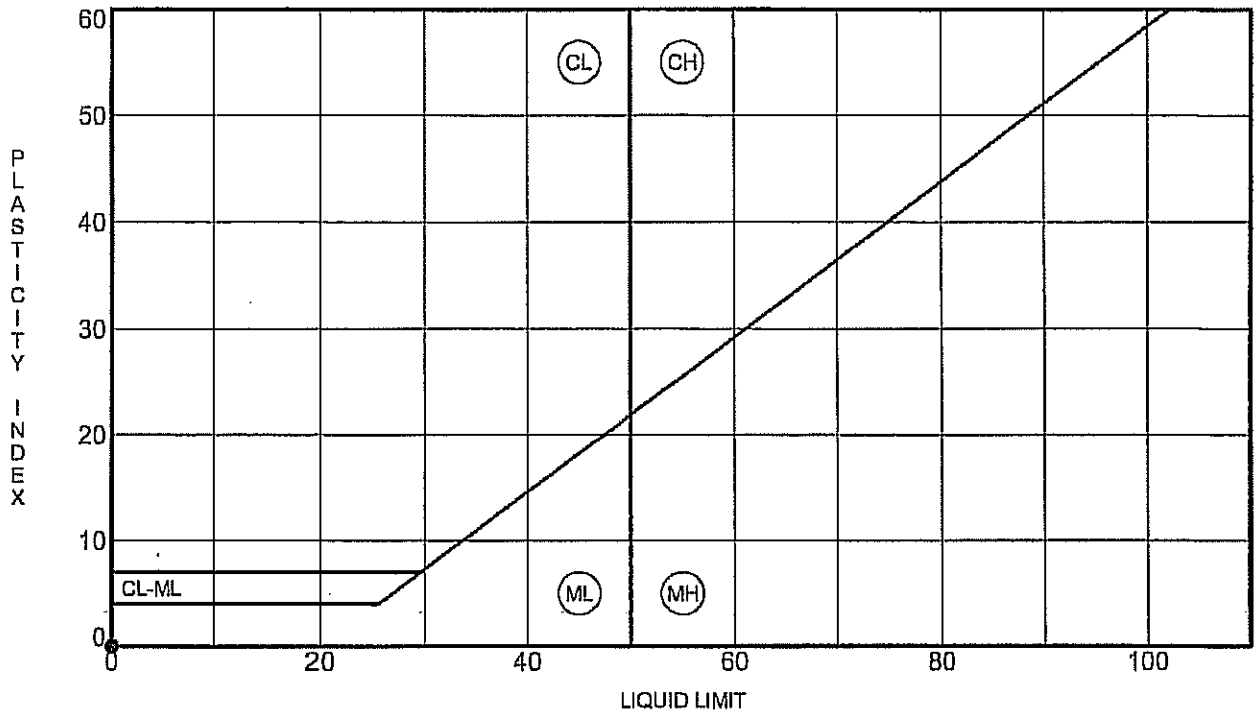
ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-2	NP	NP	NP	35.5	SILTY SAND SM

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P.O. Box 7030
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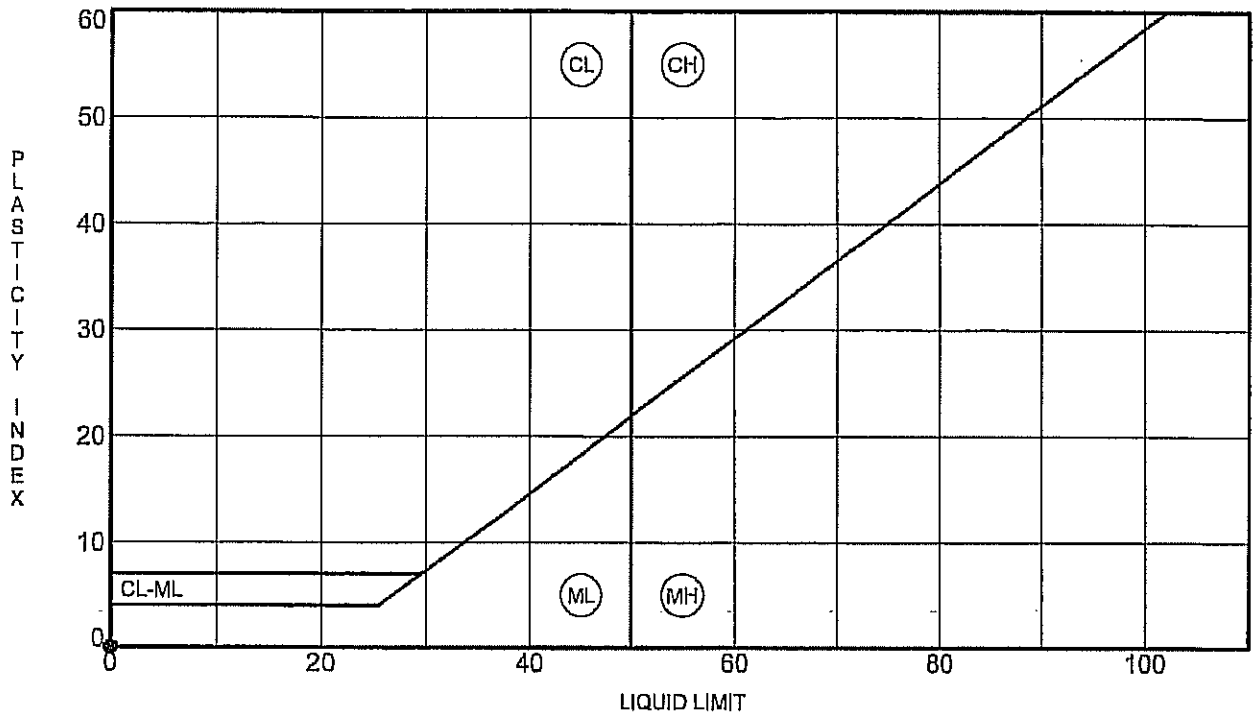
ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-3	NP	NP	NP	32.1	SILTY SAND SM

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P.O. Box 7030
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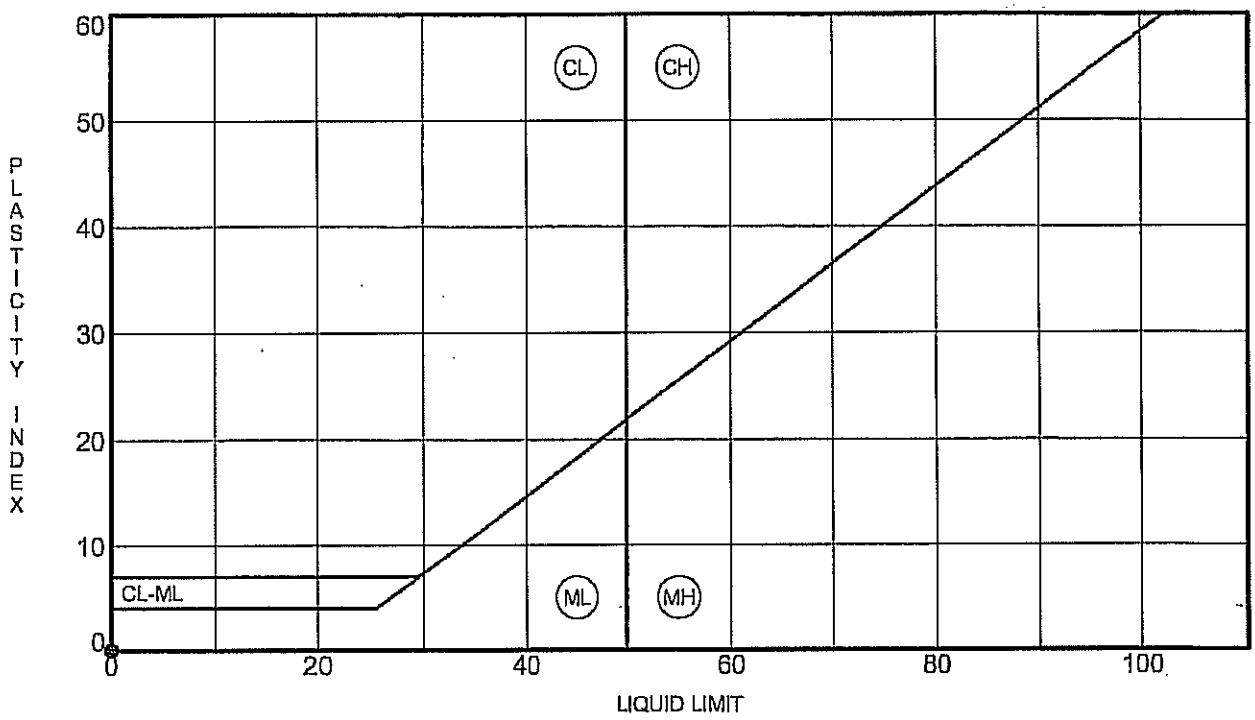
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-4	NP	NP	NP	53.8	SANDY SILT (ML)

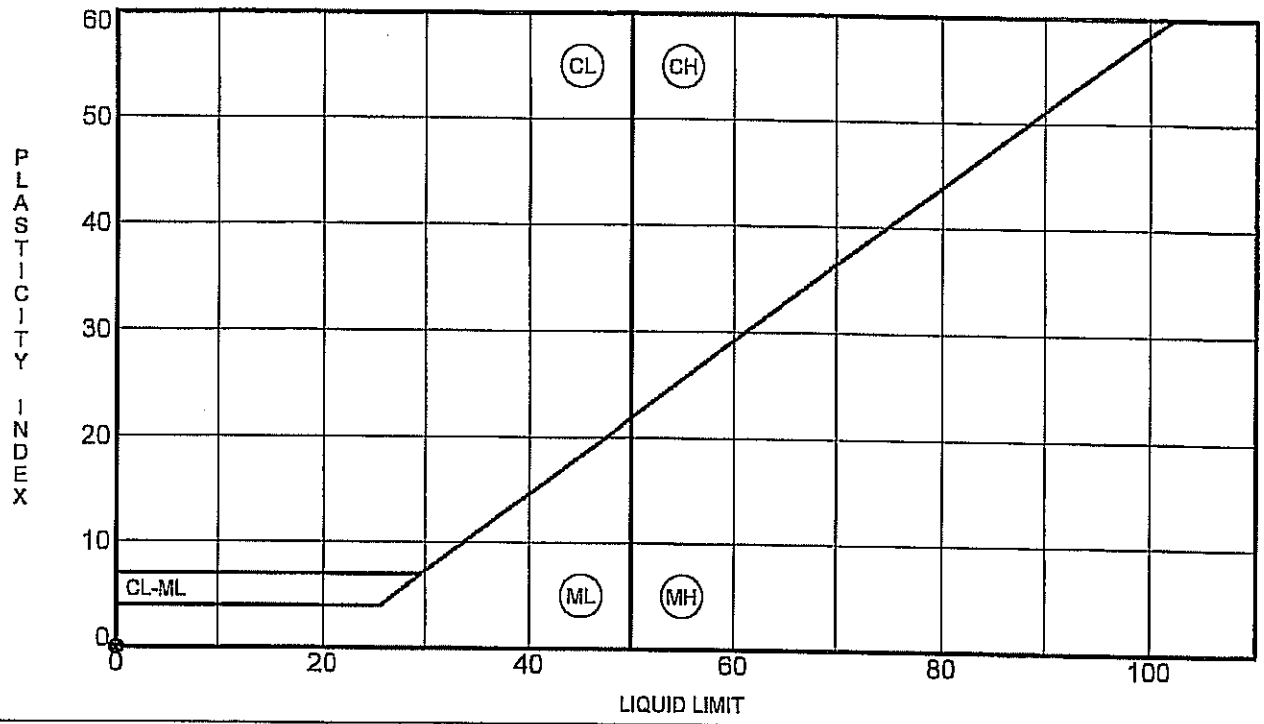
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-5	NP	NP	NP	23.8	SILTY SAND SM

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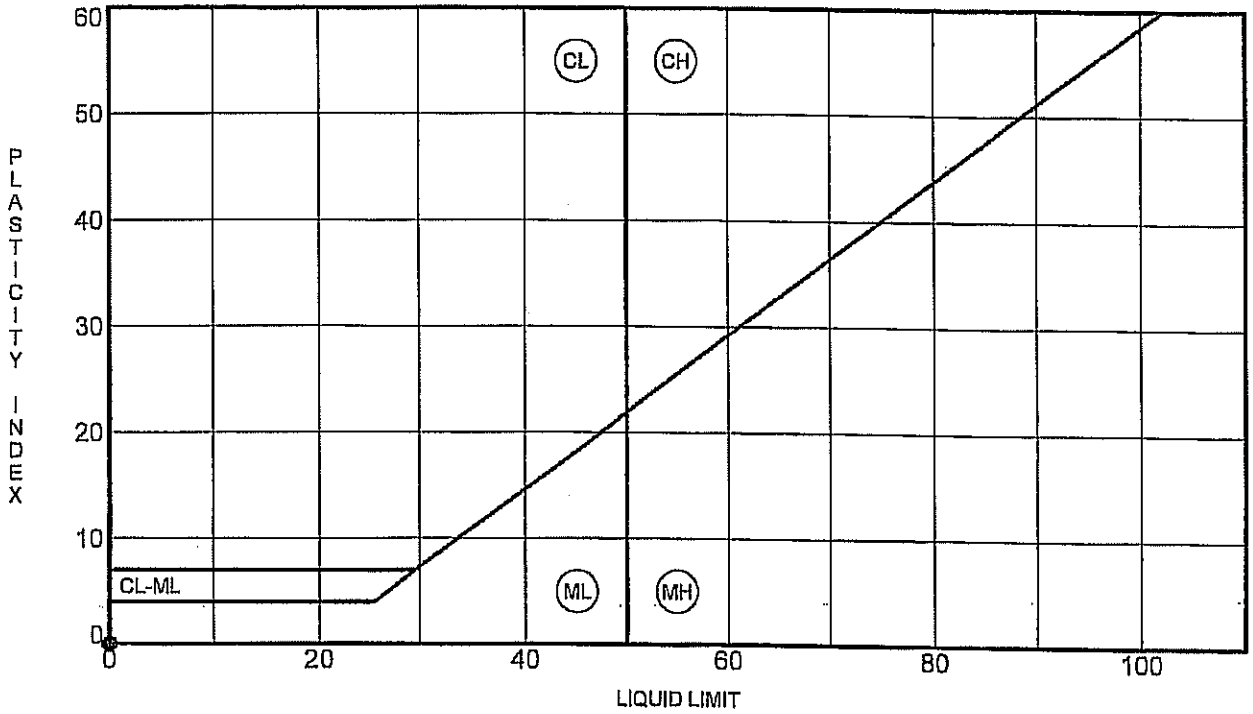
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-6	NP	NP	NP	41.0	SILTY SAND SM

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

1 of 2

PROOFROLLING OBSERVATIONS

ESP ASSOCIATES, P.A.
engineering • surveying • planning

Asbestos @ Design Subgrade

Project Name: Marshall Steam Station

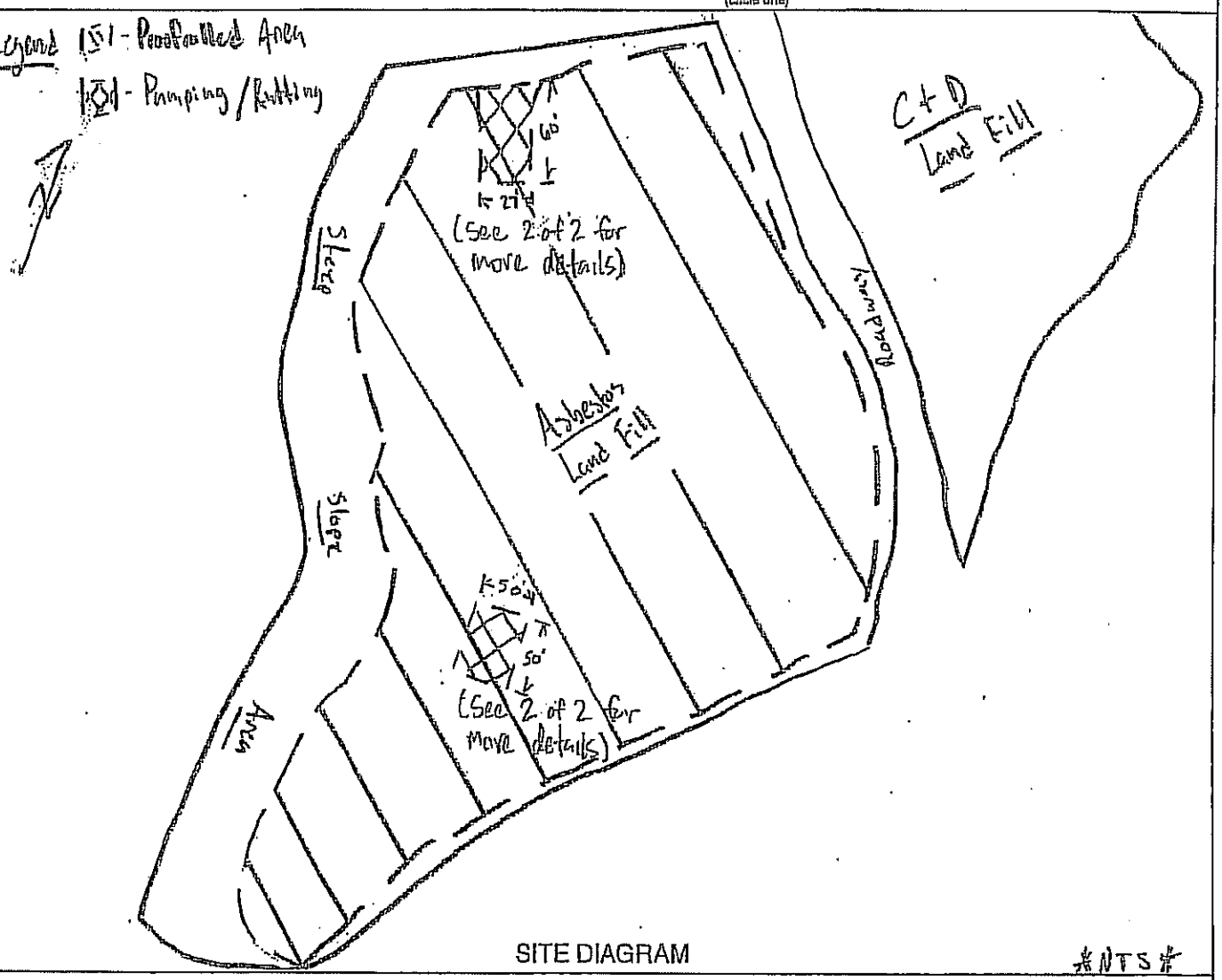
Date: 11/19/08 Project Number: WJ-13,300

~~Engineer~~/Tech: Jason F

Location: Terrell, NC

Weather: Clear

Proofrolling Vehicle: Loaded Pan / Scraper Soil Subgrade / Aggregate Base Course
(circle one)



SITE DIAGRAM

NTS

COMMENTS/RECOMMENDATIONS: Tech on-site to proofroll above noted Design Subgrade of Asbestos Land Fill. Some movement was observed in noted areas, but as a whole area appeared to be stable / suitable @ Design Subgrade. Note: STAGE indicated to Jake S. that the use of a "bridge" lift is acceptable to stabilize the two areas depicted above. JKS

Signature

2 of 2

PROOFROLLING OBSERVATIONS

ESP ASSOCIATES, P.A.
engineering • surveying • planning

Project Name: Marshall Steam Station

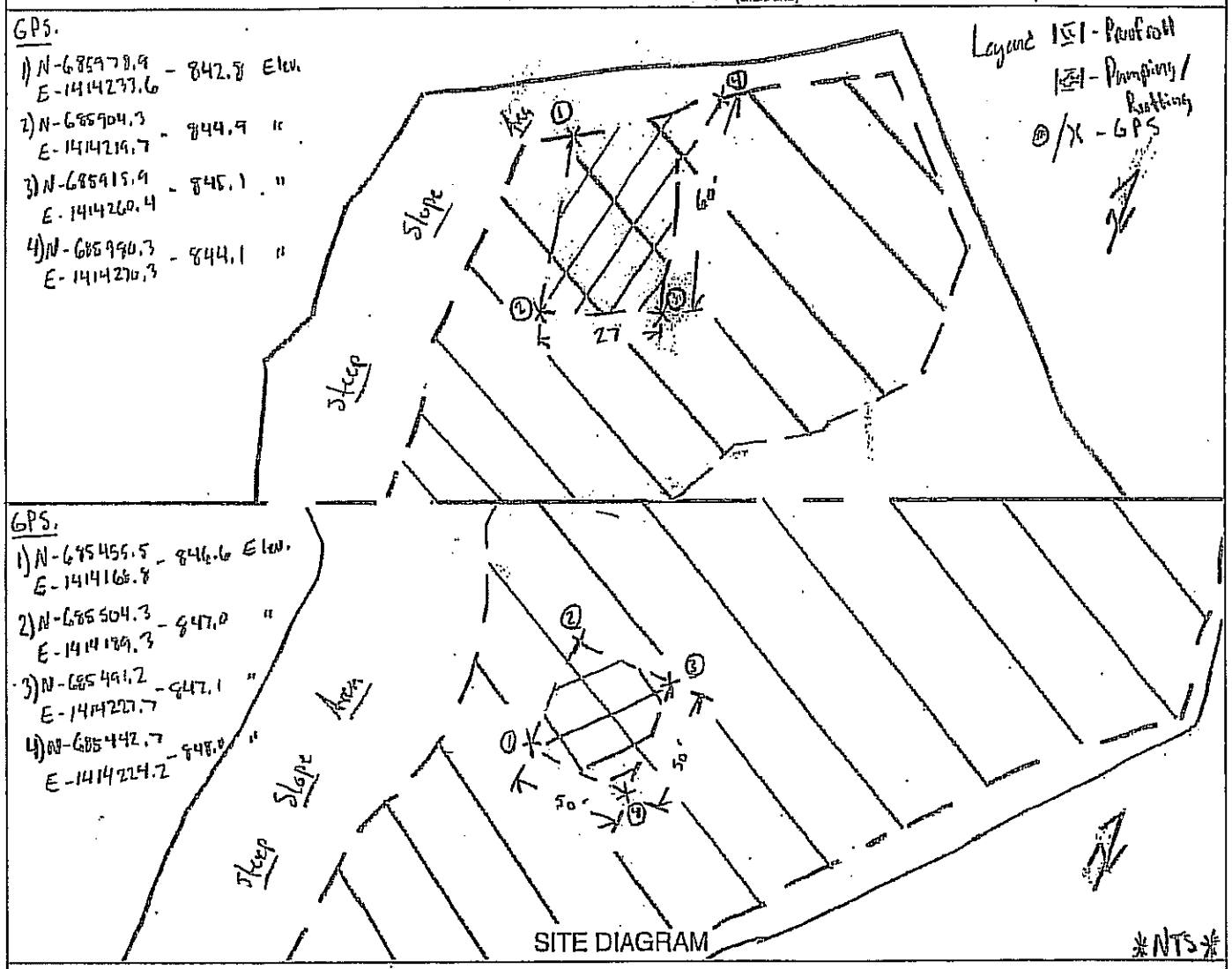
Date: 11/19/08 Project Number: WJ-13,300

~~Engineer~~/Tech: Jason F.

Asbestos @ Design Subgrade

Location: Terrell, NC Weather: clear

Proofrolling Vehicle: Loaded Pan / Scraper (Soil Subgrade / Aggregate Base Course) (circle one)



COMMENTS/RECOMMENDATIONS: Tech on-site to proofroll Asbestos Land Fill Area. Above noted area's showed pumping / movement under loaded equipment and was then noted by reporting documentation.

