## Concrete Test Report

**Project Name:** UNC CAMPUS AIRPORT DISPOSAL  
**Client:** ARCADIS  
**S&ME Project No:** 1053-06-171  
**Laboratory No:** 8726  

### Field Information
- **Date Sampled:** 06/08/2006  
- **Sampled By:** B. SWARR  
- **Date Received in Lab:** 06/09/2006  
- **Concrete Supplier:** CHANDLER  
  - **Track No.:** 158  
  - **Ticket No.:** 1367783  
  - **Time Batched:** 07:50  
  - **Time Sampled:** 08:35  
  - **Size of Load:** 9.0 CY  
  - **Water Added on Site:** 10 gal  
  - **Authorized by:** SUPPLIER

### Field Test Data
- **Mix Design No.:** CH-66 - CHANDLER CONCRETE  
  - **Admixture:**  
    - **Design Compressive Strength:** 4,000 psi based on 28 days of age  
  - **Test specimens fabricated in general accordance with ASTM C-31**  
- **Slump:** ASTM C143  
  - **Field:** 3 3/4  
  - **Specified:** 4.5 MAX
- **Air Content:** ASTM C231  
  - **Field:** 0.4%  
  - **Specified:** 0-3%
- **Temperature:** ASTM C1064  
  - **Concrete:** 81 F  
  - **Air:** 72 F  
  - **Concrete:** 146.2 pcf

### Concrete Placement Location
- **SLAB A TO B FROM 1 TO 2**  
- **SAMPLED @ 15'W & 5'S FROM NE CORNER OF SLAB**

### Laboratory Compressive Strength Test Results

(6+/-0.02" x 12" Cylinder tested in accordance with ASTM C39 unless otherwise noted)

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>Age (Days)</th>
<th>Date Tested</th>
<th>Type Curing</th>
<th>Diameter (inches)</th>
<th>Area (sq.in.)</th>
<th>Load (lbs)</th>
<th>L/D Factor</th>
<th>Strength (psi)</th>
<th>Fracture Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7</td>
<td>06/15/2006</td>
<td>1F/6L</td>
<td>5.97</td>
<td>27.99</td>
<td>89,800</td>
<td>1.00</td>
<td>3,210</td>
<td>Cone &amp; Split</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>07/06/2006</td>
<td>1F/27L</td>
<td>5.97</td>
<td>27.99</td>
<td>123,330</td>
<td>1.00</td>
<td>4,410</td>
<td>Cone &amp; Split</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>07/06/2006</td>
<td>1F/27L</td>
<td>5.97</td>
<td>27.99</td>
<td>126,570</td>
<td>1.00</td>
<td>4,520</td>
<td>Cone &amp; Split</td>
</tr>
<tr>
<td>8</td>
<td>56</td>
<td>08/03/2006</td>
<td>1F/55L</td>
<td>6.00</td>
<td>28.27</td>
<td>HOLD</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: F = Field Cured, L = Lab Cured  
Average 28 day strength = 4,470 psi

### Comments:

Distribution: MR. JIM SHILLIDAY, III, LG. MR. WHIT RAWLS, MS. NICOLE BRADLEY

**Signature**  
**Name (Technical Responsibility):** MR. MAL KRAJAN, A.E.T.
CONCRETE TEST REPORT
06/26/2006

FIELD INFORMATION

- Date Sampled: 05/23/2006
- Sampled By: A. RIKHEY
- Date Received in Lab: 05/24/2006
- Concrete Supplier: CHANDLER
  - Track No.: 137
  - Ticket No.: 1361955
- Time Batched: 02:22
- Time Sampled: 03:14
- Size of Load: 7.5 CY
- Water Added on Site: 0 gal

