



Consulting Engineers and Scientists ♦ Construction and Materials Testing

July 23, 1998

Mr. Tim Jewett  
Western Area Engineer  
NCDEHNR - Solid Waste Section  
585 Waughtown Street  
Winston-Salem, NC 27107



Re: *Project Certification - Phase II Partial Closure  
Greensboro, North Carolina  
Olver Project Number 20114*

Dear Mr. Jewett:

The City of Greensboro is completing closure activities for Phase II of the White Street Sanitary Landfill and is currently placing construction and demolition material in the Stage I area approved by permit modification dated January 7, 1998. The City has completed a partial closure of the approximately four-acre Stage II area and is requesting approval to expand construction and demolition waste disposal into that area.

In accordance with the permit requirements, attached are the laboratory and field tests conducted by Olver Incorporated to verify that the clay cap was placed as specified in the Closure Plan. As indicated on the attached figure, hand auger tests were conducted to verify the clay cap thickness and the elevation of top of clay was recorded. As observed, the thickness of the clay cap was greater than 18 inches and the east-to-west grade across the area is greater than the 8 percent specified by the Closure Plan. This information will be incorporated into the Construction Quality Assurance Certification report for the total Phase II area upon completion of final closure.

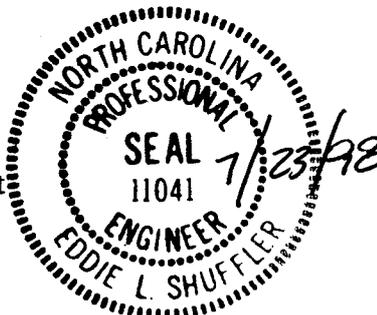
Based on field observations and the attached monitoring data, it is the professional opinion of Olver Incorporated that the construction of the project components for partial site closure was constructed in general accordance with the approved closure plan, current NCDEHNR Solid Waste Rules and Regulations, and acceptable engineering practices.