Signature

COVER SYSTEM THICKNESS EVALUATION
ASBESTOS LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 1

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
1	N685494.77 E1414504.80	3.0	Yes
2	N685452.72 E1414416.45	3.0	Yes
3	N685409.76 E1414326.56	3.0	Yes
4	N685512.20 E1414303.09	3.0	Yes
5	N685565.28 E1414399.85	3.0	Yes
6	N685614.53 E1414494.12	3.0	Yes
7	N685715.56 E1414484.66	3.0	Yes
8	N685675.85 E1414388.40	3.0	Yes
9	N685631.00 E1414293.62	3.0	Yes
10	N685604.62 E1414198.95	3.0	Yes
11	N685470.38 E1414208.37	3.0	Yes
12	N685373.82 E1414236.44	3.0	Yes
13	N685361.70 E1414133.61	3.0	Yes
14	N685278.92 E1414071.02	3.0	Yes
15	N685380.58 E1414043.36	3.0	Yes
16	N685487.07 E1414118.33	3.0	Yes
17	N685599.08 E1414126.64	3.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

COVER SYSTEM THICKNESS EVALUATION
ASBESTOS LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 1 (continued)

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
18	N685693.97 E1414110.02	3.0	Yes
19	N685716.35 E1414193.96	3.0	Yes
20	N685745.53 E1414296.50	3.0	Yes
21	N685782.62 E1414378.12	3.0	Yes
22	N685809.97 E1414453.35	3.0	Yes
23	N685879.46 E1414339.53	3.0	Yes
24	N685847.39 E1414245.54	3.0	Yes
25	N685832.45 E1414149.77	3.0	Yes
26	N685957.63 E1414176.10	3.0	Yes
27	N685967.95 E1414251.41	3.0	Yes
28	N685975.45 E1414323.87	3.0	Yes
29	N685995.20 E1414371.96	3.0	Yes
30	N685887.97 E1414403.65	3.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

COVER SYSTEM THICKNESS EVALUATION
C&D LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 2

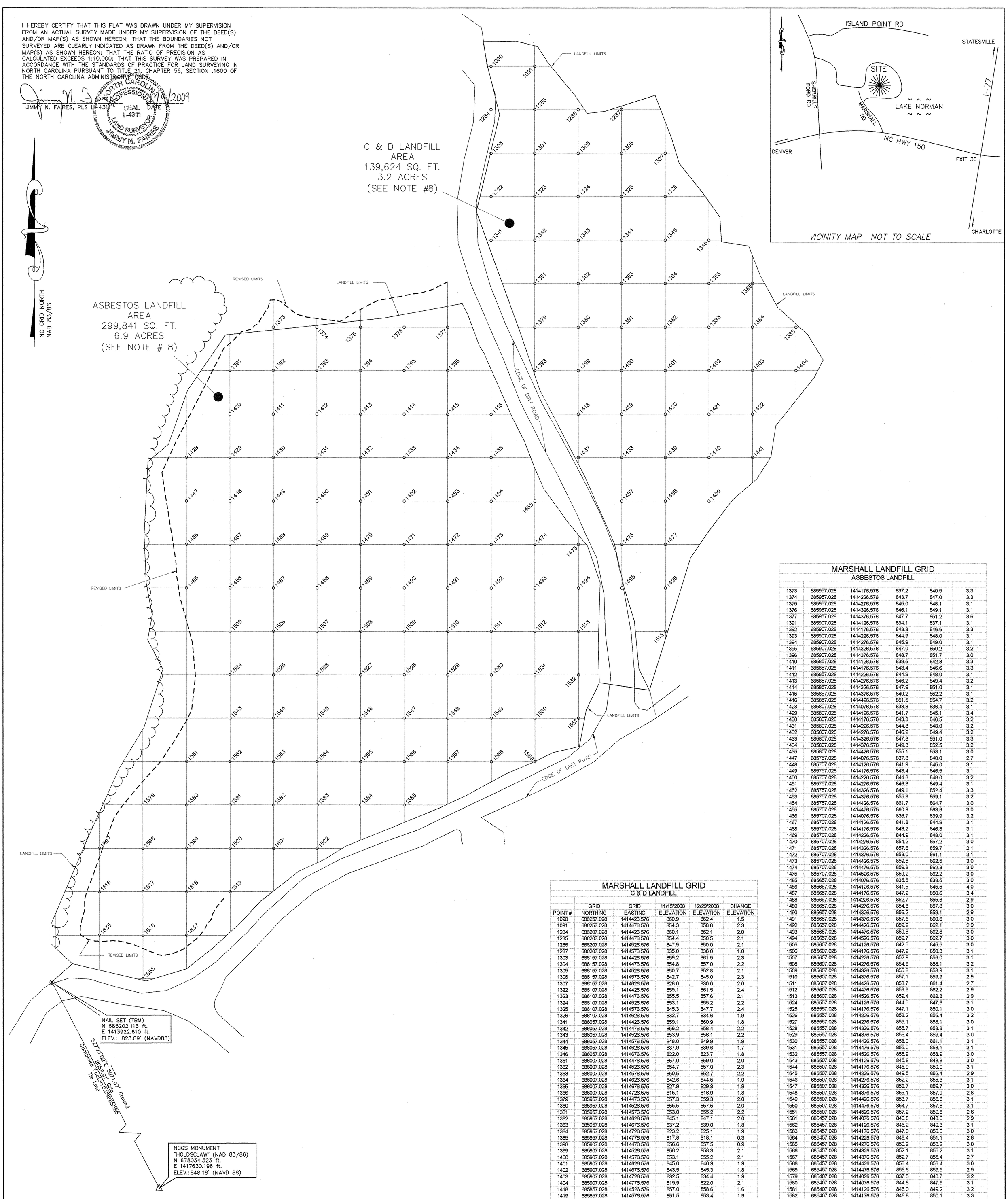
Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
1	N686234.44 E1414456.75	2.0	Yes
2	N686127.37 E1414447.37	2.0	Yes
3	N686151.75 E1414544.44	2.0	Yes
4	N686195.38 E1414614.15	2.0	Yes
5	N686033.85 E1414485.90	2.0	Yes
6	N686071.08 E1414504.87	2.0	Yes
7	N686103.58 E1414663.03	2.0	Yes
8	N685927.90 E1414511.03	2.0	Yes
9	N685964.49 E1414602.90	2.0	Yes
10	N686007.54 E1414686.74	2.0	Yes
11	N685833.34 E1414578.82	2.0	Yes
12	N685886.55 E1414673.27	2.0	Yes
13	N685923.56 E1414747.47	2.0	Yes
14	N685740.08 E1414574.58	2.0	Yes
15	N685793.23 E1414653.80	2.0	Yes
16	N685642.85 E1414608.16	2.0	Yes
17	N685806.83 E1414721.48	2.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 1/9/2009

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



MARSHALL LANDFILL GRID
C & D LANDFILL

POINT #	GRID NORTHING	GRID EASTING	11/15/2008 ELEVATION	12/29/2008 ELEVATION	CHANGE ELEVATION
1090	686257.028	1414426.576	860.9	862.4	1.5
1091	686257.028	1414476.576	854.3	856.6	2.3
1284	686207.028	1414426.576	860.1	862.1	2.0
1285	686207.028	1414476.576	854.4	856.5	2.1
1286	686207.028	1414526.576	847.9	850.0	2.1
1287	686207.028	1414576.576	835.0	836.0	1.0
1303	686157.028	1414426.576	859.2	861.5	2.3
1304	686157.028	1414476.576	854.8	857.0	2.2
1305	686157.028	1414526.576	850.7	852.8	2.1
1306	686157.028	1414576.576	842.7	845.0	2.3
1307	686157.028	1414626.576	828.0	830.0	2.0
1322	686107.028	1414426.576	859.1	861.5	2.4
1323	686107.028	1414476.576	855.5	857.6	2.1
1324	686107.028	1414526.576	853.1	855.2	2.2
1325	686107.028	1414576.576	845.3	847.7	2.4
1326	686107.028	1414626.576	832.7	834.6	1.9
1341	686057.028	1414426.576	859.1	860.9	1.8
1342	686057.028	1414476.576	856.2	858.4	2.2
1343	686057.028	1414526.576	853.9	856.1	2.2
1344	686057.028	1414576.576	848.0	849.9	1.9
1345	686057.028	1414626.576	837.9	839.6	1.7
1346	686057.028	1414676.576	822.0	823.7	1.8
1361	686007.028	1414476.576	857.0	859.0	2.0
1362	686007.028	1414526.576	854.7	857.0	2.3
1363	686007.028	1414576.576	850.5	852.7	2.2
1364	686007.028	1414626.576	842.6	844.5	1.9
1365	686007.028	1414676.575	827.9	829.8	1.9
1366	686007.028	1414726.575	815.1	816.9	1.8
1379	685957.028	1414476.576	857.3	859.3	2.0
1380	685957.028	1414526.576	855.5	857.5	2.0
1381	685957.028	1414576.576	853.0	855.2	2.2
1382	685957.028	1414626.576	845.1	847.1	2.0
1383	685957.028	1414676.576	837.2	839.0	1.8
1384	685957.028	1414726.576	823.2	825.1	1.9
1385	685957.028	1414776.576	817.8	818.1	0.3
1398	685907.028	1414476.576	856.6	857.5	0.9
1399	685907.028	1414526.576	856.2	858.3	2.1
1400	685907.028	1414576.576	853.1	855.2	2.1
1401	685907.028	1414626.576	845.0	846.9	1.9
1402	685907.028	1414676.576	843.5	845.3	1.8
1403	685907.028	1414726.576	832.5	834.4	1.9
1404	685907.028	1414776.576	819.9	822.0	2.1
1418	685857.028	1414526.576	857.0	858.6	1.6
1419	685857.028	1414576.576	851.5	853.4	1.9
1420	685857.028	1414626.576	845.7	847.7	2.0
1421	685857.028	1414676.576	844.3	846.2	1.9
1422	685857.028	1414726.576	837.2	839.0	1.8
1437	685807.028	1414526.576	855.3	857.1	1.9
1438	685807.028	1414576.576	851.3	853.3	2.0
1439	685807.028	1414626.576	847.6	849.5	1.9
1440	685807.028	1414676.576	845.3	847.2	1.9
1441	685807.028	1414726.576	834.2	835.6	1.4
1457	685757.028	1414576.576	853.3	855.1	1.9
1458	685757.028	1414626.576	850.1	852.1	2.0
1459	685757.028	1414676.576	846.4	848.4	2.0
1476	685707.028	1414576.576	853.0	855.2	2.2
1477	685707.028	1414626.576	851.6	853.5	1.9
1495	685657.028	1414576.576	853.6	855.6	2.0
1496	685657.028	1414626.576	851.4	853.4	2.0
1515	685607.028	1414626.576	851.7	853.9	2.2

MARSHALL LANDFILL GRID
ASBESTOS LANDFILL

1373	685957.028	1414176.576	837.2	840.5	3.3
1374	685957.028	1414226.576	843.7	847.0	3.3
1375	685957.028	1414276.576	845.0	848.1	3.1
1376	685957.028	1414326.576	846.1	849.1	3.1
1377	685957.028	1414376.576	847.7	851.2	3.6
1391	685907.028	1414126.576	834.1	837.1	3.1
1392	685907.028	1414176.576	843.3	846.6	3.3
1393	685907.028	1414226.576	844.9	848.0	3.1
1394	685907.028	1414276.576	845.9	849.0	3.1
1395	685907.028	1414326.576	847.0	850.2	3.2
1396	685907.028	1414376.576	848.7	851.7	3.0
1410	685857.028	1414126.576	839.5	842.8	3.3
1411	685857.028	1414176.576	843.4	846.6	3.3
1412	685857.028	1414226.576	844.9	848.0	3.1
1413	685857.028	1414276.576	846.2	849.4	3.2
1414	685857.028	1414326.576	847.9	851.0	3.1
1415	685857.028	1414376.576	849.2	852.2	3.1
1416	685857.028	1414426.576	851.5	854.7	3.2
1428	685807.028	1414076.576	833.3	836.4	3.1
1429	685807.028	1414126.576	841.7	845.1	3.4
1430	685807.028	1414176.576	843.3	846.5	3.2
1431	685807.028	1414226.576	844.8	848.0	3.2
1432	685807.028	1414276.576	846.2	849.4	3.2
1433	685807.028	1414326.576	847.8	851.0	3.3
1434	685807.028	1414376.576	849.3	852.5	3.2
1435	685807.028	1414426.576	855.1	858.1	3.0
1447	685757.028	1414076.576	837.3	840.0	2.7
1448	685757.028	1414126.576	841.9	845.0	3.1
1449	685757.028	1414176.576	843.4	846.5	3.1
1450	685757.028	1414226.576	844.8	848.0	3.2
1451	685757.028	1414276.576	846.3	849.4	3.1
1452	685757.028	1414326.576	849.1	852.4	3.3
1453	685757.028	1414376.576	855.9	859.1	3.2
1454	685757.028	1414426.576	861.7	864.7	3.0
1455	685757.028	1414476.575	860.9	863.9	3.0
1466	685707.028	1414076.576	836.7	839.9	3.2
1467	685707.028	1414126.576	841.8	844.9	3.1
1468	685707.028	1414176.576	843.2	846.3	3.1
1469	685707.028	1414226.576	844.9	848.0	3.1
1470	685707.028	1414276.576	854.2	857.2	3.0
1471	685707.028	1414326.576	857.6	859.7	2.1
1472	685707.028	1414376.576	858.0	861.1	3.1
1473	685707.028	1414426.575	859.5	862.5	3.0
1474	685707.028	1414476.575	859.8	862.8	3.0
1475	685707.028	1414526.575	859.2	862.2	3.0
1485	685657.028	1414076.576	835.5	838.5	3.0
1486	685657.028	1414126.576	841.5	845.5	4.0
1487	685657.028	1414176.576	847.2	850.6	3.4
1488	685657.028	1414226.576	852.7	855.6	2.9
1489	685657.028	1414276.576	854.8	857.8	3.0
1490	685657.028	1414326.576	856.2	859.1	2.9
1491	685657.028	1414376.576	857.6	860.6	3.0
1492	685657.028	1414426.576	859.2	862.1	2.9
1493	685657.028	1414476.576	859.5	862.5	3.0
1494	685657.028	1414526.576	859.7	862.7	3.0
1505	685607.028	1414126.576	842.5	845.5	3.0
1506	685607.028	1414176.576	847.2	850.3	3.1
1507	685607.028	1414226.576	852.9	856.0	3.1
1508	685607.028	1414276.576	854.9	858.1	3.2
1509	685607.028	1414326.576	855.8	858.9	3.1
1510	685607.028	1414376.576	857.1	859.9	2.9
1511	685607.028	1414426.576	858.7	861.4	2.7
1512	685607.028	1414476.576	859.3	862.2	2.9
1513	685607.028	1414526.576	859.4	862.3	2.9
1524	685557.028	1414126.576	844.5	847.6	3.1
1525	685557.028	1414176.576	847.1	850.1	3.0
1526	685557.028	1414226.576	853.2	856.4	3.2
1527	685557.028	1414276.576	855.1	858.1	3.0
1528	685557.028	1414326.576	855.7	858.8	3.1
1529	685557.028	1414376.576	856.4	859.4	3.0
1530	685557.028	1414426.576	858.0	861.1	3.1
1531	685557.028	1414476.576	855.0	858.1	3.1
1532	685557.028	1414526.576	855.9	858.9	3.0
1543	685507.028	1414126.576	845.8	848.8	3.0
1544	685507.028	1414176.576	846.9	850.0	3.1
1545	685507.028	1414226.576	849.5	852.4	2.9
1546	685507.028	1414276.576	852.2	855.3	3.1
1547	685507.028	1414326.576	856.7	859.7	3.0
1548	685507.028	1414376.576	855.1	857.9	2.8
1549	685507.028	1414426.576	853.7	856.8	3.1
1550	685507.028	1414476.576	854.7	857.8	3.1
1551	685507.028	1414526.576	857.2	859.8	2.6
1561	685457.028	1414076.576	840.8	843.6	2.9
1562	685457.028	1414126.576	846.2	849.3	3.1
1563	685457.028	1414176.576	847.0	850.0	3.0
1564	685457.028	1414226.576	848.4	851.1	2.8
1565	685457.028	1414276.576	850.2	853.2	3.0
1566	685457.028	1414326.576	852.1	855.2	3.1
1567	685457.028	1414376.576	852.7	855.4	2.7
1568	685457.028	1414426.576	853.4	856.4	3.0
1569	685457.028	1414476.576	856.6	859.5	2.9
1579	685407.028	1414026.576	837.5	840.7	3.2
1580	685407.028	1414076.576	844.8	847.9	3.1
1581	685407.028	1414126.576	846.0	849.2	3.2
1582	685407.028	1414176.576	846.8	850.1	3.3
1583	685407.028	1414226.576	848.5	851.6	3.1
1584	685407.028	1414276.576	850.4	853.6	3.2
1585	685407.028	1414326.576	852.2	855.1	2.9
1597	685357.028	1413976.575	830.9	834.0	3.1
1598	685357.028	1414026.576	843.0	846.2	3.2
1599	685357.028	1414076.576	844.4	847.5	3.1
1600	685357.028	1414126.576	845.5	848.4	2.9
1601	685357.028	1414176.576	846.9	850.1	3.2
1602	685357.028	1414226.576	849.0	851.9	2.9
1616	685307.028	1413976.576	835.2	838.3	3.1
1617	685307.028	1414026.576	842.7	846.3	3.6
1618	685307.028	1414076.576	843.9	846.8	2.9
1619	685307.028	1414126.576	845.0	848.0	3.0
1635	685257.028	1413976.576	837.3	840.1	2.8
1636	685257.028	1414026.576	842.5	846.6	4.1
1637	685257.028	1414076.576	843.5	846.5	3.0

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.
2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.
3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.
5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.
6) ELEVATIONS BASED ON NAVD 88.
7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).
8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.
9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

LEGEND

ELEV. = ELEVATION
◉ = NAIL SET
—/\/— = NOT TO SCALE
⌒⌒⌒ = TREELINE
TBM = TEMPORARY BENCHMARK

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

GRID FILL VERIFICATION SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:
S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

WSP • SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	NOVEMBER/DECEMBER 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JANUARY 9, 2009	1 of 1	056234-001-GRID

Permit No.	Date	Document ID No.
18-04	**February 20, 2009**	**6847**

RECEIVED
February 10, 2009
Solid Waste Section
Asheville Regional Office

CONSTRUCTION CERTIFICATION REPORT
MARSHALL STEAM STATION C&D LANDFILL
CATAWBA COUNTY, NORTH CAROLINA

S&ME Project No. 1356-08-106

Prepared for:
Duke Energy
526 South Church Street
Charlotte, North Carolina, 28202

Prepared by:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

January 16, 2009

S&ME

Celebrating 35 Years
1973 • 2008

January 16, 2009

Duke Energy Carolinas, LLC
P.O. Box 1006 / EC10C
Charlotte, NC 28201-1006

Attention: Randy McClamrock

Reference: **Construction Certification Report**
Marshall Steam Station C&D Landfill
Catawba County, NC
S&ME Project No. 1356-08-106

Dear Mr. McClamrock:

S&ME is pleased to submit the *Construction Certification Report* for the Construction and Demolition (C&D) Landfill at Duke Energy's Marshall Steam Station in Catawba County, North Carolina. The Construction Certification Report was completed in general accordance with S&ME's *Proposal for Landfill Design and Permit Services* (S&ME Proposal No. CIV-097-08) dated April 17, 2008 and Duke Energy's approved P.O. MSW01.0000030349 dated April 22, 2008 and approved revisions. This report is provided for your use and/or authorization for final submittal.

S&ME sincerely appreciates the continued opportunity to be of service to Duke Energy. Please contact us at your convenience if you have any questions. Thank you for choosing S&ME.

Respectfully submitted,

S&ME, Inc.

NORTH CAROLINA PROFESSIONAL SEAL 032156 ENGINEER JASON S. REEVES

Jason S. Reeves, P.E.
Senior Project Engineer

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

Kenneth R. Daly
Senior Project Engineer

Attachments: Construction Certification Report – Marshall Steam Station C&D Landfill

cc: (1) Donna Burrell, (1) Darrell Wolfe, (1) Ed Sullivan – Duke Energy

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1.1 General 1
1.2 Project Information 1
2. CLOSURE AREA 2
3. BORROW AREAS 2
4. CONSTRUCTION 2
5. COVER THICKNESS VERIFICATION 3
6. CERTIFICATION 4

FIGURES

Figure 1 Marshall Steam Station C&D Landfill

APPENDICES

Appendix I Figure 1 – Site Vicinity Map
Drawing 1 of 6 – Existing Conditions Map (From Closure and Post-Closure Report)
Appendix II Topographic Survey (Revised November 20, 2008) by WSP-Sells
Topographic Survey (Revised December 30, 2008) by WSP-Sells
Grid Fill Verification (Dated January 9, 2009) by WSP-Sells
Appendix III Construction Materials Testing Services report (Dated January 9, 2009) by ESP Associates, P.A.
Appendix IV Construction Certification Statement

1. INTRODUCTION

1.1 General

Closure of the Marshall Steam Station Construction and Demolition (C&D) Landfill was recently completed in general accordance with the approved "Closure and Post-Closure Plan" prepared by S&ME, Inc. dated September 3, 2008. The Closure and Post-Closure Plan was prepared in general accordance with Title 15A Subchapter 13B of the North Carolina Administrative Code (NCAC) Rules .0501 through .0510. Duke Energy will also use the Closure and Post-Closure Plan to provide post-closure maintenance and monitoring during the post-closure care period.

S&ME developed an Erosion and Sediment Control Plan for the site dated September 10, 2008. A Letter of Approval dated September 30, 2008 was issued by NCDENR for the Erosion and Sediment Control Plan. S&ME issued an Erosion and Sediment Control Plan Addendum on October 9, 2008 to increase the total disturbed area to 22.0 acres.

1.2 Project Information

Marshall Steam Station is located on 8320 East Highway 150 in Terrell, North Carolina. The C&D Landfill is located on the Duke Energy property to north of the Closed Ash Landfill as shown on **Figure 1 – Site Vicinity Map** included in Appendix I. The C&D Landfill is bordered to the north and east by wooded areas, to the west by the Asbestos Landfill, and to the south by the Closed Ash Landfill. A dirt/gravel access road is located between the Asbestos Landfill and the Closed Ash Landfill. A more detailed illustration of the site conditions prior to closure activities is provided on **Drawing 1 of 6 – Existing Conditions Map** also included in **Appendix I** from the Closure and Post-Closure Plan.

The C&D Landfill on Duke Energy property is a part of the North Carolina Department of Environment and Natural Resources (NCDENR) landfill permit No. 18-04, issued in 1983. Landfill permit No. 18-04 encompasses 3 areas. Area 1 consists of a 58-acre flyash landfill, located to the south of the Asbestos Landfill, which was closed in 2001. Area 2 consists of an asbestos landfill located to the northwest of the ash landfill with an original permitted area of 38.1 acres. Area 3 consists of the C&D Landfill which has an original permitted area of 2.9 acres. Surface drainage generally flows to existing detention basin at the toe of the C&D Landfill slope.

The NCDENR Solid Waste Section issued revised regulations for the closure of existing C&D landfills in January 2007 in North Carolina Administrative Code Title 15A Chapter 13B Section .0532 through .0547. These rules contain more extensive closure requirements than the previous rules for closure found in Section .0510. The revised rules state that C&D landfills that receive no waste after June 30, 2008 can be closed under the requirements of Section .0510 and the conditions of the existing permit. The Marshall C&D Landfill operations stopped on or before June 30, 2008.

2. CLOSURE AREA

Based on the "Topographic Survey" by WSP-Sells updated on December 30, 2008, the closure area for the Marshall C&D Landfill encompasses approximately 3.2 acres. The C&D Landfill is bordered to the north and east by wooded areas, to the west by the Asbestos Landfill, and to the south by the Closed Ash Landfill. Grading was performed in general accordance with the "Proposed Final Cover Plan" – Drawing 3 of the Closure and Post-Closure Plan. Construction activities within the closure area for the C&D Landfill generally included earthwork required to reach the soil cover system subgrade, compacted soil cover grading, drainage structure installation, soil amendment, seeding, matting, and installation of stormwater structures and erosion and sediment control measures. The final closure cover system subgrade and final grades and associated drainage structures are shown on the revised November 20, 2008 **"Topographic Survey"** and December 30, 2008 **"Topographic Survey"** by WSP-Sells included in **Appendix II**, respectively.

3. BORROW AREAS

Two borrow areas were utilized as sources for structural fill and topsoil for the cover system subgrade and cover system grading. These areas consisted of the 4-acre primary borrow area to the north of the Asbestos Landfill and the 7-acre topsoil borrow area to the northwest of the Asbestos Landfill. Construction activities within the Borrow Areas generally consisted of excavation, grading for drainage, installation of erosion control measures, soil amendment, and seeding.

Laboratory testing of the borrow materials was performed by ESP Associates. These tests included laboratory standard Proctor moisture-density, grain-size analysis, and Atterberg Limits. Based on the results of the laboratory testing, the borrow materials used for the project meet the project Technical Specification for the borrow material. Please refer to the **Construction Materials Testing Services"** report by ESP Associates dated January 9, 2009 included in **Appendix III** for more detailed information.

4. CONSTRUCTION

Construction of the Marshall Steam Station C&D closure cover system was performed by Morgan Corporation. Construction of the closure cover system began around October 21, 2008 and was substantially complete by December 23, 2008. Monitoring of the site construction activities was primarily performed by Duke Energy representatives. S&ME personnel attended a construction progress meeting on December 23, 2008 with representatives of Duke Energy and Morgan Corporation to review the substantially completed work items. Quality control laboratory soil testing, field density testing, proofrolling observations, and cover thickness verification by the use of hand auger borings

were performed by ESP Associates, P.A. on behalf of Morgan Corporation to verify conformance with the Technical Specifications for the closure cover system. The results of these testing and observation services are summarized in the **"Construction Materials Testing Services"** report by ESP Associates dated January 9, 2009 included in **Appendix III**.

The cover system consisted of a 2-foot thick soil layer including a 6-inch topsoil/vegetative layer. Re-grading of the C&D Landfill slopes was generally performed to achieve the cover system subgrade grades with some additional fill placed on the existing landfill prior to the closure cover system construction to generally provide minimum 3 percent slopes and maximum 3 horizontal to 1 vertical slopes. The as-built closure cover system subgrade and final closure cover system grades are shown on the attached November 20, 2008 "**Topographic Survey"** (as-built cover system subgrade survey) and revised December 30, 2008 and **"Topographic Survey"** (as-built final cover system survey) by WSP-Sells included in **Appendix II**, respectively**.**

The results of the laboratory soil testing and field density testing performed by others indicates that the closure cover system materials met the soil classification and density requirements outlined in the Technical Specifications. Please refer to the attached **"Construction Materials Testing Services"** report for additional information.

5. COVER THICKNESS VERIFICATION

The design closure cover system for the C&D Landfill consists of a 2-foot layer of soil fill including a 6-inch topsoil/vegetative layer. The specified tolerance for the cover system thickness was +/- 0.1 foot. As previously mentioned, surveying of the site was performed prior to construction, after cover system subgrade grading, and after final cover system grading by WSP-Sells.

Thickness verifications for the closure cover system were verified primarily by comparing the difference in elevations between the cover system subgrade elevations within the C&D Landfill closure area on a 50-foot grid spacing to the final as-built closure cover system elevations at the same grid locations as shown on the **"Grid Fill Verification Survey"** included in **Appendix II**. The results of the surveying indicate that the minimum cover system thickness of 2 feet was present in the majority of the grid locations with the exceptions of grid points 1090, 1287, 1341, 1345, 1346, 1366, 1383, 1385, 1398, 1402, 1418, 1422, and 1441 that indicated surveyed subgrade to final cover grade differences of 0.3 to 1.8 feet. However, a comparison of the original ground surface elevations from the pre-construction site survey to the final cover elevations and/or the hand auger boring cover thickness verifications performed in these general areas by ESP Associates presented in **Table 2** of the **"Construction Materials Testing Services"** report, a minimum of 2 feet of soil cover appears to be present in these locations.

6. CERTIFICATION

Results of cover thickness verification, as-built post-closure survey, our observations during the December 23, 2008 substantial completion meeting, field and laboratory quality control testing results provided by Morgan Corporation, correspondence from Duke Energy related to construction activities, the closure cover system and temporary drainage control measures were constructed in general accordance with the Closure and Post-Closure Plan. A Construction Certification Statement signed and sealed by an engineer registered in the state of North Carolina is included in **Appendix IV**.

APPENDIX I

SITE VICINITY MAP
AND EXISTING CONDITIONS MAP

SCALE:	1-IN:1600-FT
DATE:	1-12-2009
DRAWN BY:	WMH
PROJECT NO:	1356-08-106

S&ME
WWW.SMEINC.COM

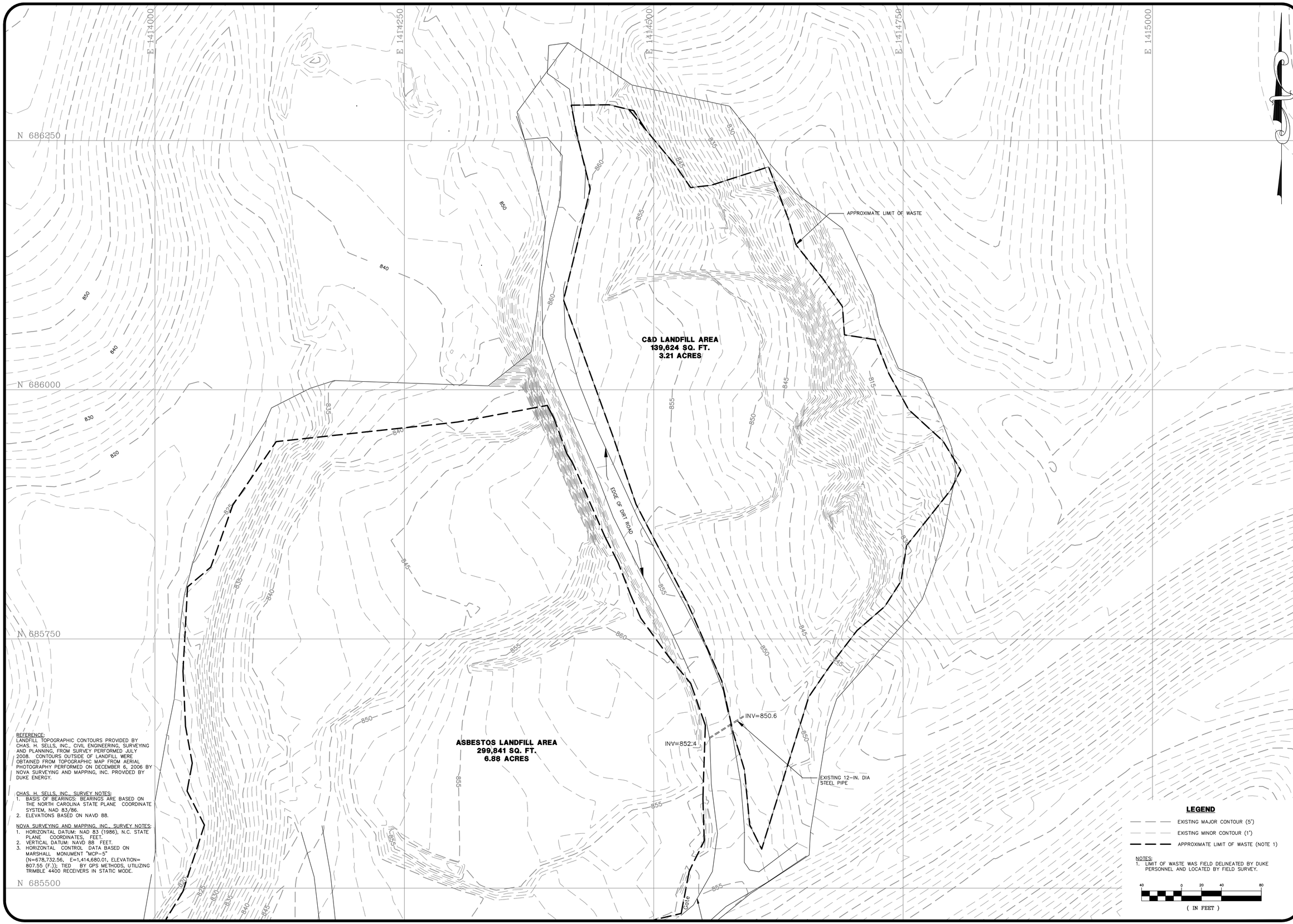
SITE VICINITY MAP
C&D LANDFILL CLOSURE
DUKE ENERGY-MARSHALL STEAM STATION
CATAWBA COUNTY, NC

FIGURE NO.
1

Q:\1356\DUKE ENERGY\08-106 Marshall C&DLF Closure\FIGURE1.dwg

APPENDIX II

TOPOGRAPHIC SURVEYS
AND GRID FILL VERIFICATION SURVEY



REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC., CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

CHAS. H. SELLS, INC., SURVEY NOTES:
1. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
2. ELEVATIONS BASED ON NAVD 88.

