Addendum #4

DATE: 6-20-14

CONTENT FOR ADDENDUM #4:

1. **Smith Dalia Architects – Addendum #4 – see attachment.**

2. **Geotechnical Report – see attachment.**

3. **REMINDER – All bids must be submitted directly to Mark Hawks – Purchasing Department at Fulton County, on specified date and by specified time as noted on ITB, preferably via email to: mark.hawks@fultoncountyga.gov .**

4. **REMINDER – All bids must be submitted on Winter Johnson Group Bid Form with scope(s) of work noted – see attachment.**

ADDENDUM NO.: 04

Project Name:	Metropolitan Library
Project Number:	11165
Date:	20 June 2004
To:	Evan Jahn - Heery/Russell; Jeff Lewis, William Mensah - Winter-Construction
From:	Sara Singleton, SDA
Copies:	Robyn Zurfluh, Craig Wertz, Glenn Grosse - SDA

This addendum forms a part of the Contract Documents and modifies the original "Revised Pricing Documents" dated 05/28/14.

This Addendum includes changes to the following:

CHANGES TO GENERAL SHEETS:

1. Drawing Index- C0.0, L202, and S301 were not a part of this set, and will be removed from index.

CHANGES TO ARCHITECTURAL:

1. Correction to Addendum #01, ARCHITECTURAL, #10:
   Regarding detail #1 & 2 on A503 refer to below as Type 1 decking, sloped with structure.
   Regarding detail #6 on A503, refer to Type 2 decking- Alt A or B, pending pricing results. The 1.5" ISO listed in Addendum #01 that is replacing the cover board, only occurs at the two exterior roof canopies at the Building Entrance to provide a surface to attach the TPOS.

Layers listed from Exterior to Interior

Clarification of Roof Types:

Roof Assembly- **Type 1 Deck: sloped with structure**, at Meeting rooms lower roof only (grid Line E, south). Spans beneath high roof continuous, provide access opening.

- TPO adhered roof membrane system
- Rigid insulation
- 1 ½" metal roof Deck (sloping w structure), 20 GA

Roof Assembly- **Type 1 Deck**: High roof over Meeting Rooms only (grid Line E, south)

- TPO adhered roof membrane system
- Tapered rigid insulation
- Base Rigid insulation
- 1 ½" metal roof Deck, 20 GA

Roof Assembly- **Type 2 Deck: Alt A**

- TPO adhered roof membrane system
- Tapered rigid insulation
- Base Rigid insulation

621 NORTH AVENUE, NE
SUITE C-140
ATLANTA, GA 30308-2805
TEL 404-892-2443
FAX 404-892-2470

- Epic Deck, Toris 4

Roof Assembly- **Type 2 Deck: Alt B**

- TPO adhered roof membrane system
- Tapered rigid insulation
- Base Rigid insulation
- 3" Versa-Deck (Acoustical Decking)

Entry Canopy roof Assembly- **Type 1 Deck** (refer to detail 3 & 6/A504)

- TPO adhered roof membrane system
- 1 ½" ISO Board
- 1 ½" metal roof Deck, 20 GA
- Steel structure
- Glassmat gypsum sheathing
- WRB
- Metal Panel Soffit (MCM)

*no cover board included in any of the assemblies above- Contractor responsible to ensure all roof assemblies meet roof manufacturer's warranty requirements.

CHANGES TO STRUCTURAL:

1. A 45' section of the bio retention retaining wall, located between Grid lines 4 and 5 on north side of building, has increased in height due to revised grading needed to daylight mechanical vents. Top of wall elevation has not changed. Previous bottom of wall ranged from 1022 to 1025. Revised bottom of wall is 1022.
2. Clarification: on S501 the HSS braces are HSS5x5x1/2 U.N.O.

CHANGES TO MECHANICAL:

1. Supply and Return Air Grills in ACT-3 to be linear to fit within 6" wide by 60" (max) length in ceiling grid.

CHANGES TO ELECTRICAL:

1. Access Panels to be placed where required to reach junction boxes for lighting, security, and fire alarm equipment that will be placed on top side of Epic Deck (Roof decking type 2-Alt A). Exact size of access panels to be determined by Contractor based upon required space they need to access junction boxes needed during and after installation. The estimated number of access panels below:
    a. One junction box/one access panel per each light fixture attached to roof decking that is one-three fixtures together
    b. Two junction boxes/two access panels, one at each end of row, per long row of fixtures (4 or more),
    c. One junction/one access panel per each Emergency sign or strobe attached to underside of roof decking.

    This is only an estimate as exact number of junction boxes required at this stage. See a basic preliminary layout attached, plan contains mostly 6"x2' long access panels, also 4' and 8' panels. If there are more affordable lengths please contact the architect to discuss other options. See ASD #8.

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CHANGES TO SPECIFICATIONS:

1. Specification for Schedule of Alternates Item 01 2300 1.03 A2 should refer to Section 09 5112 Acoustical Panel Ceilings, and not Integrated Ceiling Assemblies section. Updated Spec section attached.

2. 09 5100 2.01 A.1.c Techzone System with Optima Ceiling Panels has been specified for ACT-3 ceiling. This spec section has been updated, see attached.

END OF ADDENDUM

621 NORTH AVENUE, NE
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ATLANTA, GA 30308-2805
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NO CEILING- EXPOSED TO STRUCTURE ABOVE, TYP.

INT. SUNSHADES TYPE A

PRE-FAB ALUM CANOPY

NO CEILING- EXPOSED TO STRUCTURE ABOVE

PRE-FAB ALUM CANOPY

10' - 4"A.F.F. GWB 2

10' - 10"A.F.F. GWB

11' - 0"A.F.F. ACT-2

10' - 4"A.F.F. ACT-1 SAFB

EXH.

10' - 4"A.F.F. ACT-1

10' - 10"A.F.F. ACT-1

10' - 10"A.F.F. ACT-1 SAFB

10' - 4"A.F.F. ACT-1 SAFB

10' - 0"A.F.F. GWB

include speaker j-box access in access panel

14' - 1 3/8"

14' - 0"

3' - 6"

15' - 1"

6' - 0"

11' - 6"A.F.F. GWB

10' - 10"A.F.F. GWB

4' - 0"

2' - 0"

1' - 0"

PP

10' - 10"A.F.F. GWB 2

11' - 4"A.F.F. ACT-2

10' - 0"A.F.F. GWB

EQ

EQ

11' - 6"A.F.F. GWB

10' - 10"A.F.F. GWB

97' - 0"

9' - 0"A.F.F. ACT-1

9' - 0"A.F.F. GWB 2

9' - 0"A.F.F. ACT-1

11' - 6"A.F.F. GWB

9' - 0"A.F.F. GWB 2

6' - 1 1/8"

11' - 1 3/4"

11' - 6"A.F.F. ACT-1

8' - 0"

7' - 0"A.F.F. GWB

6' - 9 3/8"

10' - 0"A.F.F. ACT-1

10' - 10"A.F.F. GWB 2

9' - 0"A.F.F. GWB 2

10' - 10"A.F.F. GWB

10' - 10"A.F.F. GWB

10' - 10"A.F.F. GWB

8'

8'

13' - 8"A.F.F. GWB

18' - 0"A.F.F. GWB

ENTRY CANOPY

ENTRY CANOPY

INT. SUNSHADES TYPE A

include speaker j-box access in access panel

NOTE:
EPIC DECK ACCESS PANELS ONLY WHERE EPIC DECK ROOF IS USED IN EXPOSED CONDITIONS IN PUBLIC SPACE- NONE NEED IN BACK OF HOUSE AREAS. USE THIS AS A GUIDE TO SIZE AND QUANTITY. EXACT PLACEMENT TO BE COORDINATED WITH ELECTRICAL REQUIREMENTS.

2E ACCESS PANEL LOCATION (#') DESCRIBES PANEL LENGTH X 6" WIDE

SMITH DALIA
ARCHITECTS, LLC
821 NORTH AVENUE, NE
SUITE C-140
ATLANTA, GEORGIA 30308-2805

SUPPLEMENTAL DRAWING
REFLECTED CEILING PLAN- ACCESS PANEL LOCATIONS FOR EXPOSED METAL ROOF DECKING/CEILING TYPE 2- ALT A

SCALE: 1/8" = 1'-0"

METROPOLITAN LIBRARY

1332 METROPOLITAN PARKWAY, ATLANTA, GEORGIA, 30310

Project No:11165
DATE: 06/20/14
REFERENCED DRAWING:
A200, E201, T101, T103

SHEET NO:
ASD 08
ADDENDUM 03

NOT FOR CONSTRUCTION

SECTION 09 5100

* ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 07 2100 - Thermal Insulation: Acoustical insulation.

B. Section 07 9005 - Joint Sealers: Acoustical sealant.

C. Section 08 3100 - Access Doors and Panels: Access panels.

1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Samples: Submit two samples 6 x 6 inch (152 x 152 mm) in size illustrating material and finish of acoustical units.

C. Samples: Submit two samples each, 12 inches (304 mm) long, of suspension system main runner.

1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 * ACOUSTICAL UNITS

A. * Manufacturers:
   1. Basis of Design - Armstrong World Industries, Inc: www.armstrong.com.
      a. ACT-1: 24"x48" Suprafine XL grid with Optima Ceiling Panels
      b. ACT-2: 24"x24" Suprafine XL grid with Optima Ceiling Panels
      c. ACT-3: Techzone Integrated Ceiling System with Superfine XL grid with Optima Square Tegular Ceiling Panels; 6” x 60”x 1” and 30" x 60” x 1”, color as selected by Architect. Coordinate with mechanical and electrical fixtures at 6" x 60” grid panel.
      d. ACT-4: 24"x48" 15/16" grid with Cortega Ceiling Panels
   2. CertainTeed Corporation: www.certainteed.com.

3. USG: www.usg.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Same as for acoustical units.
   2. Substitutions: Not permitted.

B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.

C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

L. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.02 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

G. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

3.03 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 5112

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Alternate No. 01 - Exposed Metal Roof Decking/Ceiling. Alternate Item (Not Base Bid Item) Metal Deck Type 2 Alternate B
   1. Grid Suspension system.
   2. Acoustical ceiling panel units.
   3. Wire hangars, fasteners, main runners, cross tees

1.02 RELATED REQUIREMENTS

A. Section 01 2300 Alternates: Alternate No. 01- Exposed Metal Roof Decking/Ceiling

B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

C. Section 05 3100 - Steel Decking: Placement of special anchors or inserts for suspension system.

D. Section 21 1300 - Fire Suppression Sprinklers: Sprinkler heads in ceiling system.

E. Section 26 0533 - Conduit and Raceways

F. Section 26 5100 - Interior Lighting: Light fixtures coordinated with ceiling system.

1.03 REFERENCE STANDARDS

A. A1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Al

B. ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

C. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

D. ASTM C423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Metho

E. ASTM C635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

F. C636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

G. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by use of Integrating-Sphere Reflectometers.

I. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

J. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2008e1.

K. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, mechanical and electrical items installed in the ceiling, and structural system..

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two samples 6x6 inch in size illustrating material and finish of acoustical units.

E. Manufacturer's Installation Instructions: Indicate special procedures.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

G. LEED Submittal: Documentation of recycled content and location of manufacture.

1.06 QUALITY ASSURANCE

A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.

B. Single-Source Responsibility: Provide acoustical panel units and grid Components by a single manufacturer.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
   1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

A. Manufacturers:
   1. Basis of Design: Armstrong World Industries, Inc; Product: Metalworks, Capz System Panels: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Acoustical Units - General: ASTM E1264, Class A.

2.03 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Same as for acoustical units.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

B. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

C. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

D. Do not eccentrically load system or induce rotation of runners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Install units after above-ceiling work is complete.

C. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

D. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

E. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

Revised Geotechnical Engineering Services Report

Stewart-Lakewood Branch Library
City of Atlanta, Fulton County

Prepared For: Mr. Evan Jahn
Sr. Construction Project Manager
Fulton County General Services Department
One Margret Mitchell Square
6th Floor
Atlanta, GA 30303

Prepared By:
MC Squared, Inc.
1275 Shiloh Rd, Suite 2620
Kennesaw, GA 30144

Project No.: A091107.046
Prepared: June 2014

MC²
GEOTECHNICAL • ENVIRONMENTAL
MATERIALS TESTING

June 2, 2014

Mr. Evan Jahn
Sr. Construction Project Manager
Fulton County General Services Department
One Margret Mitchell Square
6th Floor
Atlanta, Georgia 30303

Subject: Revised Report for Geotechnical Engineering Services
New Stewart-Lakewood Branch Library
Atlanta, Fulton County, Georgia
MC² Project No. A091107.046

Dear Mr. Jahn:

MC Squared, Inc. (MC²) is pleased to present this revised Report of Geotechnical Engineering Services for the proposed new **Stewart-Lakewood Branch Library Fulton County, GA.** This is a revised report addressing concerns related to the foundation design as well as an updated seismic design section and new proposed detention system (replacing the originally proposed underground vault).

This report summarizes our findings, the subsurface conditions we encountered and our conclusions and recommendations as they relate to the project design and construction.

Thank you for giving us the opportunity to work with Fulton County General Services Department. Please let us know if you have any comments or need additional information.

Respectfully submitted,
MC²

Kermit Schmidt, PE
Vice President/Chief Engineer
PE No. 031391

Sam Moussly
CEO

William "Ian" Rovira, PE
Project Engineer

Nicholas Diorio, PE (FL)
Project Manager

1275 Shiloh Road, Suite 2620, Kennesaw, GA 30144
770-650-0873

TABLE OF CONTENTS

1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

Authorization to proceed for this project was issued on June 13, 2013 through a contract agreement between **MC²** and **Fulton County General Services Department.**

1.2 PROJECT DESCRIPTION

The **Stewart Lakewood Branch Library** is proposed as a replacement facility for the existing branch library located on Lakewood Avenue near Langford Parkway. The new library property is located north of the existing church building at 1332 Metropolitan Parkway in southwest Atlanta.

The project includes a new 25,000 square foot single story structure to house new library and community meeting facilities within a new public/civic plaza. The foundation for the main building will include both elevated structured slab and slab on grade areas. The finished floor elevation is planned to be 1027 feet. Building design is based on maximum column loads of 350 kip in addition to 100 kip lateral load. Within the crawl space, below a portion of the structured slab, mechanical air handling units and trunk ducts will be routed to serve the building from below the floor. The structural slab will be a composite steel assembly on concrete piers/footings in approximately 30' x 30' bays. Foundation walls will confine the area of the raised slab (foundation walls will be present along the building perimeter as well as within the crawl space). The slab on grade will incorporate 2' high retaining wall perimeter (to accommodate the interior raised floor system) with integrated dropped footings for the main level steel columns. The main level of the building will be structured of steel columns, steel perimeter and main interior beams with 18-24" bar joists. Ceiling heights vary from 15' to 22'. Preliminary floor plans and structural diagrams were provided by Smith Dalia Architects, LLC for preparation of this report dated.

Based on the provided civil drawings and a site reconnaissance by **MC²**, existing site conditions include multiple concrete foundations from previously demolished buildings, a three story abandoned masonry building, and two (2) areas paved with asphalt. The existing building is dilapidated and will be demolished for the Stewart Lakewood Library development. Portions of the planned library building are located in areas where concrete is observed at the existing ground surface. The site has a significant slope across the face of the property from a high point at the SW commercial corner at approximately 1030 ft to the lowest point at the NW property corner at approximately 1013 ft. The natural slopes of the site are generally left intact with some fill depths of 4 feet or less in the building area.

In addition, an underground detention vault was originally proposed and now replaced with underground pipe detention systems in the northeast corner of the new library.

2.0 SCOPE OF WORK AND SERVICES

The purpose of this exploration was to collect subsurface data of the proposed construction site. The field services consisted of the following:

- Visited the site for the purpose of locating the proposed borings as prepared by Smith Dalia Architects, LLC. The boring locations were staked in the field by a **MC²** representative based upon boring locations selected by Smith Dalia Architects, LLC. All stakes were replaced at the drilled locations after completion of the drilling. Unless otherwise surveyed by Fulton County, or Smith Dalia Architects, LLC, elevations were interpolated from final existing contour lines on grading plans provided by LONG Engineering, Inc. dated June 7, 2013. Final boring locations were obtained by using handheld GPS equipment (Etrex Venture HC). It should be noted that all locations and elevations are approximate.

- Cleared underground and overhead utilities prior to commencing the drilling operations.

- Obtained any necessary permits and clearances from public or private entities in collaboration with Fulton County to perform the proposed work.

- Performed Standard Penetration Test (SPT) borings at the proposed locations. A total of eleven (11) SPT borings (B-1 through B-8 and B-13 through B-15) were performed within the foot print of the proposed building to an average depth of 35 feet or auger refusal, as specified by the project structural engineer, whichever is encountered first. No rock coring was planned during this study. No borings were terminated in soft/loose soils (N-values of 10 blows per foot or less). International building code requires that one of the borings be advanced to rock or to 100 feet whichever occurs first for seismic study. Due to existing concrete foundations onsite and asphaltic concrete, we cored four (4) of the SPT boring locations would prior to drilling and sampling.

- Performed one (1) SPT boring to a depth of fifteen (15) feet within the footprint of each originally proposed Underground Detention Vault (UDV), at the approximate location of each Double Ring Percolation test. These Vaults were removed from the final plan design and were replaced with underground pipe detention systems.

- Performed two (2) straight auger borings within the proposed parking, driveways, and walkways to a depth of 10 feet below grade (excluding B-9 as previously discussed). **NOTE:** Auger boring location B-12 was not accessible to clearing/drilling equipment at this time; the perimeter fence was too close to the existing building on south and west edges of the property. Therefore, we performed a hand auger boring to about 6 feet.

- The table below summarizes the boring depths and drilling methods. The boring location plan provided to us is also attached to this report for your reference and convenience.

Boring Number	Drilling Method	Depth (ft)
B-1	SPT	35
B-2	SPT	35
B-3	SPT	44
B-4	SPT	35
B-5	SPT	35
B-6	SPT	35
B-7	SPT	35
B-8	SPT	35
B-9*	SPT	15
AB-10	Straight Auger	10
AB-11	Straight Auger	10
HA-12	Hand Auger	6
B-13	SPT	35
B-14	SPT	35
B-15	SPT	35
B-16**	SPT	15
	Total SPT	**424**
	Total Straight Auger	**20**
	Total Hand Auger	**6**

* **Boring in 70' x 90' x 3' UDV Footprint**
**** Boring in 100' x 60' x 6' UDV Footprint**

- SPT's were conducted continuously in the top 10 feet zone and on 5 foot intervals thereafter. Samples were placed in air tight jars labeled on both side and topped with job number, boring number, sample number, sample depth, blow-counts, sample recovery and date.

- Performed a total of two (2) Double Ring Percolation tests, one (1) in the footprint of each originally proposed UDV. Each percolation test required the use of excavation equipment (backhoe, trackhoe, etc.) to excavate a pit of sufficient depth to provide safe entry and exit for **MC²** personnel, as well adequate testing space.

- All borings were performed under the full time direct supervision of a geotechnical engineer or geologist.

- Groundwater table was recorded in each boring when encountered and after completion of the boring.

- All borings were backfilled with drill cuttings upon completion of the fieldwork.

- Classified all soil samples in accordance with the visual manual soil classification method per ASTM D-2488.

- Conducted laboratory testing of selected samples. We performed a total of three (3) Atterberg limit tests with natural moisture content (ASTM D-4318), six (6) mechanical sieve analyses (ASTM D-422), two (2) material in soil finer than the No. 200 sieve (ASTM D-1140). Additionally, perform a total of two (2) standard proctors (ASTM D-698) and two (2) CBR (ASTM D1883) in the parking and UDV areas.

- Provided analyses and foundations recommendations including bearing capacities, total and differential settlements, dewatering and earthwork recommendations.

MC² provided the following data and recommendations in our report:

1. General assessment of area geology based on our past experience, study of geological literature and boring information.

2. Depth, thickness and composition of soil and rock strata, which will be excavated, provide foundation support, or will be appreciably stressed by the proposed construction.

3. General suitability of materials within the site for use as engineered fills and general backfill.

4. General location and description of potentially deleterious materials encountered in the borings, which may interfere with the buildings construction or performance, including existing fill, surficial organics or rock.

5. Discuss critical design and/or construction considerations based on the soil, rock and groundwater conditions developed from the borings.

6. Address groundwater levels in the borings and estimate high groundwater. Provided recommendations for de-watering if required.

7. Recommendations for foundation design and construction, including allowable bearing pressures for typical shallow foundations.

8. Recommended horizontal static earth pressure (active, passive and at-rest) was provided for your use in the design of below grade.

9. Recommendations for pavement sections including sub grade preparation. Pavement design is NOT within the scope of our study.

10. Seismic design criteria, including peak acceleration (Aa), effective velocity related acceleration (Av), and the soil profile type (S) based upon the review of the new International Building Code (IBC 2012) literature. Site specific Shear Wave testing was performed and originally the site was classified using the IBC 2006 Edition.

The field exploration was performed by qualified engineering technicians and/or staff geologists. The evaluations will be performed and the report prepared by licensed professional geotechnical engineers.

The SPT borings were conducted in general accordance with ASTM D-1586 (Standard Test Method for Penetration Test and Split Barrel Sampling of Soils) using hollow stem augers to drill through the soil to the test depth. Standard Penetration sampling was performed at closely spaced intervals in the upper 10 feet and at 5-foot intervals thereafter. After seating the sampler 6 inches into the bottom of the borehole, the number of blows required to drive the sampler one foot further with a standard 140 pound hammer is known as the "N" value or penetration resistance. The N-value has been empirically correlated to soil properties. The recovered samples were placed into containers and returned to our office to confirm field classification and further laboratory testing.

The approximate locations of the borings are shown on the **Boring Location Plan**, **Sheet 1** in the **Appendix A**. The **Report of Core Borings (Soil Profiles)** with selective laboratory test results are shown on **Sheets 2, 3 and 4** in the **Appendix A**.

The scope of our services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, groundwater, or air, on or below or around the area where the borings were performed. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of our client.