If you should have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

OLVER INCORPORATED

Eddie L. Shuffler, P.E., Vice President  
North Carolina Registration No. 11041

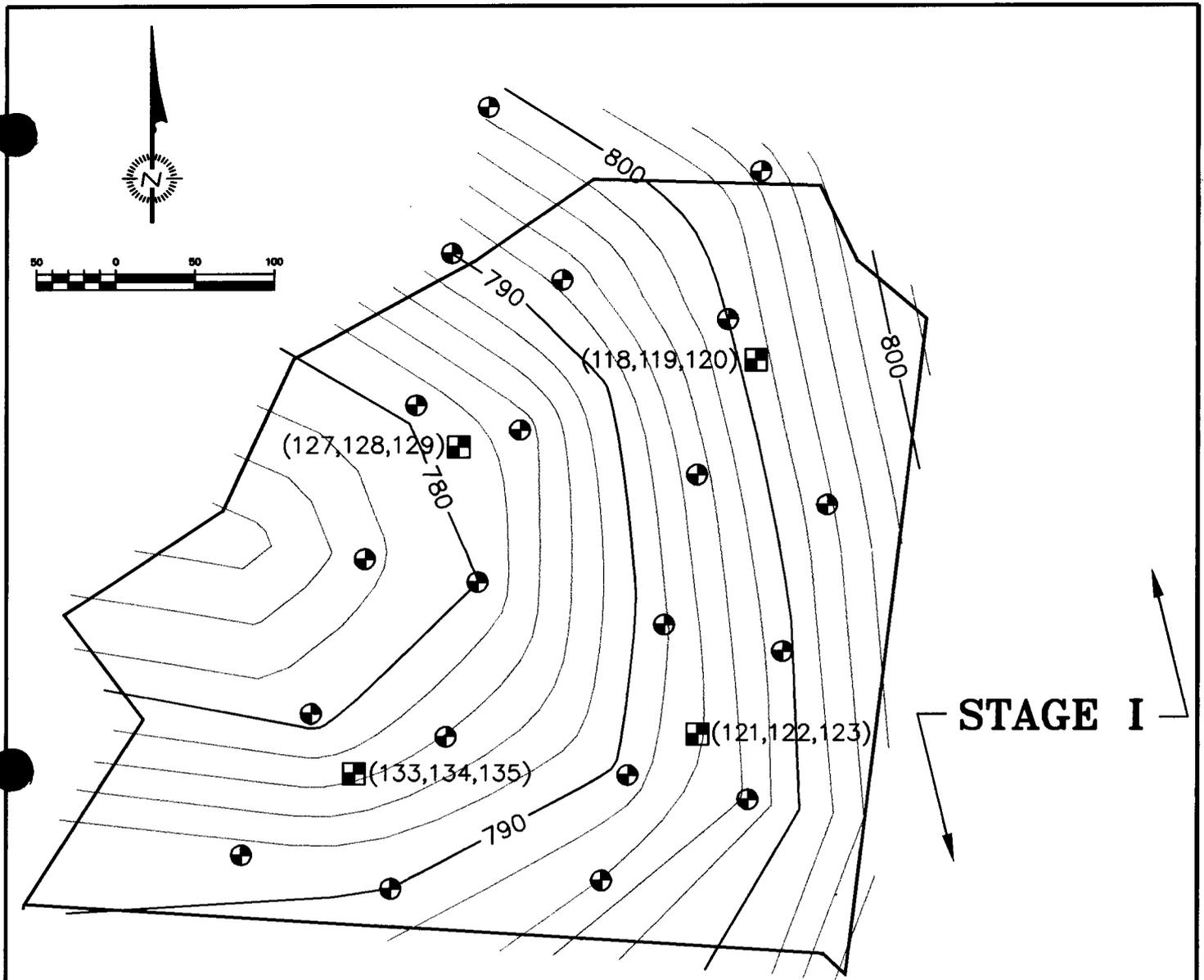


ELS/det

Attachments

*Blacksburg, Virginia*  
1116 South Main Street  
Blacksburg, Virginia 24060  
(540) 552-5548  
(540) 552-5577 FAX

*Charlotte, North Carolina*  
4957 Albemarle Road  
Charlotte, North Carolina 28205  
(704) 535-1100  
(704) 535-1148 FAX



**LEGEND**

- ⊕ - HAND AUGER
- ⊞ - FIELD TEST LOCATION (TEST NUMBER)

NOTE: TOPOGRAPHIC CONTOURS PREPARED BY THE CITY OF GREENSBORO INDICATE TOP OF CLAY ELEVATIONS.

**CITY OF GREENSBORO  
 WHITE STREET LANDFILL  
 PHASE II CLOSURE  
 STAGE II C & D AREA  
 FIGURE 1**

SCALE: 1" = 100'  
 JOB. NO.: 20114

DATE: JULY 23, 1998  
 FILE: G:\DCA\20114\PHASEII.DWG



**CITY OF GREENSBORO  
WHITE STREET LANDFILL**

**PHASE II CLOSURE  
STAGE II C&D AREA**

Test	Moisture (%)	Dry Density	Proctor (%)	Lift
118	25.9	98.2	97.6	3rd
119	25.2	100.4	99.8	2nd
120	26.0	99.7	99.1	1st
121	28.4	95.8	95.3	3rd
122	27.6	97.0	96.4	2nd
123	28.2	96.3	95.7	1st
124	26.0	97.6	97.0	3rd
125	27.0	96.3	95.8	2nd
126	26.3	97.0	96.4	1st
127	27.3	97.0	96.5	3rd
128	28.1	95.5	94.9	2nd
129	27.7	95.5	95.0	1st
130	26.5	97.3	96.7	3rd
131	26.2	97.0	96.4	2nd
132	25.9	96.9	96.3	1st
133	26.0	97.1	96.5	3rd
134	25.8	96.7	96.1	2nd
135	26.5	96.5	95.9	1st

Note: Soil Type A was used for the construction of the clay cap for the Stage II C&D disposal area. The proctor of 100.6 LBS/FT<sup>3</sup> at 22 percent moisture for Soil Type A is the average value from Lift 2 and Lift 3 of Test Pad No. 1.