NOVA SURVEYING AND MAPPING, INC., SURVEY NOTES:
1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
2. VERTICAL DATUM: NAVD 88 FEET.
3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5" (N=678,732.56, E=1,414,680.01, ELEVATION= 807.55 (F.)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

Duke Energy ©

S&ME
WWW.SMEINC.COM

NORTH CAROLINA PROFESSIONAL SEAL 032453 ENGINEER PROJECT ID: 1356-08-106 ELIZABETH R. ELLIS

NO.	DATE	DESCRIPTION	BY
--	10-10-08	ISSUED FOR CONSTRUCTION	

EXISTING CONDITIONS MAP

C&D LANDFILL FINAL CLOSURE PLAN
DUKE ENERGY - MARSHALL STEAM STATION
CATAWBA COUNTY, NORTH CAROLINA

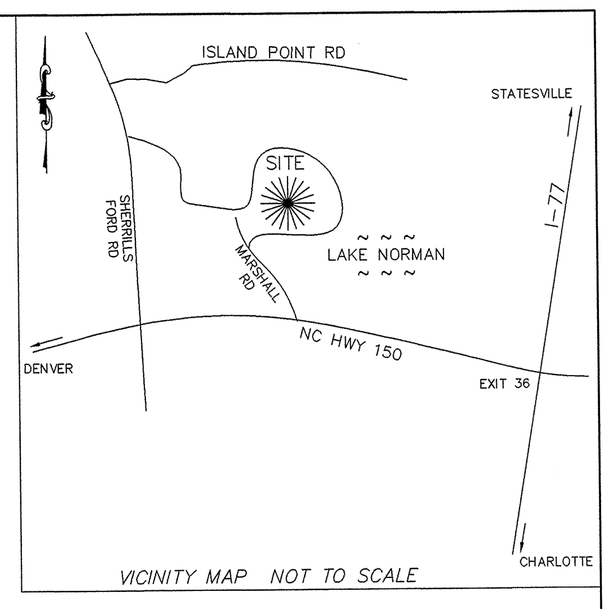
DRAWN BY: ELH	CHECKED BY: KRD
DESIGNED BY: ELH	APPROVED BY: KRD
PROJECT NUMBER: 1356-08-106	
SCALE: AS SHOWN	DATE: 10-10-08
DRAWING: 1	OF: 6

DRAWING PATH: G:\1356\DUKE ENERGY\08-106 MARSHALL C&LF CLOSURE\DUKE C&D LANDFILL CLOSURE.DWG

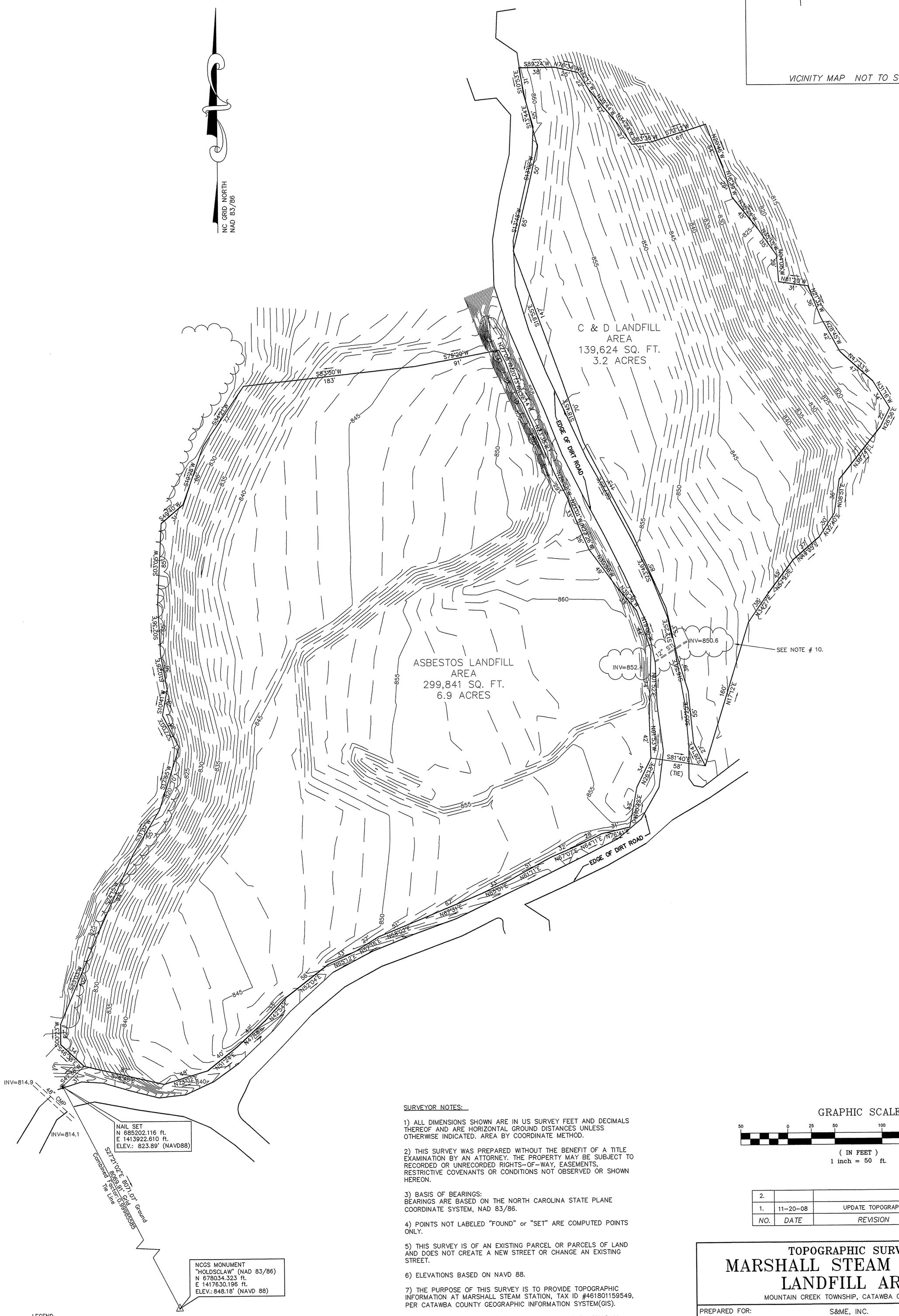
I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL DATE 7/25/2008

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

Elev. = Elevation

◉ = Nail Set

Inv = Invert

= Not To Scale

= Treeline

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

3) BASIS OF BEARINGS:
BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.

4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.

5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.

6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY CHAS. H. SELLS, INC. TO DETERMINE OR VERIFY ANY BOUNDARY LINES.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPH UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.			
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY

MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:

S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

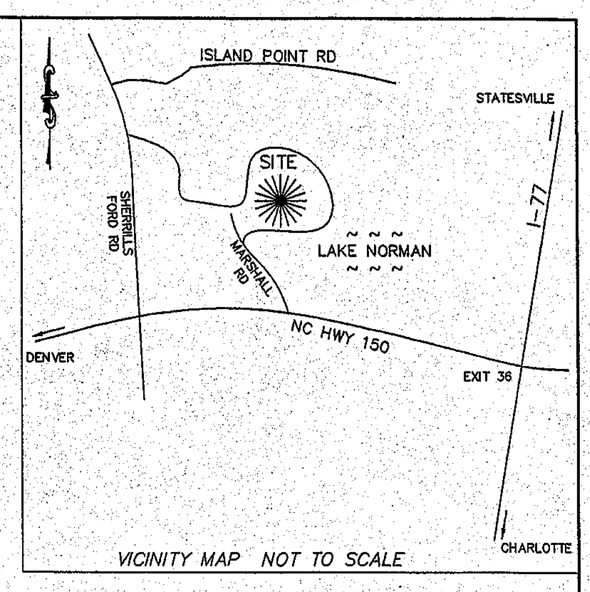
WSP • SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO

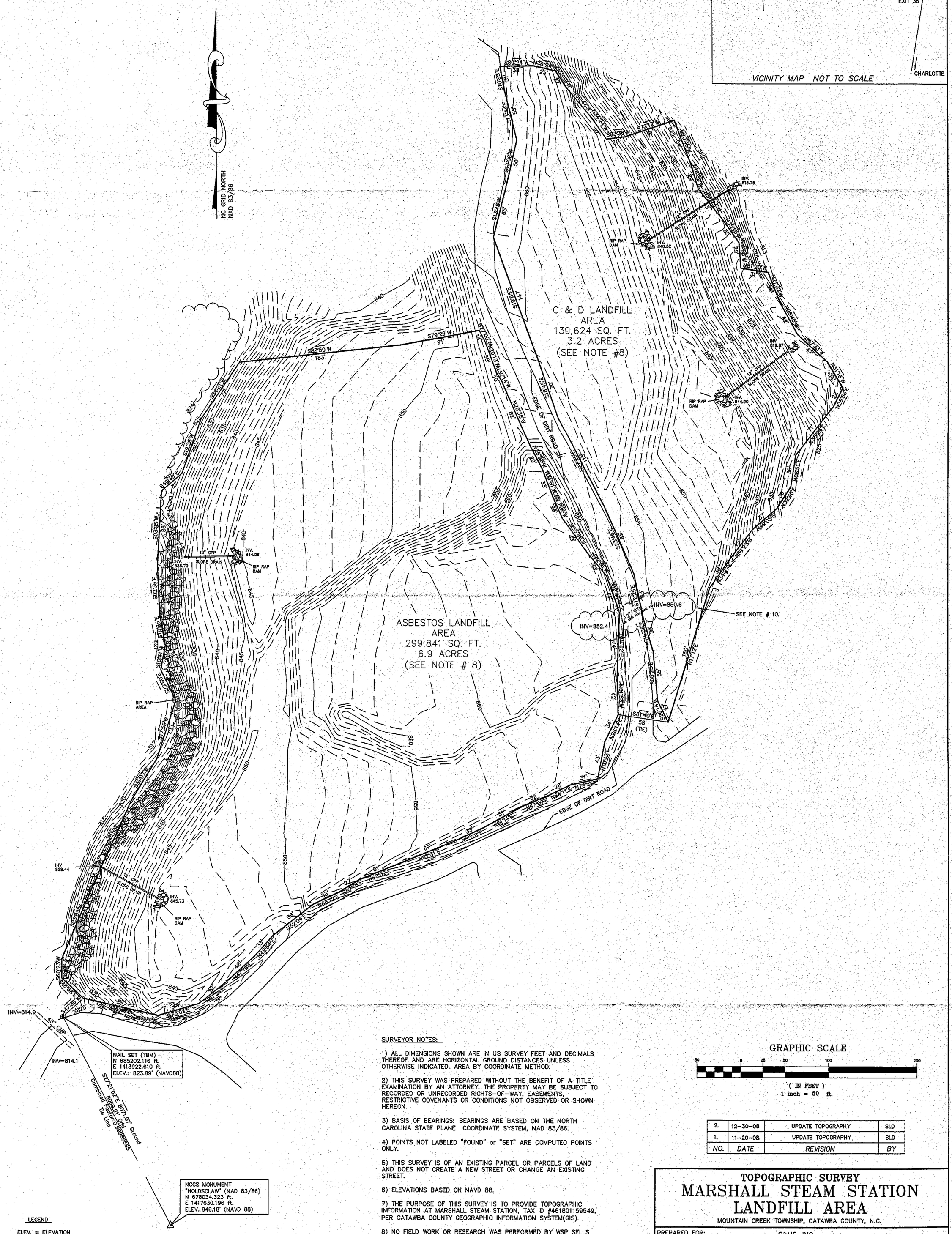
I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 12/30/2008

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

ELEV. = ELEVATION

◉ = NAIL SET

—/\/— = NOT TO SCALE

⌒⌒⌒ = TREELINE

INV = INVERT

▨ = RIP RAP

TBM = TEMPORARY BENCHMARK

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.

4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.

5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.

6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. PERIMETER METES AND BOUNDS AND AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPHY UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.	12-30-08	UPDATE TOPOGRAPHY	SLD
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:

S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

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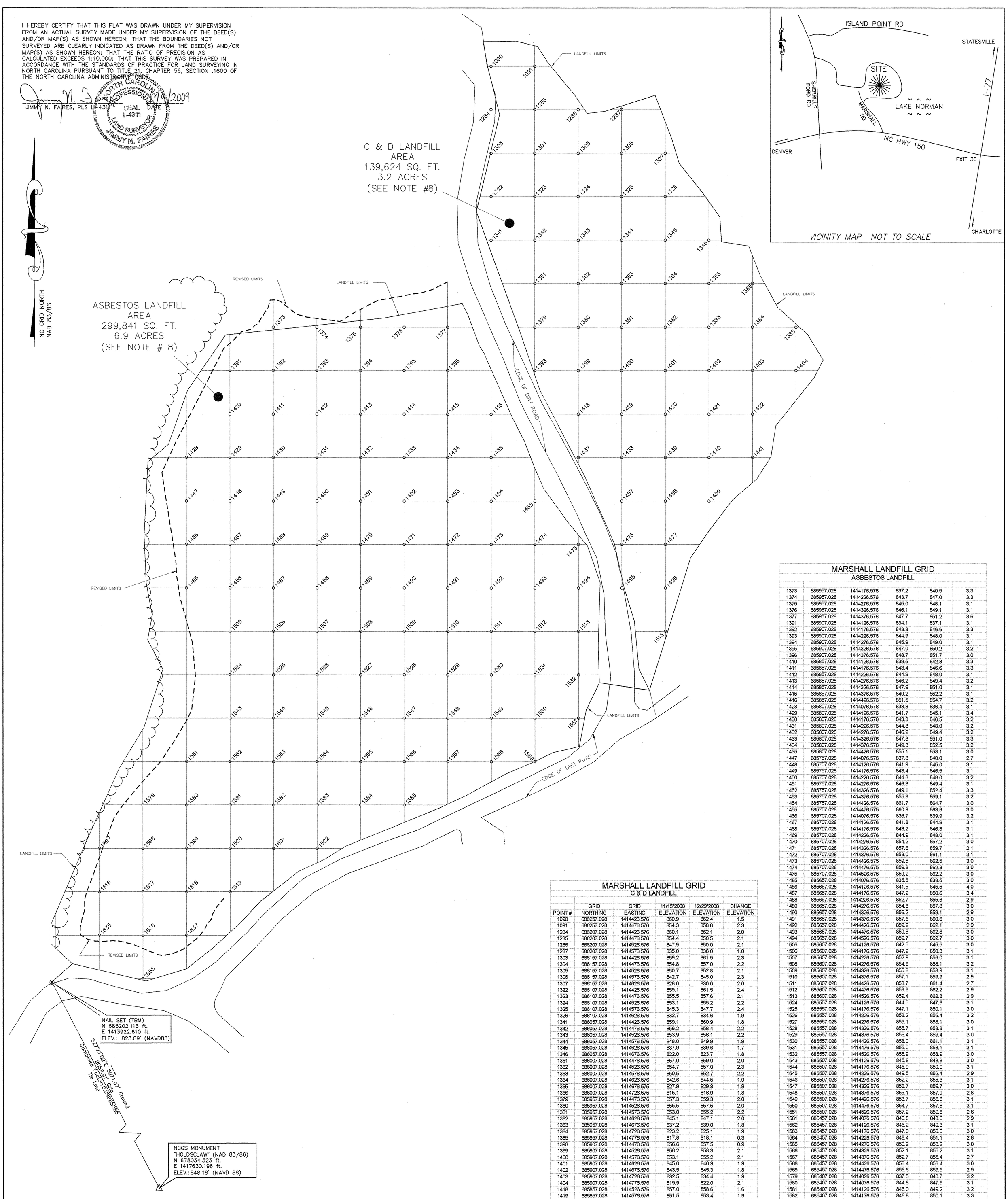
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO

I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 1/9/2009

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



MARSHALL LANDFILL GRID
C & D LANDFILL

POINT #	GRID NORTHING	GRID EASTING	11/15/2008 ELEVATION	12/29/2008 ELEVATION	CHANGE ELEVATION
1090	686257.028	1414426.576	860.9	862.4	1.5
1091	686257.028	1414476.576	854.3	856.6	2.3
1284	686207.028	1414426.576	860.1	862.1	2.0
1285	686207.028	1414476.576	854.4	856.5	2.1
1286	686207.028	1414526.576	847.9	850.0	2.1
1287	686207.028	1414576.576	835.0	836.0	1.0
1303	686157.028	1414426.576	859.2	861.5	2.3
1304	686157.028	1414476.576	854.8	857.0	2.2
1305	686157.028	1414526.576	850.7	852.8	2.1
1306	686157.028	1414576.576	842.7	845.0	2.3
1307	686157.028	1414626.576	828.0	830.0	2.0
1322	686107.028	1414426.576	859.1	861.5	2.4
1323	686107.028	1414476.576	855.5	857.6	2.1
1324	686107.028	1414526.576	853.1	855.2	2.2
1325	686107.028	1414576.576	845.3	847.7	2.4
1326	686107.028	1414626.576	832.7	834.6	1.9
1341	686057.028	1414426.576	859.1	860.9	1.8
1342	686057.028	1414476.576	856.2	858.4	2.2
1343	686057.028	1414526.576	853.9	856.1	2.2
1344	686057.028	1414576.576	848.0	849.9	1.9
1345	686057.028	1414626.576	837.9	839.6	1.7
1346	686057.028	1414676.576	822.0	823.7	1.8
1361	686007.028	1414476.576	857.0	859.0	2.0
1362	686007.028	1414526.576	854.7	857.0	2.3
1363	686007.028	1414576.576	850.5	852.7	2.2
1364	686007.028	1414626.576	842.6	844.5	1.9
1365	686007.028	1414676.575	827.9	829.8	1.9
1366	686007.028	1414726.575	815.1	816.9	1.8
1379	685957.028	1414476.576	857.3	859.3	2.0
1380	685957.028	1414526.576	855.5	857.5	2.0
1381	685957.028	1414576.576	853.0	855.2	2.2
1382	685957.028	1414626.576	845.1	847.1	2.0
1383	685957.028	1414676.576	837.2	839.0	1.8
1384	685957.028	1414726.576	823.2	825.1	1.9
1385	685957.028	1414776.576	817.8	818.1	0.3
1398	685907.028	1414476.576	856.6	857.5	0.9
1399	685907.028	1414526.576	856.2	858.3	2.1
1400	685907.028	1414576.576	853.1	855.2	2.1
1401	685907.028	1414626.576	845.0	846.9	1.9
1402	685907.028	1414676.576	843.5	845.3	1.8
1403	685907.028	1414726.576	832.5	834.4	1.9
1404	685907.028	1414776.576	819.9	822.0	2.1
1418	685857.028	1414526.576	857.0	858.6	1.6
1419	685857.028	1414576.576	851.5	853.4	1.9
1420	685857.028	1414626.576	845.7	847.7	2.0
1421	685857.028	1414676.576	844.3	846.2	1.9
1422	685857.028	1414726.576	837.2	839.0	1.8
1437	685807.028	1414526.576	855.3	857.1	1.9
1438	685807.028	1414576.576	851.3	853.3	2.0
1439	685807.028	1414626.576	847.6	849.5	1.9
1440	685807.028	1414676.576	845.3	847.2	1.9
1441	685807.028	1414726.576	834.2	835.6	1.4
1457	685757.028	1414576.576	853.3	855.1	1.9
1458	685757.028	1414626.576	850.1	852.1	2.0
1459	685757.028	1414676.576	846.4	848.4	2.0
1476	685707.028	1414576.576	853.0	855.2	2.2
1477	685707.028	1414626.576	851.6	853.5	1.9
1495	685657.028	1414576.576	853.6	855.6	2.0
1496	685657.028	1414626.576	851.4	853.4	2.0
1515	685607.028	1414626.576	851.7	853.9	2.2

MARSHALL LANDFILL GRID
ASBESTOS LANDFILL

1373	685957.028	1414176.576	837.2	840.5	3.3
1374	685957.028	1414226.576	843.7	847.0	3.3
1375	685957.028	1414276.576	845.0	848.1	3.1
1376	685957.028	1414326.576	846.1	849.1	3.1
1377	685957.028	1414376.576	847.7	851.2	3.6
1391	685907.028	1414126.576	834.1	837.1	3.1
1392	685907.028	1414176.576	843.3	846.6	3.3
1393	685907.028	1414226.576	844.9	848.0	3.1
1394	685907.028	1414276.576	845.9	849.0	3.1
1395	685907.028	1414326.576	847.0	850.2	3.2
1396	685907.028	1414376.576	848.7	851.7	3.0
1410	685857.028	1414126.576	839.5	842.8	3.3
1411	685857.028	1414176.576	843.4	846.6	3.3
1412	685857.028	1414226.576	844.9	848.0	3.1
1413	685857.028	1414276.576	846.2	849.4	3.2
1414	685857.028	1414326.576	847.9	851.0	3.1
1415	685857.028	1414376.576	849.2	852.2	3.1
1416	685857.028	1414426.576	851.5	854.7	3.2
1428	685807.028	1414076.576	833.3	836.4	3.1
1429	685807.028	1414126.576	841.7	845.1	3.4
1430	685807.028	1414176.576	843.3	846.5	3.2
1431	685807.028	1414226.576	844.8	848.0	3.2
1432	685807.028	1414276.576	846.2	849.4	3.2
1433	685807.028	1414326.576	847.8	851.0	3.3
1434	685807.028	1414376.576	849.3	852.5	3.2
1435	685807.028	1414426.576	855.1	858.1	3.0
1447	685757.028	1414076.576	837.3	840.0	2.7
1448	685757.028	1414126.576	841.9	845.0	3.1
1449	685757.028	1414176.576	843.4	846.5	3.1
1450	685757.028	1414226.576	844.8	848.0	3.2
1451	685757.028	1414276.576	846.3	849.4	3.1
1452	685757.028	1414326.576	849.1	852.4	3.3
1453	685757.028	1414376.576	855.9	859.1	3.2
1454	685757.028	1414426.576	861.7	864.7	3.0
1455	685757.028	1414476.575	860.9	863.9	3.0
1466	685707.028	1414076.576	836.7	839.9	3.2
1467	685707.028	1414126.576	841.8	844.9	3.1
1468	685707.028	1414176.576	843.2	846.3	3.1
1469	685707.028	1414226.576	844.9	848.0	3.1
1470	685707.028	1414276.576	854.2	857.2	3.0
1471	685707.028	1414326.576	857.6	859.7	2.1
1472	685707.028	1414376.576	858.0	861.1	3.1
1473	685707.028	1414426.575	859.5	862.5	3.0
1474	685707.028	1414476.575	859.8	862.8	3.0
1475	685707.028	1414526.575	859.2	862.2	3.0
1485	685657.028	1414076.576	835.5	838.5	3.0
1486	685657.028	1414126.576	841.5	845.5	4.0
1487	685657.028	1414176.576	847.2	850.6	3.4
1488	685657.028	1414226.576	852.7	855.6	2.9
1489	685657.028	1414276.576	854.8	857.8	3.0
1490	685657.028	1414326.576	856.2	859.1	2.9
1491	685657.028	1414376.576	857.6	860.6	3.0
1492	685657.028	1414426.576	859.2	862.1	2.9
1493	685657.028	1414476.576	859.5	862.5	3.0
1494	685657.028	1414526.576	859.7	862.7	3.0
1505	685607.028	1414126.576	842.5	845.5	3.0
1506	685607.028	1414176.576	847.2	850.3	3.1
1507	685607.028	1414226.576	852.9	856.0	3.1
1508	685607.028	1414276.576	854.9	858.1	3.2
1509	685607.028	1414326.576	855.8	858.9	3.1
1510	685607.028	1414376.576	857.1	859.9	2.9
1511	685607.028	1414426.576	858.7	861.4	2.7
1512	685607.028	1414476.576	859.3	862.2	2.9
1513	685607.028	1414526.576	859.4	862.3	2.9
1524	685557.028	1414126.576	844.5	847.6	3.1
1525	685557.028	1414176.576	847.1	850.1	3.0
1526	685557.028	1414226.576	853.2	856.4	3.2
1527	685557.028	1414276.576	855.1	858.1	3.0
1528	685557.028	1414326.576	855.7	858.8	3.1
1529	685557.028	1414376.576	856.4	859.4	3.0
1530	685557.028	1414426.576	858.0	861.1	3.1
1531	685557.028	1414476.576	855.0	858.1	3.1
1532	685557.028	1414526.576	855.9	858.9	3.0
1543	685507.028	1414126.576	845.8	848.8	3.0
1544	685507.028	1414176.576	846.9	850.0	3.1
1545	685507.028	1414226.576	849.5	852.4	2.9
1546	685507.028	1414276.576	852.2	855.3	3.1
1547	685507.028	1414326.576	856.7	859.7	3.0
1548	685507.028	1414376.576	855.1	857.9	2.8
1549	685507.028	1414426.576	853.7	856.8	3.1
1550	685507.028	1414476.576	854.7	857.8	3.1
1551	685507.028	1414526.576	857.2	859.8	2.6
1561	685457.028	1414076.576	840.8	843.6	2.9
1562	685457.028	1414126.576	846.2	849.3	3.1
1563	685457.028	1414176.576	847.0	850.0	3.0
1564	685457.028	1414226.576	848.4	851.1	2.8
1565	685457.028	1414276.576	850.2	853.2	3.0
1566	685457.028	1414326.576	852.1	855.2	3.1
1567	685457.028	1414376.576	852.7	855.4	2.7
1568	685457.028	1414426.576	853.4	856.4	3.0
1569	685457.028	1414476.576	856.6	859.5	2.9
1579	685407.028	1414026.576	837.5	840.7	3.2
1580	685407.028	1414076.576	844.8	847.9	3.1
1581	685407.028	1414126.576	846.0	849.2	3.2
1582	685407.028	1414176.576	846.8	850.1	3.3
1583	685407.028	1414226.576	848.5	851.6	3.1
1584	685407.028	1414276.576	850.4	853.6	3.2
1585	685407.028	1414326.576	852.2	855.1	2.9
1597	685357.028	1413976.575	830.9	834.0	3.1
1598	685357.028	1414026.576	843.0	846.2	3.2
1599	685357.028	1414076.576	844.4	847.5	3.1
1600	685357.028	1414126.576	845.5	848.4	2.9
1601	685357.028	1414176.576	846.9	850.1	3.2
1602	685357.028	1414226.576	849.0	851.9	2.9
1616	685307.028	1413976.576	835.2	838.3	3.1
1617	685307.028	1414026.576	842.7	846.3	3.6
1618	685307.028	1414076.576	843.9	846.8	2.9
1619	685307.028	1414126.576	845.0	848.0	3.0
1635	685257.028	1413976.576	837.3	840.1	2.8
1636	685257.028	1414026.576	842.5	846.6	4.1
1637	685257.028	1414076.576	843.5	846.5	3.0

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.
2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.
3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.
5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.
6) ELEVATIONS BASED ON NAVD 88.
7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).
8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.
9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

LEGEND

ELEV. = ELEVATION
◉ = NAIL SET
—/\/— = NOT TO SCALE
⌒⌒⌒ = TREELINE
TBM = TEMPORARY BENCHMARK

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

GRID FILL VERIFICATION SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:
S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

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Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	NOVEMBER/DECEMBER 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JANUARY 9, 2009	1 of 1	056234-001-GRID

APPENDIX III

CONSTRUCTION MATERIALS TESTING SERVICES REPORT

ESP Associates, P.A.