FIELD TEST DATA

- Mix Design No.: CH-39 - CHANDLER CONCRETE
- Admixture:
  - Design Compressive Strength: 4,000 psi based on 28 days of age
- Test specimens fabricated in general accordance with ASTM C-31
- Slump: ASTM C143
  - Field: 4 1/2
  - Specified: 4.5 MAX
- Air Content: ASTM C231
  - Field: 2.1%
  - Specified: 0-3%
- Temperature: ASTM C1064
  - Concrete: 75 F
  - Air: 71 F
- Fresh Unit Weight: ASTM C138
  - 146.4 pcf

CONCRETE PLACEMENT LOCATION

SE FOOTING
SAMPLED @ 3W & 2'S FROM NE CORNER OF SE FOOTING

LABORATORY COMPRESSIVE STRENGTH TEST RESULTS

(6 +/- 0.02" x 12" Cylinder tested in accordance with ASTM C39 unless otherwise noted)

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>Age (Days)</th>
<th>Date Tested</th>
<th>Type Cure</th>
<th>Diameter (inches)</th>
<th>Area (sq.in.)</th>
<th>Load (lbs)</th>
<th>L/D Factor</th>
<th>Strength (psi)</th>
<th>Fracture Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>05/30/2006</td>
<td>1F/6L</td>
<td>5.97</td>
<td>27.99</td>
<td>84,910</td>
<td>1.00</td>
<td>3,030</td>
<td>Cone &amp; Split</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>06/20/2006</td>
<td>1F/27L</td>
<td>5.97</td>
<td>27.99</td>
<td>131,460</td>
<td>1.00</td>
<td>4,700</td>
<td>Cone &amp; Split</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>06/20/2006</td>
<td>1F/27L</td>
<td>5.97</td>
<td>27.99</td>
<td>124,290</td>
<td>1.00</td>
<td>4,440</td>
<td>Cone &amp; Split</td>
</tr>
<tr>
<td>4</td>
<td>56</td>
<td>07/18/2006</td>
<td>1F/55L</td>
<td>6.00</td>
<td>28.27</td>
<td>HOLD</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: F = Field Cured, L = Lab Cured

Average 28 day strength = 4,570 psi

Comments:

Distribution: MR. JIM SHILLIDAY, III, LG. MR. WHIT RAWLS, MS. NICOLE BRADLEY

MR. MAL KRAJAN, A.E.T.
Name (Technical Responsibility)

S&ME, Inc. 3201 Spring Forest Road, Raleigh, North Carolina 27616, (919) 872-2660

QUALITY SYSTEMS COORDINATOR
Name (Technical Responsibility)
Signature
Position
June 5, 2006

Arcadis
801 Corporate Center Drive
Suite 300
Raleigh, North Carolina 27607

ATTENTION: Mr. Jim Shilliday, III, LG

Reference: SOIL DENSITY TEST RESULTS
UNC Campus Airport Disposal Area
Chapel Hill, North Carolina
S&ME Project No. 1053-06-171

Dear Mr. Shilliday:

Please find enclosed the results of field density test performed on May 22, 2006 at the above referenced project.

The above referenced in-place field density tests were obtained using general guidelines from ASTM D-1556, “Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method” and ASTM D-4959, “Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method”. Laboratory testing was performed in general accordance with the specified moisture-density relationship listed on the attached Summary of Density Test Results.

If you have any questions or comments concerning these results, please do not hesitate to contact our office.

Sincerely,
S&ME, Inc.

Ms. Nicole Bradley
Project Manager

NB/jp

Enclosure(s)

cc: Mr. Whit Rawls—Arcadis

S:\PROJECTS\2006\06-171 UNC Campus Airport Disposal Area\Construct\Density Tests\06-171\May22(06).doc
# Summary of Density Test Results

**Project Name:** UNC CAMPUS AIRPORT DISPOSAL  
**Client:** ARCADIS, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NORTH CAROLINA 27607