3.0 LABORATORY TESTING

3.1 SOIL CLASSIFICATION TESTING

Representative soil samples collected from the SPT and auger borings were visually reviewed in the laboratory by a geotechnical engineer to confirm the field classifications. The samples were classified and stratified in general accordance with the Unified Soil Classification System (USCS). Classification was based on visual observations with the results of the laboratory testing used to confirm the visual classification. Laboratory classification tests consisting of percent passing the No. 200 sieve, Atterberg Limits and moisture content determinations were performed on select soil samples believed to be representative of the materials encountered. A summary of the laboratory test results

are provided in **Table 2** in the **Appendix A** and grain size distribution and/or atterberg test results in **Appendix B**. In addition, two (2) Standard Proctors and two (2) California bearing (CBR) tests were performed and the results presented in **Appendix B.**

3.2 PERCENT PASSING THE NO. 200 SIEVE

The wash gradation test measures the percentage of a dry soil sample passing the No. 200 sieve. By definition in the Unified Soil Classification System, the percentage by weight passing the No. 200 sieve is the silt and clay content. The amount of silt and clay in a soil influences its properties, including permeability, workability and suitability as fill. This test was performed in general accordance with ASTM D-1140 (Standard Test Methods for Amount of Material Finer than the No. 200 (75 μm) Sieve).

3.3 ATTERBERG LIMITS

The Atterberg liquid and plastic limit tests are performed on clayey soils and measure the moisture contents at which a soil behaves as a viscous fluid and becomes plastic, respectively. The difference between the plastic limit and liquid limit is defined as the plasticity index. These moisture contents have been correlated to soil properties, such as suitability for fill and shrink-swell tendency. ASTM D 4318 (Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils) was used as a guideline for this testing.

3.4 MOISTURE CONTENT

The laboratory moisture content test consists of the determination of the percentage of moisture contents in selected samples in general accordance with ASTM test designation D-2216. Briefly, natural moisture content is determined by weighing a sample of the selected material and then drying it in a warm oven. Care is taken to use a gentle heat so as not to destroy any organics. The sample is removed from the oven and reweighed. The difference of the two weights is the amount of moisture removed from the sample. The weight of the moisture divided by the weight of the dry soil sample is the percentage by weight of the moisture in the sample.

3.5 STANDARD PROCTOR COMPACTION TEST

The Standard Proctor compaction test was performed in general accordance with ASTM test designation D-698. The laboratory compaction procedure is intended to simulate the compactive effort anticipated in the field. In the laboratory compaction test, a soil at a known water content is placed in a specified manner in a mold of given dimensions and subjected to a compactive effort of controlled magnitude, after which the resulting unit weight of the soil is determined. The procedure is repeated at various water contents until a relation between water content and unit weight of the soil is established.

3.6 CALIFORNIA BEARING RATIO (CBR) TEST

The CBR test is a penetration test for evaluation of the mechanical strength of road subgrades and base courses. It was developed by the California Department of Transportation. The test is performed by measuring the pressure required to penetrate a soil sample with a plunger of standard area. The measured pressure is then divided by the pressure required to achieve an equal penetration on a standard crushed rock material. The test was performed in general accordance with ASTM Standard D1883-05 (for laboratory prepared samples). The harder the surface, the higher the CBR rating. The standard material for this test is crushed California limestone, which has a CBR value of 100.

4.0 GENERAL SITE AND SUBSURFACE CONDITIONS

4.1 REGIONAL GEOLOGY

The project site is in the Piedmont Physiographic Province, an area underlain by igneous and metamorphic rocks up to 600 million years old. The natural soils present in this geologic area have been formed by the in-place chemical and physical weathering of the parent rock. Weathering is facilitated by fractures, joints and by the presence of less resistant rock types. The typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands that generally become harder with depth to the top of parent bedrock.

4.2 FULTON COUNTY SOIL SURVEY

The U.S. Department of Agriculture - Soil Conservation Service, now known as the Natural Resources Conservation Service (NRCS), has mapped the shallow soils in this area of Fulton County. This information is available through the NRCS Web Soil Survey. The soil information of Fulton County, Georgia used was Version 5 dated October 9, 2008 with aerial images taken in August 10, 2007. Most of the areas along the proposed pipe alignment are covered with three (3) soil mapping units as described below.

a. Urban land-Cecil complex, 2 to 10 percent slopes, moderately eroded.

The USDA Soil Survey is not necessarily an exact representation of the soils on the site. The mapping is based on interpretation of aerial maps with scattered shallow borings for confirmation. Accordingly, borders between mapping units are approximate and the change may be transitional. Differences may also occur from the typical stratigraphy, and small areas of other similar and dissimilar soils may occur within the soil-mapping unit. As such, there may be differences in the mapped description and the boring descriptions obtained for this report. The survey may, however, serve as a good basis for evaluating the shallow soil conditions of the area.

4.3 SUBSURFACE CONDITIONS

The boring locations were selected by **Fulton County** representatives and located in the field by **MC²**. Information about boring depth, depth to water table, and depth to partially weathered rock (PWR) can be found in **Table 1** of **Appendix A.** The approximate boring locations and **Report of Core Borings (Soil Profiles)** have been prepared by **MC²** and are presented on **Sheet 2, 3 and 4** in **Appendix A.** The SPT soil samples were classified in our laboratory using the Unified Soil Classification System (ASTM D-2487-06) or Visual Manual Classification System (ASTM D-2488-06) by **MC²** geologist. The boring logs in the **Appendix A** should be reviewed for specific soil, rock, and groundwater information at each boring location. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected across the site and between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

The subsurface conditions within the building footprint were explored using eleven (11) SPT borings (B-1 through B-8, B-13, B-14 and B-15). Boring termination depths within the footprint ranged from 35 to 44 feet below ground surface (BGS). All borings in the footprint were terminated at the proposed 35 foot depth except for boring B-3 which was performed for seismic study and was terminated at an auger refusal depth of 44 feet BSG. In general, the borings within the footprint of the building indicated loose micaceous sand (SP), medium dense to very dense micaceous slightly silty sands (SP-SM), loose to very dense silty sand (SM) and/or firm to very stiff sandy silts (ML) extending to depths ranging from approximately 28.5 to 35 feet below the existing ground or approximately elevations 987 to 987.5 feet. Boring B-3, B-13 and B-15 encountered very dense partially weathered rock (PWR) at depths ranging from approximately 28.5 to 44 feet BGS.

The subsurface contitions in the proposed parking lot area were explored using two (2) auger borings (AB-10 and AB-11) and two (2) SPT borings (B-9 and B-16). The auger and SPT borings were terminated at a depth of ten (10) feet BGS and fifteen (15) feet BGS, respectively. No rock or groundwater was encountered in the parking lot auger and SPT borings. In general, the auger borings consisted of micaceous silty sand (SM) or micaceous sandy clay (CL). In general, the SPT borings consisted of micaceous sandy silt (ML) and/or silty sand (SM). Two (2) bulk soil samples were taken from the Double-Ring Infiltrometer Test locations at an approximate depth range of 5 to 6 feet BGS for Standard Proctor and California Bearing Ratio testing.

The description of subsurface condition presented in the following sections is of a generalized nature, provided to highlight the major subsurface strata encountered in the borings performed at the site.

4.3.1 Topsoil

Approximately 4 inches of topsoil was encountered in borings B-1, B-4, B-6, B-7, AB-11, HA-12 and B-15. Topsoil contained small roots and other organic material and primarily

consisted of silty sands and sandy silts. The thickness of top soil layer may vary between and away from our boring locations.

4.3.2 Fill

Based on the material encountered near the surface and the site, it is our opinion, that fill soils were not encountered below the topsoil in the borings. Fill soils may exist in the project site particularly under the existing slabs and pavement.

4.3.3 Residuum

Residual soils were encountered below the topsoil in B-1, B-2, B-4, B-5, B-7, B-8, B-9, AB-10, AB-11, HA-12, B-14 and B-16. Residual soils consisted of loose sand (SP), medium dense to very dense slightly silty sands (SP-SM), loose to very dense silty sand (SM) and/or firm to very stiff sandy silts (ML) with varying amounts of mica. The penetration resistance in the residuum ranged from 6 to 35 bpf with 18 to 45 bpf being typical.

All borings were terminated in the residuum at a depths ranging from 6 to 35 feet.

4.3.4 Partially Weathered Rock (PWR)

Partially weathered rock (PWR) was encountered below the residuum only in borings B-3, B-6, B-13 and B-15 extending to depths ranging from 28.5 to 35 feet. PWR consisted of very dense, micaceous silty sand with penetration resistance of generally 50 blows for 4 inches of penetration.

4.3.5 Auger Refusal and Bedrock

Auger refusal was encountered in boring B-3 at a depth of 44 feet. Rock coring was not part of the scope of services for this project.

4.3.6 Groundwater

Groundwater was measured during drilling and at the end of drilling for all borings. The Groundwater ranged from depths of 24.5 to 43 feet BGS or elevations 979 to 991.5 feet. Groundwater fluctuation of approximately 5 feet is common in this geology due to seasonal and climatic variations.

4.3.6 Seismic Criteria for Structural Engineer

MC² conducted an analysis, utilizing the Multi-Channel Analysis of Surface Waves (MASW) technique, to determine the Seismic Site Classification for the proposed site. The Probabilistic Ground Motion values were retrieved for a central location within the project site, utilizing the USGS Earthquake Hazards Program, using latitude (N

33.718876) & longitude (W -84.407346). The following are the Spectral Response Acceleration Parameters for a 2% probability in 50 years:

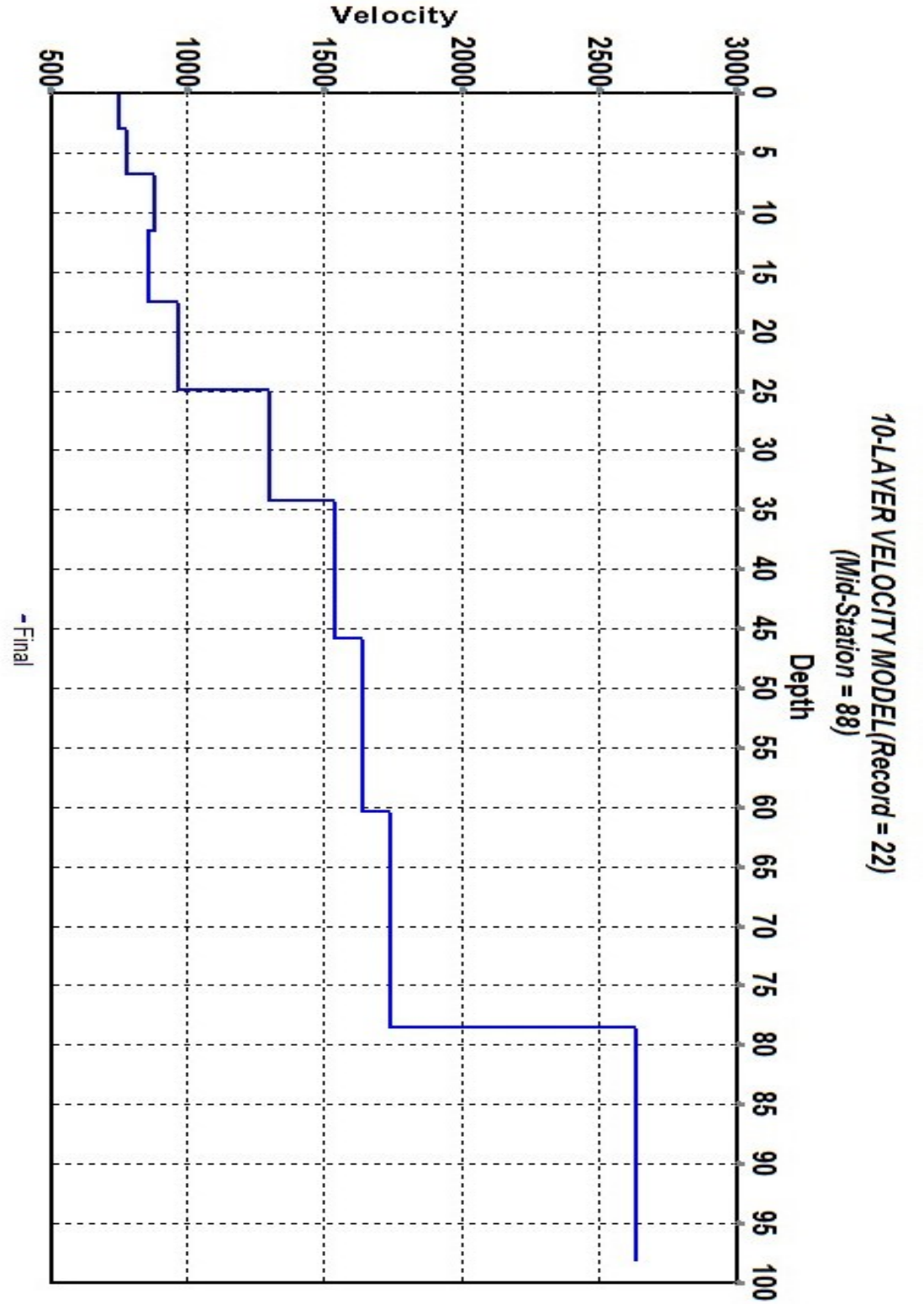
S_s: *Short period (0.2 second), Spectral Response* = 0.183
S_1: *1-second period, Spectral Response* = 0.089

The site classification was undertaken in general accordance with the **International Building Code 2012 (IBC2012)**, Table 1613.3.2 and chapter 20 of ASCE 7 by relying on the shear wave velocity for the upper 100 ft of the subgrade.

- A site-specific seismic evaluation was carried out by conducting surface velocity testing and performing a Multi-Channel Analysis of Surface Waves (MASW) in order to determine the Seismic Site Classification for the proposed project. One line was deployed; designated as line 1. MASW utilizes seismic energy of Rayleigh type surface waves to calculate the shear wave velocity. For this method, the geophones (receivers) remain stationary and data is collected with the source located off the end of the line of geophones. Data is collected at multiple locations (i.e., offsets) in order to obtain the optimal survey settings that would yield the most coherent data set. This data is then processed and inverted to calculate a 1-D shear wave velocity profile.

A weighted average of the 1-D shear wave velocity profile can then be used to get an average shear wave velocity down to the maximum depth of the 1-D shear wave velocity profile. For this survey, the most coherent data set was obtained along Line 1 which was generally oriented in an East-West direction. A proprietary pressure-coupled land streamer was deployed with Geophones spaced 5 ft apart and the source position was located 40 ft off the western end of the transect. The source consisted of a 20 pound hammer striking a steel plate. The surface along which the land streamer was deployed was asphalt pavement. The data was collected using a 24-channel Geode seismograph, manufactured by Geometrics, Inc., with 4.5 Hz geophones.

The data was processed using the KGS SurfSeis 3 software package, developed by Kansas Geologic Survey. This software is used to process and invert the surface wave data, and produces a 1-D shear wave velocity model, presented below.


10-LAYER VELOCITY MODEL(Record = 22)
(Mid-Station = 88)
Velocity
500
1000
1500
2000
2500
3000
Depth
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
- Final

The analysis yielded an average shear wave velocity (for the upper 100 ft) V_{s100} at 1564 ft/sec. This value corresponded to a Seismic Site Class 'C'. A Site Class C correlates to the following site coefficients adjusted for site class, based on Tables 1613.3.3(1) and 1613.3.3(2) of IBC 2012:

F_a = 1.2
F_v = 1.7

The maximum considered earthquake spectral response accelerations for short periods and at 1-second periods follow:

S_{MS} = 0.219 *Equation (16-37, IBC2012)*
S_{M1} = 0.152 *Equation (16-38, IBC2012)*

This translates to the following Design Spectral Response Acceleration Parameters:

S_{DS} = 0.146 *Equation (16-39, IBC2012)*
S_{D1} = 0.101 *Equation (16-40, IBC2012)*

5.0 EVALUATION AND RECOMMENDATIONS

5.1 General Site Development Considerations

Based on the information provided to us by Smith, Dalia Architects and Fulton County General Services Department, it is our understanding that the building floor level rises above the street and takes advantage of the site configuration to separate (vertically) the noisy roadway from the quieter functions of the library. The natural slopes of the site are generally left intact with some fill depths of 4 feet or less in the building area. It is advisable to specify higher compaction for structural areas that require deep (a maximum of 5 feet) fills as this would permit the use of higher bearing pressure and eliminate the need to wait for settlement of fill and underlying soils before commencing building construction.

Based on the findings of our test borings, our understanding of the proposed development, and our geotechnical engineering evaluation, shallow foundations can be used to support the proposed library one-story structure.

It is recommended that **MC²** be retained to provide a review of the design documents prior to the beginning of construction to ensure that our recommendations are incorporated and implemented properly. In addition, it is recommended that **MC²** be retained to provide observation and testing of construction activities involved in the earthwork, foundation, and related activities of this project. **MC²** cannot accept any responsibilities for any conditions

which deviate from those described in this report if not engaged to also provide construction observation and testing for this project.

The following sections further discuss specific design and construction concerns at this site from a geotechnical standpoint.

5.2 Site Preparation

Prior to construction, the site should be stripped of any surface vegetation and topsoil to a depth of at least 12 inches below existing grade and should be removed extending out at least 10 feet beyond the construction limits. Additional topsoil to depths deeper than those recorded in our borings - if encountered between and away from our boring locations - should also be removed. Any remnants of existing slabs, foundations or construction debris should be removed from the project site. The presence or absence of any underground utilities within the area of the proposed development should be verified by Smith Dalia Architects and Fulton County General Services Department.

The areas that require fill or construction at the existing grade should be proofrolled with a fully loaded (20 ton) dump truck in the presence of a geotechnical engineer. The geotechnical engineer observing the proofrolling should identify any areas that deflect or "pump" excessively and evaluate those areas further by probing, hand auger borings, and/or excavating test pits. Recommendations for subgrade improvement such as undercutting, stabilizing using crushed stone or other means should also be provided by the geotechnical engineer who observing the proofrolling.

5.3 Earthwork

5.3.1 Suitability of Existing Soils

The existing fill soils generally appear to be suitable for reuse provided they are free of organic materials, excessive amounts of clays, debris or any other deleterious material. The existing fill will need to be evaluated at the time of construction to determine if it is suitable for reuse as structural fill. Some moisture conditioning of the fill soils may be necessary prior to reuse.

The residual soils encountered in our borings generally appear suitable for use as structural fill; however, some of the micaceous to highly micaceous silts may require very tight moisture control to achieve proper compaction. Residual soils excavated just above and below groundwater table will require drying prior to reuse as structural fill.

5.3.2 Use of Partially Weathered Rock (PWR) and Rock as Fill

Rock and partially weathered rock (PWR) should be used as fill with caution and in strict compliance with the recommendation contained in this section of our report. If the partially weathered rock can be broken down by heavy compaction equipment, it may be

used as regular soil fill. If in the opinion of the geotechnical engineer the PWR cannot be crushed under heavy construction equipment, it should be considered rock fill.

If rock has to be used as fill, it should only be permitted in deep fill areas, below pavements only. Rock fill should not be used in the footprint of any structures and up to 10 feet outside of it. Where soils are mixed with rock during grading, the soils should be at or close to their optimum moisture content. Heavy compaction equipment will be required to adequately compact the soil matrix to its required density and to break down the partially weathered rock boulders. Fills which contain substantial rock cannot be adequately tested; therefore, an engineering technician should observe the placement of such fills on a full time basis. The contractor should proofroll the rock fill with heavy construction equipment or dump trucks.

If soil fill has to be placed over rock fill, the surface of rock fill should be choked off with crusher run or suitable engineering fabric. If a fully soil choked soil-rock mixture is used, it will not be necessary to use crusher run or fabric. Rock sizes should be no larger than 4 inch maximum size, in the upper 3 feet of fill below paved areas. Rock fills in pavement areas at depths greater than 3 feet may contain rocks no greater than 2 feet in the largest dimension. There is a risk of excessive settlement if rocks larger than 2 feet are used in the fill placed within the pavement areas. Rocks larger than 2 feet in size should be separated and should only be used in the bottom of deeper fills (10 feet or more) after prior approval of the geotechnical engineer.

5.3.3 Concerns Related to Deep Fills

Based on the information available to us, the natural slopes of the site are generally left intact with some fill depths of 4 feet or less in the building area. It is advisable to specify higher compaction for structural areas that require deep (a maximum of 5 feet) fills as this would permit the use of higher bearing pressure and eliminate the need to wait for settlement of fill and underlying soils before commencing building construction.In order to limit the overall (and time of) settlement of the fill, we recommend that all fill within and 10 feet outside of the building or structure footprints should be compacted to 98% of the soil’s standard Proctor maximum dry density within +/-3% of the optimum moisture content as determined by ASTM D-698. All other structural fill should be compacted to at least 95 percent of the soil's standard Proctor maximum dry density within +/-3% of the optimum moisture content as determined by ASTM standard D-698. The upper foot of fill which will support pavements or slabs should be compacted to at least 98 percent of the soil's standard Proctor maximum dry density for improved support. In areas which are at or above the finished grade, and which will support pavements, the upper 8 inches immediately below the pavement should be scarified and recompacted to the 98 percent criteria.

5.3.4 Fill Placement, Compaction and Testing

Structural fill should be free of organic material, have a plasticity index (PI) less than 20

and contain rock sizes no larger than 4 inches. The moisture content of fill soils at the time of placement and compaction should generally be within +/-3% percentage points of their optimum moisture content. A representative of **MC²** should observe fill placement operations and perform density tests concurrently to indicate if the specified compaction is being achieved. The upper foot of fill which will support pavements or slabs should be compacted to at least 98 percent of the soil's standard Proctor maximum dry density within +/-3% of the optimum moisture content for improved support. In areas which are at or above the finished grade, and which will support pavements or slabs, the upper 8 inches immediately below these systems should be scarified and recompacted to the 98 percent criteria within +/-3% of the optimum moisture content.

Density testing should be performed by a soils technician to determine the degree of compaction and verify compliance with the project specifications. For all structural fill in building pads and pavement, at least one field density test should be conducted for each 5000 square feet of fill area for each two foot lift. Testing frequency should be increased in confined areas. Areas which do not meet the compaction specifications should be recompacted to the specified compaction. If fill has to be placed near existing structures, it should be placed in 6 to 8 inch loose lifts and compacted using a static roller. Within small excavations such as in utility trenches, around manholes, or within 5 feet of any of the structure walls, we recommend the use of smaller, hand or remote-guided equipment. Placement of loose lift thickness of 4 inches is recommended when using such equipment.

5.4 Excavation Considerations

The following sections provide detailed recommendations related to excavation of soil, partially weathered rock, and rock.