January 9, 2009

Morgan Corporation
P.O. Box 480130
Charlotte, North Carolina 28269

Attention: Mr. Craig Greeson

Reference: **CONSTRUCTION MATERIALS TESTING SERVICES**
Marshall Steam Station
Terrell, North Carolina
ESP Project No. E4-WJ13.300 (Report #1)

Dear Mr. Greeson:

As requested, ESP Associates, P.A. (ESP), provided construction materials testing services on a part-time, on-call basis for the referenced project. Our services were coordinated with you and Mr. Alan Ramsey with Morgan Corporation. This letter summarizes our field density testing, subgrade evaluation and cover thickness evaluation for the period beginning October 30, 2008 through December 23, 2008. Horizontal and vertical control was provided in the field by Morgan Corporation.

FIELD DENSITY TESTING

During this reporting period, an engineering technician from our office visited the site and performed fifty-eight (58) field density tests. The field density tests were performed on fill materials placed to achieve the design subgrade elevations and cover thickness elevations within the asbestos and C&D landfills and on fill materials placed to construct diversion berms within the asbestos and C&D landfills. The tests performed indicate densities equaling or exceeding 90 percent of the soil's maximum dry density based on a Standard Proctor moisture-density relationship. The results of the field density tests, laboratory Standard Proctor moisture-density

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relationships and associated natural moisture content, grain size distribution and Atterberg limits test results performed on the fill materials are enclosed for your review. The test location coordinates and test depth information shown on the attached "Report of Field Density Tests" were provided by Morgan Corporation's surveyors or earthmoving equipment operators using GPS devices incorporated into their equipment.

SUBGRADE EVALUATION

During this reporting period, a representative from our office visited the site to evaluate the design subgrade within the asbestos landfill prior to fill placement required to achieve the cover thickness elevations. Our evaluation consisted of visual observations, probing with a steel probe rod and proofrolling observations. Proofrolling was performed utilizing a loaded pan excavator. Based on our evaluation, two areas appeared unstable. However, the project specifications prohibited undercutting within the asbestos landfill. Therefore, Mr. Jason Reeves, Project Manager with S&ME, recommended the use of a "bridge" lift within the two unstable locations to aid in subgrade stability and to facilitate compaction of subsequent fill placement. ESP observed that a "bridge" lift approximately 1 foot thick was placed at each location in general accordance with S&ME's recommendation. For more detailed information, please refer to the attached "Proofrolling Observations" sheets dated November 19, 2008.

As recommended by Mr. Reeves and/or Mr. Ken Daly, Design Engineer with S&ME, the existing subgrade within the asbestos landfill was not proofrolled prior to fill placement required to achieve the design subgrade elevations due to the project specifications prohibiting undercut in that area. Also as recommended by Mr. Reeves and/or Mr. Daly, the existing subgrade and design subgrade within the C&D landfill was not proofrolled prior to fill placement due to protruding landfill debris that would potentially damage the proofrolling equipment.

LANDFILL COVER THICKNESS EVALUATION

During this reporting period, a representative from our office visited the site to evaluate the asbestos and C&D landfill cover thickness by performing a total of forty-seven (47) hand auger borings upon completion of the grading activities at the designed finished grades. Thirty (30) hand auger borings were performed within the asbestos landfill and were extended to a minimum depth of approximately 3 feet. Seventeen (17) hand auger borings were performed within the C&D landfill and were extended to a minimum depth of approximately 2 feet. The hand auger borings were performed on an approximate 100-foot grid within each landfill.

Based on the results of the hand auger borings, the minimum required cover thickness was encountered at the asbestos and C&D landfills. A summary of the landfill cover thickness evaluation is presented on "Cover Thickness Evaluation, Asbestos Landfill, Table 1" and "Cover Thickness Evaluation, C&D landfill, Table 2" included the appendix. The hand auger boring location coordinates shown on the attached tables were provided by Morgan Corporation's surveyors using GPS devices.

ESP appreciates the opportunity to have assisted you during this project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, P.A.

Jacob L. Sarna, PG
Project Manager

David A. Bixler II, PE
NC Licensure No. 33560

NORTH CAROLINA PROFESSIONAL SEAL 033560 ENGINEER DAVID A. BIXLER II 1/9/09

JLS/DAB

Copies submitted (2)

Attachments: Report of Field Density Tests
Moisture-Density Relationships (S-1 through S-6)
Grain Size Distributions (S-1 through S-6)
Atterberg Limits Results (S-1 through S-6)
Proofrolling Observations Sheets dated November 19, 2008 (2)
Cover Thickness Evaluation, Asbestos Landfill, Table 1
Cover Thickness Evaluation, C&D Landfill, Table 2

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	1 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
1	10/30/08	DT	93.2	23.8	108.1	21.4	89.0	95	Asbestos Landfill - 685757.1N and 1414173.7E	approximately proposed design subgrade		
2	10/30/08	DT	93.2	23.8	109.0	22.1	89.3	96	Asbestos Landfill - 685863.2N and 1414218.1E	approximately proposed design subgrade		
3	10/31/08	DT	96.1	21.9	109.0	20.9	90.2	94	Asbestos Landfill - 685811.4N and 1414347.9E	approximately proposed design subgrade		
4	10/31/08	DT	96.1	21.9	108.1	21.4	89.0	93	Asbestos Landfill - 685895.7N and 1414317.0E	approximately proposed design subgrade		
5	10/31/08	DT	96.1	21.9	109.3	21.7	89.8	93	Asbestos Landfill - 685623.5N and 1414141.1E	approximately proposed design subgrade		
6	11/01/08	DT	94.2	23.2	106.6	22.2	87.2	93	Asbestos Landfill - 685431.5N and 1414122.9E	approximately 1 foot below proposed design subgrade		
7	11/01/08	DT	94.2	23.2	107.8	22.6	87.9	93	Asbestos Landfill - 685343.1N and 1414081.3E	approximately 1 foot below proposed design subgrade		
8	11/03/08	DT	96.0	21.8	109.5	19.4	91.7	96	Asbestos Landfill - 685431.8N and 1414278.9E	approximately 1 foot below proposed design subgrade		
10	11/04/08	DT	94.9	22.6	106.6	20.3	88.6	93	Asbestos Landfill - 685565.7N and 1414157.1E	approximately 1 foot below proposed design subgrade		
11	11/04/08	DT	94.9	22.8	107.5	21.2	88.7	93	Asbestos Landfill - 685520.9N and 1414475.9E	approximately proposed design subgrade		

TYPE OF TEST
SC: SAND CONE
DT: DRIVE TUBE
NG: NUCLEAR GAUGE
RB: RUBBER BALLOON

REMARKS

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	2 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
12	11/05/08	DT	94.5	23.0	106.0	21.1	87.5	93	Asbestos Landfill - 685301.1N and 1414071.7E	approximately proposed design subgrade		
13	11/05/08	DT	94.5	23.0	106.6	21.6	87.5	93	Asbestos Landfill - 685451.8N and 1414164.8E	approximately proposed design subgrade		
14	11/05/08	DT	94.5	23.0	104.6	20.8	86.8	92	Asbestos Landfill - 685446.5N and 1414309.8E	approximately proposed design subgrade		
15	11/06/08	DT	97.1	23.0	109.8	22.2	89.9	93	Asbestos Landfill - 685624.1N and 1414492.7E	approximately proposed design subgrade		
16	11/06/08	DT	97.1	23.0	110.1	22.5	89.8	93	Asbestos Landfill - 685699.3N and 1414473.9E	approximately proposed design subgrade		
17	11/06/08	DT	97.1	23.0	109.5	22.0	89.8	92	Asbestos Landfill - 685625.9N and 1414359.6E	approximately proposed design subgrade		
18	11/11/08	DT	95.3	22.2	109.8	21.8	90.1	95	Asbestos Landfill - 685960.3N and 1414311.9E	approximately proposed design subgrade		
9	11/14/08	DT	94.9	22.6	104.2	19.7	87.1	92	Asbestos Landfill - 685607.1N and 1414163.0E	approximately 2 feet below proposed design subgrade		
20	11/21/08	DT	93.5	23.6	112.8	21.8	92.6	99	Asbestos Landfill - 685829.2N and 1414149.7E	approximately 2 feet below proposed design subgrade		
19	11/21/08	DT	96.5	23.6	112.2	21.2	92.6	96	Asbestos Landfill - 685803.5N and 1414353.5E	approximately 2 feet below proposed design subgrade		

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
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TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV.DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
21	11/25/08	DT	96.2	21.6	108.7	18.8	91.5	95	Asbestos Landfill - 685503.2N and 1414468.8E	approximately 2 feet below proposed final subgrade		
22	11/25/08	DT	96.2	21.6	110.4	18.7	93.0	97	Asbestos Landfill - 685521.2N and 1414490.5E	approximately 1 foot below proposed final subgrade		
23	11/25/08	DT	96.2	21.6	109.9	18.5	92.7	96	Asbestos Landfill - 685406.5N and 1414241.3E	approximately 2 feet below proposed final subgrade		
24	11/25/08	DT	96.2	21.6	108.7	19.8	90.7	94	Asbestos Landfill - 685384.2N and 1414138.8E	approximately 1 foot below proposed final subgrade		
25	11/25/08	DT	98.5	24.0	116.8	24.6	93.7	95	Asbestos Landfill - 685477.5N and 1414137.8E	approximately 2 feet below proposed final subgrade		
26	11/25/08	DT	96.2	21.6	108.4	20.2	90.2	94	Asbestos Landfill - 685320.6N and 1414028.6E	approximately 1 foot below proposed final subgrade		
27	11/25/08	DT	98.5	24.0	113.4	24.2	91.3	93	Asbestos Landfill - 685863.2N and 1414383.6E	approximately 1 foot below proposed final subgrade		
28	11/25/08	DT	98.5	24.0	115.5	25.2	92.3	94	Asbestos Landfill - 685671.6N and 1414112.5E	approximately 1 foot below proposed final subgrade		
32	12/03/08	DT	97.2	24.8	117.6	26.4	93.0	96	Asbestos Landfill - 685637.3N and 1414296.4E	approximately 2 feet below proposed final subgrade		
33	12/03/08	DT	98.6	22.0	107.8	19.9	89.9	91	Asbestos Landfill - 685682.4N and 1414432.3E	approximately 2 feet below proposed final subgrade		

TYPE OF TEST
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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
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TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
29	12/03/08	DT	98.6	22.0	107.2	19.5	89.7	91	Asbestos Landfill - 685530.8N and 1414487.5E	approximately proposed final subgrade		
30	12/03/08	DT	97.2	24.8	118.5	27.0	93.3	96	Asbestos Landfill - 685426.7N and 1414302.6E	approximately proposed final subgrade		
31	12/03/08	DT	97.2	24.8	118.8	26.7	93.8	96	Asbestos Landfill - 685345.4N and 1414104.6E	approximately proposed final subgrade		
34	12/03/08	DT	98.6	22.0	108.4	19.5	90.7	92	Asbestos Landfill - 685912.5N and 1414348.6E	approximately proposed final subgrade		
35	12/03/08	DT	97.2	24.8	112.2	26.5	88.7	91	Asbestos Landfill - 685759.0N and 1414240.8E	approximately proposed final subgrade		
36	12/05/08	DT	94.9	22.6	106.3	19.5	89.0	94	Asbestos Landfill - 685632.2N and 1414287.3E	approximately 1 foot below proposed final subgrade		
37	12/05/08	DT	94.9	22.6	104.5	19.4	87.5	92	Asbestos Landfill - 685685.7N and 1414429.6E	approximately 1 foot below proposed final subgrade		
38	12/05/08	DT	94.9	22.6	103.8	19.3	87.1	92	Asbestos Landfill - 685622.7N and 1414486.9E	approximately proposed final subgrade		
39	12/05/08	DT	94.9	22.6	104.8	19.7	87.6	92	Asbestos Landfill - 685576.5N and 1414397.9E	approximately proposed final subgrade		
48	12/16/08	DT	95.0	22.6	111.3	22.3	91.0	96	Asbestos Landfill Diversion Berms - 685480.8N and 1414122.2E	approximately proposed subgrade		

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REPORT OF FIELD DENSITY TESTS

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TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
49	12/16/08	DT	95.0	22.6	109.3	22.0	89.6	94	Asbestos Landfill Diversion Berms - 685390.8N and 1414057.9E	approximately proposed subgrade		
50	12/16/08	DT	95.0	22.6	110.4	22.4	90.2	95	Asbestos Landfill Diversion Berms - 685282.5N and 1414022.3E	approximately proposed subgrade		
51	12/16/08	DT	95.0	22.6	112.2	23.5	90.9	96	Asbestos Landfill Diversion Berms - 685667.3N and 1414124.9E	approximately proposed subgrade		
52	12/16/08	DT	95.0	22.6	108.7	21.7	89.3	94	Asbestos Landfill Diversion Berms - 685765.6N and 1414124.6E	approximately proposed subgrade		
53	12/16/08	DT	95.0	22.6	110.1	22.6	89.8	95	Asbestos Landfill Diversion Berms - 685669.1N and 1414158.5E	approximately proposed subgrade		
40	12/08/08	DT	94.0	23.3	109.3	22.6	89.2	95	C&D Landfill - 686128.7N and 1414493.5E	approximately 1 foot below proposed final subgrade		
41	12/08/08	DT	94.0	23.3	103.9	21.8	85.3	91	C&D Landfill - 685929.9N and 1414556.6E	approximately 1 foot below proposed final subgrade		
42	12/09/08	DT	94.8	22.5	103.9	19.8	86.7	91	C&D Landfill - 686850.2N and 1414650.0E	approximately 1 foot below proposed final subgrade		
43	12/09/08	DT	94.8	22.5	108.7	23.8	87.8	93	C&D Landfill - 685702.1N and 1414606.6E	approximately 1 foot below proposed final subgrade		
44	12/09/08	DT	94.8	22.5	107.8	23.3	87.4	92	C&D Landfill - 685690.2N and 1414599.4E	approximately proposed final subgrade		

TYPE OF TEST
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REMARKS

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REPORT OF FIELD DENSITY TESTS

Project:	Marshall Steam Station
Client:	Morgan Corporation
ESP Project No:	WJ13.300
Report Date:	January 09, 2009
Page:	6 of 6

TEST #	DATE	TYPE OF TEST	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	IN-PLACE WET DENSITY (PCF)	IN-PLACE MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (PCF)	PERCENT COMPACTION (%)	LOCATION	APPROXIMATE ELEV./DEPTH (FT)	Test Specific Comment	Test # Linked to Comment(s):
45	12/09/08	DT	94.8	22.5	104.5	20.3	86.9	92	C&D Landfill - 685841.6N and 1414655.5E	approximately proposed final subgrade		
46	12/09/08	DT	94.8	22.5	109.3	24.1	88.1	93	C&D Landfill - 686102.4N and 1414478.5E	approximately proposed final subgrade		
47	12/09/08	DT	94.8	22.5	105.1	20.8	87.0	92	C&D Landfill - 685956.4N and 1414526.6E	approximately proposed final subgrade		
54	12/22/08	DT	95.0	26.0	111.6	28.2	87.1	92	C&D Landfill Diversion Berms - 686125.8N and 1414574.5E	approximately proposed subgrade		
55	12/22/08	DT	95.0	26.0	109.0	27.3	85.6	90	C&D Landfill Diversion Berms - 686015.6N and 1414605.2E	approximately proposed subgrade		
56	12/22/08	DT	95.0	26.0	108.1	25.5	86.1	91	C&D Landfill Diversion Berms - 685936.5N and 1414660.1E	approximately proposed subgrade		
57	12/22/08	DT	95.0	26.0	110.7	27.7	86.7	91	C&D Landfill Diversion Berms - 685849.2N and 1414696.6E	approximately proposed subgrade		
58	12/22/08	DT	95.0	26.0	108.5	27.1	86.2	91	C&D Landfill Diversion Berms - 685784.3N and 1414660.7E	approximately proposed subgrade		

TYPE OF TEST
SC: SAND CONE
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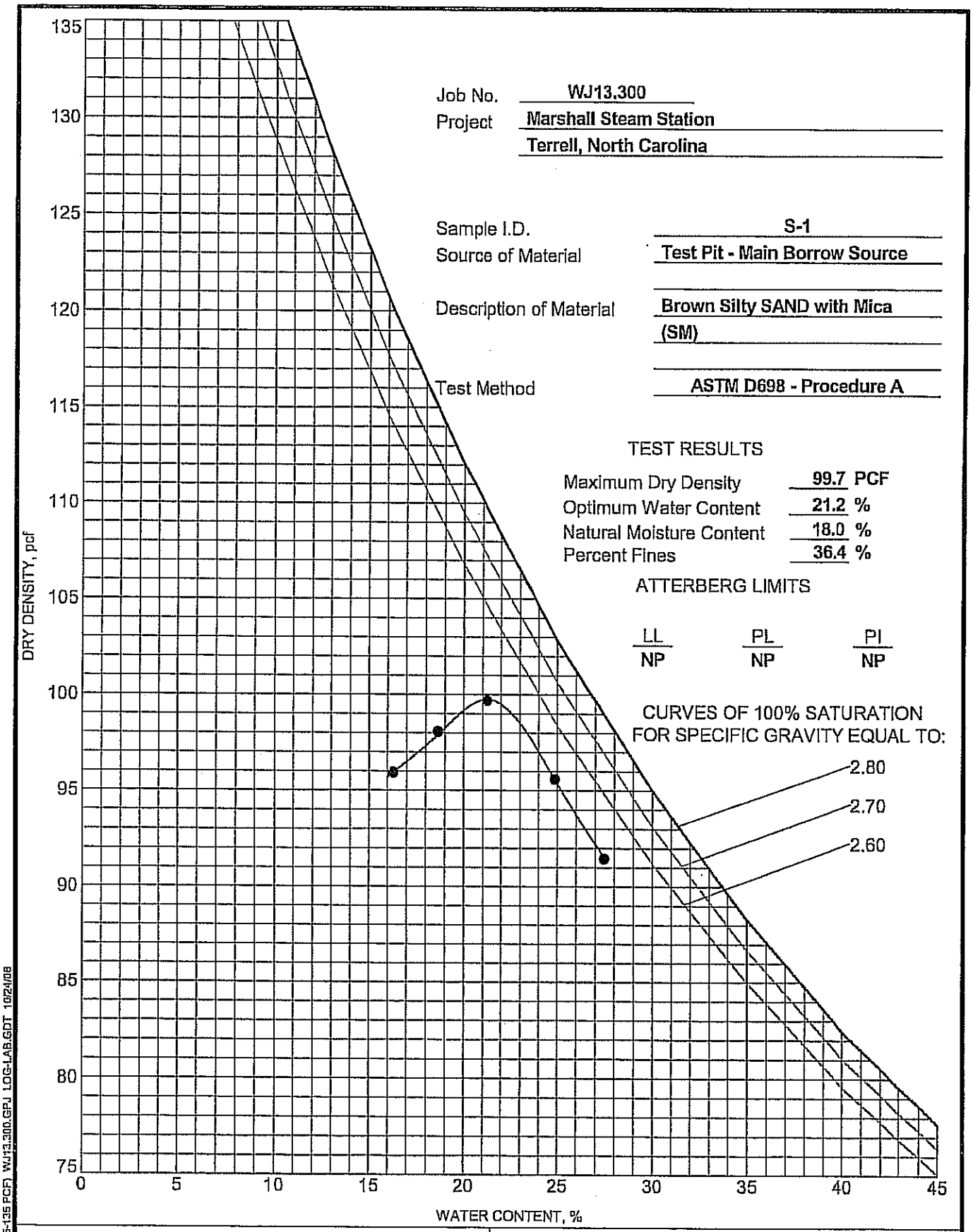
REMARKS



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-1

Source of Material Test Pit - Main Borrow Source

Description of Material Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	99.7	PCF
Optimum Water Content	21.2	%
Natural Moisture Content	18.0	%
Percent Fines	36.4	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

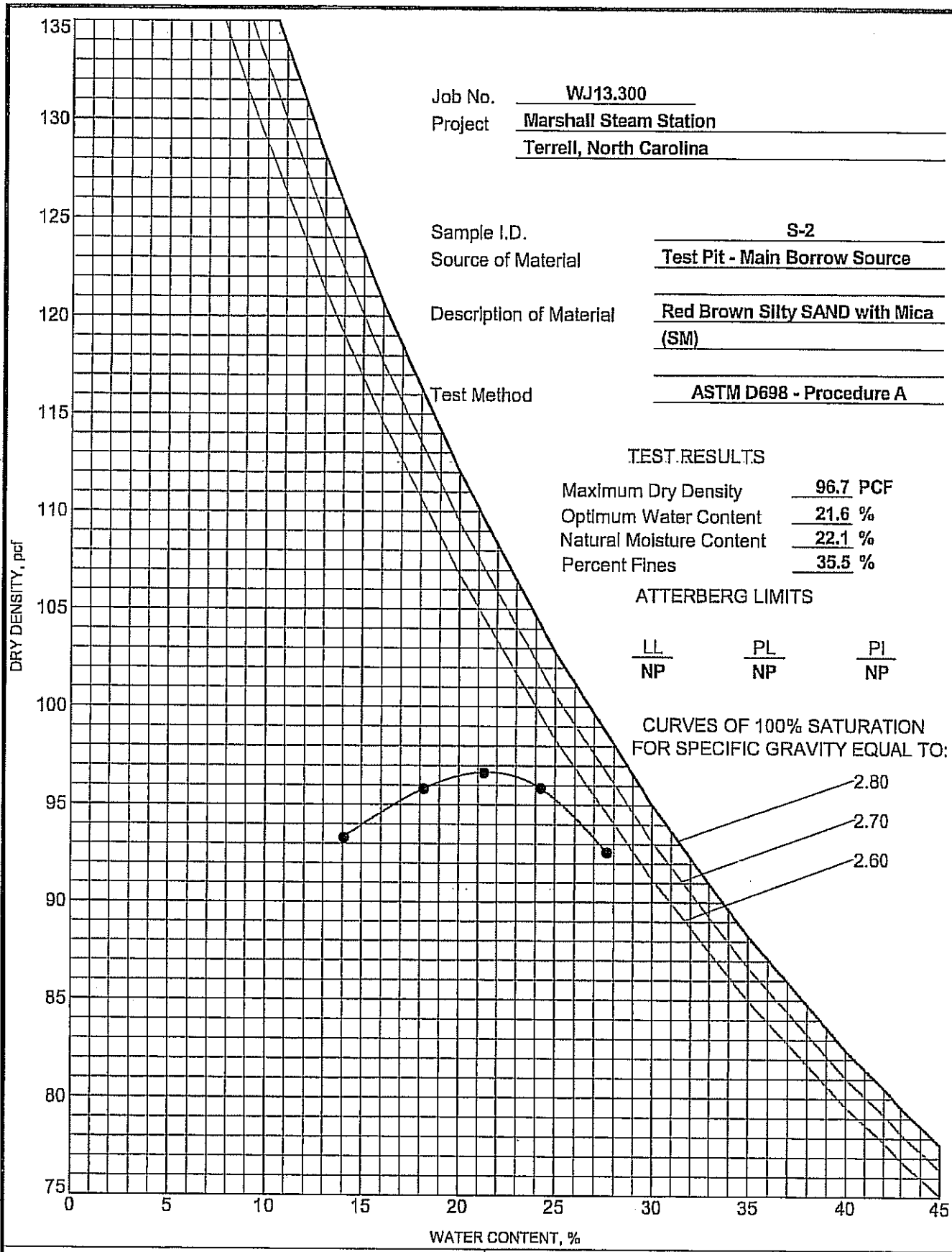
MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

ESP_COMPACTION11 (75-135 PCF) WJ13.300.GPJ LOG-LAB.GDT 10/24/08



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-2

Source of Material Test Pit - Main Borrow Source

Description of Material Red Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	96.7	PCF
Optimum Water Content	21.6	%
Natural Moisture Content	22.1	%
Percent Fines	35.5	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

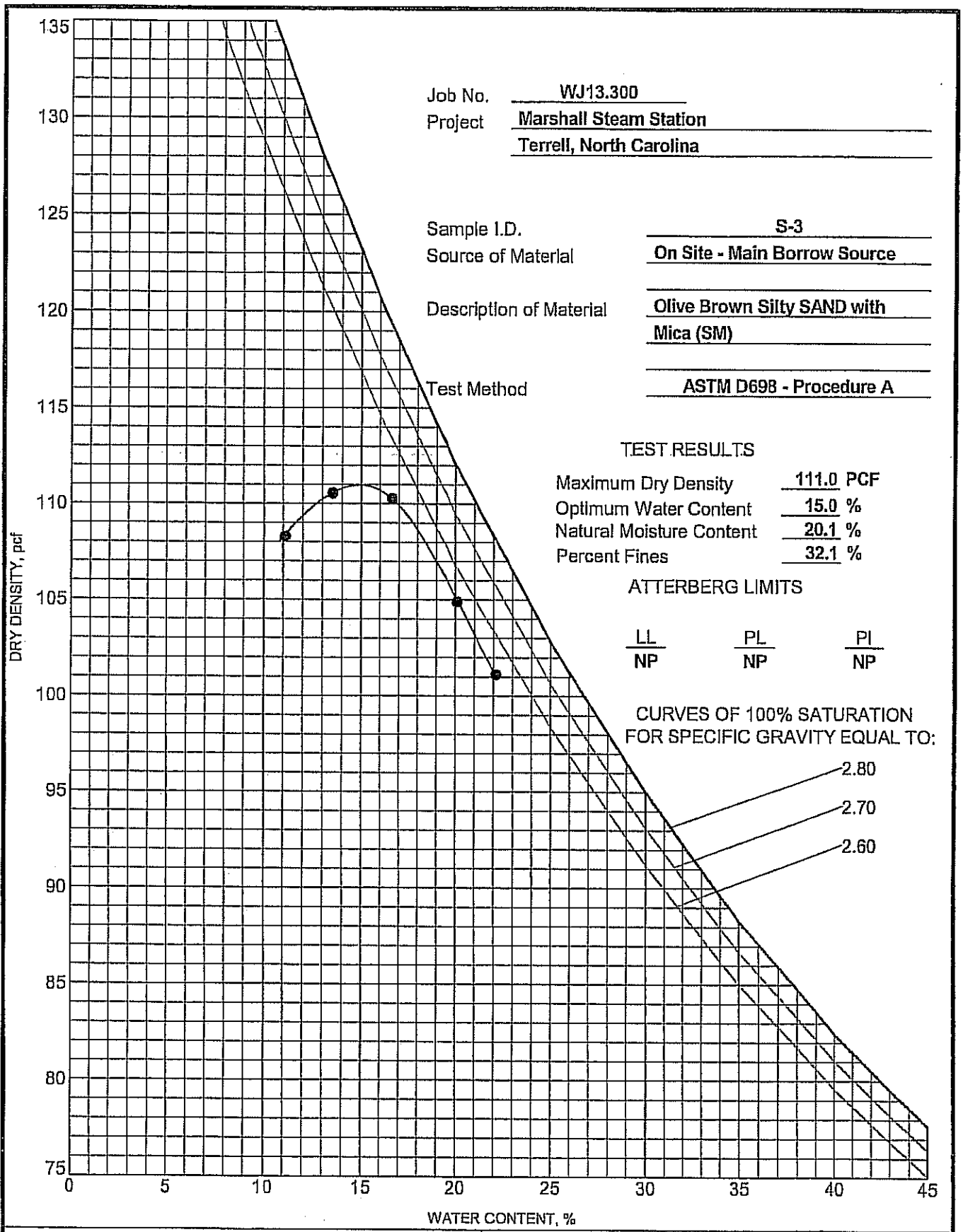
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-3