<table>
<thead>
<tr>
<th>Test No.</th>
<th>Date</th>
<th>Test Type</th>
<th>Dry Density</th>
<th>Moisture Content</th>
<th>In-Place Density Test</th>
<th>Dry Density</th>
<th>Moisture Content</th>
<th>Check Plug Data</th>
<th>Dry Density</th>
<th>Moisture Content</th>
<th>Reference Standard</th>
<th>Optimum Moisture Content</th>
<th>Percent Specified</th>
<th>Percent In-Place</th>
<th>Location</th>
<th>Elevation or Stone Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>05/22/06</td>
<td>D 1556</td>
<td>93.3</td>
<td>28.5</td>
<td>91.5</td>
<td>28.4</td>
<td></td>
<td>D 698</td>
<td>91.5</td>
<td>28.4</td>
<td>D 698</td>
<td>28.4</td>
<td>95.0</td>
<td>100+</td>
<td>BLDG PAD; CENTER OF BLDG PAD</td>
<td>-1.5*</td>
</tr>
<tr>
<td>2</td>
<td>05/22/06</td>
<td>D 1556</td>
<td>96.6</td>
<td>27.8</td>
<td>89.7</td>
<td>22.2</td>
<td></td>
<td>D 698</td>
<td>91.5</td>
<td>28.4</td>
<td>D 698</td>
<td>28.4</td>
<td>95.0</td>
<td>100+</td>
<td>BLDG PAD; CENTER OF BLDG PAD</td>
<td>SG</td>
</tr>
</tbody>
</table>

* = Failed Specified Compaction, ** = Failed Specified Moisture Content

All Test Locations and Elevations are Approximate

**Notes:**

**References:** ASTM D 1556: Density and Unit Weight of Soil In Place by the Sand Cone Method, ASTM D 698: Laboratory Compaction Characteristics of Soil Using Standard Effort

**Distribution:** MR. JIM SHILLIDAY, III, LG, MR. WHIT RAWLS, MS. NICOLE BRADLEY

---

**MS. NICOLE BRADLEY**  
Name (Technical Responsibility)

---

**PROJECT MANAGER**

---

S&ME, Inc. 3201 Spring Forest Road, Raleigh, North Carolina 27616, (919) 872-2660
May 12, 2006

Arcadis
801 Corporate Center Drive
Suite 300
Raleigh, North Carolina 27606

Attention: Mr. Jim Shilliday, III, LG

Reference: LABORATORY TEST RESULTS
UNC Airport Disposal Area
Chapel Hill, North Carolina
S&ME Job No. 1053-06-171

Dear Mr. Shilliday:

S&ME, Inc. has completed laboratory testing on materials from the UNC Airport Disposal Area project in Chapel Hill, North Carolina. Two bulk samples were obtained and delivered to our office. One sample was obtained from a hand auger boring for classification testing and the other sample was obtained from American Stone for Moisture-Density Relations testing. This report presents results of laboratory testing.

LABORATORY TESTING

The sample obtained for classification testing (HA-1, Sample 1) was classified in general accordance with ASTM D-2487 “Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).” This sample classifies as sandy silty clay (CH) with a liquid limit of 78, a plastic limit of 34, and a plastic index of 44. Grain size analysis results indicate fines contents (passing the sieve no.200) of 89.6 percent of the total sample.

Laboratory Test results indicate the sample obtained for Moisture-Density Relations testing consisted of sandy clayey silt with gravel (visual). The Moisture-density Relations indicate a maximum dry density (MDD) of 96.3 pounds per cubic foot (PCF) with an optimum moisture content of 25.3 percent. The natural moisture content was approximately 26.9 percent.

We have attached laboratory test results for your review. S&ME, Inc. appreciates the opportunity to be of service to you on this project. If you have any questions concerning this report, please contact our office.

Sincerely,

S&ME, Inc.