5.4.1 Soil

The existing soils in the library area generally consist of micaceous silty sands and sandy silts. These materials may be excavated by a qualified contractor using conventional earth moving equipment without difficulties.

For soils of the type present at the site we recommend that all temporary excavations be sloped no steeper than 1.5H: 1V. Please refer to the Federal Temporary Excavation Regulations reported below. The use of any bracing system during the temporary excavation is the sole responsibility of the contractor.

5.4.2 Partially Weather Rock

Partially weathered rock (PWR) was encountered in borings B-3, B-6 and B-13, and B-15. In large excavations, removal of PWR generally requires loosening using a large single-tooth ripper pulled by a Caterpillar D-8K dozer, or similar equipment prior to removal using conventional earth moving equipment. Most partially weathered rock with penetration resistances of 50 blows for more than 2 inches of penetration may be

considered rippable for planning purposes. Partially weathered rock with penetration resistances of 50 blows for 2 inches or less penetration would likely require blasting to aid in removal.

The rippability of PWR is dependent upon several factors including the penetration resistance and continuity of the material encountered; the type and condition of the equipment utilized; and the skill, effort, and diligence of the grading contractor. Sometimes PWR can be ripped in one direction due to existing joints and fractures but ripping in other directions may be unsuccessful. The project specifications should clearly state that the contractor should attempt to rip in several directions using appropriate equipment before any claims of rock excavation is considered valid. Any claims of rock excavation should be verified by the geotechnical engineer or his representative. If excavation of deep layers and/or large quantities of PWR is anticipated, it may be more expeditious and economical for the contractor to loosen the PWR by blasting. Removal of PWR in confined excavations, such as excavations for utility lines and shallow foundations, would likely require the use of large backhoes, hoe ram, or blasting.

5.4.3 Rock

Auger refusal rock was encountered in boring B-3 at 44 feet BGS. The contractor may be able to rip the upper few feet for fractured rock. However, for planning purposes, we anticipate that all material below auger refusal depths will require blasting prior to removal (if necessary) using conventional earth moving equipment. We do not expect excavation on this site to be deep; however, we are providing the information below should the planned design/construction changes. Therefore, the presence of rock should not impact the planned development.

When blasting near proposed finished grades or within foundation excavations, the contractor should exercise caution to avoid damaging the underlying material. Any material that is damaged during blasting should be removed prior to commencing construction.

The contractor should take appropriate precautionary measures prior to commencing blasting to ensure that the nearby facilities, structures, and utility lines are not adversely impacted. We recommend that a pre-blast survey be performed to record the condition of the existing structures prior to blasting and blast monitoring devices be installed at critical locations to monitor vibrations caused by blasting. The blasting and all associated tasks including precautionary measures related to blasting should be the sole responsibility of the contractor.

5.4.4 Definitions of Rock for Payment

On many projects conflict arise over the definition of rock. We suggest that the following definitions be incorporated into specifications to avoid such conflicts. These definitions have been used on other projects successfully and are included herein for your guidance.

Mass Excavation Rip Rock: Any material that cannot be removed by scrapers, loaders, pans, dozers, or graders; and requires loosening by using a single-tooth ripper mounted on a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds.

Mass Excavation Blast Rock: Any material which cannot be excavated after loosening with a single-tooth ripper mounted on a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds (Caterpillar D-8K or equivalent) or by a Caterpillar 973 front-end loader or equivalent; and occupying an original volume of at least one (1) cubic yard.

Trench Excavation Blast Rock: Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 25,700 pounds (Caterpillar Model 225 or equivalent) and occupying an original volume of at least one-half (1/2) cubic yard.

5.5 Groundwater Considerations and Dewatering

The groundwater elevation in two borings ranges from 979 to 991.5 feet in borings B-3 and B-13. It is our opinion, that groundwater will not impact the construction of the proposed library.

The contractor should determine the actual groundwater levels at the time of construction to determine if dewatering is necessary. We anticipate that water will likely seep thru the rock fissures, factures, and joints during the course of construction. Pumping of miscellaneous inflow of water, should be performed from sumps excavated and placed just below the elevation of the proposed foundation area for the library.

5.6 Foundation Recommendations

Surface Structure (Library)

Based on the grading information provided to us and discussed in section 1 of this report, the natural slopes of the site are generally left intact with some fill depths of 4 feet or less in the building area. Shallow foundations for this structure should consist of spread footings and strip footings resting on soils compacted to 98% of the soil's standard Proctor (ASTM D-698) maximum dry density. Moisture should within +/-3% of the optimum moisture content using a net allowable bearing pressure of 3000 psf.

The continuous wall (strip) footing should have a minimum embedment depth of 1.5 feet (to prevent frost action) below adjacent compacted grade on all sides and a minimum width of 2.0 feet. Column footings should be embedded 2.0 feet below adjacent compacted grade and a minimum of 4.0 feet in width. The minimum footing sizes should be used regardless of whether or not the foundation loads and allowable bearing pressure dictate a smaller

size. The minimum footing sizes tend to provide adequate bearing area to develop bearing capacity and account for minor variations in the bearing material.

Provided the recommended site preparation and grading operations are properly performed and the recommendations previously stated are followed, the total settlement of the shallow foundations should not exceed approximately 1 inch. Differential settlement is estimated to be on the order of 50 percent of the total settlement. Differential settlement of this magnitude is usually considered tolerable for the anticipated construction; however, the tolerance of the proposed structure to the predicted total and differential settlement should be confirmed by the structural engineer.

Upon review of the newly proposed Underground Detention System combined with the Dry Swale, it is our opinion that any groundwater associated with the aforementioned storm water system adjacent the north side of the structure, **when performing as proposed/designed**, shall have no impact on the settlement of the shallow foundations.

Foundation bearing surface evaluations should be performed by **MC².** If any weak zones are noted within the foundation excavation, they should be undercut and replaced with compacted crushed stone or lean concrete. Footing concrete should be poured the same day the foundation excavations are made. All foundations should be constructed in the "dry". At a minimum, all foundation excavations should be covered during rain events. Uncovered excavations may become oversaturated and difficult to compact during rain events. Surface run-off water should be drained away from the excavations and not allowed to pond. Alternatively, if the foundation excavations must be left open and rain is anticipated, it may be protected by the placement of a thin (2-3 inch) mud mat of lean concrete. Soils left exposed during inclement weather may soften and will require additional excavation.

The floor slabs should bear on properly placed and compacted structural fill or stone. The final 1.0 foot of fill required to reach finish grade under floor slabs should be compacted to 98% of the soil's standard Proctor maximum dry density. A 6-inch thick leveling course of #57 stone may be placed under the floor slab for additional protection.

The floor slab may be designed using a modulus of subgrade reaction (k_s) of 150 pounds per cubic inch (pci).

5.7 Earth Pressures and Retaining Wall Recommendations

Based on the soil types encountered at the site, we recommend that temporary slopes under 15 feet in height should be no steeper than 1.5(H) to 1(V). Any permanent slopes should be less than 2(H) to 1(V). The foundation of any structure should be setback at least 10 feet from the edge of any slopes. The nearest edge of any pavements should be setback a minimum of 5 feet.

Static Earth Pressure

Below grade walls must be designed to resist lateral earth pressures. The "at rest" earth pressure state should be used for soils supporting rigidly restrained walls. The onsite soils are generally suitable materials for use as wall backfill. The table below presents recommended values of earth pressure coefficients for Piedmont fill soils, assuming an approximate angle of internal friction of 28 degrees. Equivalent fluid densities are frequently used for the calculation of lateral earth pressures. Equivalent fluid densities for the "at-rest" and active conditions based upon a total unit weight of 120 pcf and a fluid unit weight of 62.4 pcf are shown in the table below.

Static Earth Pressure Parameters				
Earth Pressure State	**Earth Pressure Coefficient**	**Equivalent Fluid Pressure (pcf)**		
		Above Water Table	Below Water Table (No Hydrostatic Pressure)	Below Water Table (with Hydrostatic Pressure)
At-Rest (soil backfill)	0.5	60	30	90
Active	0.33	40	20	80
Passive	3.0	360	175	235

The design values and recommendations presented above assume that the backfill behind the wall will be horizontal with no surcharge loads. Equivalent fluid densities for *no hydrostatic pressure and including hydrostatic pressure are given above. Walls below the groundwater level should include hydrostatic pressures.*

Large roller and other heavy construction equipment should not be permitted to compact backfill immediately behind any retaining wall. All wall backfill should be compacted to at least 98% of the soil's standard Proctor maximum dry density. Compaction behind retaining wall will require the use of light compaction equipment such as hand-operated “wacker-packer” or remote control operated mini-rollers. All exterior retaining walls that are exposed to surface water infiltration should be protected using a footing and wall drain. The drain should consist of a perforated schedule 40 PVC pipe, placed in washed #57 stone, wrapped in a 4-ounce nonwoven filter fabric.

The lateral loads on shallow foundations may be resisted by passive pressures against the side of the footing or sliding resistance on the base. Using a factor of safety of about 2, an allowable equivalent fluid pressure of 150 pcf may be used for passive resistance. A factor of safety of 2 is recommended for passive resistance due to the large deflections required to mobilize full passive resistance. Using a factor of safety of 1.5, an allowable

friction factor of 0.4 may be used to calculate lateral resistance at the base of the footings.

Dynamic Earth Pressure

If needed, below grade walls must be designed to resist dynamic lateral earth pressures and should be obtained by an experienced structural engineer. The scope of our study was specifically to perform Shear Wave testing in order to determine the site classification. We suggest that the structural engineer consult with the IBC Chapter 16.Structural Design and also use adequate factors of safety. *Walls below the groundwater level should include hydrostatic pressures.*

5.8 Federal Temporary Excavation Regulations

In Federal Register Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P." This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations, or footing excavations, be constructed in accordance with the revised OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in these local, state, and federal safety regulations.

We are providing this information solely as a service to our client. **MC²** is not assuming responsibility for construction site safety or the contractor’s activities; such responsibility is not being implied and should not be inferred.

5.9 General Pavement Guidelines

In general, following the completion of the recommended clearing and grading operations, the compacted structural fill should be acceptable for construction and support of a flexible type pavement section.

The subgrade should be a minimum of 12 inches in thickness and compacted to a minimum of 98% of the Standard Proctor maximum dry density. Subgrade soils should be firm and true to line and grade prior to paving. Traffic should not be allowed on the subgrade prior to the placement of base material to avoid rutting.

As a guideline for pavement design, we recommend that the graded aggregate base course (GAB) have a minimum thickness of 8 inches in all parking areas. Before paving, the base should be checked for soundness. Any fill utilized to elevate the cleared pavement areas to subgrade elevation should consist of structural fill uniformly compacted to a minimum density of 98% of the standard Proctor maximum dry density.

The asphaltic concrete structural course type and thickness should be selected by the designers. The asphaltic concrete should meet standard GDOT material requirements and placement procedures as outlined in the current GDOT standards.

The above paragraphs serve as guidelines. The actual pavement section thicknesses shall be provided by the design civil engineer based on traffic loads, volume, and the owner's design life requirements. The above section represents minimum thicknesses of representative typical load and construction practices. As such, periodic maintenance should be anticipated. All pavement materials and construction procedures should conform to GDOT or appropriate Fulton county requirements.

6. 0 REPORT LIMITATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. **MC Squared, Inc** is not responsible for the conclusions, opinions or recommendations made by others based on these data. This report has been prepared for the exclusive use of **Fulton County General Services Department and their Architects** for the specific application to the proposed new Stewart-Lakewood Branch Library in the City of Atlanta, Fulton County, Georgia.

The analyses and recommendations submitted in this report are based upon the anticipated location and type of construction and the data obtained from the soil borings performed at the locations indicated and does not reflect any variations which may occur among these borings. If any variations become evident during the course of construction, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. When final design plans and specifications are available, a general review by our office should be completed to check that the assumptions made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

APPENDIX A

- **Table 1 – Summary of Boring Information, Groundwater Tables, and Depth to Rock/Partially Weathered Rock**
- **Table 2 – Summary of Laboratory Tests**
- **Boring Location Plan – Sheet 1**
- **Report of Core Borings (Soil Profiles) – Sheets 2, 3 and 4**
- **gINT Logs**
- **Double-Ring Infiltrometer Test**
- **Approximate Orientation of the MASW Line**

Table 1

Summary of Boring Information, Groundwater Tables, and Depths to Rock/Partially Weathered Rock
New Stewart-Lakewood Branch Library
Fulton County, Georgia
MC^2 Inc. Project No. A091107.046

Boring No.	Approx. Boring Elevation (ft)	Boring Target Depth (ft)	Water Table Depth During Drilling (ft)	Water Table Depth After Drilling (ft)	Auger Refusal Depth (ft)	Depth to PWR (ft)
SPT Borings						
B-1	1016	35	NA	25	NE	NE
B-2	1029	35	NA	29	NE	NE
B-3	1022	60	NA	43	44	35
B-4	1020	35	NE	NE	NE	NE
B-5	1030	35	NE	NE	NE	NE
B-6	1023	35	28.5	26.5	NE	33.5
B-7	1029	35	30	30.5	NE	NE
B-8	1030	35	30	28.5	NE	NE
B-9	1030	15	NE	NE	NE	NE
B-13	1016	35	30	24.5	NE	28.5
B-14	1030	35	33	28.5	NE	NE
B-15	1029	35	33	28.5	NE	33.5
B-16	1028	15	NE	NE	NE	NE
Auger Borings						
AB-10	1028	10	NE	NE	NE	NE
AB-11	1029	10	NE	NE	NE	NE
Hand Auger Boring						
HA-12	1030	6	NE	NE	NE	NE

Notes:

1. NE = Not Encountered
2. NA = Not Apparent
3. PWR = Partially Weathered Rock
4. All Measurements Approximate

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Table 2
Summary of Laboratory Test Results
Stewart Lakewood Branch Library
Fulton County, Georgia
MC² A091107.046

Boring No.	Depth (ft)	USCS Class.	Sieve Analysis (% Passing)								Liquid Limit (%)	Plastic Index (%)	Natural Moisture Content (%)
			#3/8	#4	#10	#20	#40	#60	#100	#200			
B-2	3.5 - 5.0	SM	-	-	-	-	-	-	-	24			11
B-3	6.0 - 7.5	SM	100	100	99	88	71	57	43	29			16
B-4	3.5 - 5.0	SM	-	-	-	-	-	-	-	41			18
B-5	0.0 - 1.5	ML	100	100	100	95	84	76	67	58			23
B-6	8.5 - 10.0	SM	100	100	99	85	68	55	42	30			17
B-7	13.5 - 15.0	SM	100	100	100	89	72	60	50	38			23
B-8	3.5 - 5.0	SM	100	100	98	88	74	64	53	41			21
AB-10	1.5 - 3.0	SM	-	-	-	-	-	-	-	41	39	6	27
AB-11	3.5 - 5.0	CL	-	-	-	-	-	-	-	50	43	18	29
B-14	8.5 - 10.0	SM	100	93	87	80	71	63	53	39		NP	19

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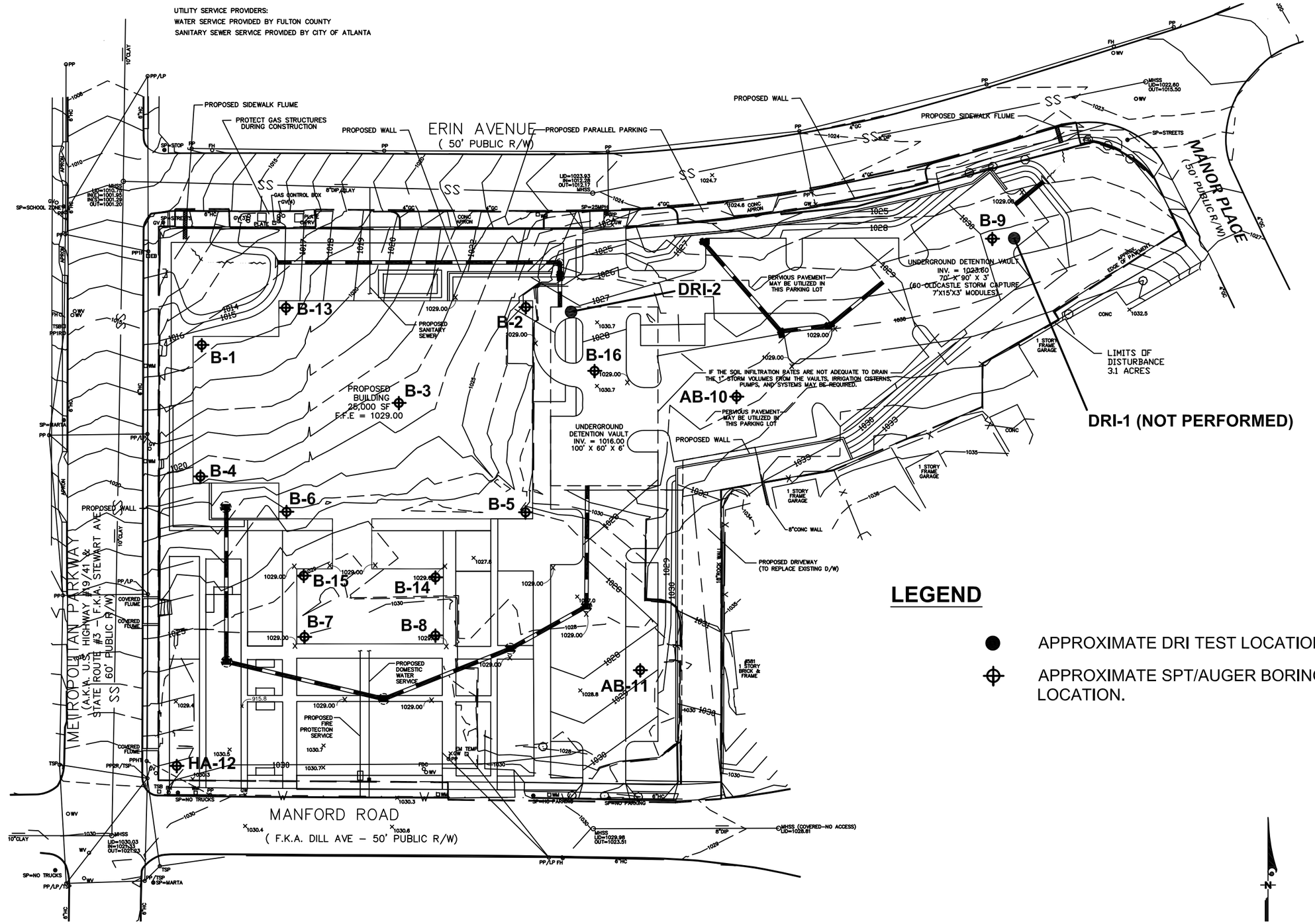
MATERIALS TESTING

UTILITY SERVICE PROVIDERS:
WATER SERVICE PROVIDED BY FULTON COUNTY
SANITARY SEWER SERVICE PROVIDED BY CITY OF ATLANTA



LEGEND

- ● APPROXIMATE DRI TEST LOCATION.
- ⊕ APPROXIMATE SPT/AUGER BORING LOCATION.

SCALE: 1"=60'.

DATE	NAME	REVISION	APPROVED BY:

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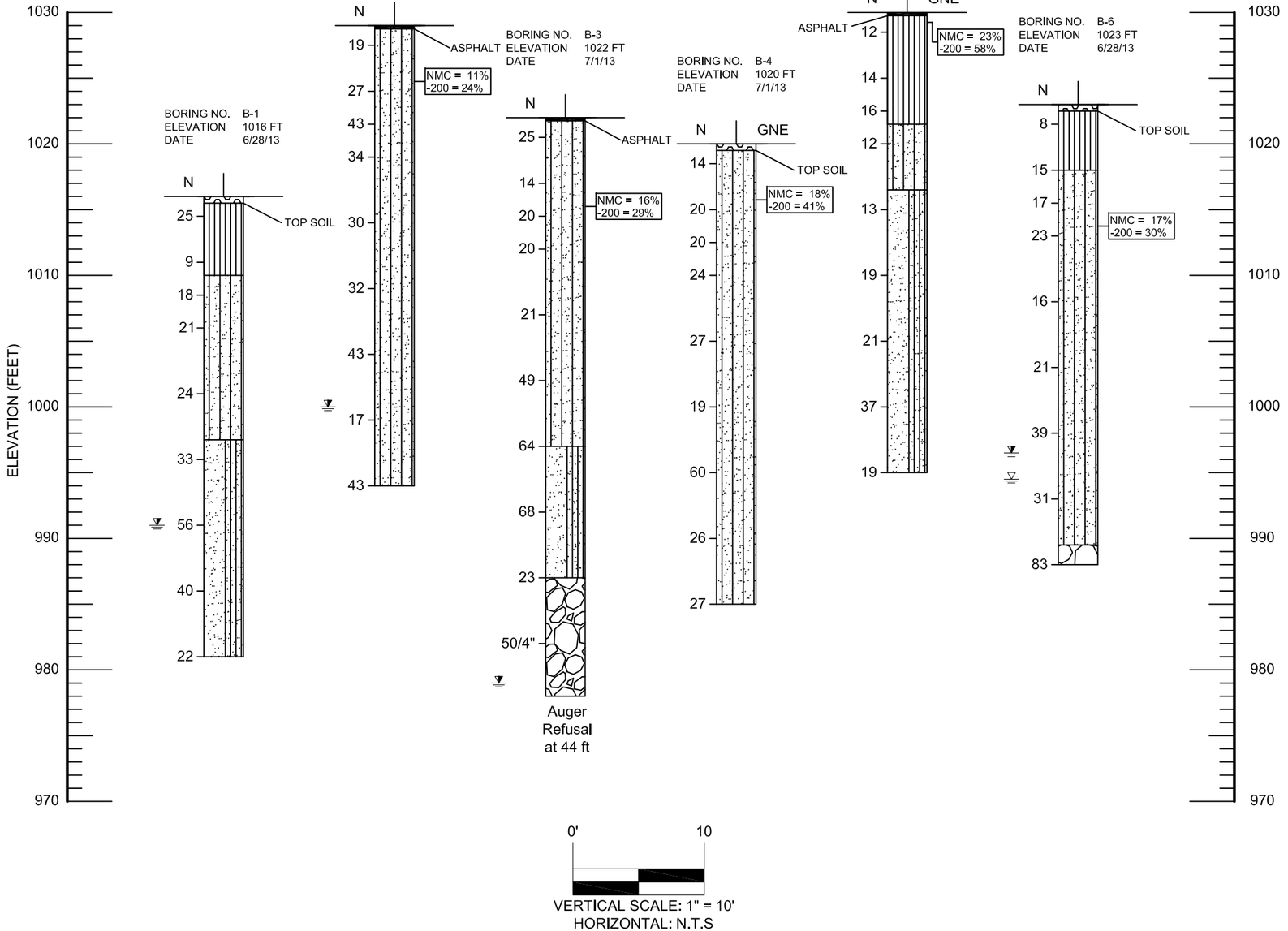
Ph:770-650-0873 Fax:770-650-7825
GEOTECHNICAL • ENVIRONMENTAL MATERIALS TESTING
GEORGIA ENGINEERING CERTIFICATE OF AUTHORIZATION No. PEF004822
Kermit Schmidt, P.E.
GEORGIA LICENSE No. PE031391

	NAME	DATE
DESIGNED BY:	IR	07/13
DRAWN BY:	IR	07/13
CHECKED BY:	KS	07/13
SUPERVISED BY:		

BORING LOCATION PLAN	PROJECT NO.	SHEET NO.
Stewart Lakewood Branch Library Atlanta, Fulton County, GA	A091107.046	1



LEGEND

- ASPHALT.
- TOPSOIL.
- CONCRETE.
- (SP) BROWN, WHITE, BLACK, OR GRAY MICACEOUS SAND.
- (SP-SM) WHITE, BLACK, OR GRAY MICACEOUS SLIGHTLY SILTY SAND.
- (SM) BROWN, GRAY, WHITE, OR BLACK SILTY SAND.
- (ML) BROWN, REDDISH BROWN, BLACK, OR WHITE MICACEOUS SANDY SILT.
- (CL) BROWN OR REDDISH BROWN MICACEOUS SANDY CLAY.
- BROWN, GRAY, OR WHITE PARTIALLY WEATHERED ROCK.