Source of Material On Site - Main Borrow Source

Description of Material Olive Brown Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	111.0	PCF
Optimum Water Content	15.0	%
Natural Moisture Content	20.1	%
Percent Fines	32.1	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

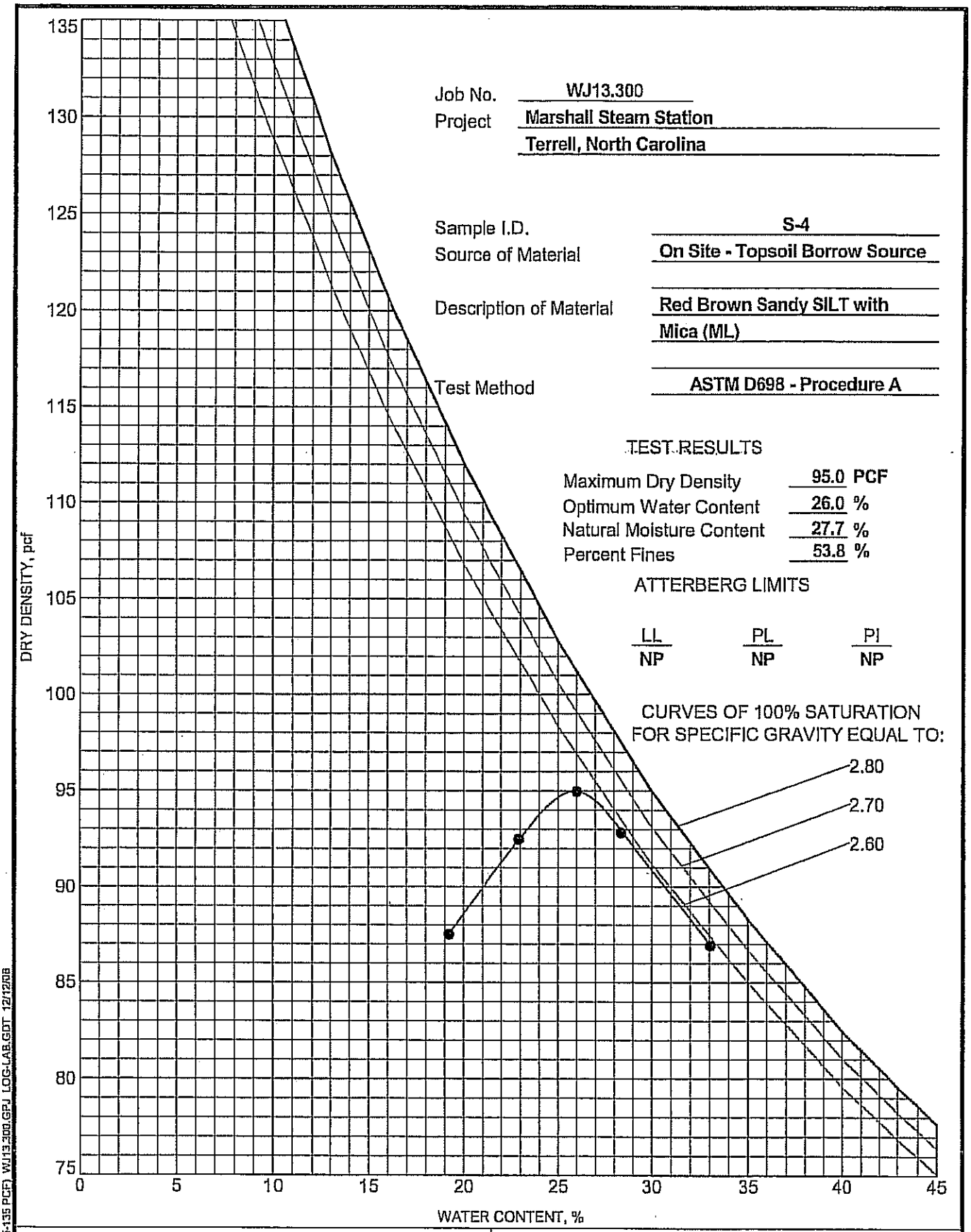
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-4

Source of Material On Site - Topsoil Borrow Source

Description of Material Red Brown Sandy SILT with Mica (ML)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	95.0	PCF
Optimum Water Content	26.0	%
Natural Moisture Content	27.7	%
Percent Fines	53.8	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

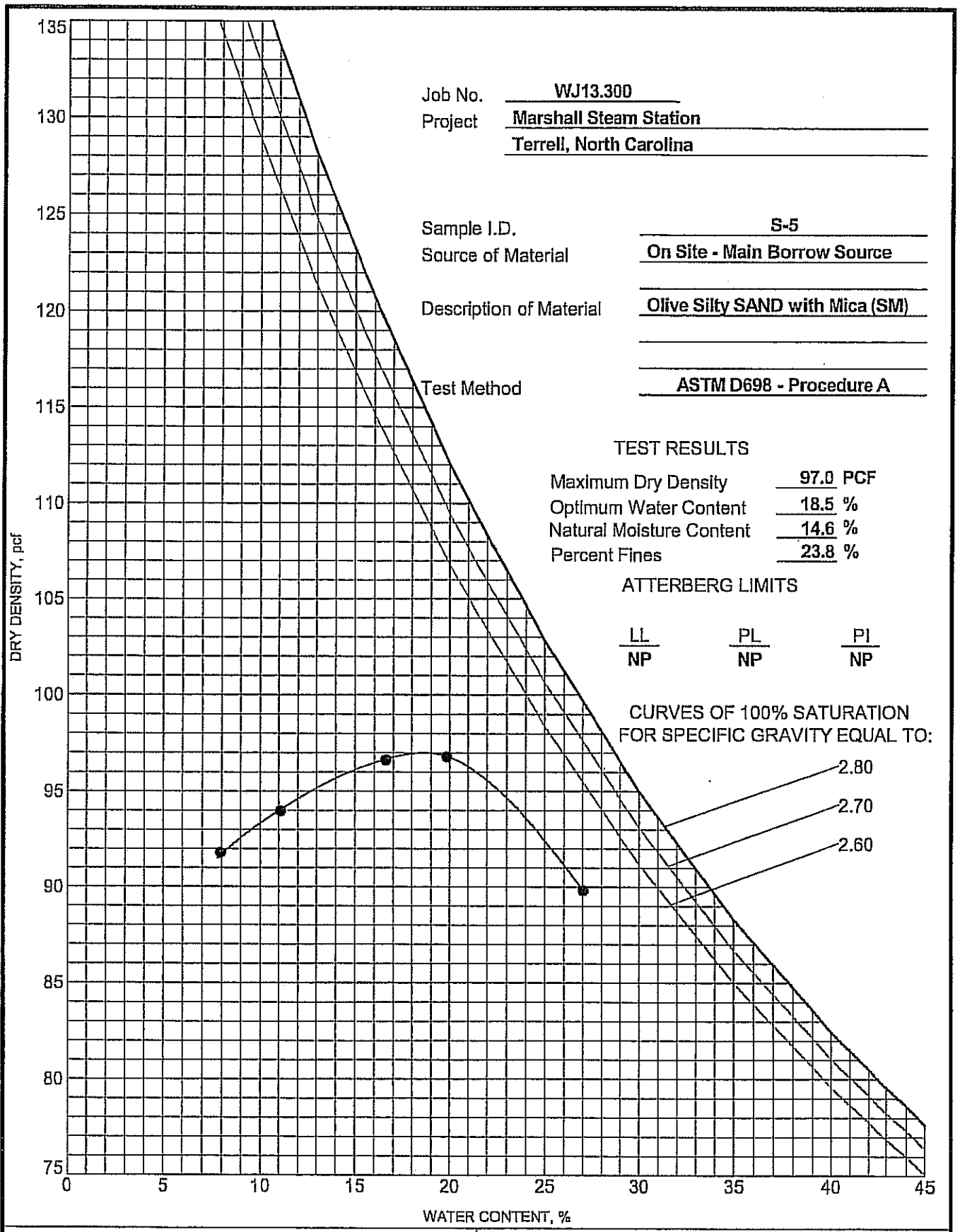
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-5

Source of Material On Site - Main Borrow Source

Description of Material Olive Silty SAND with Mica (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	97.0	PCF
Optimum Water Content	18.5	%
Natural Moisture Content	14.6	%
Percent Fines	23.8	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

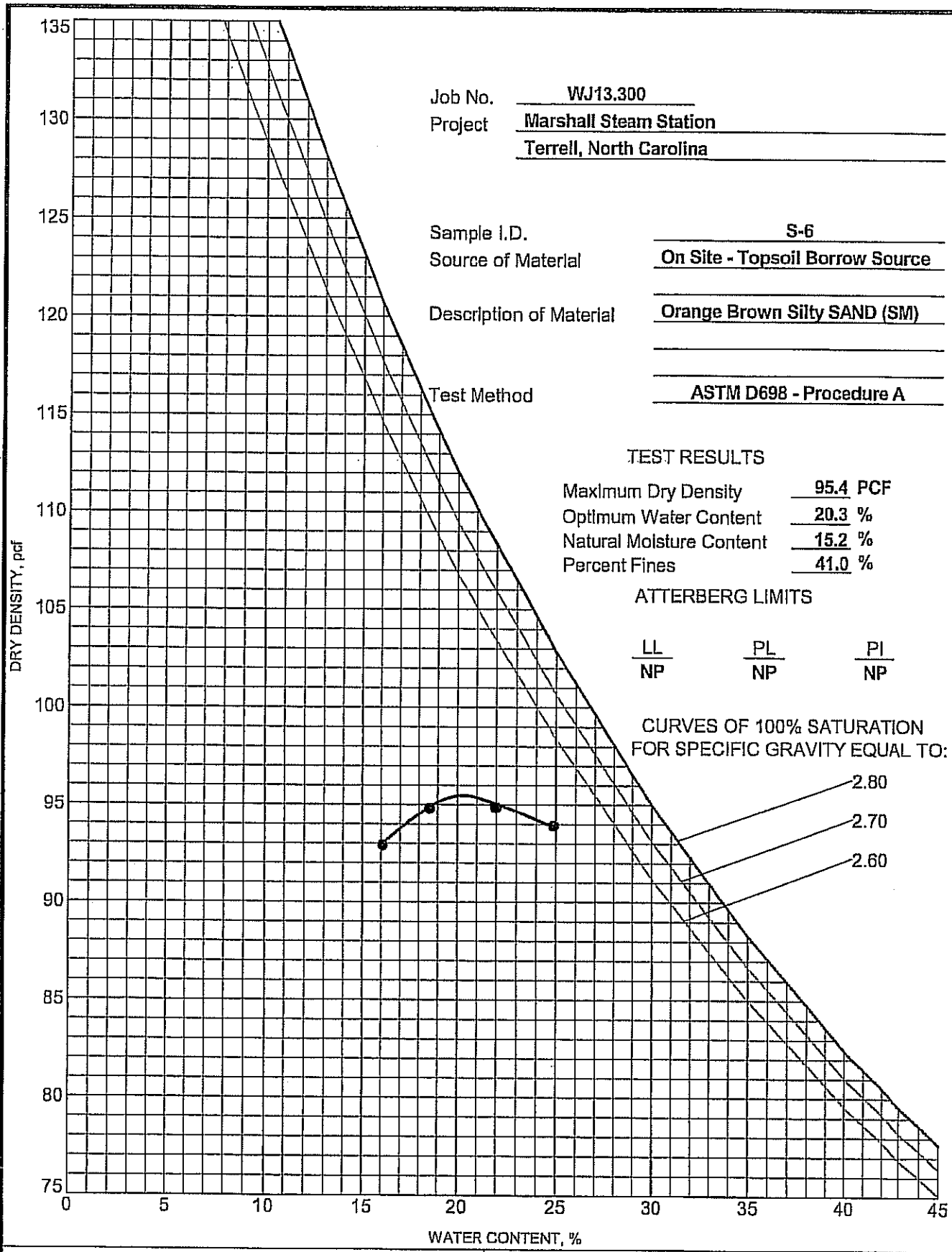
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



Job No. WJ13.300

Project Marshall Steam Station
Terrell, North Carolina

Sample I.D. S-6

Source of Material On Site - Topsoil Borrow Source

Description of Material Orange Brown Silty SAND (SM)

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density	95.4	PCF
Optimum Water Content	20.3	%
Natural Moisture Content	15.2	%
Percent Fines	41.0	%

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

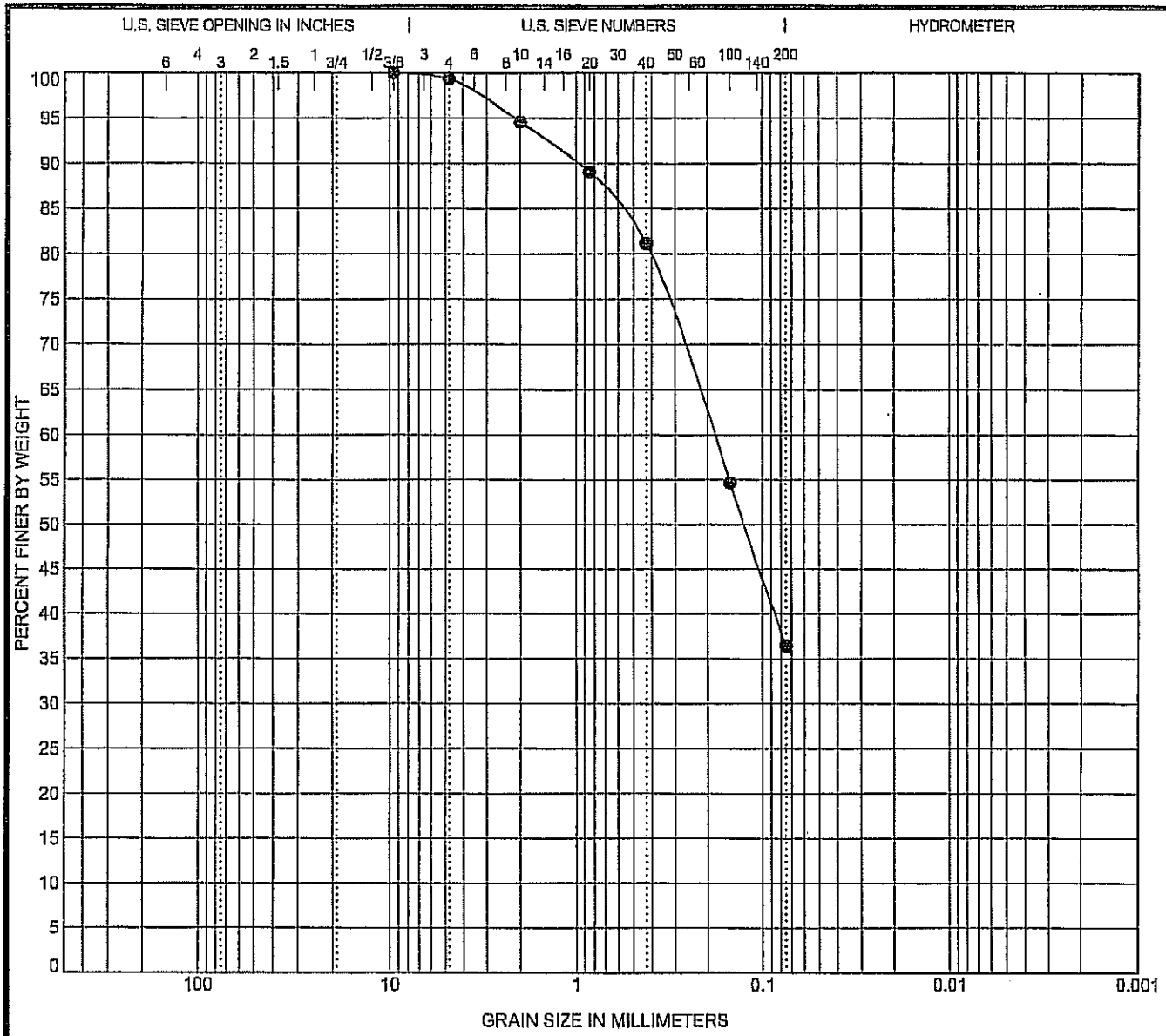
MOISTURE-DENSITY RELATIONSHIP

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

ESP_COMPACTION1 (75-135 PCF) WJ13.300.GPJ LOG-LAB.GDT 12/15/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-1	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-1	9.5	0.185			0.6	62.9	36.4	

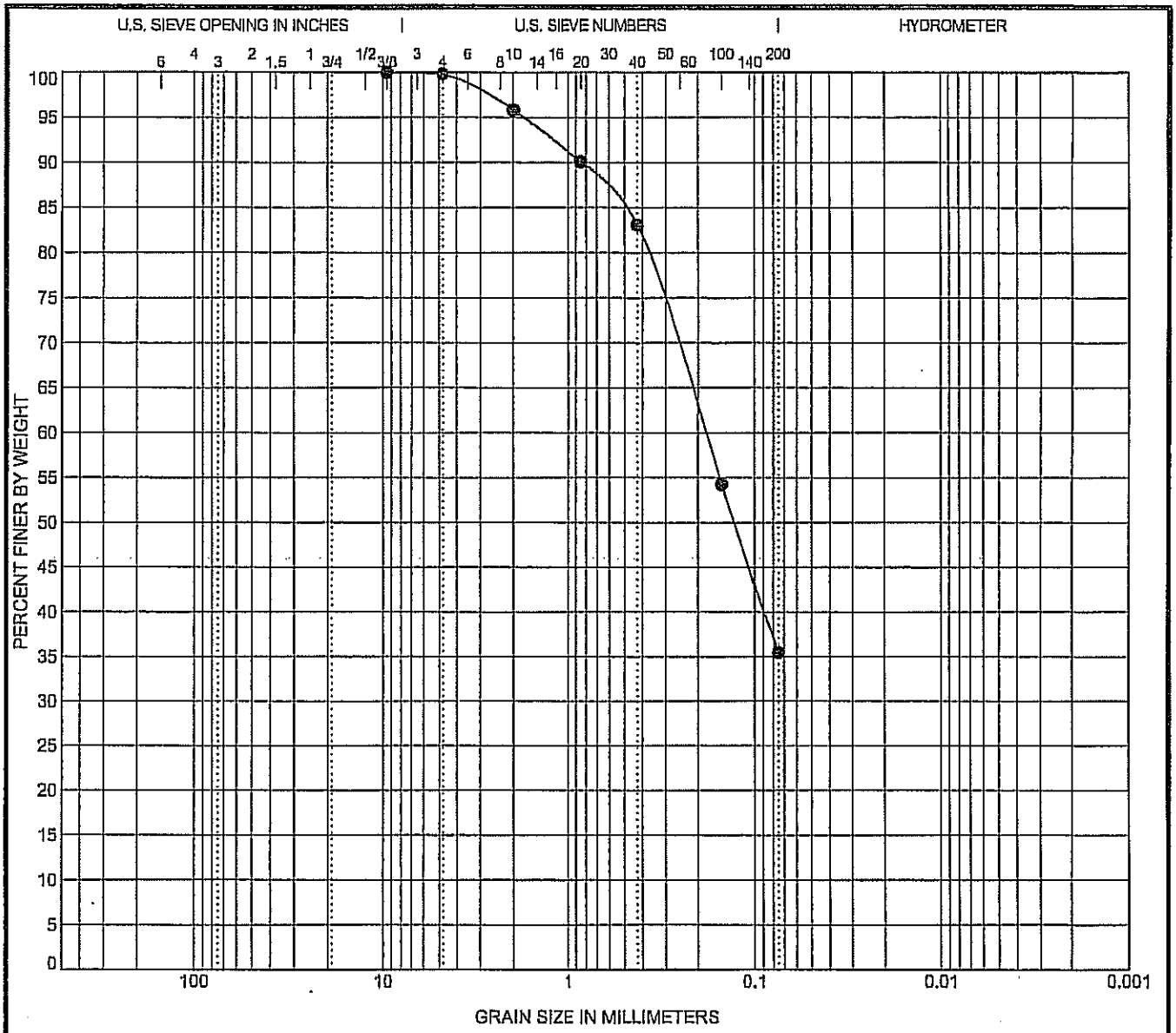
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-2	**SILTY SAND SM**	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-2	9.5	0.185			0.2	64.3	35.5	

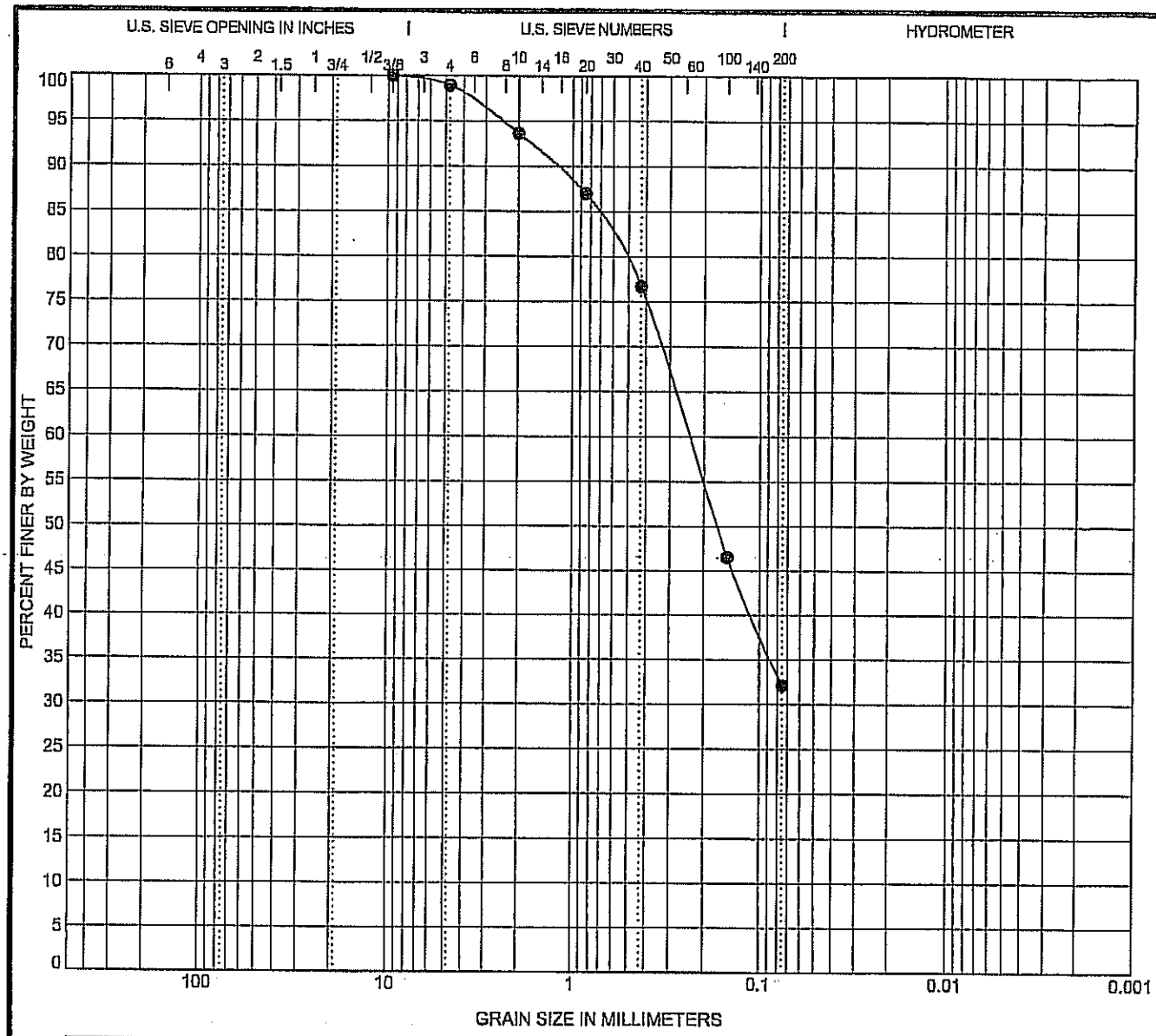
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-3	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-3	9.5	0.239			1.0	66.9	32.1	

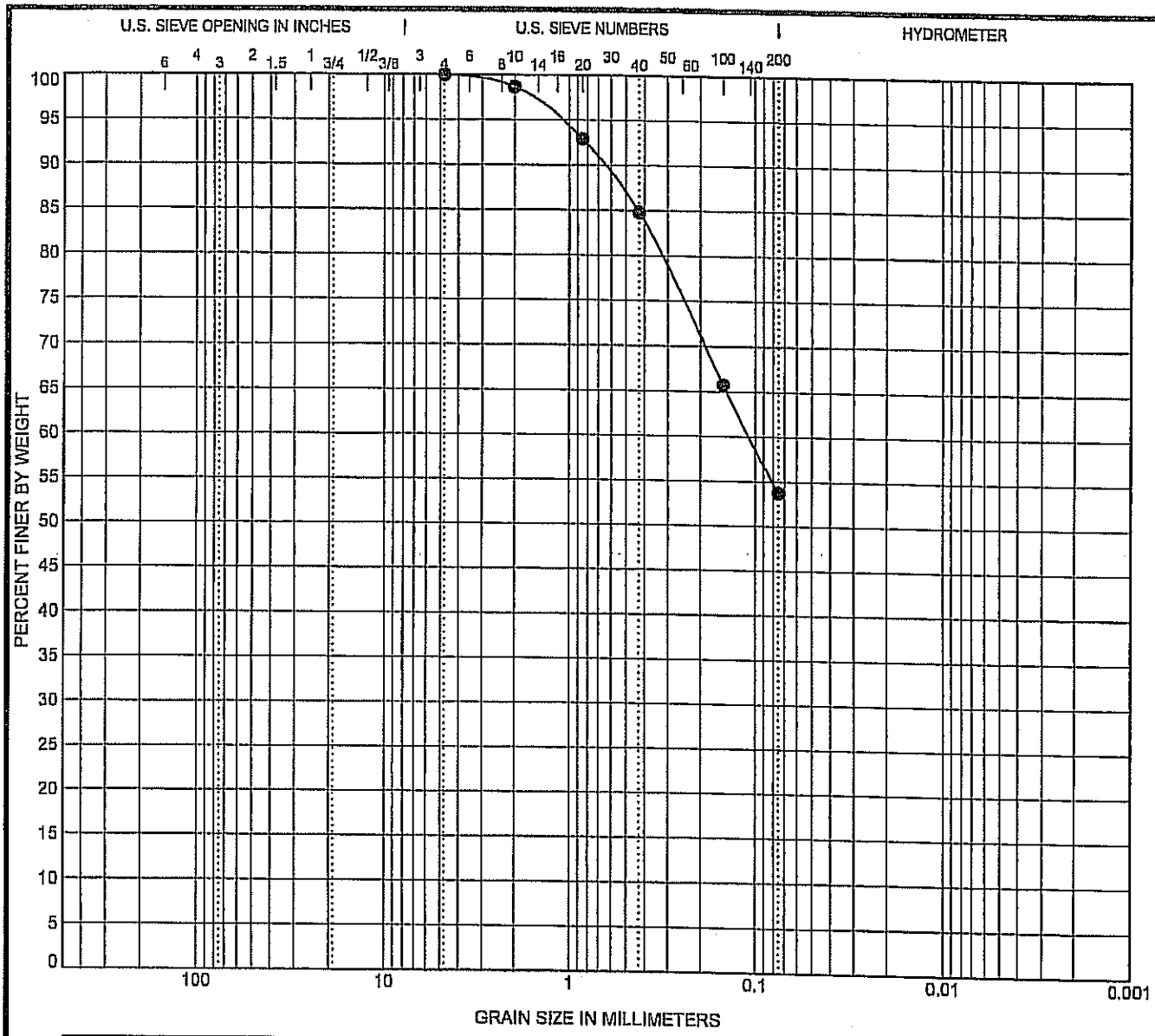
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-4	**SANDY SILT ML**	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-4	4.75	0.108			0.0	46.2	53.8	