Malyne L. Krajan, P.E.
Quality System Manager

Nathan P. Suffum
Project Manager

David B. Carver
Construction Services Manager

Enclosures
**Particle Size Analysis of Soils**

**ASTM D 422**

**Project #:** 1053-06-171  
**Project Name:** UNC Airport Disposal Area  
**Client Name:** Arcadis  
**Client Address:** 801 Corporate Center Drive, Suite 300, Raleigh, North Carolina 27606

**Boring #:** HA-1  
**Sample #:** 1  
**Sample Date:** 04/28/2006  
**Depth (ft):** -1.0'

**Sample Description:** Orange Brown Fine Sandy Silty CLAY (CH)

### Particle Size Analysis / Without Hydrometer Analysis

<table>
<thead>
<tr>
<th>Sieve Size (mm)</th>
<th>Sieve Size</th>
<th>Retained Weight</th>
<th>Percent Retained</th>
<th>Percent Passing Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.50</td>
<td>1.5&quot;</td>
<td>0.00</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>25.00</td>
<td>1.0&quot;</td>
<td>0.00</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>19.00</td>
<td>3/4&quot;</td>
<td>0.00</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>12.50</td>
<td>1/2&quot;</td>
<td>0.00</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>9.50</td>
<td>3/8&quot;</td>
<td>0.00</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>4.75</td>
<td>#4</td>
<td>0.10</td>
<td>0.1%</td>
<td>99.9%</td>
</tr>
<tr>
<td>2.00</td>
<td>#10</td>
<td>0.70</td>
<td>0.4%</td>
<td>99.6%</td>
</tr>
<tr>
<td>0.85</td>
<td>#20</td>
<td>1.19</td>
<td>0.6%</td>
<td>99.4%</td>
</tr>
<tr>
<td>0.43</td>
<td>#40</td>
<td>2.83</td>
<td>1.5%</td>
<td>98.5%</td>
</tr>
<tr>
<td>0.25</td>
<td>#60</td>
<td>7.85</td>
<td>4.2%</td>
<td>95.8%</td>
</tr>
<tr>
<td>0.15</td>
<td>#100</td>
<td>13.52</td>
<td>7.3%</td>
<td>92.7%</td>
</tr>
<tr>
<td>0.075</td>
<td>#200</td>
<td>19.45</td>
<td>10.4%</td>
<td>89.6%</td>
</tr>
</tbody>
</table>

**Notes:** Maximum Particle Size 3/8"  
**Apparent Relative Density** ND  
**Liquid Limit** 78  
**Fineness Modulus** ND  
**Plastic Limit** 34  
**Cu = D60/D10:** ND  
**Plastic Index** 44  
Ce = (D30)²/(D10xD60): ND  
**ND = Not determined**

**Organic Content** ND

**D10 =**  
**D30 =**  
**D60 =**  
**D50 =**  
**D90 =**

**ASTM D 422:** Particle Size Analysis of Soils  
**ASTM D 421:** Dry Preparation of Soil Samples  
**ASTM D 4318:** Liquid Limit, Plastic Limit, & Plastic Index of Soils  
**ASTM D 2487:** Classification of Soils for Engineering Purposes (Unified Soil Classification System)

**Test Date(s):** 04/28 - 05/02/2006  
**Report Date:** 05/02/2006

**Technician Name:** Chana Savananpirdi  
**Technical Responsibility:** Mal Krajan

** NICET 116132 **

**Laboratory Supervisor**

S&M, INC.  
3109 Spring Forest Road, Raleigh, N.C. 27616  
HA-1 Classification
Particle Size Analysis of Soils

ASTM D 422

S&ME Project #: 1053-06-171
Project Name: UNC Airport Disposal Area
Client Name: Arcadis
Client Address: 801 Corporate Center Drive, Suite 300, Raleigh, North Carolina 27606

Report Date: 05/02/2006
Test Date(s): 04/28 - 05/02/2006

Boring #: HA-1
Sample #: 1
Sample Date: 04/28/2006
Location: Hand Auger Boring
Depth (ft): -1.0'