Job No.: 20114  
Report No.: 1632  
Date Issued: 7/28/97

SOILS/AGGREGATE TEST REPORT

Client: City of Greensboro, N.C.  
Date Received: July 23, 1997  
Sample Number: S-0845  
Project: White St. Landfill Closure  
Project Manager: Tim Loveday  
Contractor: N/A  
Source of Material: Test Pad - 2nd Lift  
Description of Material: ELASTIC SILT - Red/Brown (MH)

Moisture-Density Relation:

Test Method: ASTM D-698A  
Maximum Dry Density: 100.5 pounds per cubic foot (pcf)  
Optimum Moisture Content: 22.0 percent  
Moisture Content: 24.7 percent

Soil Analysis: N/A

<u>Sieve Size</u>	<u>Percent Passing</u>
<u>1/2"</u>	<u>100.0</u>
<u>3/8"</u>	<u>98.9</u>
<u># 4</u>	<u>98.8</u>
<u># 8</u>	<u>98.5</u>
<u># 16</u>	<u>98.1</u>
<u># 30</u>	<u>97.7</u>
<u># 50</u>	<u>96.3</u>
<u>#100</u>	<u>93.4</u>
<u>#200</u>	<u>87.1</u>

Specific Gravity: N/A  
Liquid Limit: 55  
Plastic Limit: 36  
Plasticity Index: 19  
Classification: (MH)  
Permeability: N/A

Submitted by:

John H. Kilby  
John H. Kilby, Manager  
Materials Testing Lab



OLVER INCORPORATED  
Consulting Engineers • Environmental Laboratories

1116 SOUTH MAIN STREET  
BLACKSBURG, VIRGINIA 24060

FAX (703) 552-5577  
(703) 552-5548

Client's No: CITY OF GREENSBORO Job No. 20114  
Date: 28 July 97 Sample No. S-0845  
Project: WHITE STREET  
LANDFILL CLOSURE

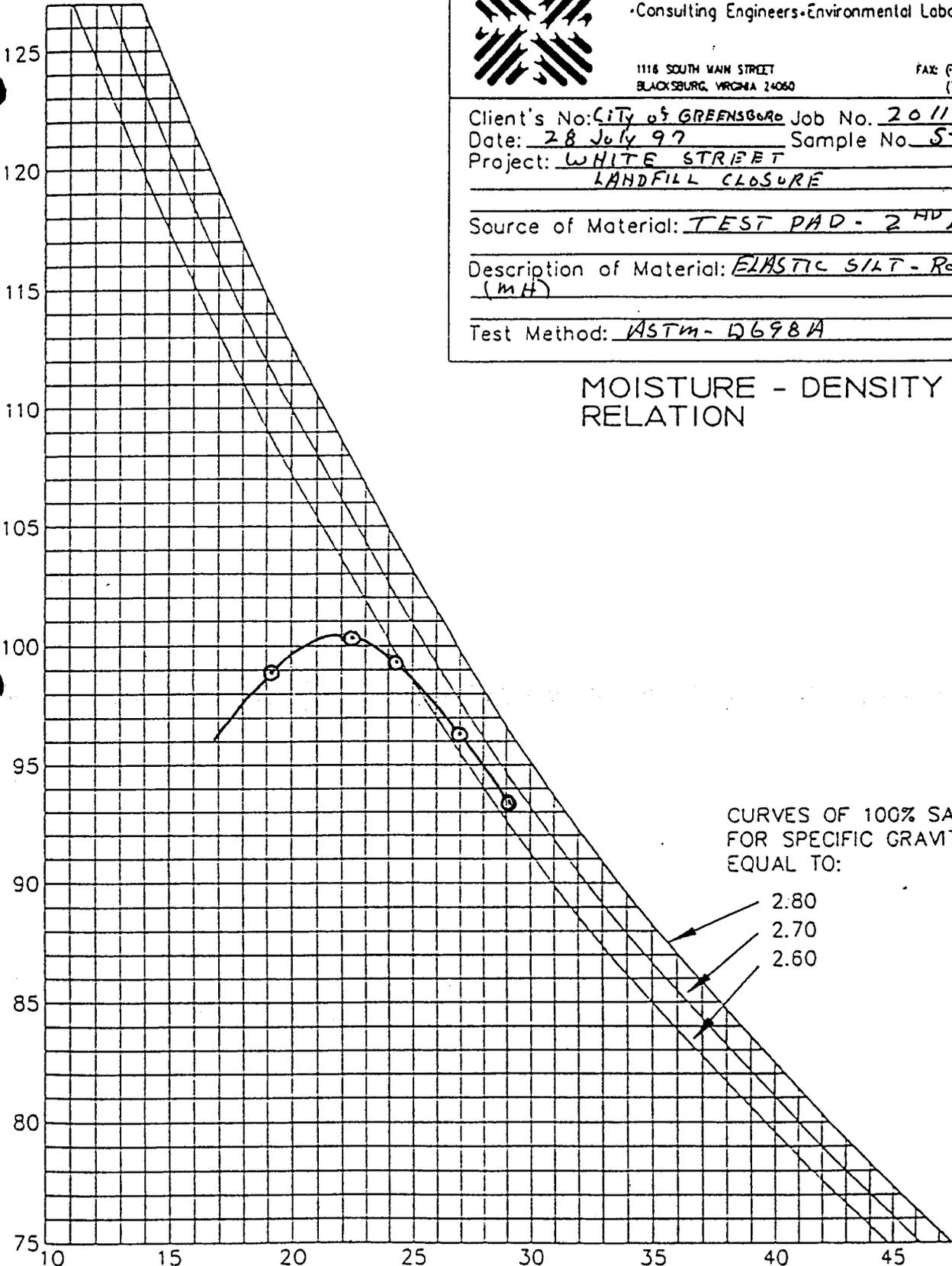
Source of Material: TEST PAD - 2<sup>ND</sup> LIST