A WITH ROCK FRAGMENTS

NOTES:

ALL SC, SM, ML, AND CL SOILS ARE RESIDUUM SOILS

▽	WATER TABLE DURING DRILLING	LL	LIQUID LIMIT (%)
▽	WATER TABLE AFTER DRILLING	PI	PLASTICITY INDEX (%)
GNE	GROUNDWATER NOT ENCOUNTERED	NP	NON PLASTIC SOILS
N	SPT N-VALUE		
WH	WEIGHT OF HAMMER		
-200	FINES PASSING NO. 200 SIEVE (%)		
NMC	NATURAL MOISTURE CONTENT (%)		

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT)
VERY LOOSE	LESS THAN 4
LOOSE	5-10
MEDIUM	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT)
VERY SOFT	LESS THAN 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	30-50
VERY HARD	GREATER THAN 50

DATE	NAME	REVISION	APPROVED BY:

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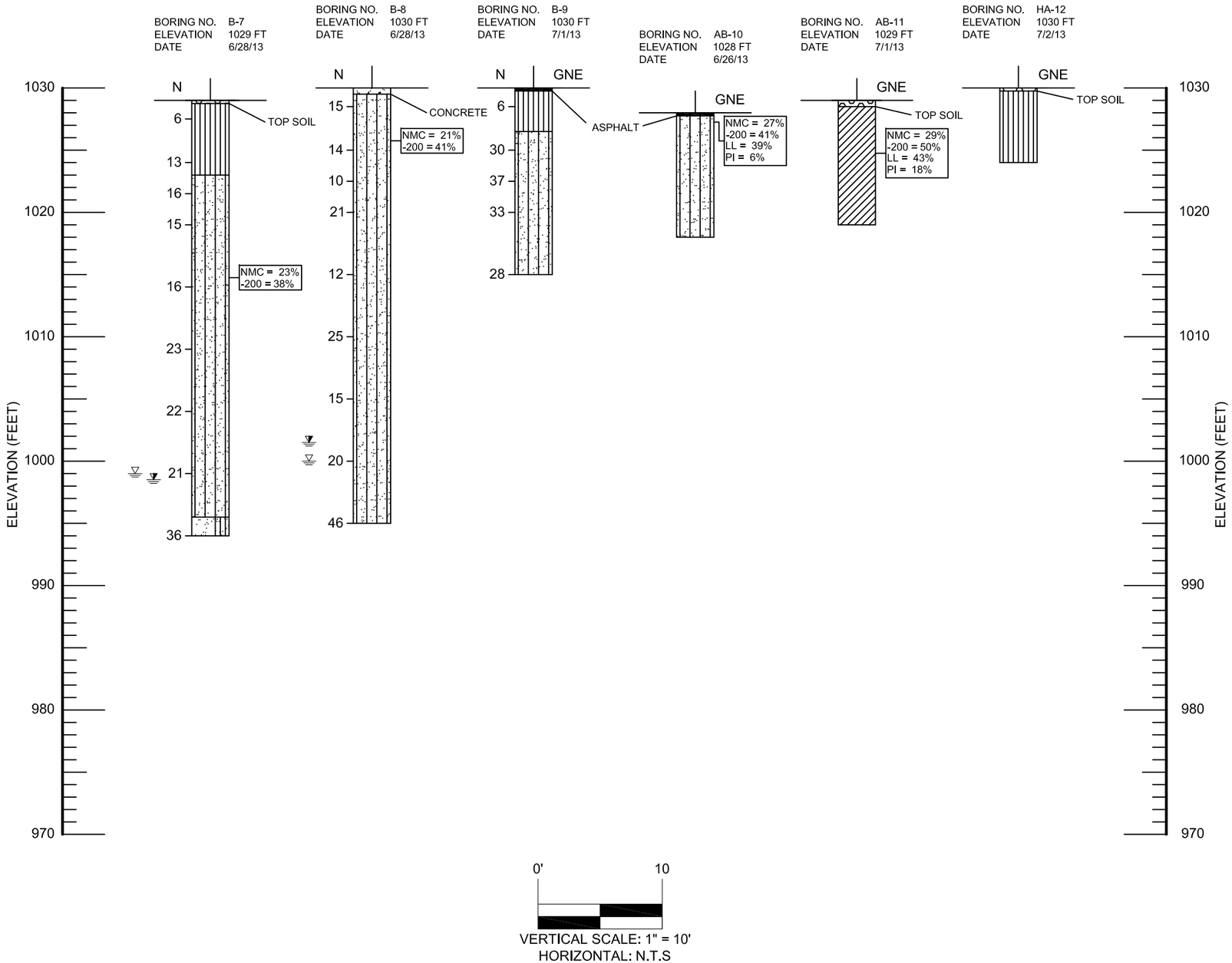
	NAME	DATE
DESIGNED BY:	IR	07/13
DRAWN BY:	IR	07/13
CHECKED BY:	KS	07/13
SUPERVISED BY:		

REPORT OF CORE BORINGS	PROJECT NO.	SHEET NO.
Stewart Lakewood Branch Library Atlanta, Fulton County, GA	A091107.046	2



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- BROWN, GRAY, OR WHITE PARTIALLY WEATHERED ROCK.

A WITH ROCK FRAGMENTS

NOTES:

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▽	WATER TABLE DURING DRILLING	LL	LIQUID LIMIT (%)
▽	WATER TABLE AFTER DRILLING	PI	PLASTICITY INDEX (%)
GNE	GROUNDWATER NOT ENCOUNTERED	NP	NON PLASTIC SOILS
N	SPT N-VALUE		
WH	WEIGHT OF HAMMER		
-200	FINES PASSING NO. 200 SIEVE (%)		
NMC	NATURAL MOISTURE CONTENT (%)		

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT)
VERY LOOSE	LESS THAN 4
LOOSE	5-10
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DENSE	31-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT)
VERY SOFT	LESS THAN 2
SOFT	3-4
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VERY STIFF	16-30
HARD	30-50
VERY HARD	GREATER THAN 50

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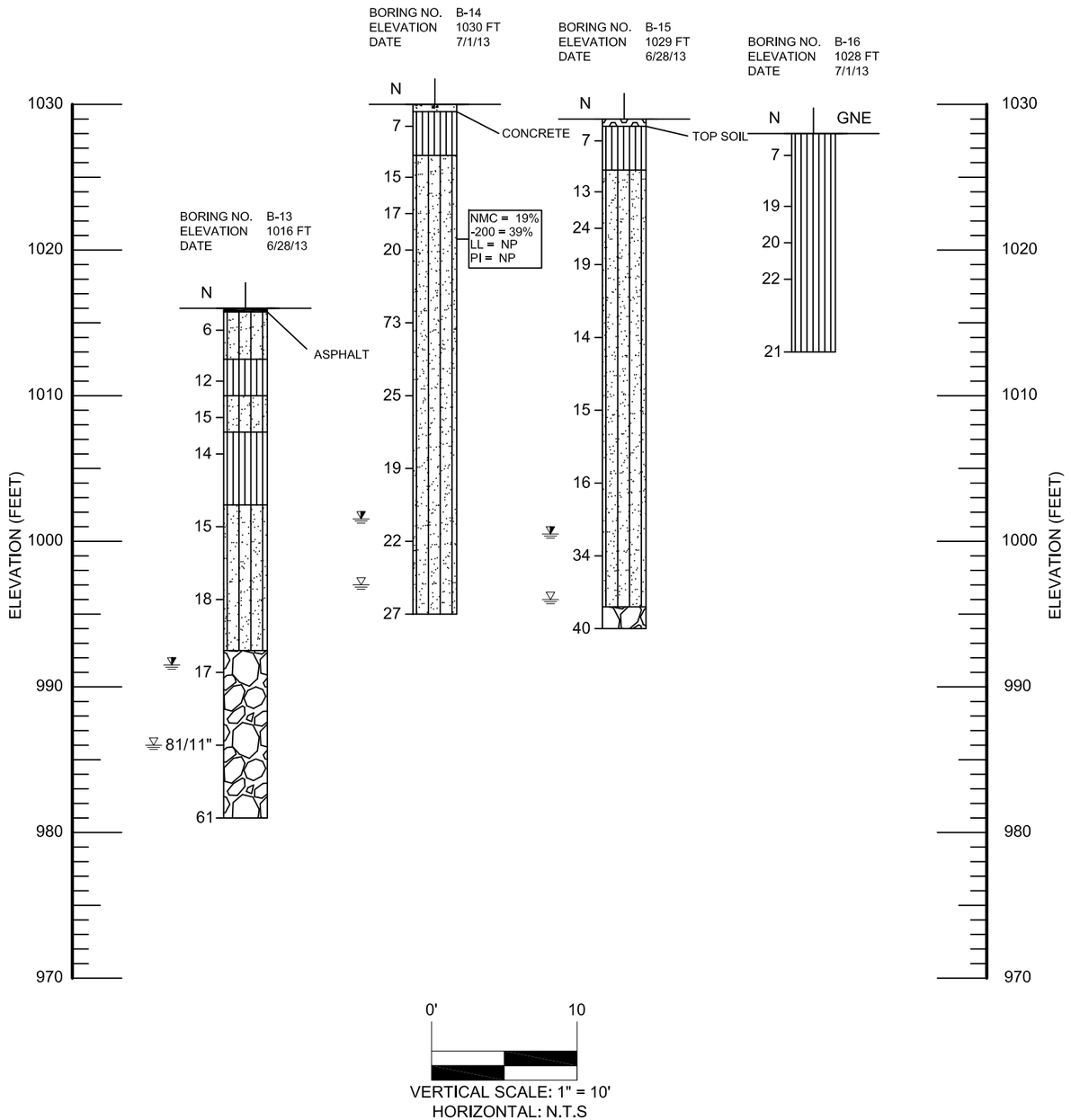
CHECKED BY:	KS	07/13
SUPERVISED BY:		

REPORT OF CORE BORINGS	PROJECT NO.	SHEET NO.
Stewart Lakewood Branch Library Atlanta, Fulton County, GA	A091107.046	3



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A WITH ROCK FRAGMENTS

NOTES:

ALL SC, SM, ML, AND CL SOILS ARE RESIDUUM SOILS

▽	WATER TABLE DURING DRILLING	LL	LIQUID LIMIT (%)
▽	WATER TABLE AFTER DRILLING	PI	PLASTICITY INDEX (%)
GNE	GROUNDWATER NOT ENCOUNTERED	NP	NON PLASTIC SOILS
N	SPT N-VALUE		
WH	WEIGHT OF HAMMER		
-200	FINES PASSING NO. 200 SIEVE (%)		
NMC	NATURAL MOISTURE CONTENT (%)		

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT)
VERY LOOSE	LESS THAN 4
LOOSE	5-10
MEDIUM	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT)
VERY SOFT	LESS THAN 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	30-50
VERY HARD	GREATER THAN 50

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REPORT OF CORE BORINGS	PROJECT NO.	SHEET NO.
Stewart Lakewood Branch Library Atlanta, Fulton County, GA	A091107.046	4

Soil Profile

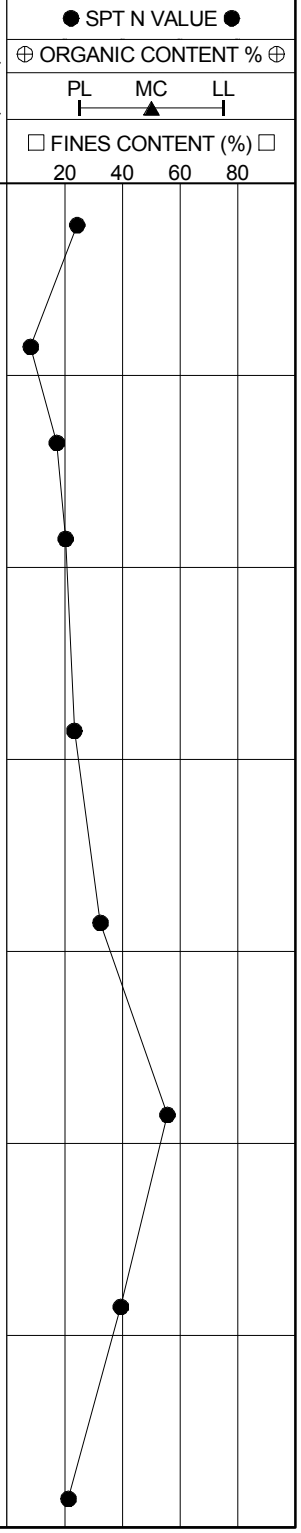
BORING ID: B-1

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1016 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NR
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.146, W 084 24.458
AFTER DRILLING 25.0 ft / Elev 991.0 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
0			Topsoil.		
	1014	ML	loose to medium dense brown micaceous sandy SILT.	SS 1	7-20-5 (25)
	1012			SS 2	4-4-5 (9)
5	1010				
			medium dense white or gray micaceous silty SAND.	SS 3	7-7-11 (18)
	1008				
				SS 4	7-9-12 (21)
10	1006				
	1004	SM			
	1002			SS 5	7-11-13 (24)
15	1000				
	998				
			medium dense to very dense white, black, gray micaceous slightly silty SAND.	SS 6	11-16-17 (33)
20	996				
	994				
	992			SS 7	11-24-32 (56)
25			▼		
	990	SP-SM			
	988			SS 8	12-18-22 (40)
30	986				
	984				
	982			SS 9	8-9-13 (22)
35					

RECOVERY % (RQD)



Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-2

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1029 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NR
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.150, W 084 24.447
AFTER DRILLING 29.0 ft / Elev 1000.0 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	1028		Asphalt.			
			medium dense to dense white, brown, black, gray, micaceous silty SAND.	SS 1	6-8-11 (19)	
	1026					
5	1024			SS 2	9-13-14 (27)	
	1022			SS 3	12-21-22 (43)	
	1020			SS 4	12-18-16 (34)	
10	1018					
	1016			SS 5	11-15-15 (30)	
15	1014					
	1012	SM				
	1010			SS 6	8-15-17 (32)	
20	1008					
	1006			SS 7	9-17-26 (43)	
25	1004					
	1002					
	1000		▼	SS 8	6-8-9 (17)	
30	998					
	996					
35	994			SS 9	8-18-25 (43)	

SPT N VALUE ● ⊕ ORGANIC CONTENT % ⊕ PL MC LL ☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-3

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1022 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 43.0 ft / Elev 979.0 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.141, W 084 24.429
AFTER DRILLING 43.0 ft / Elev 979.0 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	1022		Asphalt.			
		SM	medium dense to very dense brown, white, black, micaceous silty SAND.	SS 1	7-11-14 (25)	
5	1018			SS 2	9-7-7 (14)	
	1016			SS 3	7-9-11 (20)	
	1014					
10	1012			SS 4	7-9-11 (20)	
	1010					
	1008			SS 5	11-11-10 (21)	
15	1006					
	1004					
20	1002			SS 6	13-24-25 (49)	
	1000					
	998			SS 7	48-30-34 (64)	
25	996	SP-SM	medium dense to very dense white, gray micaceous slightly silty SAND.			
	994					
30	992			SS 8	44-32-36 (68)	
	990					
	988			SS 9	17-11-12 (23)	
35	986		very dense white, gray Partially Weathered Rock.			
	984					
40	982			SS 10	11-17-50/4"	
	980					
	978		Auger Refusal at 44 ft.			

SPT N VALUE
ORGANIC CONTENT %
PL MC LL
FINES CONTENT (%)
20 40 60 80

Bottom of hole at 44.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

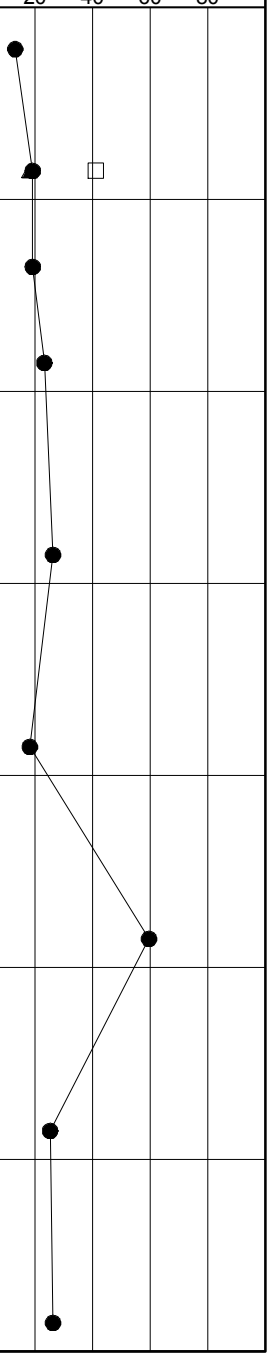
BORING ID: B-4

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1020 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.134, W 084 24.459
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	1020		Topsoil.			
		SM	medium dense light brown to brown, orange, white, black micaceous silty SAND.	SS 1	5-7-7 (14)	
	1018					
	1016			SS 2	7-8-12 (20)	
5						
	1014			SS 3	8-9-11 (20)	
	1012					
				SS 4	8-9-15 (24)	
10	1010					
	1008					
	1006			SS 5	8-13-14 (27)	
15						
	1004					
	1002			SS 6	7-8-11 (19)	
20	1000					
	998					
	996			SS 7	13-26-34 (60)	
25						
	994					
	992			SS 8	10-12-14 (26)	
30	990					
	988					
	986			SS 9	12-12-15 (27)	
35						

SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-5

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1030 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.132, W 084 24.437
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0			Asphalt.			
	1028	ML	stiff to very stiff brown, black, white, micaceous sandy SILT	SS 1	5-5-7 (12)	
	1026			SS 2	4-6-8 (14)	
5						
	1024			SS 3	4-7-9 (16)	
	1022					
10	1020	SM	medium dense black, white, brown micaceous silty SAND.	SS 4	5-5-7 (12)	
	1018					
	1016	SP-SM	medium dense to dense black, white, gray, brown micaceous SAND with silt.	SS 5	5-6-7 (13)	
15						
	1014					
	1012			SS 6	4-8-11 (19)	
20	1010					
	1008					
	1006			SS 7	4-10-11 (21)	
25						
	1004					
	1002			SS 8	12-17-20 (37)	
30	1000					
	998					
	996			SS 9	5-7-12 (19)	
35						

SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-6

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1023 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 28.5 ft / Elev 994.5 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.130, W 084 24.447
AFTER DRILLING 26.5 ft / Elev 996.5 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
0	1022	ML	firm to stiff brown, black, white micaceous sandy SILT.	SS 1	4-4-4 (8)
5	1018			SS 2	7-7-8 (15)
10	1014	SM	medium dense to dense black, white, brown, gray, micaceous silty SAND.	SS 3	6-7-10 (17)
				SS 4	9-10-13 (23)
15	1008			SS 5	5-8-8 (16)
20	1004			SS 6	7-10-11 (21)
25	998			SS 7	11-16-23 (39)
30	994			SS 8	9-15-16 (31)
35	988		very dense black, gray Partially Weathered Rock.	SS 9	10-42-41 (83)

RECOVERY % (RQD)

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
□ FINES CONTENT (%) □
20 40 60 80

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

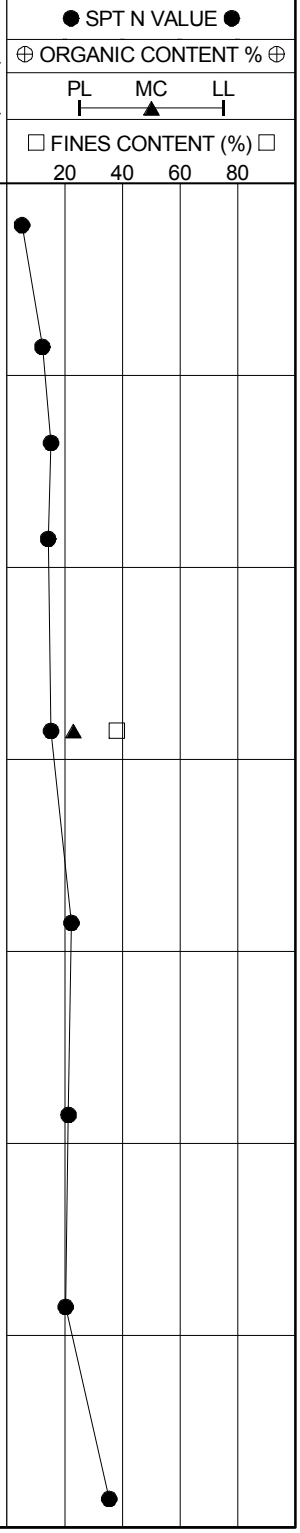
BORING ID: B-7

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1029 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 30.0 ft / Elev 999.0 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.119, W 084 24.434
AFTER DRILLING 30.5 ft / Elev 998.5 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	1029		Topsoil.			
	1028	ML	firm to stiff brown micaceous sandy SILT.	SS 1	2-3-3 (6)	
	1026					
5	1024			SS 2	5-6-7 (13)	
	1022		medium dense white, brown, black micaceous silty SAND.	SS 3	6-8-8 (16)	
	1020			SS 4	2-7-8 (15)	
10						
	1018					
	1016					
15	1014			SS 5	4-7-9 (16)	
	1012					
	1010			SS 6	6-10-13 (23)	
20		SM				
	1008					
	1006					
25	1004			SS 7	8-10-12 (22)	
	1002					
	1000			SS 8	8-10-11 (21)	
30			▽			
	998					
	996					
35	994	SP-SM	dense black, white, gray micaceous slightly silty SAND.	SS 9	6-18-18 (36)	

Bottom of hole at 35.0 feet.



MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-8

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1030 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 30.0 ft / Elev 1000.0 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.119, W 084 24.434
AFTER DRILLING 28.5 ft / Elev 1001.5 ft

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0				Concrete.			
	1028			loose to dense orange, white, black, brown micaceous silty SAND.	SS 1	6-7-8 (15)	
	1026				SS 2	7-7-7 (14)	
5							
	1024				SS 3	4-4-6 (10)	
	1022						
					SS 4	4-9-12 (21)	
10	1020						
	1018						
	1016				SS 5	2-5-7 (12)	
15							
	1014						
	1012		SM				
					SS 6	6-12-13 (25)	
20	1010						
	1008						
	1006				SS 7	7-7-8 (15)	
25							
	1004						
	1002			▼			
					SS 8	6-10-10 (20)	
30	1000			▽			
	998						
	996				SS 9	16-20-26 (46)	
35							

SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
□ FINES CONTENT (%) □
20 40 60 80

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-9

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1030 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.152, W 084 24.363
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0.0			Asphalt.			
			firm brown, reddish brown, black, or white micaceous sandy SILT.	SS	3-2-4 (6)	
	1028	ML				
2.5						
			medium dense to dense brown, black, gray, white micaceous silty SAND.	SS	6-11-19 (30)	
	1026					
5.0						
	1024			SS	11-16-21 (37)	
7.5						
	1022	SM		SS	11-16-17 (33)	
10.0	1020					
	1018					
12.5						
	1016			SS	11-12-16 (28)	
15.0						

SPT N VALUE
ORGANIC CONTENT %
PL MC LL
FINES CONTENT (%)
20 40 60 80

Bottom of hole at 15.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: AB-10

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/26/13 **COMPLETED** 6/26/13
GROUND ELEVATION 1028 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.139, W 084 24.404
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	● SPT N VALUE ● / ⊕ ORGANIC CONTENT % ⊕ / PL MC LL / ☐ FINES CONTENT (%) ☐
0.0				Asphalt.				
				red brown micaceous sandy SILT.				
	1026							
2.5								
	1024							
5.0			ML					
	1022							
7.5								
	1020							
10.0	1018							

20 40 60 80

Bottom of hole at 10.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: AB-11

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1029 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.111, W 084 24.411
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	● SPT N VALUE ● / ⊕ ORGANIC CONTENT % ⊕ / PL MC LL / ☐ FINES CONTENT (%) ☐ (20 40 60 80)
0.0				Topsoil.				
				red brown micaceous sandy CLAY.				
	1028							
2.5								
	1026							▲ ☐
5.0	1024		CL					
	1022							
7.5								
	1020							
10.0								

Bottom of hole at 10.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: HA-12

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/2/13 **COMPLETED** 7/2/13
GROUND ELEVATION 1030 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.103, W 084 24.462
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0				Topsoil.			
				brown micaceous sandy SILT.			
1							
2	1028						
3			ML				
4	1026						
5							
6	1024						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of hole at 6.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-13

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1016 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 30.0 ft / Elev 986.0 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.149, W 084 24.447
▼ **AFTER DRILLING** 24.5 ft / Elev 991.5 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0			Asphalt.			
	1014	SM	loose brown silty SAND.	SS 1	6-3-3 (6)	
	1012	ML	stiff brown micaceous sandy SILT.	SS 2	5-6-6 (12)	
5	1010	SM	medium dense white, black, brown micaceous silty SAND.	SS 3	7-7-8 (15)	
	1008	ML	stiff white, black, brown micaceous sandy SILT.	SS 4	5-6-8 (14)	
10	1006					
	1004	SM	medium dense white, brown micaceous silty SAND.	SS 5	4-7-8 (15)	
	1002					
15	1000					
	998			SS 6	7-8-10 (18)	
20	996					
	994					
	992		medium dense to very dense white, black, gray Partially Weathered Rock.	SS 7	6-8-9 (17)	
25	990					
	988			SS 8	7-31-50/5"	
30	986		▽			
	984					
	982			SS 9	11-28-33 (61)	
35						

SPT N VALUE
ORGANIC CONTENT %
PL MC LL
FINES CONTENT (%)
20 40 60 80

>>

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-14

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1030 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 33.0 ft / Elev 997.0 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.125, W 084 24.434
AFTER DRILLING 28.5 ft / Elev 1001.5 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0			Concrete.			
	1028	ML	firm brown micaceous sandy SILT.	SS 1	3-3-4 (7)	
	1026		medium dense to dense brown, orange, white, black micaceous silty SAND.	SS 2	5-7-8 (15)	
5						
	1024			SS 3	3-4-13 (17)	
	1022					
10	1020			SS 4	7-8-12 (20)	
	1018					
	1016			SS 5	8-38-35 (73)	
15						
	1014					
	1012					
20	1010	SM		SS 6	6-11-14 (25)	
	1008					
	1006			SS 7	3-6-13 (19)	
25						
	1004					
	1002		▽			
30	1000			SS 8	6-10-12 (22)	
	998		▽			
	996			SS 9	6-10-17 (27)	
35						

SPT N VALUE ● | ORGANIC CONTENT % ⊕ | PL MC LL | FINES CONTENT (%) □ | 20 40 60 80

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-15

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 6/28/13 **COMPLETED** 6/28/13
GROUND ELEVATION 1029 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 33.0 ft / Elev 996.0 ft
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.128
AFTER DRILLING 28.5 ft / Elev 1000.5 ft

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	1028	ML	Topsoil. firm white, black, brown micaceous sandy SILT.	SS 1	3-3-4 (7)	
	1026					
5	1024	SM	medium dense to dense orange, white, black, brown micaceous silty SAND.	SS 2	6-6-7 (13)	
	1022			SS 3	9-12-12 (24)	
10	1020			SS 4	6-8-11 (19)	
	1018					
	1016			SS 5	3-7-7 (14)	
15	1014					
	1012					
20	1010			SS 6	5-7-8 (15)	
	1008					
	1006			SS 7	6-8-8 (16)	
25	1004					
	1002					
	1000			SS 8	5-14-20 (34)	
30	998					
	996					
35	994		dense white, gray Partially Weathered Rock.	SS 9	9-19-21 (40)	

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

Soil Profile

BORING ID: B-16

MC² Geotechnical • Environmental Materials Testing

CLIENT Fulton County Facilities and Transportation Service Department
PROJECT NAME Stewart Lakewood Branch Library
PROJECT NUMBER A091107.046
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 7/1/13 **COMPLETED** 7/1/13
GROUND ELEVATION 1028 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Kilman Brothers
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING NE
LOGGED BY J. Palmer **CHECKED BY** S. Moussly
AT END OF DRILLING ---
NOTES N 33 43.146, W 084 24.409
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0.0				firm to very stiff reddish brown, white, brown, orange, black micaceous sandy SILT.	SS 1	3-3-4 (7)	
	1026						
2.5							
	1024				SS 2	4-8-11 (19)	
5.0							
	1022				SS 3	4-8-12 (20)	
7.5			ML				
	1020				SS 4	7-11-11 (22)	
10.0	1018						
	1016						
12.5							
	1014				SS 5	7-10-11 (21)	
15.0							

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of hole at 15.0 feet.

MC2 REPORT W ELEV. STEWART LAKEWOOD LIBRARY.GPJ MC2.GDT 8/15/13

MC SQUARED, INC.
1275 Shiloh Road NW, Suite 2620
Kennesaw, GA 30144
PH 770/650-0873 FAX 770/650-7825

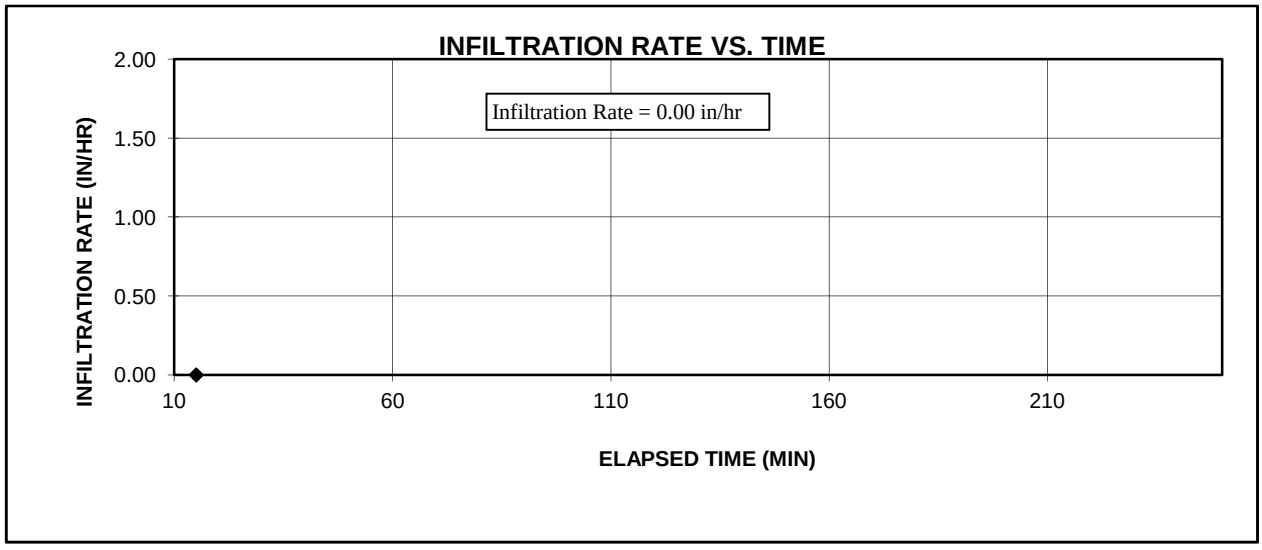
GEOTECHNICAL • ENVIRONMENTAL
MATERIALS TESTING

DOUBLE-RING INFILTROMETER TEST

Project:	**Stewart-Lakewood Library**	*Client:*	Fulton County
Project No.:	A091107.046	*Surface Description:*	Partially Weathered Rock
Performed By:	JP/AM	*Test Depth:*	6 feet below existing grade
Date/Time	07/02/13	*Ring Size*	12", 24"
Test No.:	DRI-1	*Constant Head:*	Not Applicable
Location:	12' E of Boring B-9		

INNER RING FIELD TEST DATA

ELAPSED TIME (minutes)	QUANTITY H_20 (mL)	INFILTRATION RATE (in/hr)
15	0	0.00
30		
45		
60		
75		
90		
105		
120		
135		
150		
165		
180		
195		



Note: Double-Ring Infiltration Test could not be performed due to soil conditions at testing depth encountering a this strata of partially weathered rock.

MC SQUARED, INC.
1275 Shiloh Road NW, Suite 2620
Kennesaw, GA 30144
PH 770/650-0873 FAX 770/650-7825

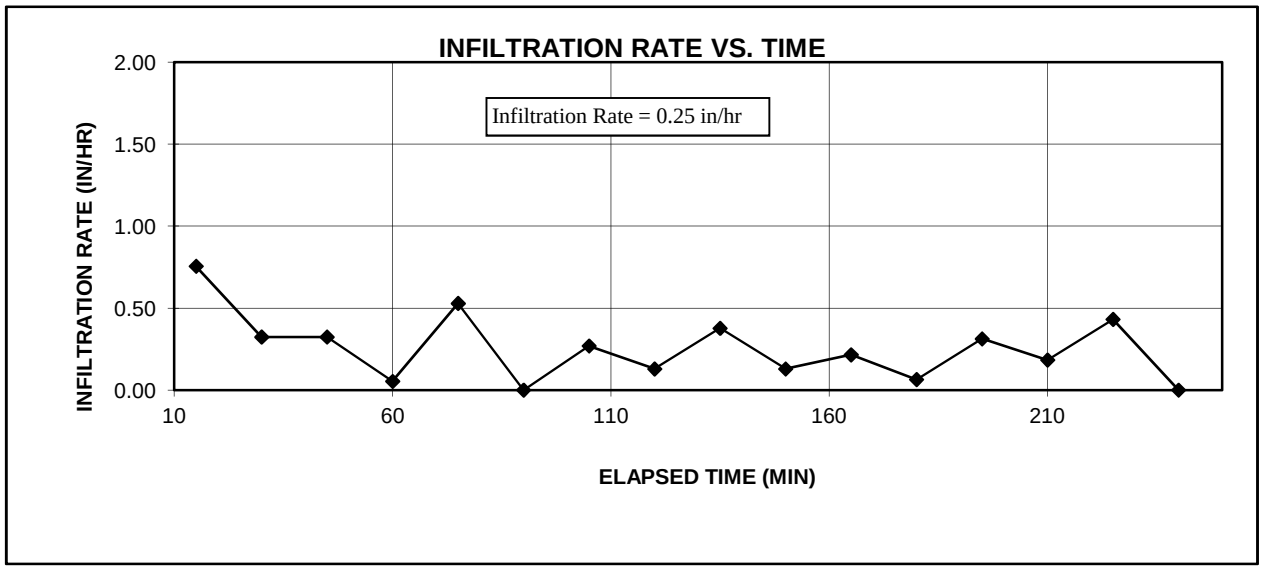
GEOTECHNICAL • ENVIRONMENTAL
MATERIALS TESTING

DOUBLE-RING INFILTROMETER TEST

Project:	**Stewart-Lakewood Library**	*Client:*	Fulton County
Project No.:	A091107.046	*Surface Description:*	Sandy Clay (CL)
Performed By:	JP/AM	*Test Depth:*	6 feet below existing grade
Date/Time	07/02/13	*Ring Size*	12", 24"
Test No.:	DRI-2	*Constant Head:*	8.5"
Location:	12' W and 33' N of Boring B-16		

INNER RING FIELD TEST DATA

ELAPSED TIME (minutes)	QUANTITY H_20 (mL)	INFILTRATION RATE (in/hr)
15	350	0.76
30	150	0.32
45	150	0.32
60	25	0.05
75	245	0.53
90	0	0.00
105	125	0.27
120	60	0.13
135	175	0.38
150	60	0.13
165	100	0.22
180	30	0.06
195	145	0.31
210	85	0.18
225	200	0.43
240	0	0.00



PLAN VIEW OF THE SITE (Google Maps) SHOWING THE APPROXIMATE ORIENTATION OF THE MASW LINE

APPENDIX B

- **Grain Size Distribution Test Reports**
- **CompactionTests Result**
- **California Bearing Ratio Results**
- **Test Procedures**

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

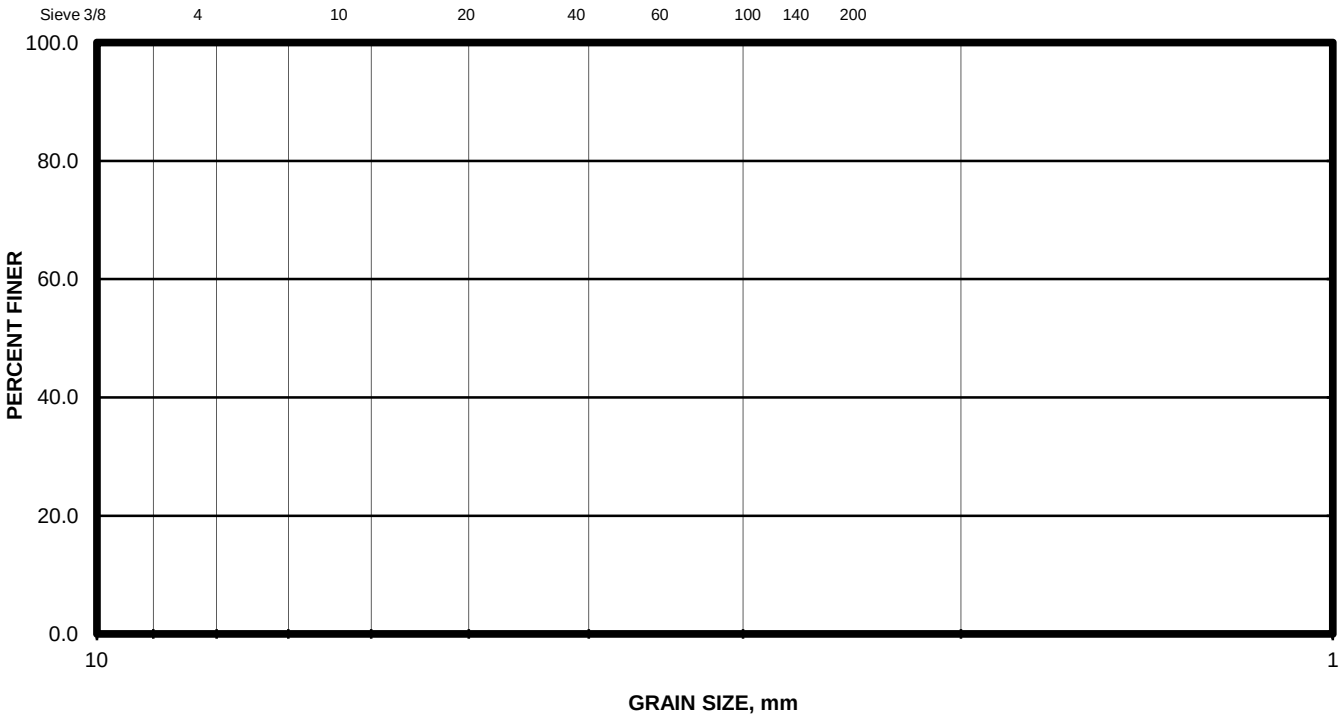
Sample Location: B2 3.5' - 5.0'

Soil Description: White, brown micaceous silty SAND

Soil Classification: SM LL PI

NMC % 11.4

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
		24.1

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

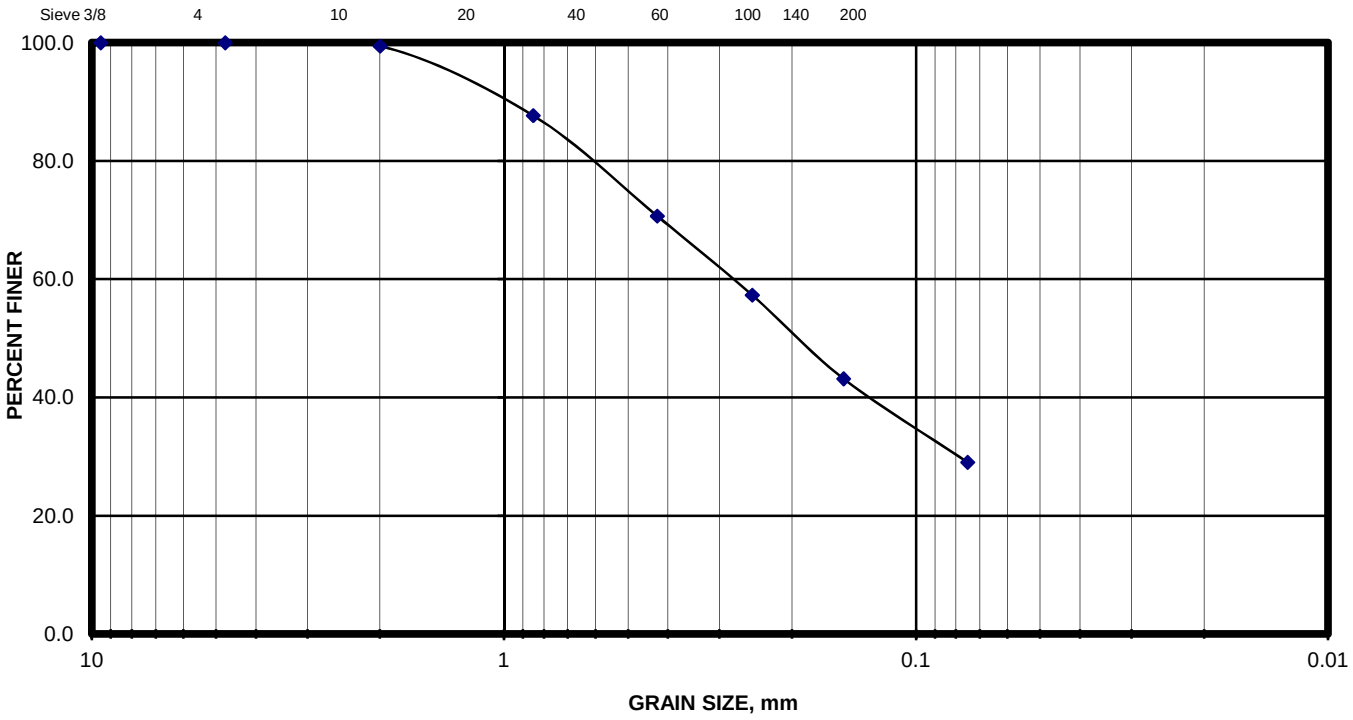
Sample Location: B3 6 - 7.5

Soil Description: White, brown micaceous silty SAND

Soil Classification: SM LL PI

NMC % 16.2

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	71.0	29.0

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

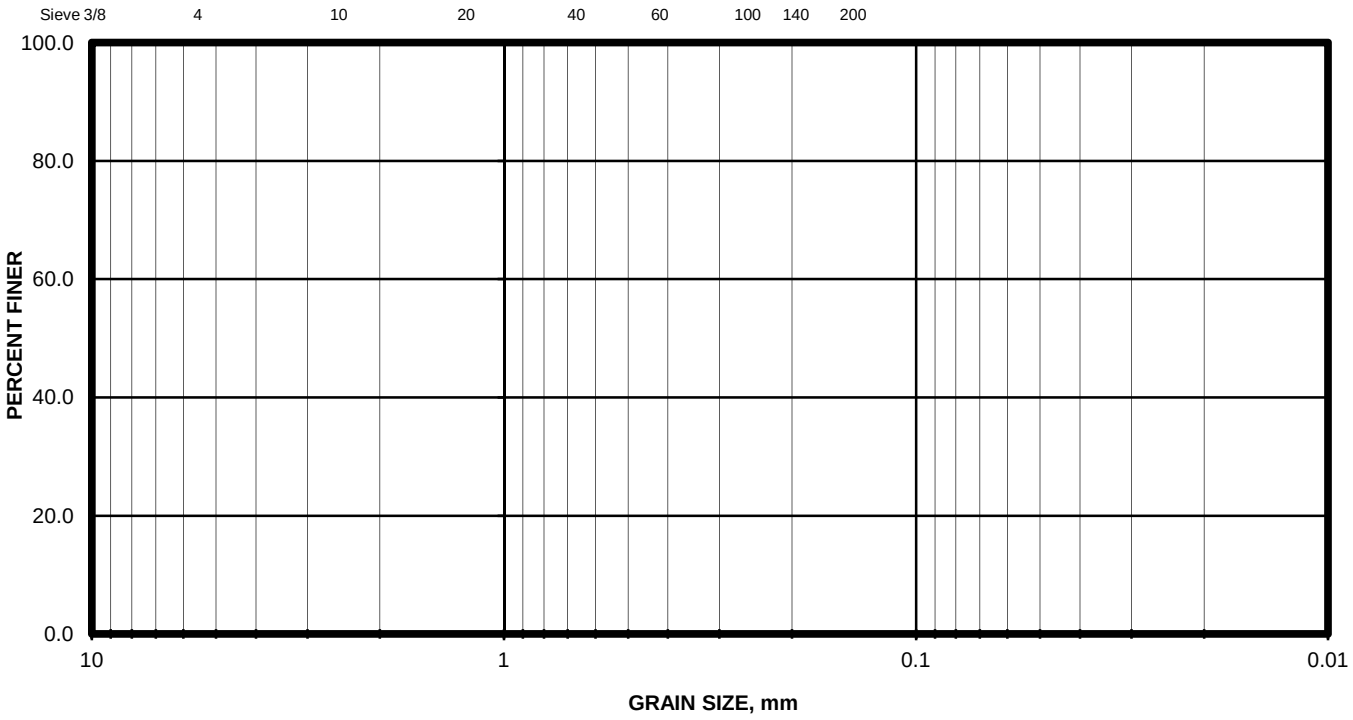
Sample Location: B4 3.5' - 5.0'