Sample Description: Orange Brown Fine Sandy Silty CLAY (CH)

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Particle Size (mm)

<table>
<thead>
<tr>
<th>Particle Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5&quot;</td>
<td>100%</td>
</tr>
<tr>
<td>1.0&quot;3/4&quot;</td>
<td>90%</td>
</tr>
<tr>
<td>1/2&quot;3/8&quot;</td>
<td>80%</td>
</tr>
<tr>
<td>#4</td>
<td>70%</td>
</tr>
<tr>
<td>#10</td>
<td>60%</td>
</tr>
<tr>
<td>#20</td>
<td>50%</td>
</tr>
<tr>
<td>#40</td>
<td>40%</td>
</tr>
<tr>
<td>#60</td>
<td>30%</td>
</tr>
<tr>
<td>#100</td>
<td>20%</td>
</tr>
<tr>
<td>#200</td>
<td>10%</td>
</tr>
<tr>
<td>Colloids</td>
<td>&lt; 0.001 mm</td>
</tr>
</tbody>
</table>

Cobbles   Fine Sand          Colloids
< 300 mm (1") and > 75 mm (3")  < 0.425 mm and > 0.075 mm (#200)
< 75 mm and > 4.75 mm (#4)       < 0.075 and > 0.005 mm
< 4.75 mm and > 2.00 mm (#10)    < 0.005 mm
< 2.00 mm and > 0.425 mm (#40)   < 0.001 mm

Maximum Particle Size: 3/8"
Silt & Clay (% Passing #200): 89.6%
Apparent Relative Density: ND
Liquid Limit: 78

Gravel 0%  Medium Sand 1%
Coarse Sand 0%  Fine Sand 9%
Moisture Content: 35.0%
Plastic Limit: 34
Organic Content: ND
Plastic Index: 44

ND=Not determined

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Description of Sand & Gravel

<table>
<thead>
<tr>
<th>Rounding</th>
<th>Angular</th>
<th>Hard &amp; Durable</th>
<th>Soft</th>
<th>Weathered &amp; Friable</th>
</tr>
</thead>
</table>

**References:**
ASTM D 422: Particle Size Analysis of Soils
ASTM D 421: Dry Preparation of Soil Samples
ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils
ASTM D 2487: Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 854: Specific Gravity of Soils

---

Technical Responsibility: Mal Krajan
Laboratory Supervisor: S&ME, INC.
3109 Spring Forest Road, Raleigh, NC. 27616
HA-1 Classification
**Liquid Limit, Plastic Limit, and Plastic Index**

**Project #:** 1053-06-171  
**Report Date:** 05/02/2006  
**Project Name:** UNC Airport Disposal Area  
**Test Date(s):** 04/28 - 05/02/2006  
**Client Name:** Arcadis  
**Client Address:** 801 Corporate Center Drive, Suite 300, Raleigh, North Carolina 27606  
**Boring #:** HA-1  
**Sample #:** 1  
**Sample Date:** 04/28/2006  
**Location:** Hand Auger Boring  
**Offset:** NA  
**Depth (ft):** -1.0'  
**Sample Description:** Orange Brown Fine Sandy Silty CLAY (CH)

<table>
<thead>
<tr>
<th>Pan #</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test #</td>
<td>1</td>
</tr>
<tr>
<td>Tare #</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td>A Tare Weight</td>
<td>11.12</td>
<td>13.47</td>
</tr>
<tr>
<td>B Wet Soil Weight + A</td>
<td>22.60</td>
<td>23.80</td>
</tr>
<tr>
<td>C Dry Soil Weight + A</td>
<td>17.69</td>
<td>19.19</td>
</tr>
<tr>
<td>D Water Weight (B-C)</td>
<td>4.91</td>
<td>4.61</td>
</tr>
<tr>
<td>E Dry Soil Weight (C-A)</td>
<td>6.57</td>
<td>5.72</td>
</tr>
<tr>
<td>F % Moisture Content (D/E)*100</td>
<td>74.7%</td>
<td>80.6%</td>
</tr>
<tr>
<td>N # OF DROPS</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>LL LL = F * FACTOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ave. Average</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Estimate the % Retained on the #40 Sieve