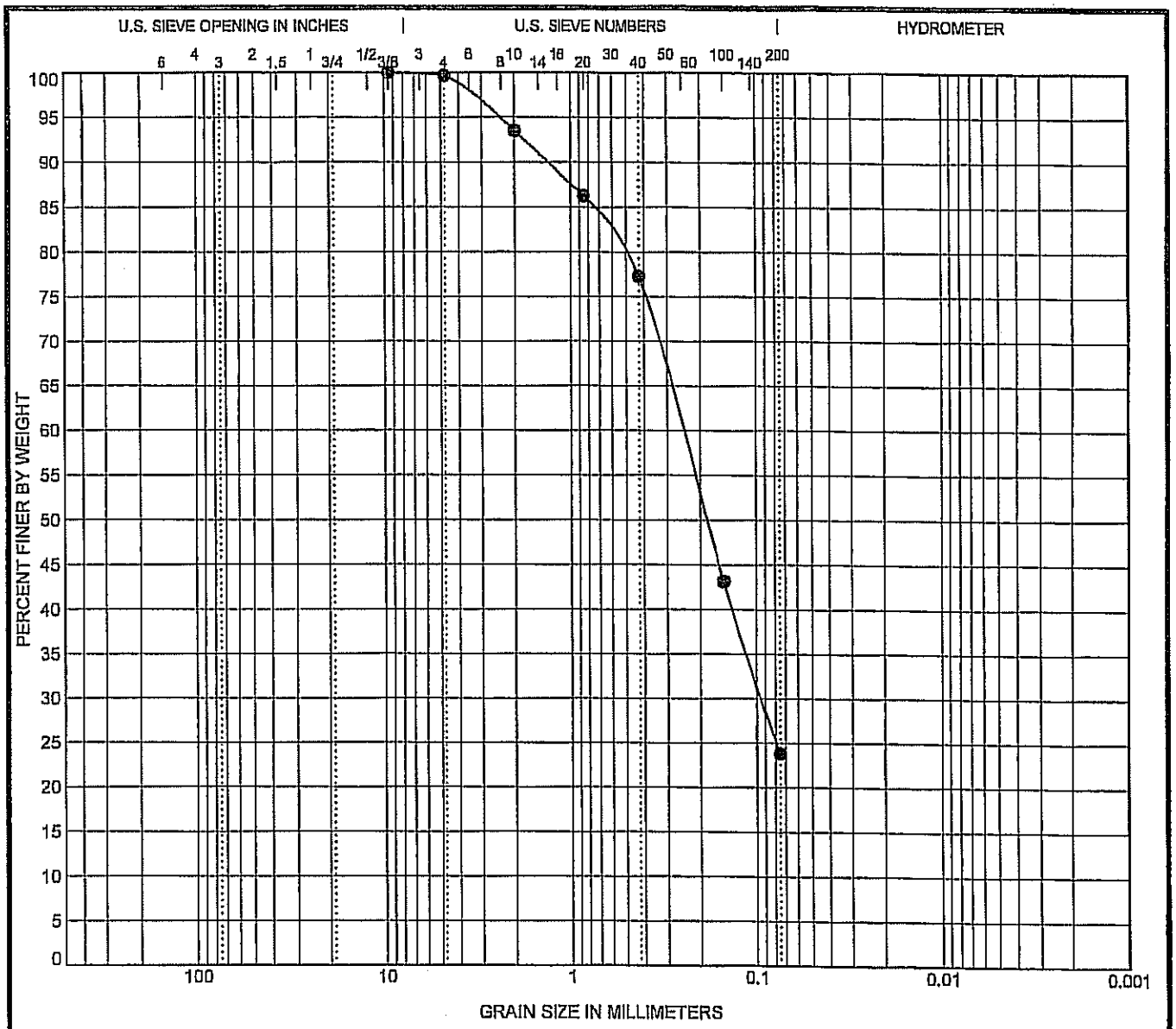
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-5	SILTY SAND SM	NP	NP	NP		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-5	9.5	0.251	0.094		0.3	75.8	23.8	

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P.O. Box 7030
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Telephone: 803.802.2440
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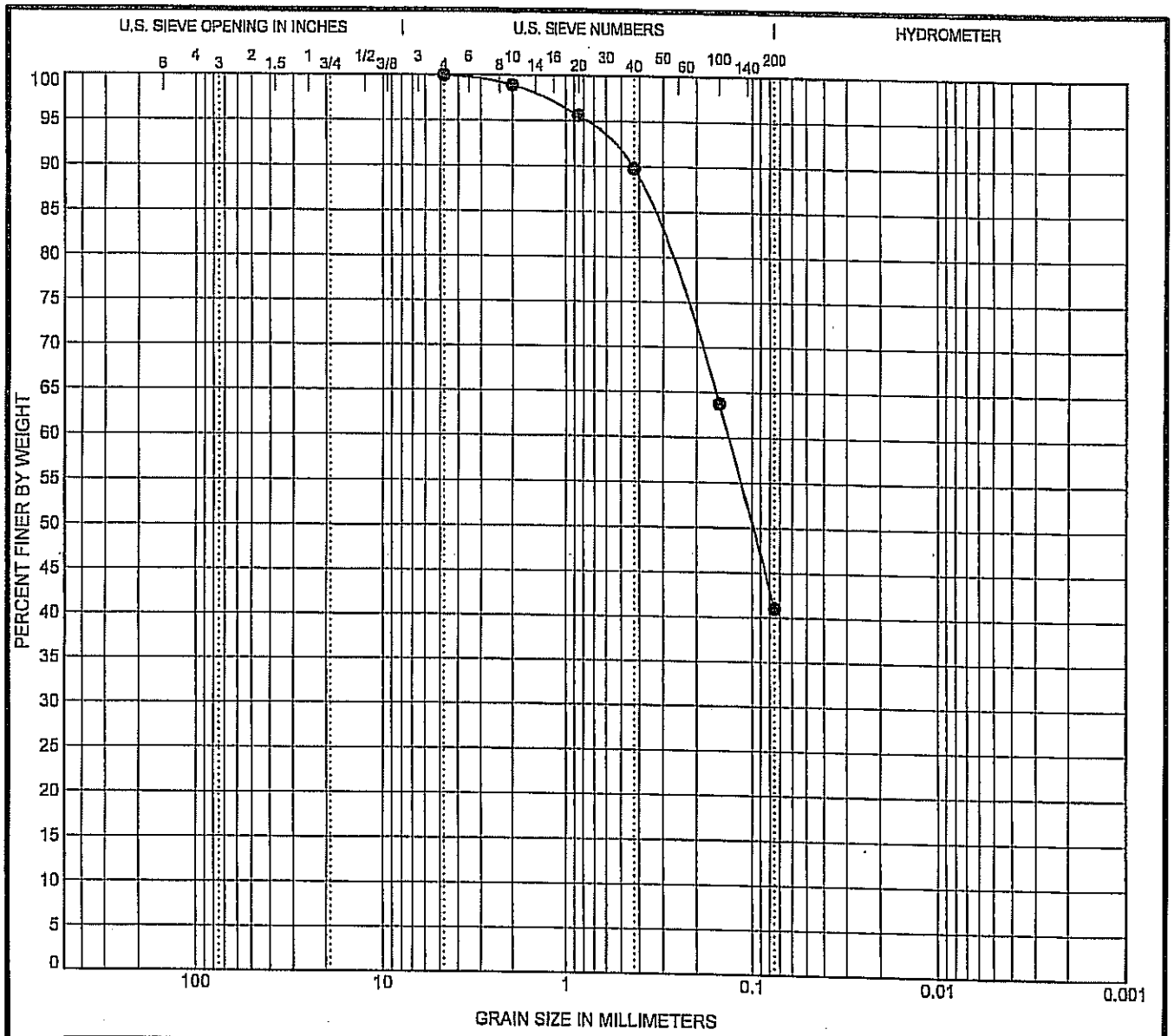
GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	S-6	**SILTY SAND SM**	**NP**	**NP**	**NP**		

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	S-6	**4.75**	**0.134**			**0.0**	**59.0**	**41.0**	

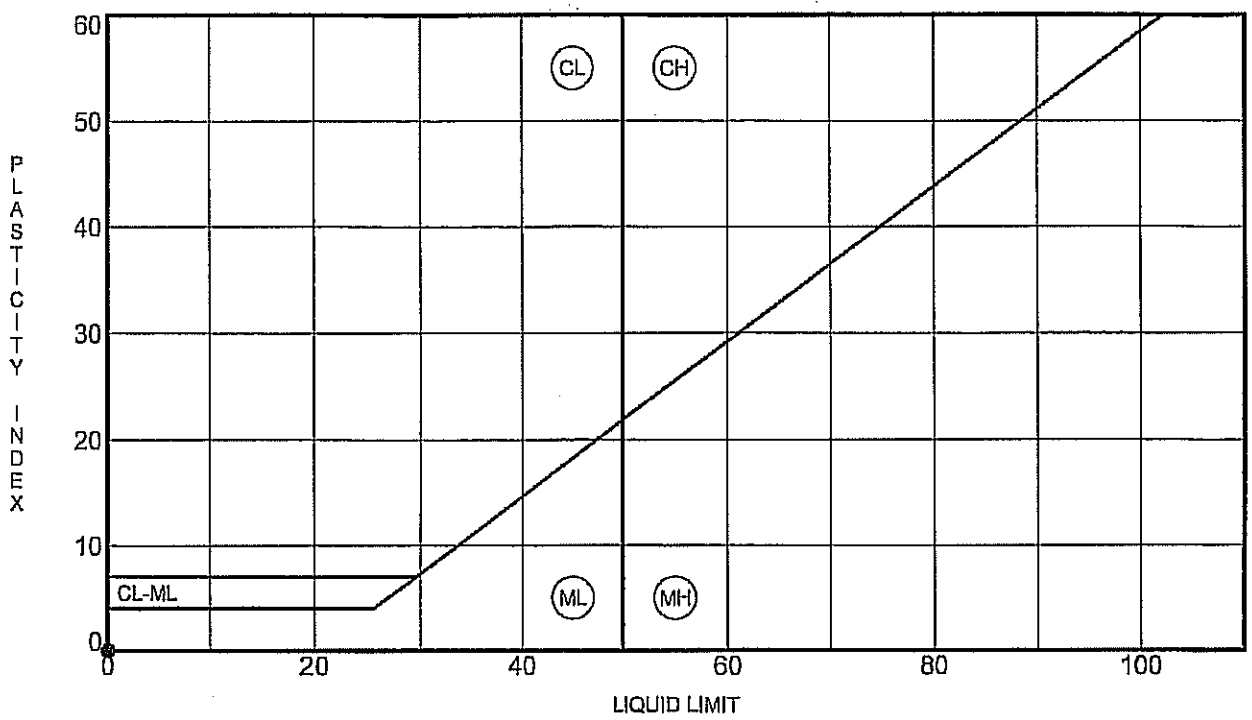
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

GRAIN SIZE DISTRIBUTION

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-1	NP	NP	NP	36.4	SILTY SAND SM

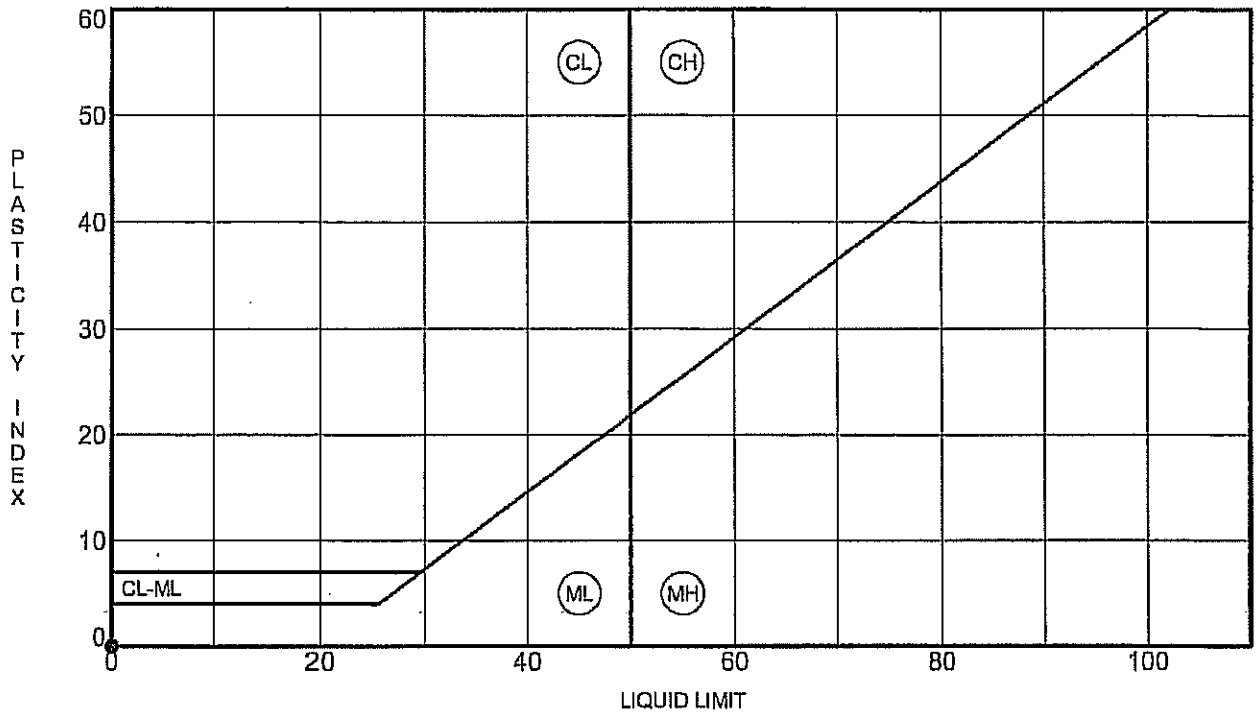
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-2	NP	NP	NP	35.5	SILTY SAND SM

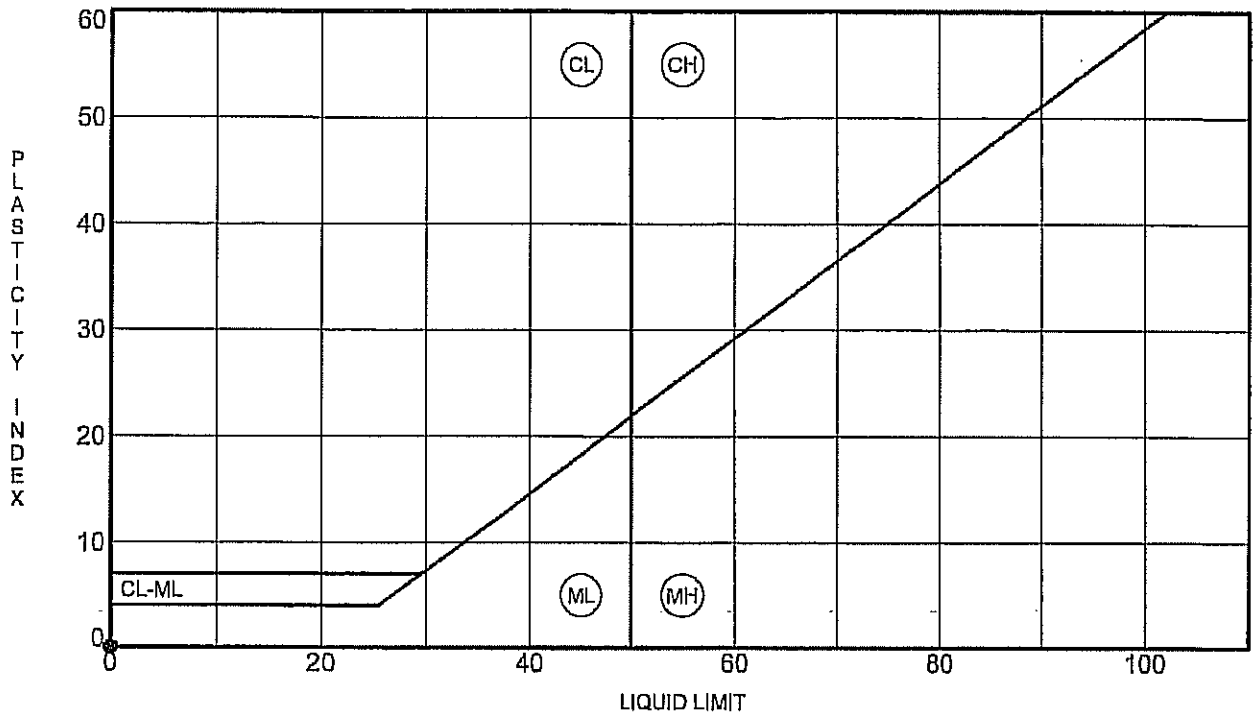
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-3	NP	NP	NP	32.1	SILTY SAND SM

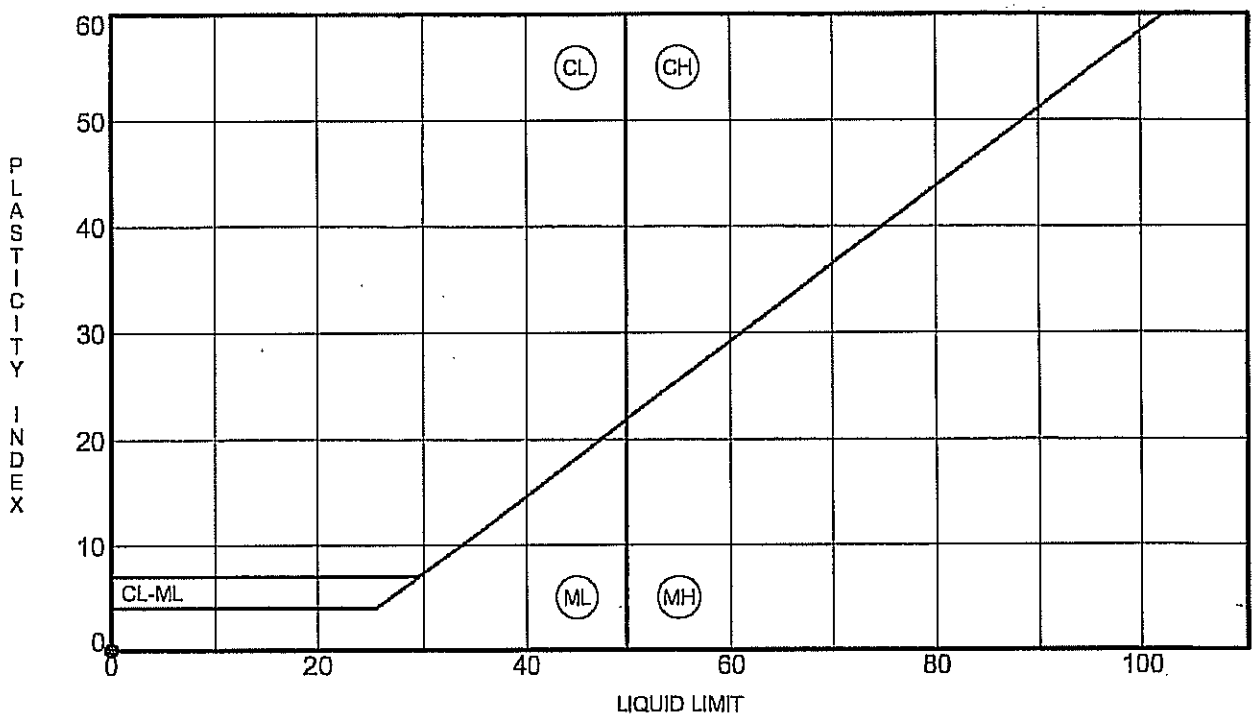
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-4	NP	NP	NP	53.8	SANDY SILT (ML)

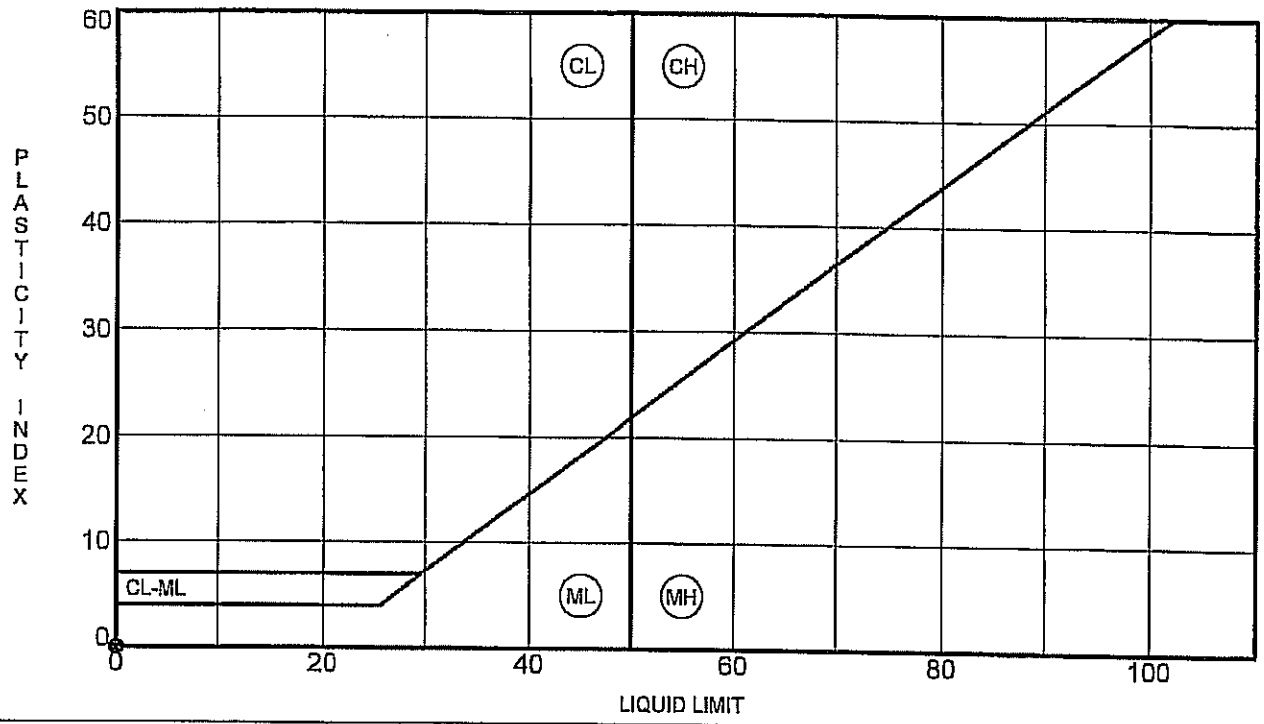
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-5	NP	NP	NP	23.8	SILTY SAND SM

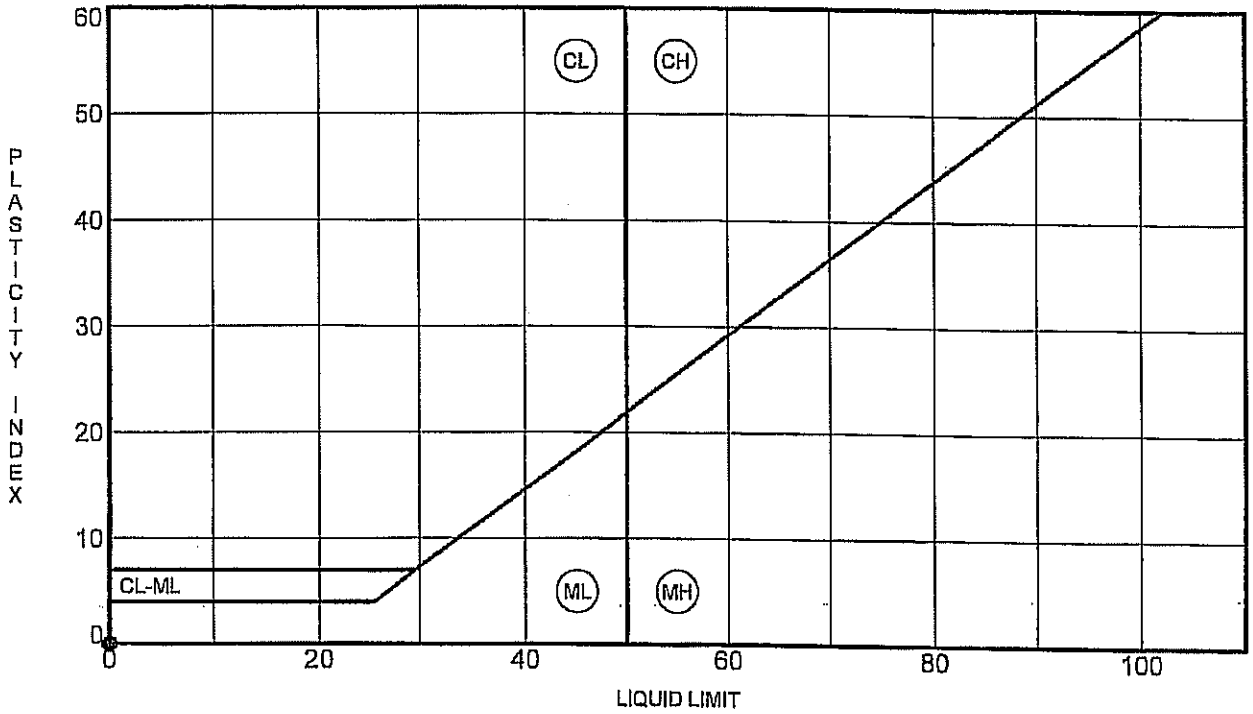
ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300



	Specimen Identification	LL	PL	PI	Fines	Classification
●	S-6	NP	NP	NP	41.0	SILTY SAND SM

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241
Telephone: 803.802.2440
Fax: 803.802.2515