Soil Description: Black, brown micaceous silty SAND

Soil Classification: SM LL PI

NMC % 17.5

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
		40.9

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

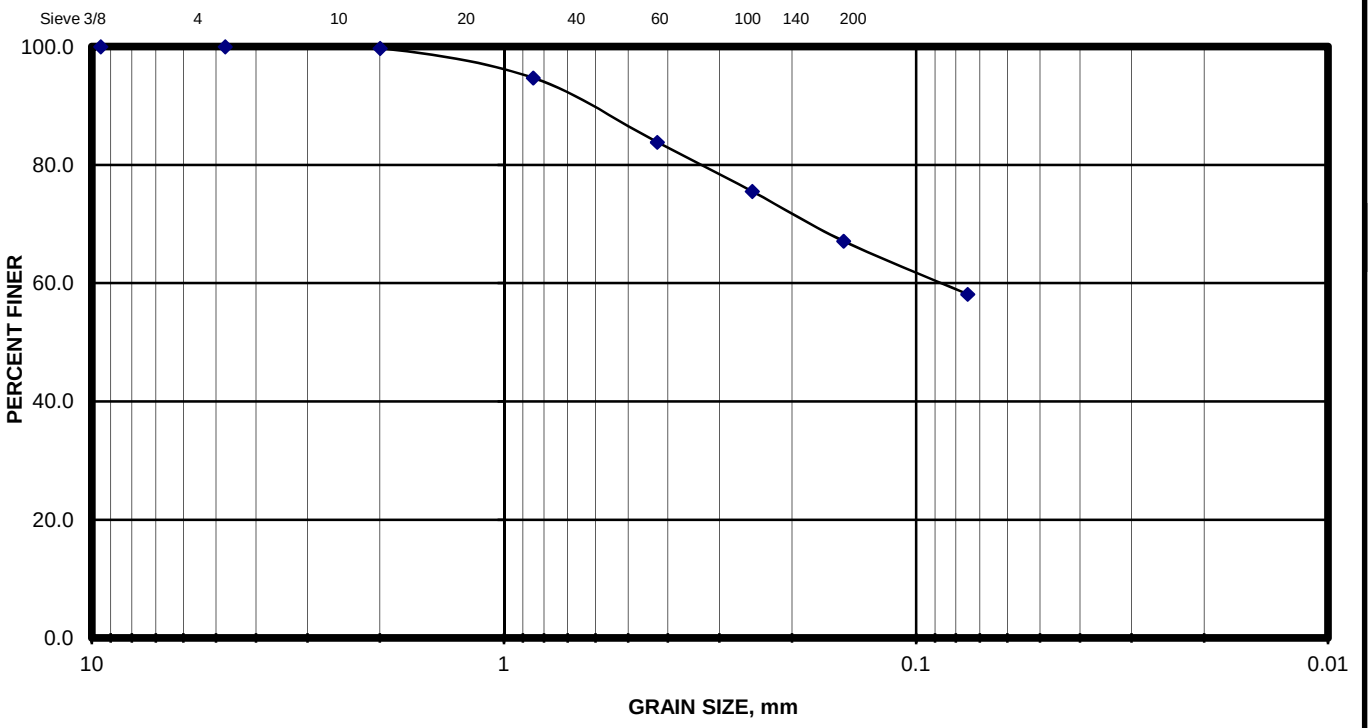
Sample Location: B5 0' - 1.5'

Soil Description: Black, brown micaceous sandy SILT

Soil Classification: ML LL PI

NMC % 22.5

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	41.9	58.1

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

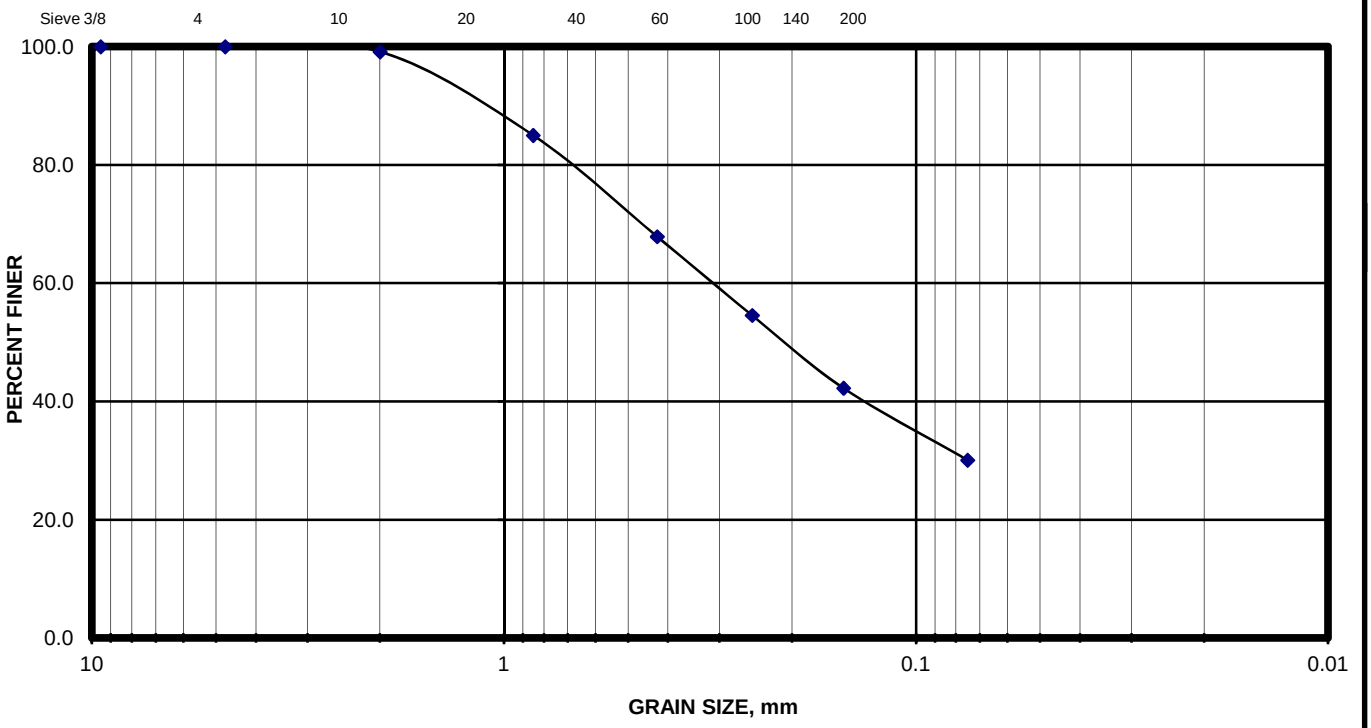
Sample Location: B6 8.5' - 10.0'

Soil Description: White, black, brown micaceous silty SAND

Soil Classification: SM LL PI

NMC % 16.8

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	69.9	30.1

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

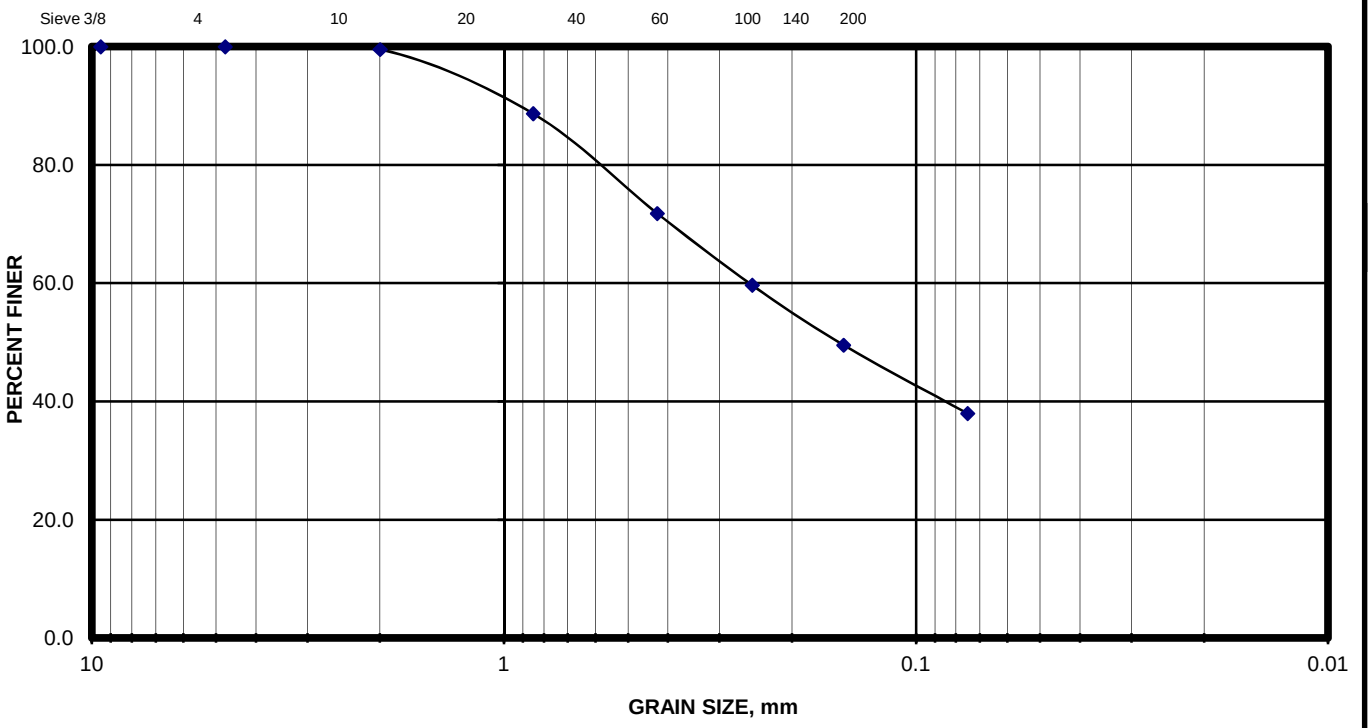
Sample Location: B7 13.5' - 15.0'

Soil Description: White, brown micaceous silty SAND

Soil Classification: SM LL PI

NMC % 22.9

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	62.0	38.0

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

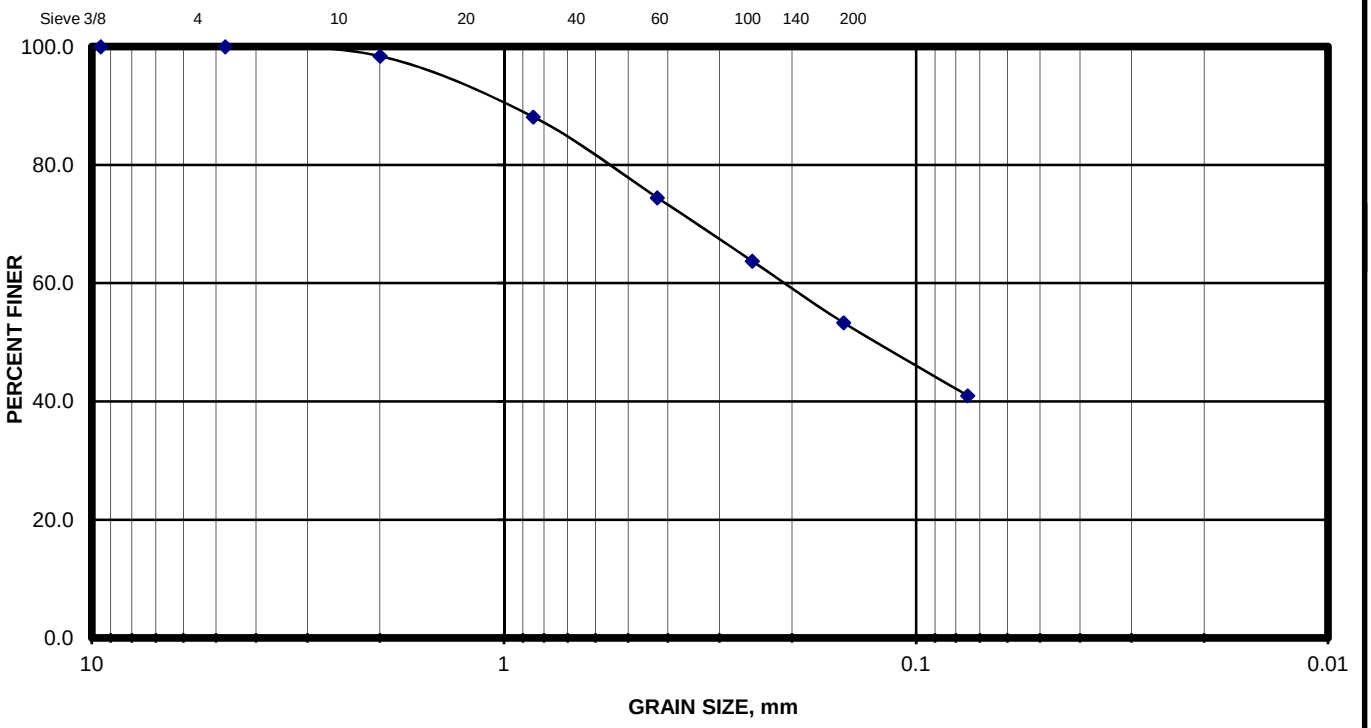
Sample Location: B8 3.5' - 5.0'

Soil Description: Black, white, brown micaceous silty SAND

Soil Classification: SM LL PI

NMC % 21.4

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
0.0	59.0	41.0

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A 091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

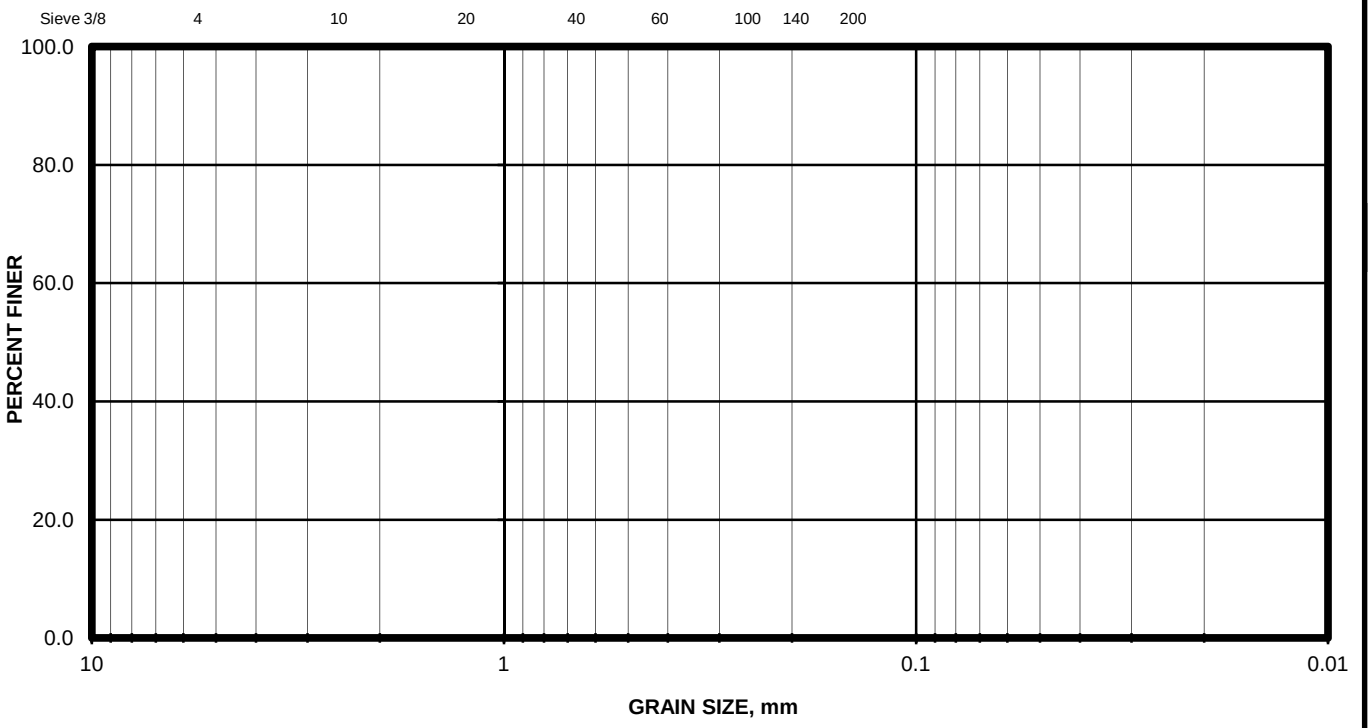
Sample Location: AB10 1.5' - 3.0'

Soil Description: Black, white, brown micaceous silty SAND

Soil Classification: SM LL 39 PI 6

NMC % 26.7

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
		40.8

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

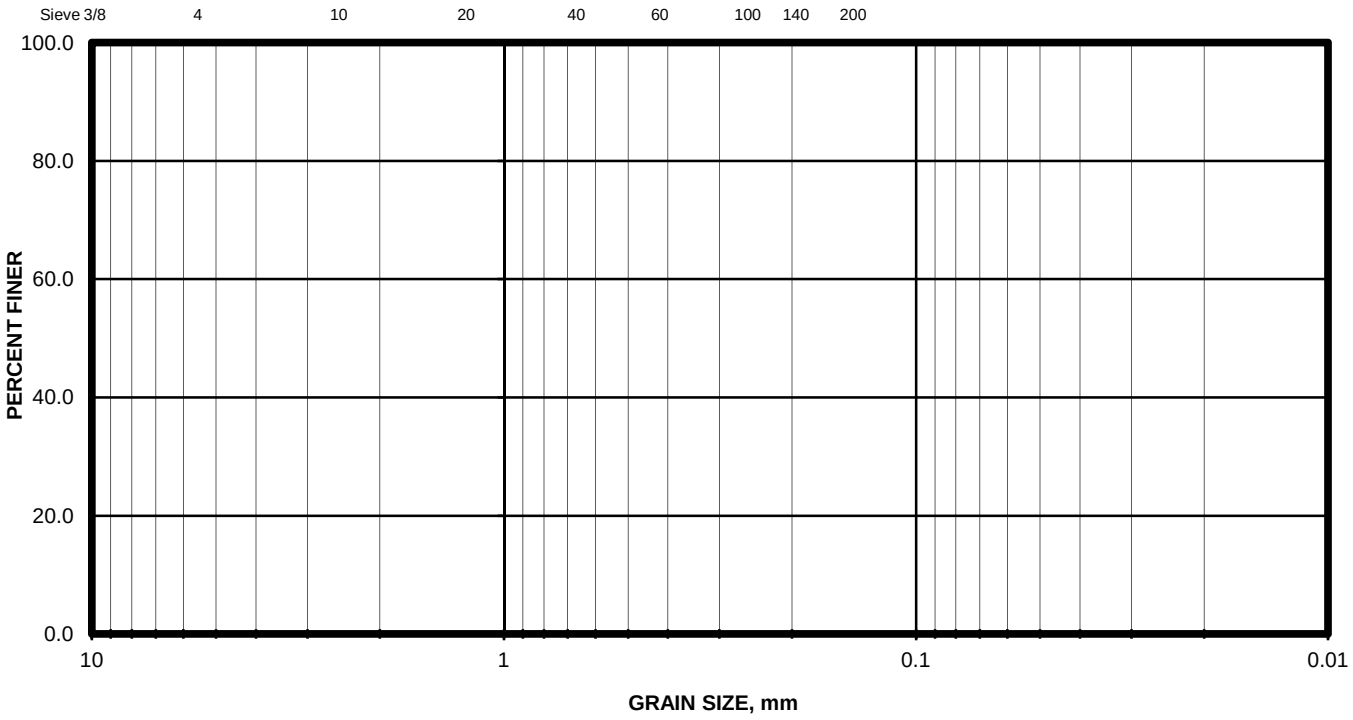
Sample Location: AB11 3.5' - 5.0'

Soil Description: Red brown micaceous Sandy CLAY

Soil Classification: CL LL 43 PI 18

NMC % 29.3

GRAIN SIZE DISTRIBUTION



% Gravel	% Sand	%-200
		49.5

D60	D30	D10	CC	CU

GRAIN SIZE DISTRIBUTION TEST REPORT

MC SQUARED, INC.