**One Point Liquid Limit**

<table>
<thead>
<tr>
<th>N</th>
<th>Factor</th>
<th>N</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.974</td>
<td>26</td>
<td>1.005</td>
</tr>
<tr>
<td>21</td>
<td>0.979</td>
<td>27</td>
<td>1.009</td>
</tr>
<tr>
<td>22</td>
<td>0.985</td>
<td>28</td>
<td>1.014</td>
</tr>
<tr>
<td>23</td>
<td>0.990</td>
<td>29</td>
<td>1.018</td>
</tr>
<tr>
<td>24</td>
<td>0.995</td>
<td>30</td>
<td>1.022</td>
</tr>
<tr>
<td>25</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Special Sampling Methods:**

- Sample Preparation: Wet Preparation ☐ Dry Preparation ☐ Air Dried ☒ NP, Non-Plastic ☐
- Liquid limit Test: Multipoint Method ☒ One-point Method ☐ Liquid Limit 78
- Classification: ASTM D 2487 ☒ AASHTO M 145 ☐ Plastic Limit 34
- Liquid limit Test: ASTM D 4318 ☒ AASHTO T 89 ☐ Plastic Index 44
- Plastic limit Test: ASTM D 4318 ☒ AASHTO T 90 ☐ Group Symbol CH

**Technician Name:** Chana Savanapridi  
**Technical Responsibility:** Mal Krajan  
**Laboratory Supervisor:** [Signature]

S&ME, INC.  
3109 Spring Forest Road, Raleigh, NC. 27616  
HA-1 Classification
 Moisture - Density Report

S&ME Project #: 1053-06-171
Project Name: UNC Campus Airport Disposal Area
Client Name: Arcadis
Client Address: 801 Corporate Center Drive, Suite 300, Raleigh, North Carolina

Boring #: Bulk Bag  Sample #: 1  Sample Date: May 5, 2006
Location: American Stone  Offset: N/A  Depth (ft): N/A
Sample Description: Red-Brown Micaceous Sandy Clayey SILT with Gravel (Visual)

Maximum Dry Density 96.3 PCF.
Optimum Moisture Content 25.3 %

ASTM D 698 Method B

Soil Properties

| Natural Moisture Content | 26.9% |
| Liquid Limit | ND |
| Plastic Limit | ND |
| Plastic Index | ND |
| Specific Gravity: 2.722 |
| % Passing 3/8" | 83.4 |

Oversize Fraction

| Bulk Sp. Gravity | 2.650 |
| % Moisture | 11.5% |
| Oversize Fraction | 16.6% |
| MDD | 103.5 |
| Opt. MC | 23.0% |

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐
Sieve Size used to separate the Oversize Fraction: #4 Sieve ☐ 3/8 inch Sieve ☒ 3/4 inch Sieve ☐
Mechanical Hammer ☐ Manual Hammer ☒ Moist Preparation ☒ Dry Preparation ☐

References:
ASTM D 698: Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 422: Particle Size Analysis of Soils
ASTM D 854: Specific Gravity of Soils

Technical Responsibility: Mal Krajan

S&ME,INC.
3109 Spring Forest Road, Raleigh, NC. 27616
Proctor #1 5-05-2006
May 1, 2006

Arcadis
801 Corporate Center Drive, Suite 300
Raleigh, North Carolina 27622

Attention: Mr. Whit Rawls

Reference: SOIL EVALUATION
UNC Campus Airport Disposal Area
Chapel Hill, North Carolina
S&ME Job No. 1053-06-171

Dear Mr. Rawls:

As requested, S&ME, Inc. visited the referenced site to evaluate existing soil conditions at the proposed UNC Campus Airport Disposal Area in Chapel Hill, North Carolina. Included is a brief summary of project information, comments regarding the suitability of evaluated soils, laboratory test results, and our recommendations.