ATTERBERG LIMITS' RESULTS

Project: Marshall Steam Station

Location: Terrell, North Carolina

Number: WJ13.300

1 of 2

PROOFROLLING OBSERVATIONS

ESP ASSOCIATES, P.A.
engineering • surveying • planning

Asbestos @ Design Subgrade

Project Name: Marshall Steam Station

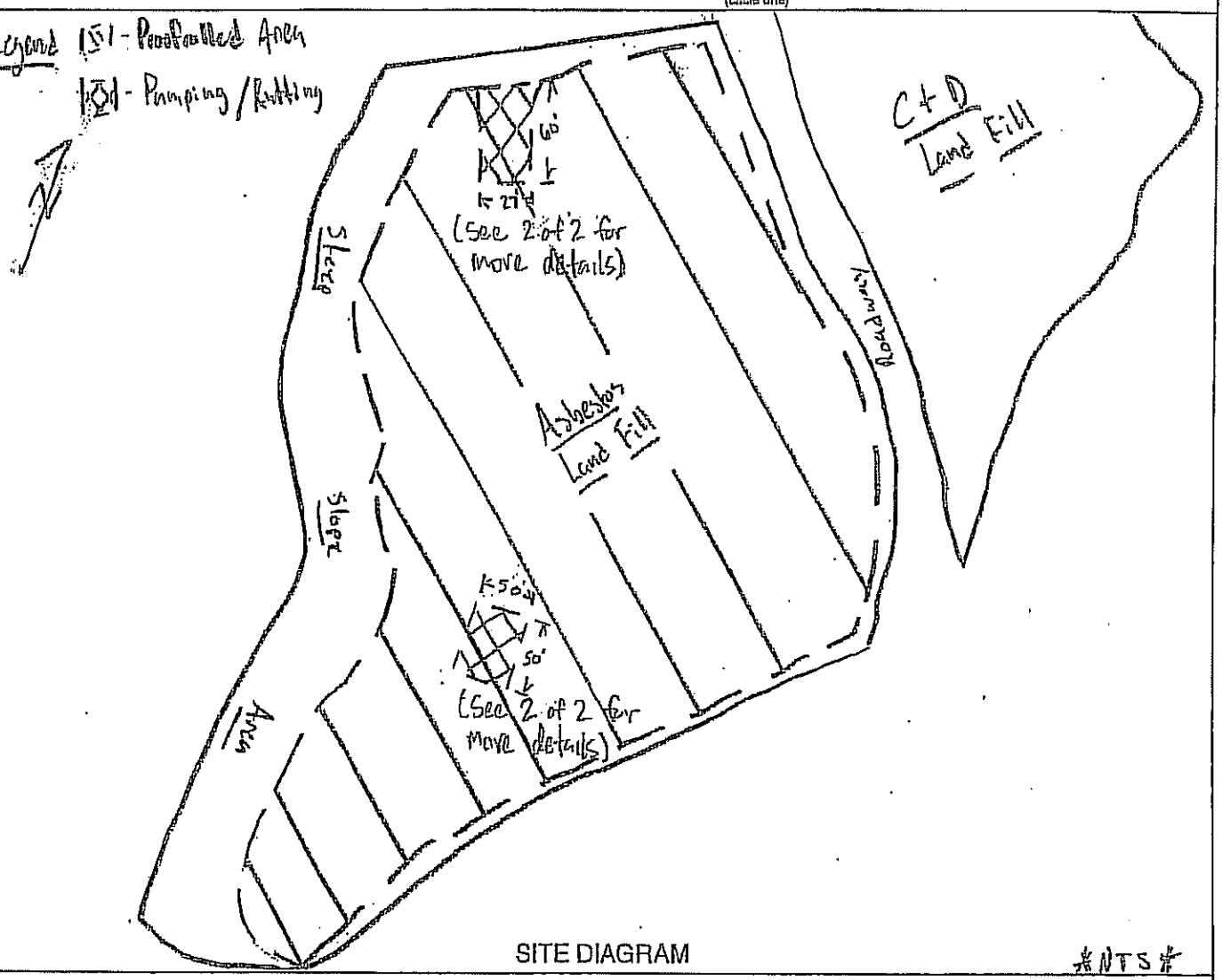
Date: 11/19/08 Project Number: WJ-13,300

~~Engineer~~/Tech: Jason F

Location: Terrell, NC

Weather: Clear

Proofrolling Vehicle: Loaded Pan / Scraper Soil Subgrade / Aggregate Base Course
(circle one)



SITE DIAGRAM

NTS

COMMENTS/RECOMMENDATIONS: Tech on-site to proofroll above noted Design Subgrade of Asbestos Land Fill. Some movement was observed in noted areas, but as a whole area appeared to be stable / suitable @ Design Subgrade. Note: STAGE indicated to Jake S. that the use of a "bridge" lift is acceptable to stabilize the two areas depicted above. JKS

Signature

2 of 2

PROOFROLLING OBSERVATIONS

ESP ASSOCIATES, P.A.
engineering • surveying • planning

Project Name: Marshall Steam Station

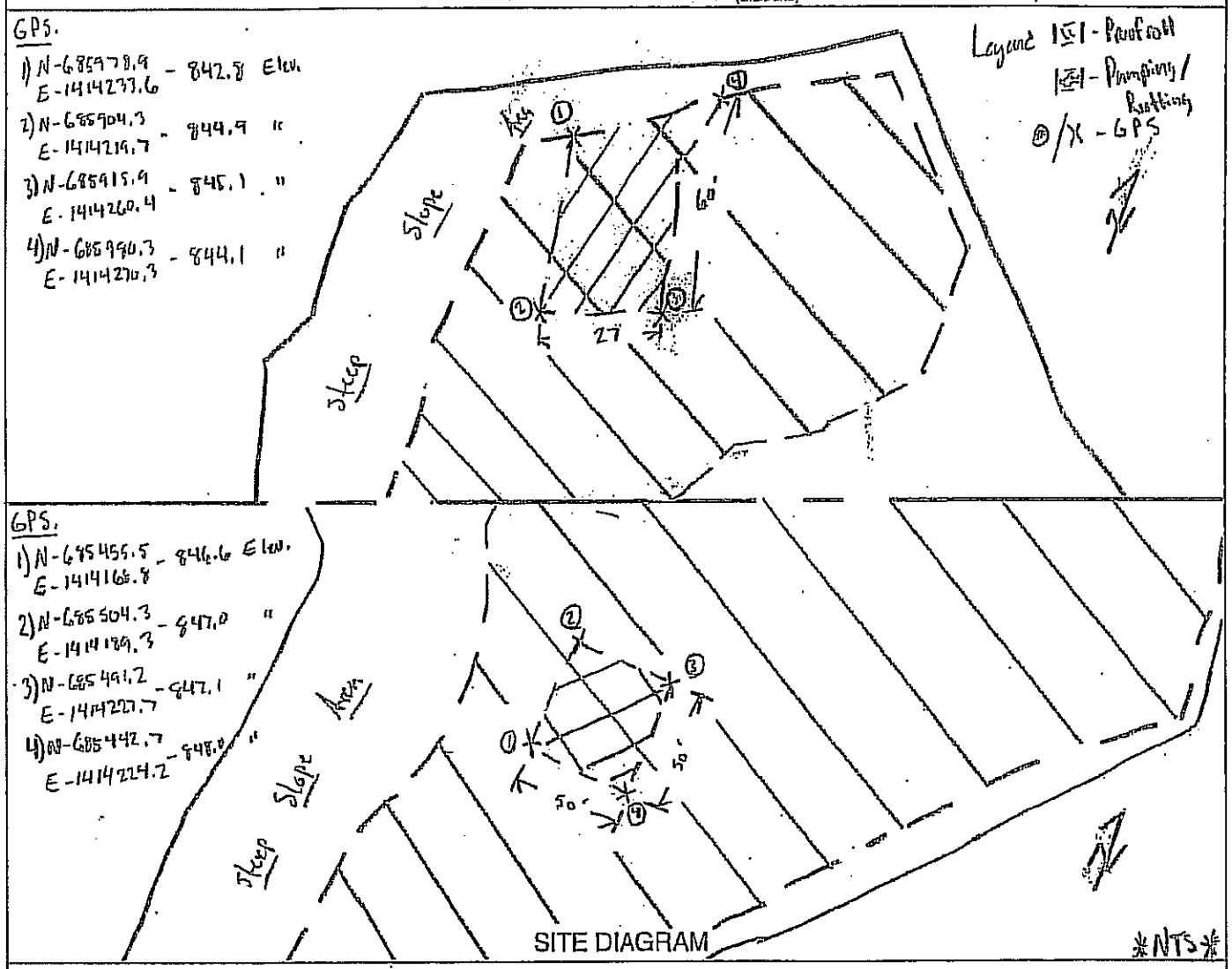
Date: 11/19/08 Project Number: WJ-13,300

~~Engineer~~/Tech: Jason F.

Asbestos @ Design Subgrade

Location: Terrell, NC Weather: clear

Proofrolling Vehicle: Loaded Pan / Scraper (Soil Subgrade / Aggregate Base Course) (circle one)



COMMENTS/RECOMMENDATIONS: Tech on-site to proofroll Asbestos Land Fill Area. Above noted area's showed pumping / movement under loaded equipment and was then noted by reporting documentation.

Signature

COVER SYSTEM THICKNESS EVALUATION
ASBESTOS LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 1

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
1	N685494.77 E1414504.80	3.0	Yes
2	N685452.72 E1414416.45	3.0	Yes
3	N685409.76 E1414326.56	3.0	Yes
4	N685512.20 E1414303.09	3.0	Yes
5	N685565.28 E1414399.85	3.0	Yes
6	N685614.53 E1414494.12	3.0	Yes
7	N685715.56 E1414484.66	3.0	Yes
8	N685675.85 E1414388.40	3.0	Yes
9	N685631.00 E1414293.62	3.0	Yes
10	N685604.62 E1414198.95	3.0	Yes
11	N685470.38 E1414208.37	3.0	Yes
12	N685373.82 E1414236.44	3.0	Yes
13	N685361.70 E1414133.61	3.0	Yes
14	N685278.92 E1414071.02	3.0	Yes
15	N685380.58 E1414043.36	3.0	Yes
16	N685487.07 E1414118.33	3.0	Yes
17	N685599.08 E1414126.64	3.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

COVER SYSTEM THICKNESS EVALUATION
ASBESTOS LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 1 (continued)

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
18	N685693.97 E1414110.02	3.0	Yes
19	N685716.35 E1414193.96	3.0	Yes
20	N685745.53 E1414296.50	3.0	Yes
21	N685782.62 E1414378.12	3.0	Yes
22	N685809.97 E1414453.35	3.0	Yes
23	N685879.46 E1414339.53	3.0	Yes
24	N685847.39 E1414245.54	3.0	Yes
25	N685832.45 E1414149.77	3.0	Yes
26	N685957.63 E1414176.10	3.0	Yes
27	N685967.95 E1414251.41	3.0	Yes
28	N685975.45 E1414323.87	3.0	Yes
29	N685995.20 E1414371.96	3.0	Yes
30	N685887.97 E1414403.65	3.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

COVER SYSTEM THICKNESS EVALUATION
C&D LANDFILL
ESP PROJECT NO. E4-WJ13.300
TABLE 2

Hand Auger No.	GPS Location	Minimum Thickness (feet)	Meets Project Specifications
1	N686234.44 E1414456.75	2.0	Yes
2	N686127.37 E1414447.37	2.0	Yes
3	N686151.75 E1414544.44	2.0	Yes
4	N686195.38 E1414614.15	2.0	Yes
5	N686033.85 E1414485.90	2.0	Yes
6	N686071.08 E1414504.87	2.0	Yes
7	N686103.58 E1414663.03	2.0	Yes
8	N685927.90 E1414511.03	2.0	Yes
9	N685964.49 E1414602.90	2.0	Yes
10	N686007.54 E1414686.74	2.0	Yes
11	N685833.34 E1414578.82	2.0	Yes
12	N685886.55 E1414673.27	2.0	Yes
13	N685923.56 E1414747.47	2.0	Yes
14	N685740.08 E1414574.58	2.0	Yes
15	N685793.23 E1414653.80	2.0	Yes
16	N685642.85 E1414608.16	2.0	Yes
17	N685806.83 E1414721.48	2.0	Yes

*GPS coordinates provided by Morgan Corporation
*Hand Augers performed on 100 foot grid

APPENDIX IV

CONSTRUCTION CERTIFICATION STATEMENT

CONSTRUCTION CERTIFICATION STATEMENT
FOR
MARSHALL STEAM STATION ASBESTOS LANDFILL

OWNER: DUKE ENERGY
OPERATOR: DUKE ENERGY

by:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273-5560

Based on review of the survey information by WSP-Sells, cover system thickness verification and construction materials testing by ESP Associates, P.A., and our observations of the as-built cover system, I hereby certify that the landfill closure cover system thickness and cover system materials were constructed in general accordance with the project specifications and construction drawings and with the NCDENR - Division of Waste Management guidelines as set forth in the Closure Plan and Post-Closure Plan. The minor modifications made during construction are as documented in the As-Built Topographic Survey drawings enclosed in this document.

NORTH CAROLINA PROFESSIONAL SEAL 024486 ENGINEER JASON S. REEVES

Jason S. Reeves, P.E. 1/16/09
N.C. Registration No. 024486

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

Kenneth R. Daly, P.E. 1/16/09
N.C. Registration No. 032153

S&ME

Celebrating 35 Years
1973 • 2008

January 16, 2009

Duke Energy Carolinas, LLC
P.O. Box 1006 / EC10C
Charlotte, NC 28201-1006

Attention: Randy McClamrock

Reference: **Construction Certification Report**
Marshall Steam Station C&D Landfill
Catawba County, NC
S&ME Project No. 1356-08-106

Dear Mr. McClamrock:

S&ME is pleased to submit the *Construction Certification Report* for the Construction and Demolition (C&D) Landfill at Duke Energy's Marshall Steam Station in Catawba County, North Carolina. The Construction Certification Report was completed in general accordance with S&ME's *Proposal for Landfill Design and Permit Services* (S&ME Proposal No. CIV-097-08) dated April 17, 2008 and Duke Energy's approved P.O. MSW01.0000030349 dated April 22, 2008 and approved revisions. This report is provided for your use and/or authorization for final submittal.

S&ME sincerely appreciates the continued opportunity to be of service to Duke Energy. Please contact us at your convenience if you have any questions. Thank you for choosing S&ME.

Respectfully submitted,

S&ME, Inc.

NORTH CAROLINA PROFESSIONAL SEAL 032156 ENGINEER JASON S. REEVES

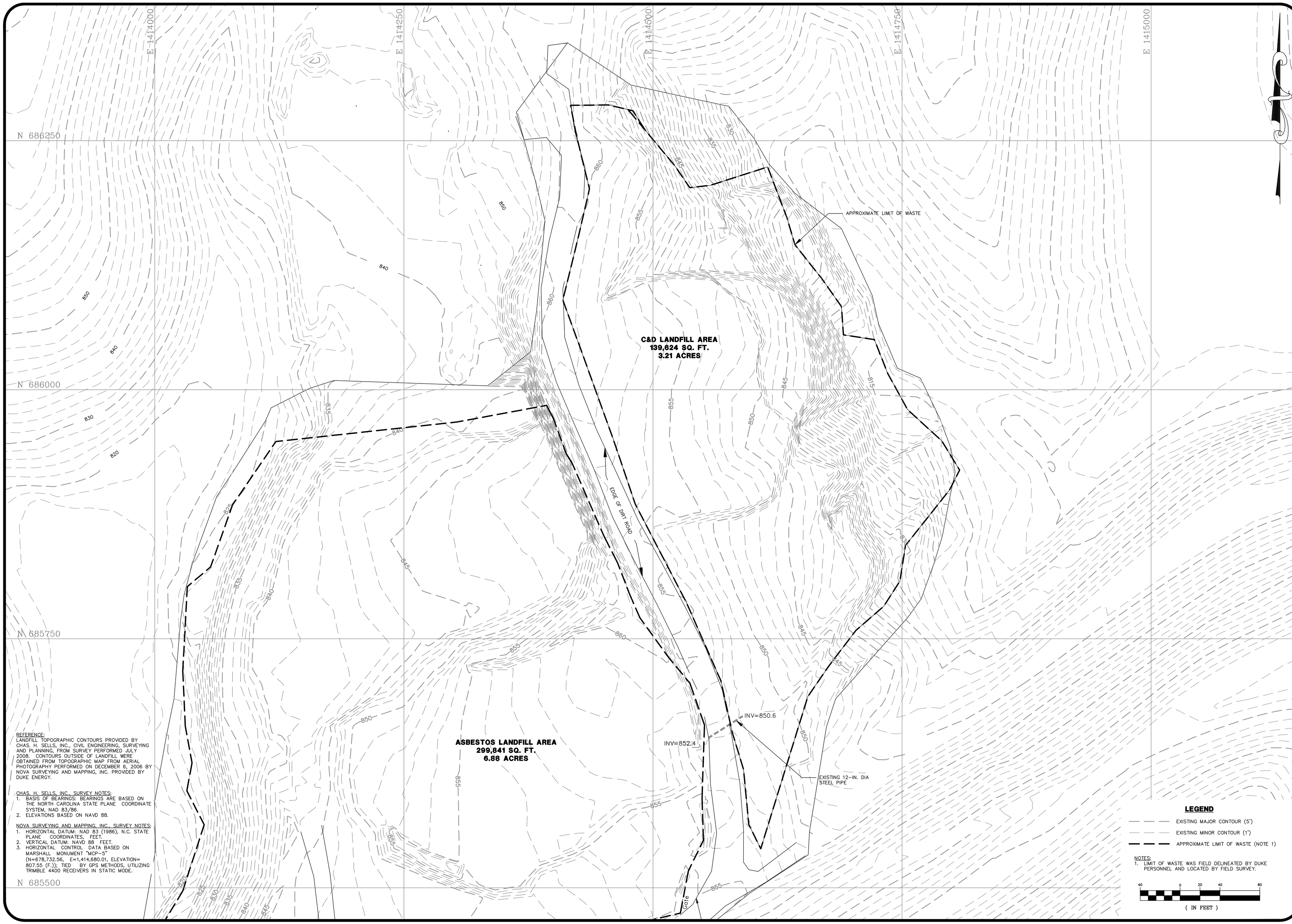
Jason S. Reeves, P.E.
Senior Project Engineer

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

Kenneth R. Daly
Senior Project Engineer

Attachments: Construction Certification Report – Marshall Steam Station C&D Landfill

cc: (1) Donna Burrell, (1) Darrell Wolfe, (1) Ed Sullivan – Duke Energy



REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC., CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

CHAS. H. SELLS, INC., SURVEY NOTES:
1. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
2. ELEVATIONS BASED ON NAVD 88.

NOVA SURVEYING AND MAPPING, INC., SURVEY NOTES:
1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
2. VERTICAL DATUM: NAVD 88 FEET.
3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5" (N=678,732.56, E=1,414,680.01, ELEVATION= 807.55 (F.)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

Duke Energy ©

S&ME
WWW.SMEINC.COM

NORTH CAROLINA PROFESSIONAL SEAL 032453 ENGINEER PROJECT ENGINEER KENNETH R. WILSON

NO.	DATE	DESCRIPTION	BY
--	10-10-08	ISSUED FOR CONSTRUCTION	

EXISTING CONDITIONS MAP

C&D LANDFILL FINAL CLOSURE PLAN
DUKE ENERGY - MARSHALL STEAM STATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWN BY: ELH	CHECKED BY: KRD
DESIGNED BY: ELH	APPROVED BY: KRD
PROJECT NUMBER: 1356-08-106	
SCALE: AS SHOWN	DATE: 10-10-08
DRAWING: 1	OF: 6

DRAWING PATH: G:\1356\DUKE ENERGY\08-106 MARSHALL C&LF CLEOSURE\NOVA\DUKE C&D LANDFILL CLOSURE.DWG

CONSTRUCTION CERTIFICATION STATEMENT
FOR
MARSHALL STEAM STATION C&D LANDFILL

OWNER: DUKE ENERGY
OPERATOR: DUKE ENERGY

by:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273-5560

Based on review of the survey information by WSP-Sells, cover system thickness verification and construction materials testing by ESP Associates, P.A., and our observations of the as-built cover system, I hereby certify that the landfill closure cover system thickness and cover system materials were constructed in general accordance with the project specifications and construction drawings and with the NCDENR - Division of Waste Management guidelines as set forth in the Closure Plan and Post-Closure Plan. The minor modifications made during construction are as documented in the As-Built Topographic Survey drawings enclosed in this document.

NORTH CAROLINA PROFESSIONAL SEAL 24486 ENGINEER JASON S. REEVES

1-16-09

Jason S. Reeves, P.E.
N.C. Registration No. 024486

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY

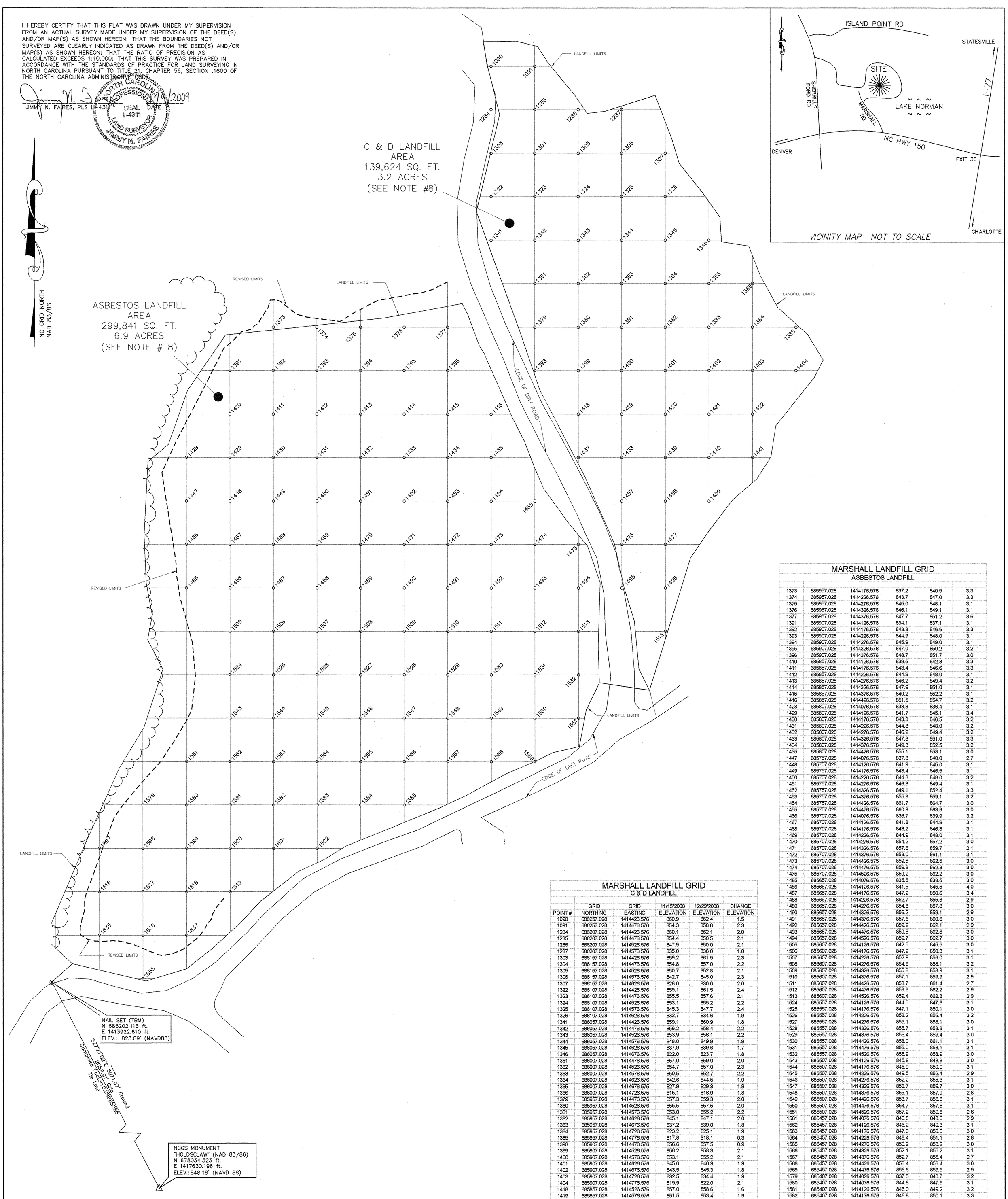
1/16/09

Kenneth R. Daly, P.E.
N.C. Registration No. 032153

I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 1/9/2009

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



MARSHALL LANDFILL GRID
C & D LANDFILL

POINT #	GRID NORTHING	GRID EASTING	11/15/2008 ELEVATION	12/29/2008 ELEVATION	CHANGE ELEVATION
1090	686257.028	1414426.576	860.9	862.4	1.5
1091	686257.028	1414476.576	854.3	856.6	2.3
1284	686207.028	1414426.576	860.1	862.1	2.0
1285	686207.028	1414476.576	854.4	856.5	2.1
1286	686207.028	1414526.576	847.9	850.0	2.1
1287	686207.028	1414576.576	835.0	836.0	1.0
1303	686157.028	1414426.576	859.2	861.5	2.3
1304	686157.028	1414476.576	854.8	857.0	2.2
1305	686157.028	1414526.576	850.7	852.8	2.1
1306	686157.028	1414576.576	842.7	845.0	2.3
1307	686157.028	1414626.576	828.0	830.0	2.0
1322	686107.028	1414426.576	859.1	861.5	2.4
1323	686107.028	1414476.576	855.5	857.6	2.1
1324	686107.028	1414526.576	853.1	855.2	2.2
1325	686107.028	1414576.576	845.3	847.7	2.4
1326	686107.028	1414626.576	832.7	834.6	1.9
1341	686057.028	1414426.576	859.1	860.9	1.8
1342	686057.028	1414476.576	856.2	858.4	2.2
1343	686057.028	1414526.576	853.9	856.1	2.2
1344	686057.028	1414576.576	848.0	849.9	1.9
1345	686057.028	1414626.576	837.9	839.6	1.7
1346	686057.028	1414676.576	822.0	823.7	1.8
1361	686007.028	1414476.576	857.0	859.0	2.0
1362	686007.028	1414526.576	854.7	857.0	2.3
1363	686007.028	1414576.576	850.5	852.7	2.2
1364	686007.028	1414626.576	842.6	844.5	1.9
1365	686007.028	1414676.575	827.9	829.8	1.9
1366	686007.028	1414726.575	815.1	816.9	1.8
1379	685957.028	1414476.576	857.3	859.3	2.0
1380	685957.028	1414526.576	855.5	857.5	2.0
1381	685957.028	1414576.576	853.0	855.2	2.2
1382	685957.028	1414626.576	845.1	847.1	2.0
1383	685957.028	1414676.576	837.2	839.0	1.8
1384	685957.028	1414726.576	823.2	825.1	1.9
1385	685957.028	1414776.576	817.8	818.1	0.3
1398	685907.028	1414476.576	856.6	857.5	0.9
1399	685907.028	1414526.576	856.2	858.3	2.1
1400	685907.028	1414576.576	853.1	855.2	2.1
1401	685907.028	1414626.576	845.0	846.9	1.9
1402	685907.028	1414676.576	843.5	845.3	1.8
1403	685907.028	1414726.576	832.5	834.4	1.9
1404	685907.028	1414776.576	819.9	822.0	2.1
1418	685857.028	1414526.576	857.0	858.6	1.6
1419	685857.028	1414576.576	851.5	853.4	1.9
1420	685857.028	1414626.576	845.7	847.7	2.0
1421	685857.028	1414676.576	844.3	846.2	1.9
1422	685857.028	1414726.576	837.2	839.0	1.8
1437	685807.028	1414526.576	855.3	857.1	1.9
1438	685807.028	1414576.576	851.3	853.3	2.0
1439	685807.028	1414626.576	847.6	849.5	1.9
1440	685807.028	1414676.576	845.3	847.2	1.9
1441	685807.028	1414726.576	834.2	835.6	1.4
1457	685757.028	1414576.576	853.3	855.1	1.9
1458	685757.028	1414626.576	850.1	852.1	2.0
1459	685757.028	1414676.576	846.4	848.4	2.0
1476	685707.028	1414576.576	853.0	855.2	2.2
1477	685707.028	1414626.576	851.6	853.5	1.9
1495	685657.028	1414576.576	853.6	855.6	2.0
1496	685657.028	1414626.576	851.4	853.4	2.0
1515	685607.028	1414626.576	851.7	853.9	2.2