Project No. A091107.046 Date: 7/8/2013

Project: Stewart Lakewood Branch Library

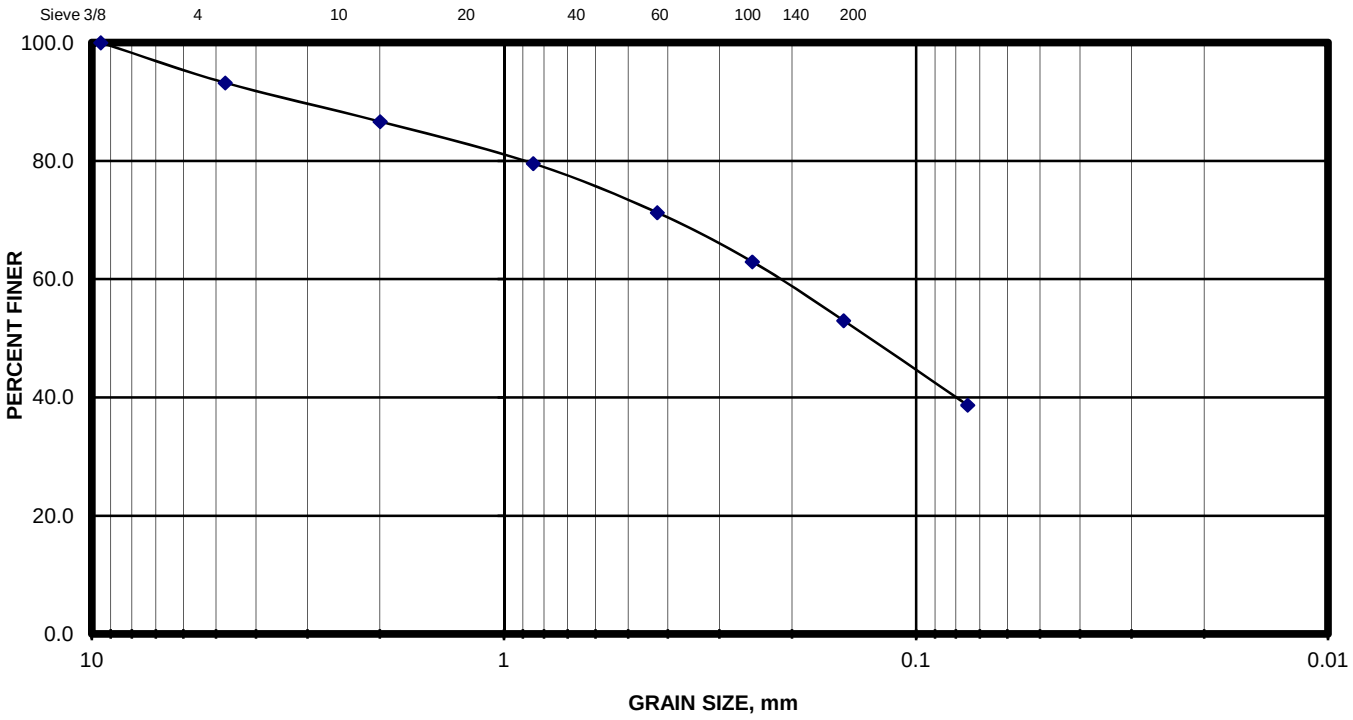
Sample Location: B14 8.5' - 10.0'

Soil Description: Black, white, brown micaceous silty SAND

Soil Classification: SM LL NP PI NP

NMC % 18.9

GRAIN SIZE DISTRIBUTION



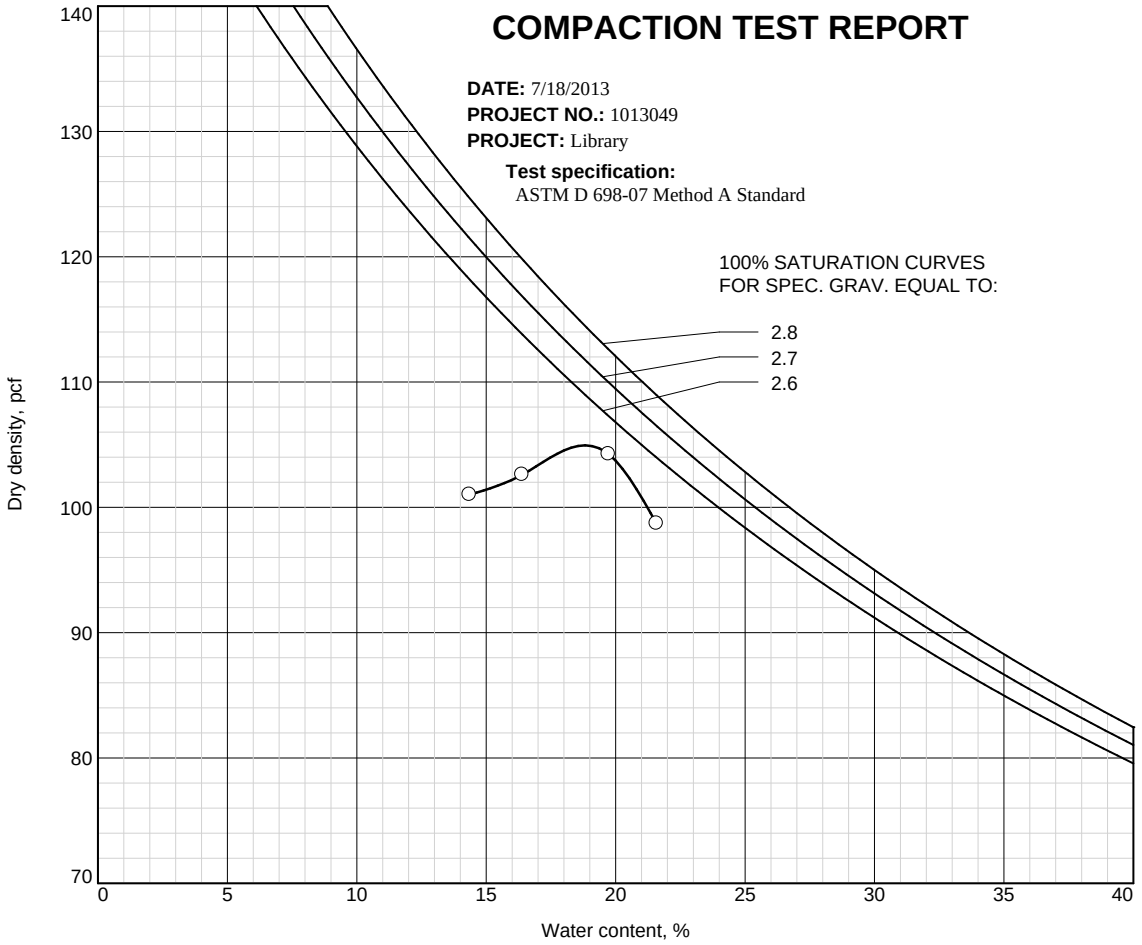
% Gravel	% Sand	%-200
6.8	54.5	38.7

D60	D30	D10	CC	CU

COMPACTION TEST REPORT

DATE: 7/18/2013
PROJECT NO.: 1013049
PROJECT: Library

Test specification:
ASTM D 698-07 Method A Standard



	Sample No.	Elev. or Depth	Material Description	Specific Gravity	LL	PL	Oversize	% < #200
○	B-9		Red Brown Fine Sand Silt					

Sample No.	B-9			
Natural water content, percent				
Optimum water content, percent	18.8			
Max dry density, pcf	104.9			

Remarks:	Project: Library	Project No.: 1013049
	Location:	
	Source: B-9	
	NOVA ENGINEERING Kennesaw, Georgia 770-425-0777	
Figure		

MOISTURE DENSITY TEST DATA

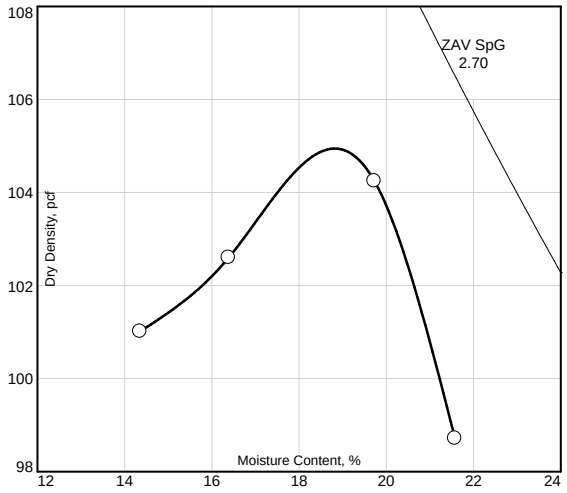
7/18/2013

Client: MC2
Project: Library
Project Number: 1013049
Location: B-9
Sample Number: B-9
Description: Red Brown Fine Sand Silt

Test Data and Results For Curve B-9

Test Specification:

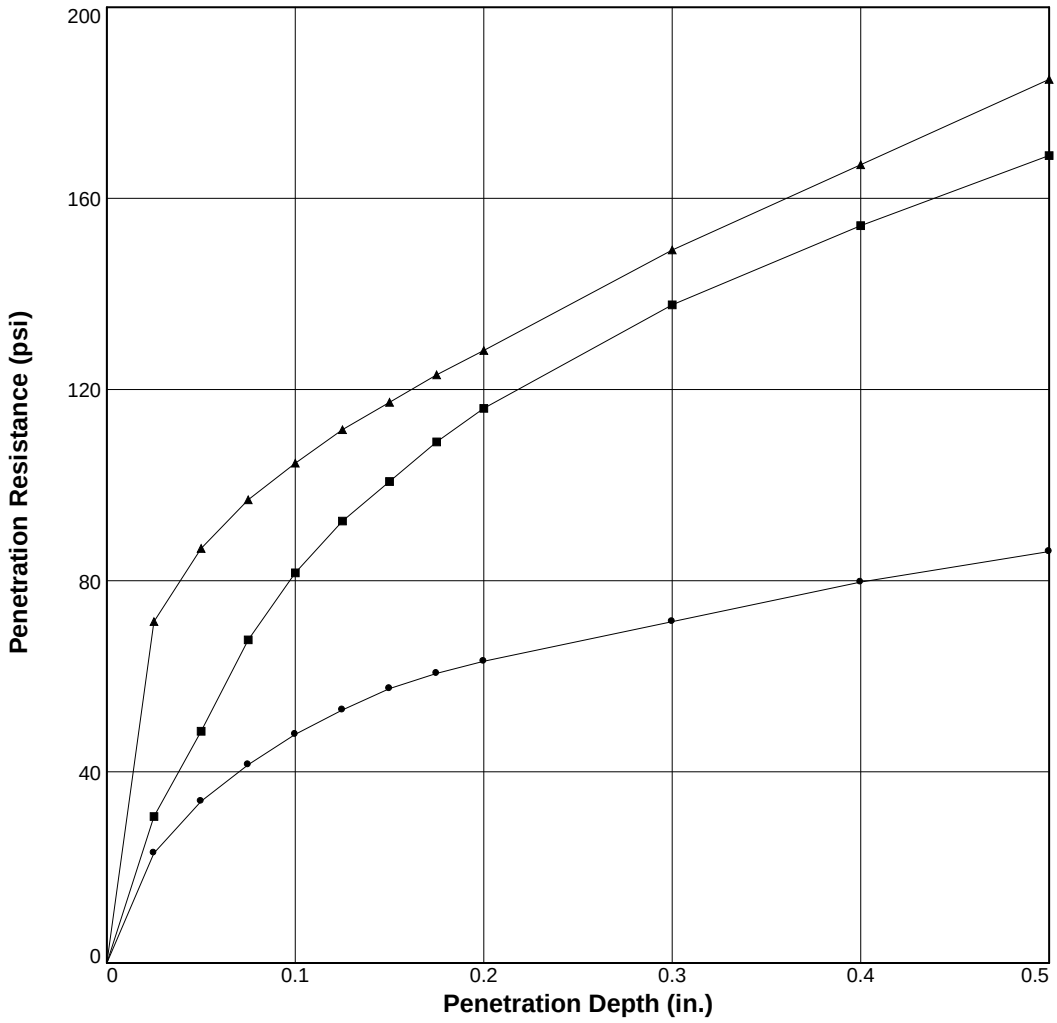
Type of Test: ASTM D 698-07 Method A Standard
Mold Dia: 4.00 **Hammer Wt.:** 5.5 lb. **Drop:** 12 in. **Layers:** three **Blows per Layer:** 25



Point No.	1	2	3	4
Wt. M+S	8.58	8.76	8.60	8.45
Wt. M	4.60	4.60	4.60	4.60
Wt. W+T	216.5	228.9	233.3	265.5
Wt. D+T	191.5	197.5	198.7	237.1
Tare	38.4	38.4	38.0	38.9
Moist.	16.4	19.7	21.6	14.4
Moist.*	16.4	19.7	21.6	14.4
Dry Den.*	102.6	104.2	98.7	101.0

Test Results: **Max. Dry Den.=** 104.9 pcf **Opt. Moist.=** 18.8%

BEARING RATIO TEST REPORT
ASTM D 1883-07



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	99.7	95	16.6	99.0	94.4	22.0	4.8	4.2	0.000	10	0.7
2 △	99.5	94.9	18.8	99.2	94.6	19.7	10.5	8.5	0.000	10	0.3
3 □	99.5	94.9	20.3	99.3	94.7	20.3	8.2	7.7	0.000	10	0.2

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red Brown Fine Sand Silt		104.9	18.8		

Project No: 1013049

Project: Library

Source of Sample: B-9

Sample Number: B-9

Date:

BEARING RATIO TEST REPORT
NOVA ENGINEERING
Kennesaw, Georgia

Test Description/Remarks:

Figure _____

BEARING RATIO TESTING RESULTS
(ASTM D 1883-07)

Date:
Project No.: 1013049
Project: Library
Location: B-9
Sample Number: B-9
Material Description: Red Brown Fine Sand Silt
USCS Classification:
Liquid Limit: **Plasticity Index:**

Test Description:
Maximum Dry Density, pcf : 104.9 **Optimum Moisture Content, %:** 18.8
Testing Remarks:

Sample 1 (25 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 252.45 | Wt. Soil+Tare, gms. 238.00 | Wt. Tare, gms. 151.07 | Moisture, % 16.6

Unit Weight

Wt. Mold+Soil, lbs. 27.91 | Wt. Mold, lbs. 19.27 | Ht. Soil, in. 4.54 | Density, pcf 99.7

Swell Data

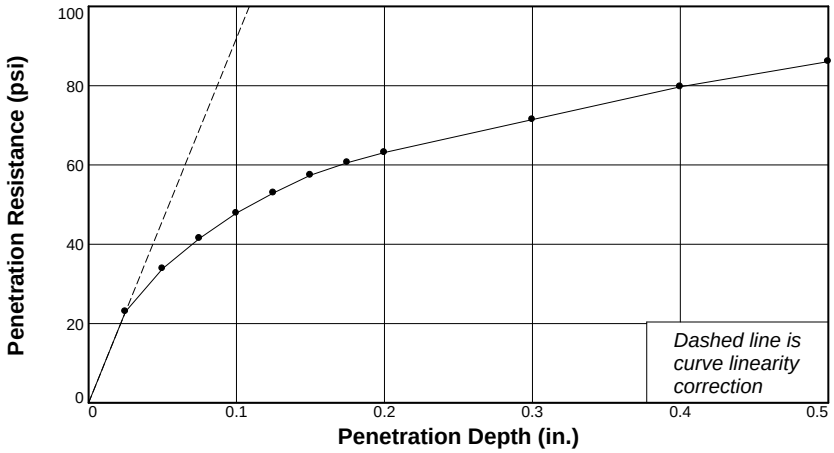
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	399	0.0
96	432	0.7

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	256.50	214.40	31.19	23.0
Middle	210.62	179.20	38.06	22.3
Bottom	186.53	161.14	38.67	20.7

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	-2.09	0.0	
0.025	34	23.0	
0.05	51	33.8	
0.075	63	41.5	
0.1	73	47.9	4.8
0.125	81	53.0	
0.15	88	57.4	
0.175	93	60.6	
0.2	97	63.2	4.2
0.3	110	71.4	
0.4	123	79.7	
0.5	133	86.1	



Sample 2 (23 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 254.83 | Wt. Soil+Tare, gms. 238.43 | Wt. Tare, gms. 151.08 | Moisture, % 18.8

Unit Weight

Wt. Mold+Soil, lbs. 28.03 | Wt. Mold, lbs. 19.25 | Ht. Soil, in. 4.54 | Density, pcf 99.5

Swell Data

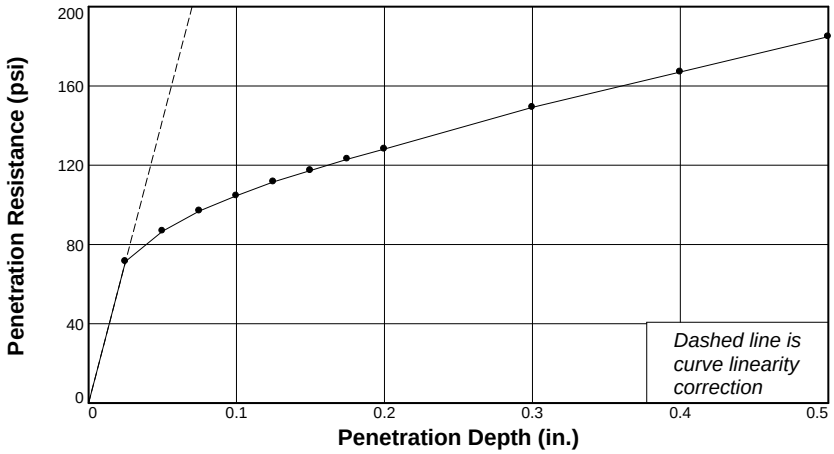
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	588	0.0
96	600	0.3

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	200.18	173.71	38.05	19.5
Middle	210.00	182.02	38.50	19.5
Bottom	213.04	183.58	37.96	20.2

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	-2.09	0.0	
0.025	110	71.4	
0.05	134	86.7	
0.075	150	96.9	
0.1	162	104.6	10.5
0.125	173	111.6	
0.15	182	117.3	
0.175	191	123.1	
0.2	199	128.2	8.5
0.3	232	149.2	
0.4	260	167.0	
0.5	288	184.9	



Sample 3 (20 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 307.95 | Wt. Soil+Tare, gms. 290.50 | Wt. Tare, gms. 204.47 | Moisture, % 20.3

Unit Weight

Wt. Mold+Soil, lbs. 27.82 | Wt. Mold, lbs. 18.93 | Ht. Soil, in. 4.54 | Density, pcf 99.5

Swell Data

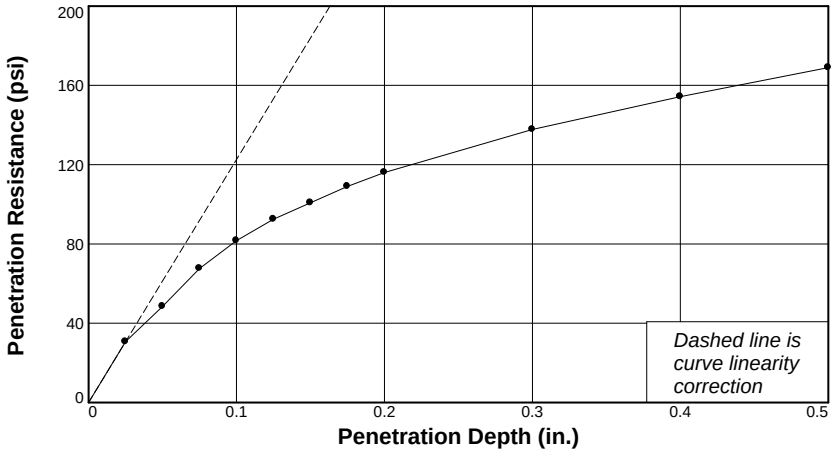
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	3	0.0
96	11	0.2

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	206.98	178.22	38.45	20.6
Middle	185.83	160.26	33.14	20.1
Bottom	197.24	169.88	33.51	20.1