Description of Material: ELASTIC SILT - Red/brown,  
(MH)

Test Method: ASTM - D698A

### MOISTURE - DENSITY RELATION

DRY DENSITY POUNDS PER CUBIC FOOT



CURVES OF 100% SATURATED  
FOR SPECIFIC GRAVITY  
EQUAL TO:

- 2.80
- 2.70
- 2.60

MOISTURE CONTENT - PER CENT OF DRY WEIGHT

### TEST RESULTS

MAXIMUM DRY DENSITY 100.5 Lbs. Cu. Ft.

OPTIMUM MOISTURE 22.0 %



Olver Incorporated

GREENSBORO PHASE II CLOSURE	
Hydraulic conductivity (ASTM D 5084)	
Sample I.D.	Bulk Sample S-0845, Lift 2
Sample Description	Light brown sandy SILT
Maximum Dry Density, pcf	100.6
Optimum Moisture Content, %	22.0
Sample Weight, gm.	1178.0
Sample Initial Moisture Content, %	21.0
Remolded Moisture Content, %	21.0
Sample Diameter, cm	7.29
Sample Length, cm	15.24
Sample Dry Density, pcf	95.6
Sample Area, cm <sup>2</sup>	41.74
Saturation, %	95.0
Sample Final Moisture Content, %	31.3
Hydraulic Conductivity, $K_{avg}$ , cm/sec	$2.19 \times 10^{-6}$

Job No.: 20114  
Report No.: 1631  
Date Issued: 7/28/97

SOILS/AGGREGATE TEST REPORT

Client: City of Greensboro, N.C.  
Date Received: July 23, 1997  
Sample Number: S-0844  
Project: White St. Landfill Closure  
Project Manager: Tim Loveday  
Contractor: N/A  
Source of Material: Test Pad - 3rd Lift  
Description of Material: ELASTIC SILT - Red/Brown (MH)

Moisture-Density Relation:

Test Method: ASTM D-698A  
Maximum Dry Density: 100.7 pounds per cubic foot (pcf)  
Optimum Moisture Content: 22.0 percent  
In-situ Moisture Content: 27.7 percent