MARSHALL LANDFILL GRID
ASBESTOS LANDFILL

1373	685957.028	1414176.576	837.2	840.5	3.3
1374	685957.028	1414226.576	843.7	847.0	3.3
1375	685957.028	1414276.576	845.0	848.1	3.1
1376	685957.028	1414326.576	846.1	849.1	3.1
1377	685957.028	1414376.576	847.7	851.2	3.6
1391	685907.028	1414126.576	834.1	837.1	3.1
1392	685907.028	1414176.576	843.3	846.6	3.3
1393	685907.028	1414226.576	844.9	848.0	3.1
1394	685907.028	1414276.576	845.9	849.0	3.1
1395	685907.028	1414326.576	847.0	850.2	3.2
1396	685907.028	1414376.576	848.7	851.7	3.0
1410	685857.028	1414126.576	839.5	842.8	3.3
1411	685857.028	1414176.576	843.4	846.6	3.3
1412	685857.028	1414226.576	844.9	848.0	3.1
1413	685857.028	1414276.576	846.2	849.4	3.2
1414	685857.028	1414326.576	847.9	851.0	3.1
1415	685857.028	1414376.576	849.2	852.2	3.1
1416	685857.028	1414426.576	851.5	854.7	3.2
1428	685807.028	1414076.576	833.3	836.4	3.1
1429	685807.028	1414126.576	841.7	845.1	3.4
1430	685807.028	1414176.576	843.3	846.5	3.2
1431	685807.028	1414226.576	844.8	848.0	3.2
1432	685807.028	1414276.576	846.2	849.4	3.2
1433	685807.028	1414326.576	847.8	851.0	3.3
1434	685807.028	1414376.576	849.3	852.5	3.2
1435	685807.028	1414426.576	855.1	858.1	3.0
1447	685757.028	1414076.576	837.3	840.0	2.7
1448	685757.028	1414126.576	841.9	845.0	3.1
1449	685757.028	1414176.576	843.4	846.5	3.1
1450	685757.028	1414226.576	844.8	848.0	3.2
1451	685757.028	1414276.576	846.3	849.4	3.1
1452	685757.028	1414326.576	849.1	852.4	3.3
1453	685757.028	1414376.576	855.9	859.1	3.2
1454	685757.028	1414426.576	861.7	864.7	3.0
1455	685757.028	1414476.575	860.9	863.9	3.0
1466	685707.028	1414076.576	836.7	839.9	3.2
1467	685707.028	1414126.576	841.8	844.9	3.1
1468	685707.028	1414176.576	843.2	846.3	3.1
1469	685707.028	1414226.576	844.9	848.0	3.1
1470	685707.028	1414276.576	854.2	857.2	3.0
1471	685707.028	1414326.576	857.6	859.7	2.1
1472	685707.028	1414376.576	858.0	861.1	3.1
1473	685707.028	1414426.575	859.5	862.5	3.0
1474	685707.028	1414476.575	859.8	862.8	3.0
1475	685707.028	1414526.575	859.2	862.2	3.0
1485	685657.028	1414076.576	835.5	838.5	3.0
1486	685657.028	1414126.576	841.5	845.5	4.0
1487	685657.028	1414176.576	847.2	850.6	3.4
1488	685657.028	1414226.576	852.7	855.6	2.9
1489	685657.028	1414276.576	854.8	857.8	3.0
1490	685657.028	1414326.576	856.2	859.1	2.9
1491	685657.028	1414376.576	857.6	860.6	3.0
1492	685657.028	1414426.576	859.2	862.1	2.9
1493	685657.028	1414476.576	859.5	862.5	3.0
1494	685657.028	1414526.576	859.7	862.7	3.0
1505	685607.028	1414126.576	842.5	845.5	3.0
1506	685607.028	1414176.576	847.2	850.3	3.1
1507	685607.028	1414226.576	852.9	856.0	3.1
1508	685607.028	1414276.576	854.9	858.1	3.2
1509	685607.028	1414326.576	855.8	858.9	3.1
1510	685607.028	1414376.576	857.1	859.9	2.9
1511	685607.028	1414426.576	858.7	861.4	2.7
1512	685607.028	1414476.576	859.3	862.2	2.9
1513	685607.028	1414526.576	859.4	862.3	2.9
1524	685557.028	1414126.576	844.5	847.6	3.1
1525	685557.028	1414176.576	847.1	850.1	3.0
1526	685557.028	1414226.576	853.2	856.4	3.2
1527	685557.028	1414276.576	855.1	858.1	3.0
1528	685557.028	1414326.576	855.7	858.8	3.1
1529	685557.028	1414376.576	856.4	859.4	3.0
1530	685557.028	1414426.576	858.0	861.1	3.1
1531	685557.028	1414476.576	855.0	858.1	3.1
1532	685557.028	1414526.576	855.9	858.9	3.0
1543	685507.028	1414126.576	845.8	848.8	3.0
1544	685507.028	1414176.576	846.9	850.0	3.1
1545	685507.028	1414226.576	849.5	852.4	2.9
1546	685507.028	1414276.576	852.2	855.3	3.1
1547	685507.028	1414326.576	856.7	859.7	3.0
1548	685507.028	1414376.576	855.1	857.9	2.8
1549	685507.028	1414426.576	853.7	856.8	3.1
1550	685507.028	1414476.576	854.7	857.8	3.1
1551	685507.028	1414526.576	857.2	859.8	2.6
1561	685457.028	1414076.576	840.8	843.6	2.9
1562	685457.028	1414126.576	846.2	849.3	3.1
1563	685457.028	1414176.576	847.0	850.0	3.0
1564	685457.028	1414226.576	848.4	851.1	2.8
1565	685457.028	1414276.576	850.2	853.2	3.0
1566	685457.028	1414326.576	852.1	855.2	3.1
1567	685457.028	1414376.576	852.7	855.4	2.7
1568	685457.028	1414426.576	853.4	856.4	3.0
1569	685457.028	1414476.576	856.6	859.5	2.9
1579	685407.028	1414026.576	837.5	840.7	3.2
1580	685407.028	1414076.576	844.8	847.9	3.1
1581	685407.028	1414126.576	846.0	849.2	3.2
1582	685407.028	1414176.576	846.8	850.1	3.3
1583	685407.028	1414226.576	848.5	851.6	3.1
1584	685407.028	1414276.576	850.4	853.6	3.2
1585	685407.028	1414326.576	852.2	855.1	2.9
1597	685357.028	1413976.575	830.9	834.0	3.1
1598	685357.028	1414026.576	843.0	846.2	3.2
1599	685357.028	1414076.576	844.4	847.5	3.1
1600	685357.028	1414126.576	845.5	848.4	2.9
1601	685357.028	1414176.576	846.9	850.1	3.2
1602	685357.028	1414226.576	849.0	851.9	2.9
1616	685307.028	1413976.576	835.2	838.3	3.1
1617	685307.028	1414026.576	842.7	846.3	3.6
1618	685307.028	1414076.576	843.9	846.8	2.9
1619	685307.028	1414126.576	845.0	848.0	3.0
1635	685257.028	1413976.576	837.3	840.1	2.8
1636	685257.028	1414026.576	842.5	846.6	4.1
1637	685257.028	1414076.576	843.5	846.5	3.0

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.
2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.
3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.
5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.
6) ELEVATIONS BASED ON NAVD 88.
7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).
8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.
9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

LEGEND

ELEV. = ELEVATION
◉ = NAIL SET
—/\/— = NOT TO SCALE
⌒⌒⌒ = TREELINE
TBM = TEMPORARY BENCHMARK

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

GRID FILL VERIFICATION SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:
S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

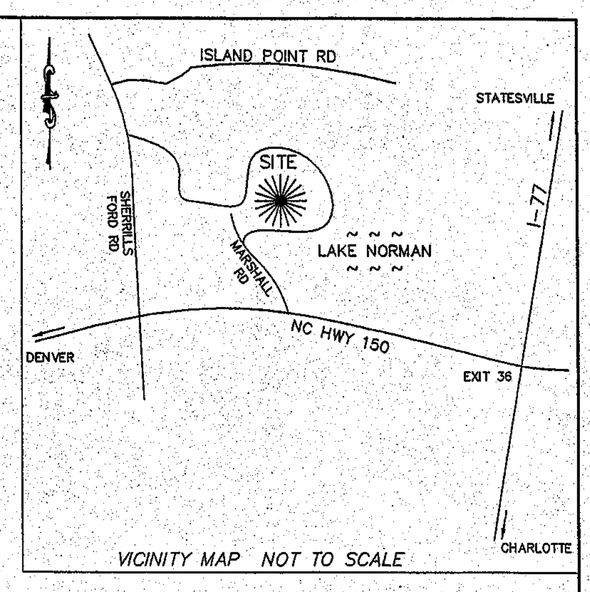
WSP • SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	NOVEMBER/DECEMBER 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JANUARY 9, 2009	1 of 1	056234-001-GRID

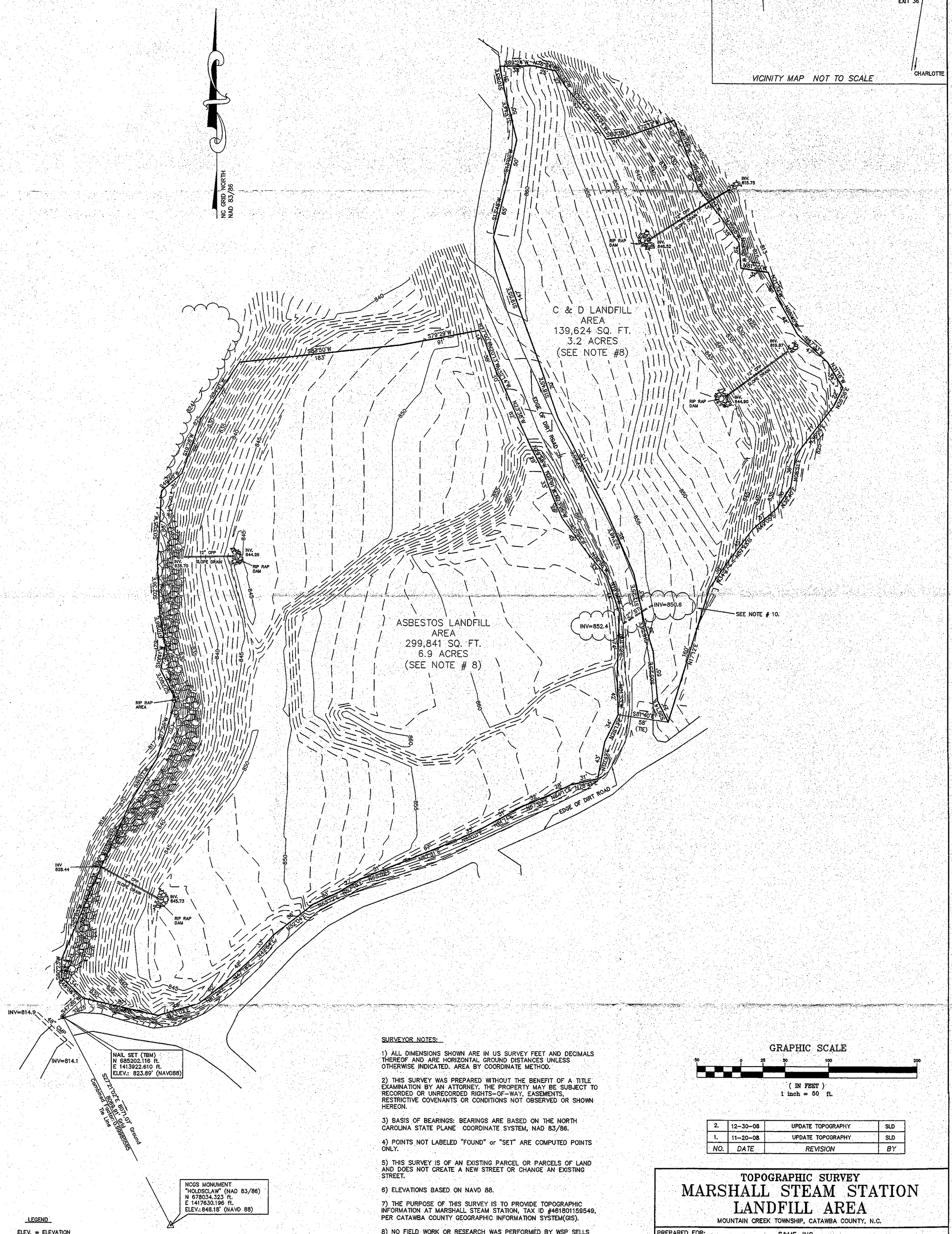
I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

JIMMY N. FAIRES, PLS L-4311 SEAL L-4311 DATE 12/30/2008

NORTH CAROLINA PROFESSIONAL SEAL L-4311 LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

ELEV. = ELEVATION

◉ = NAIL SET

—/\/— = NOT TO SCALE

⌒⌒⌒ = TREELINE

INV = INVERT

▨ = RIP RAP

TBM = TEMPORARY BENCHMARK

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE EXAMINATION BY AN ATTORNEY. THE PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS-OF-WAY, EASEMENTS, RESTRICTIVE COVENANTS OR CONDITIONS NOT OBSERVED OR SHOWN HEREON.

3) BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.

4) POINTS NOT LABELED "FOUND" or "SET" ARE COMPUTED POINTS ONLY.

5) THIS SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.

6) ELEVATIONS BASED ON NAVD 88.

7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY WSP SELLS TO DETERMINE OR VERIFY ANY BOUNDARY LINES. PERIMETER METES AND BOUNDS AND AREAS ARE SHOWN FOR LANDFILL LIMITS ONLY WHICH WERE MARKED BY A DUKE ENERGY REPRESENATIVE.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPHY UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.	12-30-08	UPDATE TOPOGRAPHY	SLD
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY
MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR:

S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

WSP · SELLS
Transportation & Infrastructure
128 Overhill Drive Suite 105 • Mooresville, NC 28117 • 704.662.0100
www.wspsells.com

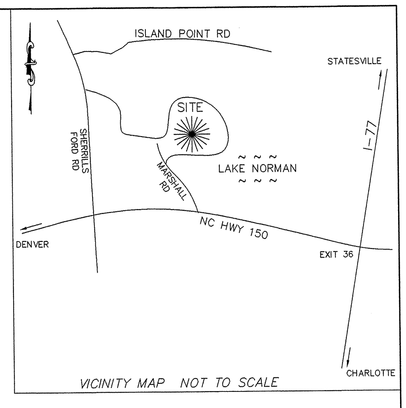
Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
PORTION OF 461801159549	SLD	JULY 2008	112	056234.001
Scale	**Checked By**	**Date**	**Drwg. No.**	**File Name**
1" = 50'	JNF	JULY 16, 2008	1 of 1	056234-001-TOPO

I HEREBY CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION OF THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM THE DEED(S) AND/OR MAP(S) AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED EXCEEDS 1:10,000; THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA PURSUANT TO TITLE 21, CHAPTER 56, SECTION .1600 OF THE NORTH CAROLINA ADMINISTRATIVE CODE.

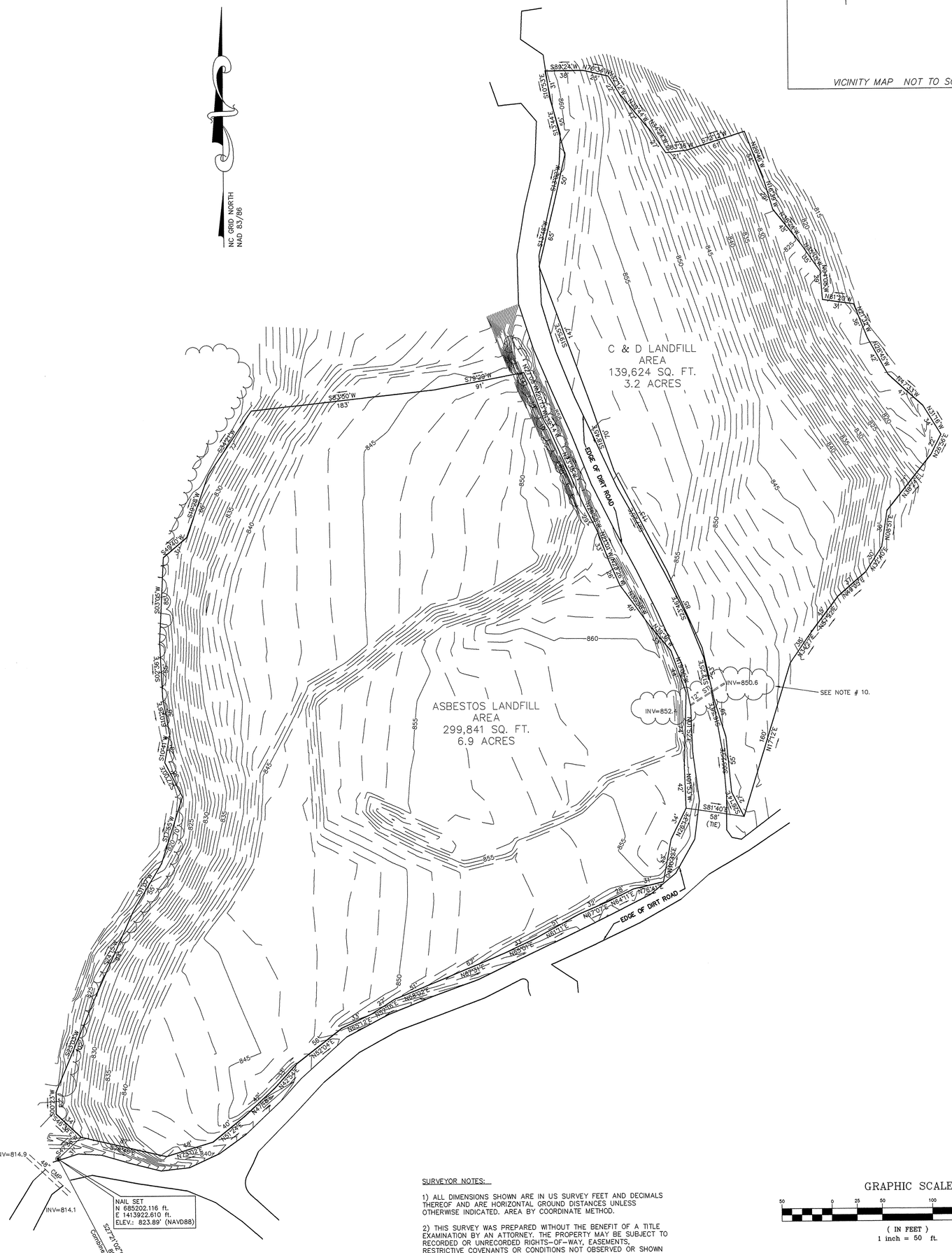
JIMMY N. FAIRES, PLS L-4311 11/25/2008

SEAL L-4311 DATE

NORTH CAROLINA PROFESSIONAL SEAL LAND SURVEYOR JIMMY N. FAIRES



VICINITY MAP NOT TO SCALE



LEGEND

Elev. = Elevation

◉ = Nail Set

Inv = Invert

= Not To Scale

= Treeline

SURVEYOR NOTES:

1) ALL DIMENSIONS SHOWN ARE IN US SURVEY FEET AND DECIMALS THEREOF AND ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE INDICATED. AREA BY COORDINATE METHOD.

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7) THE PURPOSE OF THIS SURVEY IS TO PROVIDE TOPOGRAPHIC INFORMATION AT MARSHALL STEAM STATION, TAX ID #461801159549, PER CATAWBA COUNTY GEOGRAPHIC INFORMATION SYSTEM(GIS).

8) NO FIELD WORK OR RESEARCH WAS PERFORMED BY CHAS. H. SELLS, INC. TO DETERMINE OR VERIFY ANY BOUNDARY LINES.

9) COORDINATE VALUES AS SHOWN HEREON ARE GRID (US SURVEY FOOT) AND BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD 83/86. THE AVERAGE COMBINED FACTOR USED FOR THE PROJECT WAS 0.99985585 COORDINATE VALUES FOR THE NCGS MONUMENT "HOLDSCLAW" WAS OBSERVED.

10) INVERTS AND PIPE NOT FOUND AT DATE OF THIS TOPOGRAPH UPDATE.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
2.			
1.	11-20-08	UPDATE TOPOGRAPHY	SLD

TOPOGRAPHIC SURVEY

MARSHALL STEAM STATION LANDFILL AREA

MOUNTAIN CREEK TOWNSHIP, CATAWBA COUNTY, N.C.

PREPARED FOR: S&ME, INC.
9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: 704.523.4726 FAX: 704.525.3953

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Tax Parcel Number	Drawn By	Date of Field Survey	Field Book	Job No.
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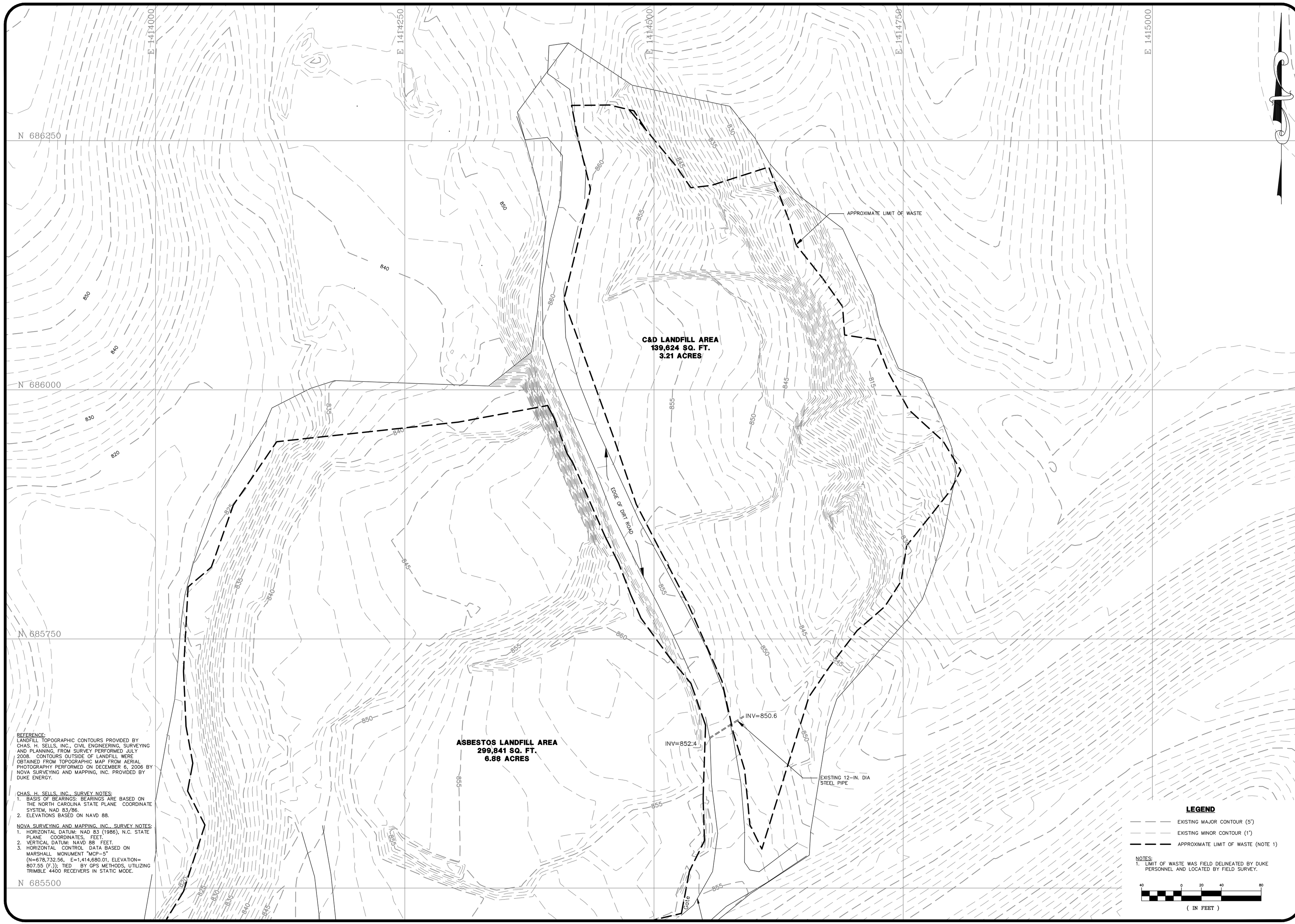

REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC., CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

CHAS. H. SELLS, INC., SURVEY NOTES:
1. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83/86.
2. ELEVATIONS BASED ON NAVD 88.

NOVA SURVEYING AND MAPPING, INC., SURVEY NOTES:
1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
2. VERTICAL DATUM: NAVD 88 FEET.
3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5". (N=678,732.56, E=1,414,680.01, ELEVATION= 807.55 (F.)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

Duke Energy®

S&ME
WWW.SMEINC.COM

NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER

NO.	DATE	DESCRIPTION	BY
--	10-10-08	ISSUED FOR CONSTRUCTION	

EXISTING CONDITIONS MAP

C&D LANDFILL FINAL CLOSURE PLAN
DUKE ENERGY - MARSHALL STEAM STATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWN BY: ELH	CHECKED BY: KRD
DESIGNED BY: ELH	APPROVED BY: KRD
PROJECT NUMBER: 1356-08-106	
SCALE: AS SHOWN	DATE: 10-10-08
DRAWING: 1	OF: 6

DRAWING PATH: G:\1356\DUKE ENERGY\08-106 MARSHALL C&D LF CLOSURE\DWG\FINCAD LANDFILL CLOSURE.DWG

REFERENCE:
LANDFILL TOPOGRAPHIC CONTOURS PROVIDED BY CHAS. H. SELLS, INC. CIVIL ENGINEERING, SURVEYING AND PLANNING, FROM SURVEY PERFORMED JULY 2008. CONTOURS OUTSIDE OF LANDFILL WERE OBTAINED FROM TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 6, 2006 BY NOVA SURVEYING AND MAPPING, INC. PROVIDED BY DUKE ENERGY.

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1. HORIZONTAL DATUM: NAD 83 (1986), N.C. STATE PLANE COORDINATES, FEET.
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3. HORIZONTAL CONTROL DATA BASED ON MARSHALL MONUMENT "MCP-5" (N=678,732.56, E=1,414,680.01, ELEVATION=807.55 (F)); TIED BY GPS METHODS, UTILIZING TRIMBLE 4400 RECEIVERS IN STATIC MODE.

LEGEND

- EXISTING MAJOR CONTOUR (5')
- EXISTING MINOR CONTOUR (1')
- APPROXIMATE LIMIT OF WASTE (NOTE 1)

NOTES:
1. LIMIT OF WASTE WAS FIELD DELINEATED BY DUKE PERSONNEL AND LOCATED BY FIELD SURVEY.

40 0 20 40 80
(IN FEET)

DRAWN BY: ELH	EXISTING CONDITIONS MAP
DESIGNED BY: ELH	C&D LANDFILL FINAL CLOSURE PLAN DUKE ENERGY - MARSHALL STEAM STATION CATAWBA COUNTY, NORTH CAROLINA
CHECKED BY:	
APPROVED BY:	
PROJECT NUMBER 1356-08-106	
SCALE: AS SHOWN	DATE: 9-4-08
DRAWING: 1	OF: 6

NO.	DATE	DESCRIPTION	BY

NORTH CAROLINA PROFESSIONAL SEAL 032158 ENGINEER KENNETH R. DALY

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DRAWING PATH: Q:\1356\DUKE ENERGY\08-106 MARSHALL C&DLF CLOSURE\DWG\C&D LANDFILL CLOSURE.DWG

SCALE:	1-IN:1600-FT
DATE:	1-12-2009
DRAWN BY:	WMH
PROJECT NO:	1356-08-106

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SITE VICINITY MAP
C&D LANDFILL CLOSURE
DUKE ENERGY-MARSHALL STEAM STATION
CATAWBA COUNTY, NC

FIGURE NO.
1

Q:\1356\DUKE ENERGY\08-106 Marshall C&DLF Closure\FIGURE1.dwg