PROJECT INFORMATION

The proposed site is located at the end of Municipal Road near the UNC Campus in Chapel Hill, North Carolina. The site currently has been cleared of trees; however, topsoil and rootmat were still present at the time of our visit. We understand that planned development will consist of a single-story, metal framed storage building with an adjacent drive. Based on the provided structural drawings, we understand the foundations have been designed using an allowable soil bearing capacity of 2,000 pounds per square foot. Fill depths will range from approximately 1 to 2 feet to reach planned site grades in the building pad after stripping.
FIELD EVALUATIONS

On April 28, 2006, a representative of S&ME, Inc. was present at the project site to evaluate existing subsurface soils within the building pad area prior to site grading. During the site visit, S&ME performed four (4) shallow hand auger borings with Dynamic Cone Penetrometer tests to evaluate the subsurface soil conditions. Soil was visually classified during our evaluation and a soil sample was obtained for laboratory testing and classification.

The Dynamic Cone Penetrometer is a device that uses a 15-pound weight falling 20 inches to drive a conical point into the soil. The number of blows required to drive the point 1-3/4 inches is measured and recorded. The “blow counts” are used as an indication of the soil’s relative consistency and can provide general information regarding foundation and slab support characteristics. Blow counts were recorded at 1 foot intervals at each hand auger boring location.

Blow count values ranged from 3 to greater than 20 blows per increment. Hand auger borings were performed to depths of approximately 5 feet below existing ground elevation (including topsoil and rootmat). Soils were visually classified as residual, fine sandy clays and silty clays and appeared highly plastic and above optimum moisture content. There was approximately 12 inches of topsoil and rootmat present at each hand auger boring location.

LABORATORY TEST RESULTS


The soil sample was obtained within hand auger boring location HA-2, at a depth of approximately 1 foot below existing elevation. The soil sample was classified in general accordance with ASTM D-2487 “Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).” This sample classifies as sandy silty clay (CH) with a liquid limit of 78, a plastic limit of 34, and a plastic index of 44. Grain size analysis results indicate fines contents (passing the sieve no.200) of about 90 percent of the total sample. We have attached laboratory test results for your review.
COMMENTS AND RECOMMENDATIONS

Based on the results of hand auger borings and laboratory testing, near surface soils are relatively soft and highly plastic. It is our opinion that these soils are not capable of supporting foundation loads without risk of settlement. Also, highly plastic clays have a tendency to shrink and swell with changes in moisture content. This could result in settlement or heave of foundations and cracking of concrete slabs.

We recommend that highly plastic soils be removed from within the upper 3 feet of finished subgrade in building area. Soils should be undercut at least 5 feet beyond the building footprint to a depth of 3 feet after the topsoil and rootmat has been stripped. Suitable soils should be used as structural fill and should be placed in maximum 8 inch loose lifts. Fill should be compacted to at least 95 percent of the standard Proctor maximum dry density, and 98 percent within the upper 18 inches. A representative of S&ME, Inc. should be present during fill placement to perform in-place soil density testing. Once the foundations have been excavated, a representative of S&ME, Inc. should evaluate the bearing soils prior to placement of concrete. This evaluation should include probing with a small diameter rod and performance of random hand auger borings with DCP testing.

S&ME, Inc. appreciates the opportunity to be of service to you on this project. If you have any questions concerning this report, please contact our office.

Sincerely,
S&ME, Inc.

Nathan P. Buffum
Project Manager

Wes Lowder
Branch Manager

cc: Mr. Shannon Dorse, Areidis

Nicole Bradley
Staff Professional
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<th>DATE</th>
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<th>SOIL DESCRIPTION</th>
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