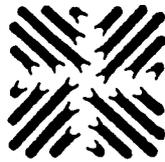
Soil Analysis: N/A

<u>Sieve Size</u>	<u>Percent Passing</u>
<u>3/8"</u>	<u>100.0</u>
<u># 4</u>	<u>99.5</u>
<u># 8</u>	<u>99.2</u>
<u># 16</u>	<u>98.9</u>
<u># 30</u>	<u>98.4</u>
<u># 50</u>	<u>97.0</u>
<u>#100</u>	<u>94.0</u>
<u>#200</u>	<u>87.5</u>

Specific Gravity: N/A  
Liquid Limit: 54  
Plastic Limit: 35  
Plasticity Index: 19  
Classification: (MH)  
Permeability: N/A

Submitted by:

*John H. Kilby*  
John H. Kilby, Manager  
Materials Testing Lab



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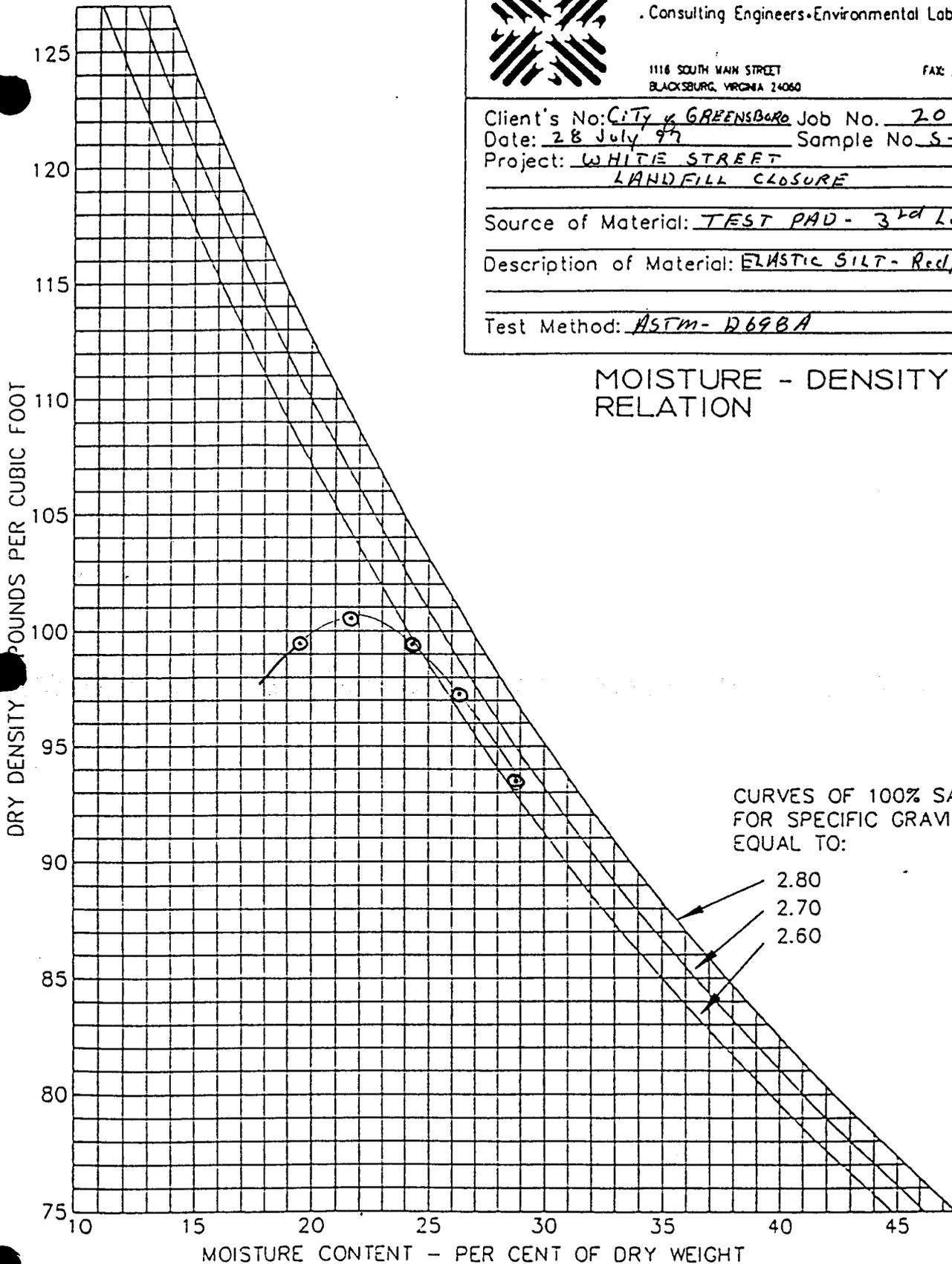
Client's No: CITY of GREENSBORO Job No. 20114  
Date: 28 July 97 Sample No. S-0844  
Project: WHITE STREET  
LANDFILL CLOSURE

Source of Material: TEST PAD - 3<sup>rd</sup> LIST

Description of Material: ELASTIC SILT - Red/brown (MH)

Test Method: ASTM - D698A

### MOISTURE - DENSITY RELATION



### TEST RESULTS

MAXIMUM DRY DENSITY 100.7 Lbs. Cu. Ft.

OPTIMUM MOISTURE 22.0 %



Olver Incorporated

GREENSBORO PHASE II CLOSURE	
Hydraulic conductivity (ASTM D 5084)	
Sample I.D.	Bulk Sample S-0844, Lift 3
Sample Description	Orange brown sandy SILT
Maximum Dry Density, pcf	100.6
Optimum Moisture Content, %	22.0
Sample Weight, gm.	1188.0
Sample Initial Moisture Content, %	20.2
Remolded Moisture Content, %	22.0
Sample Diameter, cm	7.29
Sample Length, cm	15.24
Sample Dry Density, pcf	95.6
Sample Area, cm <sup>2</sup>	41.74
Saturation, %	95.0
Sample Final Moisture Content, %	31.3
Hydraulic Conductivity, $K_{avg}$ , cm/sec	$9.29 \times 10^{-7}$

41-03 GW

PROJECT: GREENSBORO SOLID WASTE LANDFILL PROJECT NO: 6770-021-018

LOCATION: WHITE STREET, GREENSBORO, N.C. BORING NUMBER: MW-13 PAGE: 1

BORING LOG DATE: 1/6/93

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
SS-01 SS-02	4'	53 82+	SS SS			0-1.0' TOPSOIL; 0-0.5' THEN ORANGE SLIGHTLY SANDY SILT	SAPROLITE
	8'					1-2.5' ORANGE CLAYEY, MICACEOUS SANDY SILT; 1.5-2.5' VERY HARD, BROWN AND BLACK SLIGHTLY SANDY, SLIGHTLY CLAYEY SILT, PARTIALLY WEATHERED ROCK	PARTIALLY WEATHERED ROCK
	12'					3.5-5.0' BROWN AND BLACK, FINE-GRAINED SLIGHTLY SANDY SILT, VERY HARD PARTIALLY WEATHERED ROCK	PARTIALLY WEATHERED ROCK
	16'					AUGER REFUSAL AT 5.0'	
	20'					MUD ROTARY DRILLING	
	24'					5.0-18.5' BG	
	28'					CORE DRILLED FROM 18.5-32.5' OBTAINED 14.0' OF NX CORE	BEDROCK
	32'						
	36'					TD = 32.5'	
	40'						

BOREHOLE COMPLETION:

WATER DEPTH: DATE:

DRILLING METHOD: 6 1/4" HOLLOW-STEM AUGER, TRICONE BIT

LOGGED BY: CHARLES G. LEE, PG

**KEY:**  
 SI - SCREEN  
 SS - SPLITSPOON  
 SPT - SOIL PENETRATION TEST-N NUMBER  
 ST - SHELBY TUBE  
 T - TYPE  
 WL - WATER LEVEL