Penetration Test Data

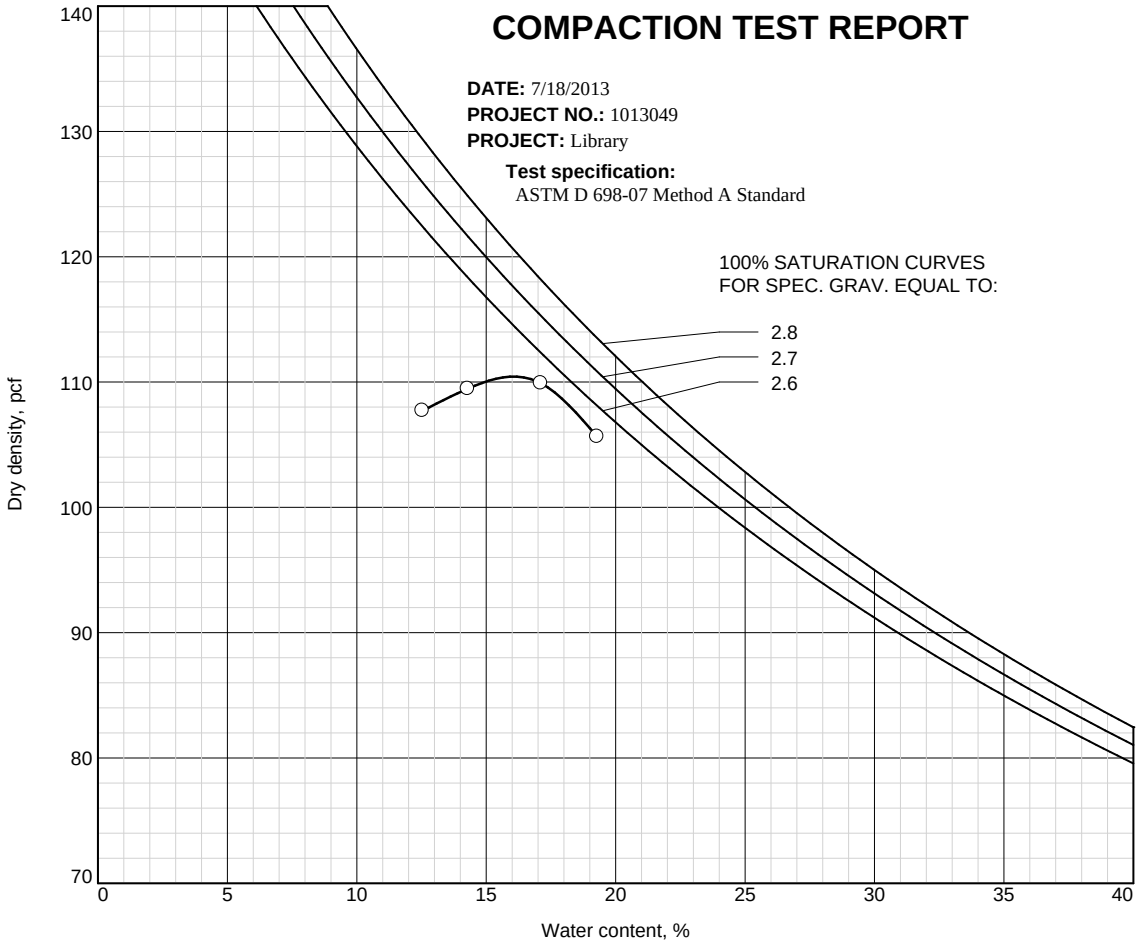
Pen. in.	Dial Reading	Stress psi	CBR %
0.0	-2.09	0.0	
0.025	46	30.6	
0.05	74	48.5	
0.075	104	67.6	
0.1	126	81.6	8.2
0.125	143	92.5	
0.15	156	100.8	
0.175	169	109.0	
0.2	180	116.1	7.7
0.3	214	137.7	
0.4	240	154.3	
0.5	263	169.0	



COMPACTION TEST REPORT

DATE: 7/18/2013
PROJECT NO.: 1013049
PROJECT: Library

Test specification:
ASTM D 698-07 Method A Standard



	Sample No.	Elev. or Depth	Material Description	Specific Gravity	LL	PL	Oversize	% < #200
○	B-16		Brown Silty Fine Sand					

Sample No.	B-16			
Natural water content, percent	14.8			
Optimum water content, percent	16.1			
Max dry density, pcf	110.4			

Remarks:	Project: Library	Project No.: 1013049
	Location:	
	Source: B-16	
	NOVA ENGINEERING Kennesaw, Georgia 770-425-0777	
Figure		

MOISTURE DENSITY TEST DATA

7/18/2013

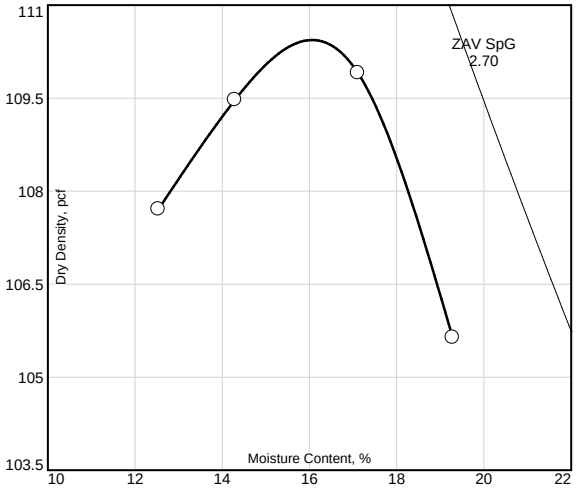
Client: MC2
Project: Library
Project Number: 1013049
Location: B-16
Sample Number: B-16
Description: Brown Silty Fine Sand
Natural Moisture: 14.8

Test Data and Results For Curve B- 16

Test Specification:

Type of Test: ASTM D 698-07 Method A Standard

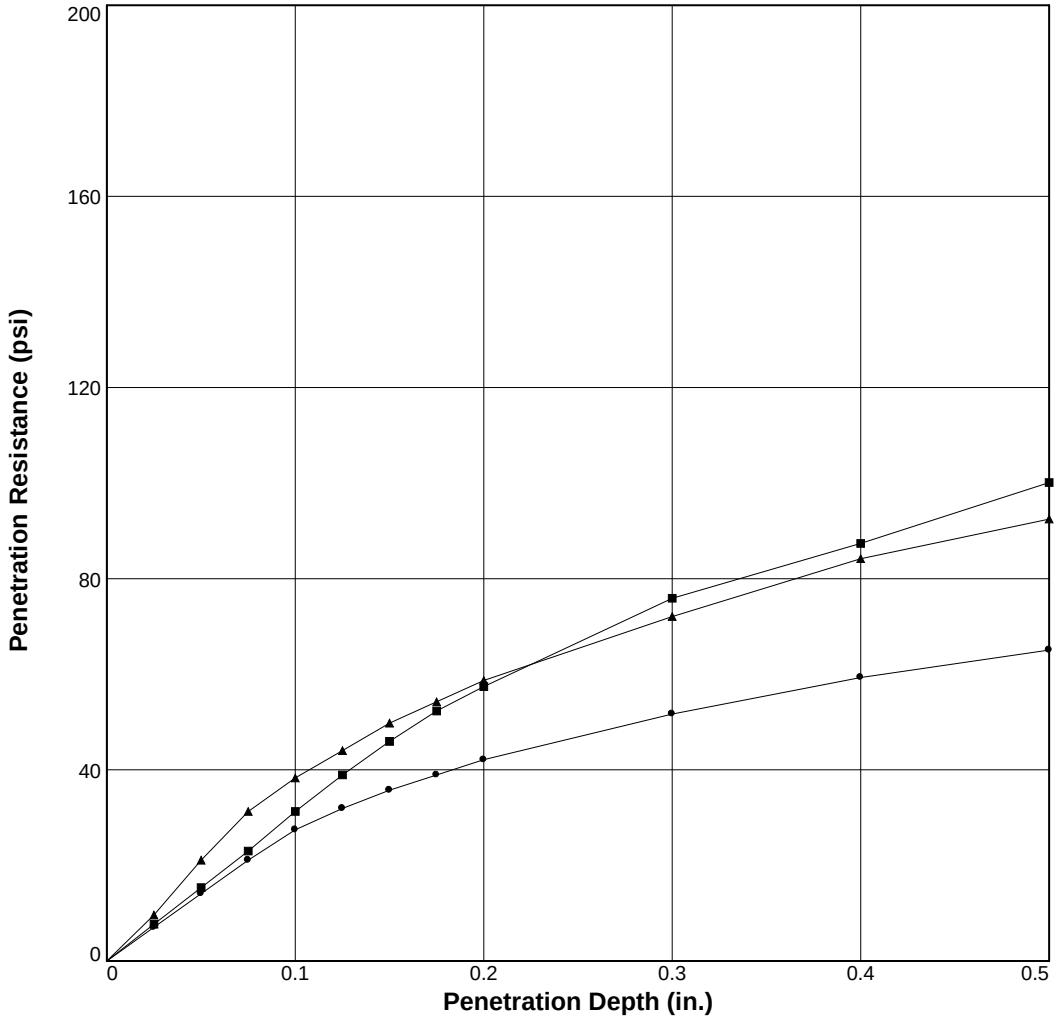
Mold Dia: 4.00 **Hammer Wt.:** 5.5 lb. **Drop:** 12 in. **Layers:** three **Blows per Layer:** 25



Point No.	1	2	3	4
Wt. M+S	8.77	8.89	8.80	8.64
Wt. M	4.60	4.60	4.60	4.60
Wt. W+T	260.4	216.3	218.5	254.5
Wt. D+T	232.7	190.3	189.5	229.8
Tare	39.0	38.5	38.8	32.6
Moist.	14.3	17.1	19.3	12.5
Moist.*	14.3	17.1	19.3	12.5
Dry Den.*	109.5	109.9	105.6	107.7

Test Results: **Max. Dry Den.=** 110.4 pcf **Opt. Moist.=** 16.1%

BEARING RATIO TEST REPORT
ASTM D 1883-07



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	104.8	94.9	14.2	103.8	94	21.3	2.7	2.8	0.000	10	0.9
2 △	104.8	94.9	16.6	104.0	94.2	20.0	3.8	3.9	0.000	10	0.7
3 □	104.7	94.8	18.4	104.3	94.5	19.9	3.1	3.8	0.000	10	0.4

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Brown Silty Fine Sand		110.4	16.1		

Project No: 1013049

Project: Library

Source of Sample: B-16

Sample Number: B-16

Date:

BEARING RATIO TEST REPORT
NOVA ENGINEERING
Kennesaw, Georgia

Test Description/Remarks:

Figure _____

BEARING RATIO TESTING RESULTS
(ASTM D 1883-07)

Date:
Project No.: 1013049
Project: Library
Location: B-16
Sample Number: B-16
Material Description: Brown Silty Fine Sand
USCS Classification:
Liquid Limit: **Plasticity Index:**

Test Description:
Maximum Dry Density, pcf : 110.4 **Optimum Moisture Content, %:** 16.1
Testing Remarks:

Sample 1 (22 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 309.41 | Wt. Soil+Tare, gms. 296.37 | Wt. Tare, gms. 204.50 | Moisture, % 14.2

Unit Weight

Wt. Mold+Soil, lbs. 27.86 | Wt. Mold, lbs. 18.97 | Ht. Soil, in. 4.54 | Density, pcf 104.8

Swell Data

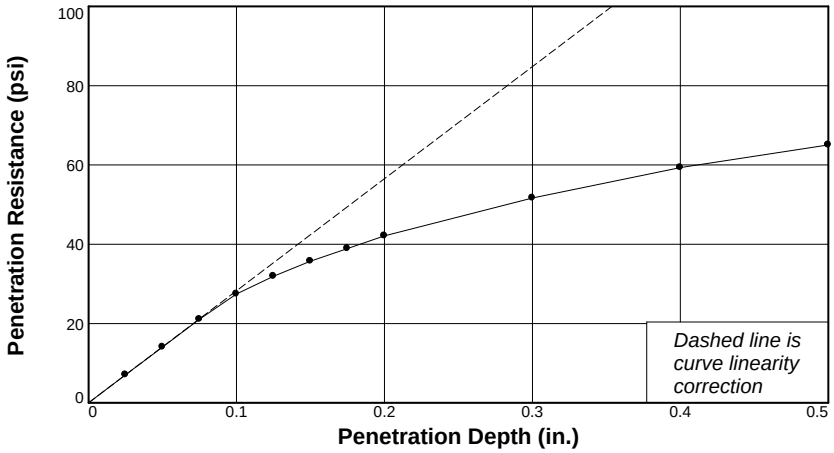
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	280	0.0
96	323	0.9

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	217.43	185.33	38.19	21.8
Middle	217.31	186.33	38.64	21.0
Bottom	222.13	190.08	38.49	21.1

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	-2.09	0.0	
0.025	9	7.1	
0.05	20	14.1	
0.075	31	21.1	
0.1	41	27.5	2.7
0.125	48	31.9	
0.15	54	35.7	
0.175	59	38.9	
0.2	64	42.1	2.8
0.3	79	51.7	
0.4	91	59.3	
0.5	100	65.1	



Sample 2 (25 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 305.45 | Wt. Soil+Tare, gms. 291.11 | Wt. Tare, gms. 204.49 | Moisture, % 16.6

Unit Weight

Wt. Mold+Soil, lbs. 27.77 | Wt. Mold, lbs. 18.70 | Ht. Soil, in. 4.54 | Density, pcf 104.8

Swell Data

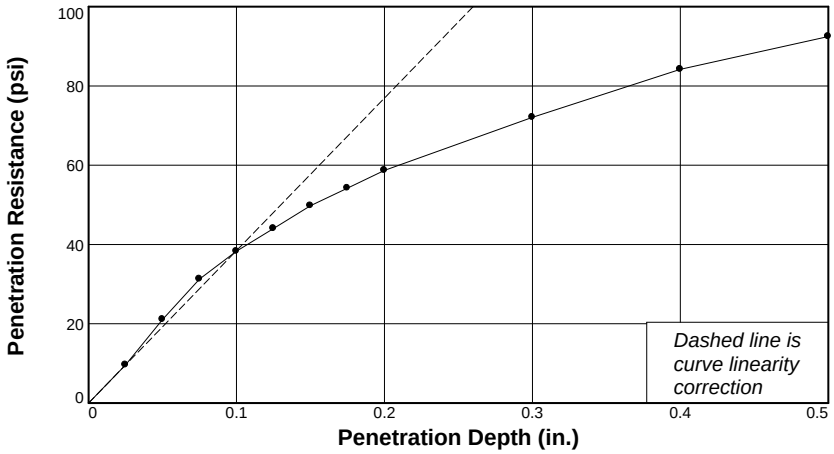
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	195	0.0
96	227	0.7

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	198.83	172.59	38.08	19.5
Middle	210.86	182.01	37.89	20.0
Bottom	238.10	204.16	38.43	20.5

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	-2.09	0.0	
0.025	13	9.6	
0.05	31	21.1	
0.075	47	31.3	
0.1	58	38.3	3.8
0.125	67	44.0	
0.15	76	49.8	
0.175	83	54.2	
0.2	90	58.7	3.9
0.3	111	72.1	
0.4	130	84.2	
0.5	143	92.5	



Sample 3 (20 Blows; Surcharge: 10 lbs.)

Water Content

Wt. Wet Soil+Tare, gms. 255.43 | Wt. Soil+Tare, gms. 239.22 | Wt. Tare, gms. 151.07 | Moisture, % 18.4

Unit Weight

Wt. Mold+Soil, lbs. 28.33 | Wt. Mold, lbs. 19.12 | Ht. Soil, in. 4.54 | Density, pcf 104.7

Swell Data

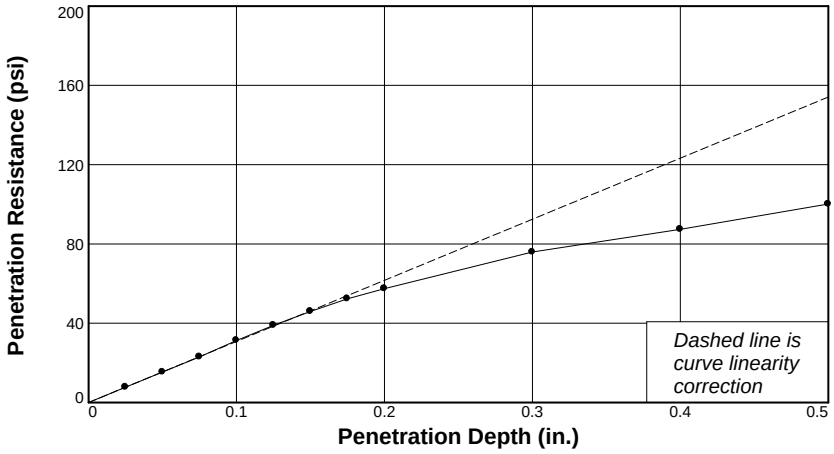
Elapsed Time, hrs.	Dial Reading in. x 1,000	Swell %
0	364	0.0
96	381	0.4

Final Water Content

	Wt. Wet Soil+Tare, gms.	Dry Soil+Tare	Tare	Moisture, %
Top	192.45	166.38	37.88	20.3
Middle	237.54	204.57	38.31	19.8
Bottom	205.07	177.59	38.04	19.7

Penetration Test Data

Pen. in.	Dial Reading	Stress psi	CBR %
0.0	-2.09	0.0	
0.025	10	7.7	
0.05	22	15.4	
0.075	34	23.0	
0.1	47	31.3	3.1
0.125	59	38.9	
0.15	70	45.9	
0.175	80	52.3	
0.2	88	57.4	3.8
0.3	117	75.9	
0.4	135	87.4	
0.5	155	100.1	



TEST PROCEDURES

The general field procedures employed by MC Squared, Inc. (**MC^2**) are summarized in the American Society for Testing and Materials (ASTM) Standard D420 which is entitled "Investigating and Sampling Soil and Rock". This recommended practice lists recognized methods for determining soil and rock distribution and groundwater conditions. These methods include geophysical and in-situ methods as well as borings.

Standard Drilling Techniques

To obtain subsurface samples, borings are drilled using one of several alternate techniques depending upon the subsurface conditions. Some of these techniques are:

In Soils:

a) Continuous hollow stem augers.
b) Rotary borings using roller cone bits or drag bits, and water or drilling mud to flush the hole.
c) "Hand" augers.

In Rock:

a) Core drilling with diamond-faced, double or triple tube core barrels.
b) Core boring with roller cone bits.

The drilling method used during this exploration is presented in the following paragraph.

Hollow Stem Augering: A hollow stem augers consists of a hollow steel tube with a continuous exterior spiral flange termed a flight. The auger is turned into the ground, returning the cuttings along the flights. The hollow center permits a variety of sampling and testing tools to be used without removing the auger.

Core Drilling: Soil drilling methods are not normally capable of penetrating through hard cemented soil, weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound, continuous rock. Material which cannot be penetrated by auger or rotary soil-drilling methods at a reasonable rate is designated as “refusal material”. Core drilling procedures are required to penetrate and sample refusal materials.

Prior to coring, casing may be set in the drilled hole through the overburden soils, to keep the hole from caving and to prevent excessive water loss. The refusal materials are then cored according to ASTM D-2113 using a diamond-studded bit fastened to the end of a hollow, double or triple tube core barrel. This device is rotated at high speeds, and the cuttings are brought to the surface by circulating water. Core samples of the material penetrated are protected and retained in the swivel-mounted inner tube. Upon completion of each drill run, the core barrel is brought to the surface, the core recovery is measured, and the core is placed, in sequence, in boxes for storage and transported to our laboratory.

Sampling and Testing in Boreholes

Several techniques are used to obtain samples and data in soils in the field; however the most common methods in this area are:

a) Standard Penetration Testing
b) Undisturbed Sampling
c) Dynamic Cone Penetrometer Testing
d) Water Level Readings

The procedures utilized for this project are presented below.

Standard Penetration Testing: At regular intervals, the drilling tools are removed and soil samples obtained with a standard 2 inch diameter split tube sampler connected to an A or N-size rod. The sampler is first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140 pound safety hammer falling 30 inches. Generally, the number of hammer blows required to drive the sampler the final 12 inches is designated the "penetration resistance" or "N" value, in blows per foot (bpf). The split barrel sampler is designed to retain the soil penetrated, so that it may be returned to the surface for observation. Representative portions of the soil samples obtained from each split barrel sample are placed in jars, sealed and transported to our laboratory.

The standard penetration test, when properly evaluated, provides an indication of the soil strength and compressibility. The tests are conducted according to ASTM Standard D1586. The depths and N-values of standard penetration tests are shown on the Boring Logs. Split barrel samples are suitable for visual observation and classification tests but are not sufficiently intact for quantitative laboratory testing.

Water Level Readings: Water level readings are normally taken in the borings and are recorded on the Boring Records. In sandy soils, these readings indicate the approximate location of the hydrostatic water level at the time of our field exploration. In clayey soils, the rate of water seepage into the borings is low and it is generally not possible to establish the location of the hydrostatic water level through short-term water level readings. Also, fluctuation in the water level should be expected with variations in precipitation, surface run-off, evaporation, and other factors. For long-term monitoring of water levels, it is necessary to install piezometers.

The water levels reported on the Boring Logs are determined by field crews immediately after the drilling tools are removed, and several hours after the borings are completed, if possible. The time lag is intended to permit stabilization of the groundwater level that may have been disrupted by the drilling operation.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the cave-in zone.

BORING LOGS

The subsurface conditions encountered during drilling are reported on a field boring log prepared by the Driller. The log contains information concerning the boring method, samples attempted and recovered, indications of the presence of coarse gravel, cobbles, etc., and observations of groundwater. It also contains the driller's interpretation of the soil conditions between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are kept on file in our office.

After the drilling is completed a geotechnical professional classifies the soil samples and prepares the final Boring Logs, which are the basis for our evaluations and recommendations.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our Boring Logs.

The classification system discussed above is primarily qualitative and for detailed soil classification two laboratory tests are necessary; grain size tests and plasticity tests. Using these test results the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior. The soil classification and physical properties are presented in this report.

The following table presents criteria that are typically utilized in the classification and description of soil and rock samples for preparation of the Boring Logs.

Relative Density of Cohesionless Soils From Standard Penetration Test		Consistency of Cohesive Soils	
Very Loose	≤ 4 bpf	Very Soft	≤ 2 bpf
Loose	5 - 10 bpf	Soft	3 - 4 bpf
Medium Dense	11 - 30 bpf	Firm	5 - 8 bpf
Dense	31 - 50 bpf	Stiff	9 - 15 bpf
Very Dense	> 50 bpf	Very Stiff	16 - 30 bpf
		Hard	30 – 50 bpf
(bpf = blows per foot, ASTM D 1586)		Very Hard	> 50 bpf

Relative Hardness of Rock		Particle Size Identification	
Very Soft	Hard Rock disintegrates or easily compresses to touch; can be hard to very hard soil.	Boulders	Larger than 12"
		Cobbles	3" - 12"
Soft	May be broken with fingers.	Gravel	
		Coarse	3/4" - 3"
Moderately Soft	May be scratched with a nail, corners and edges may be broken with fingers.	Fine	4.76mm - 3/4"
		Sand	
		Coarse	2.0 - 4.76 mm
Moderately Hard	Light blow of hammer required to break samples.	Medium	0.42 - 2.00 mm
		Fine	0.42 - 0.074 mm
Hard	Hard blow of hammer required to break sample.	Fines (Silt or Clay)	Smaller than 0.074 mm

Rock Continuity		Relative Quality of Rocks	
RECOVERY = $\frac{\text{Total Length of Core}}{\text{Length of Core Run}}$ x 100 %		**RQD** = $\frac{\text{Total core, counting only pieces > 4" long}}{\text{Length of Core Run}}$ x 100 %	
Description	Core Recovery %	Description	RQD %
Incompetent	Less than 40	Very Poor	0 - 25 %
Competent	40 - 70	Poor	25 - 50 %
Fairly Continuous	71 - 90	Fair	50 - 75 %
Continuous	91 - 100	Good	75 - 90 %
		Excellent	90 - 100 %

BID FORM

TRADE: _____

BIDDER INFORMATION:

_____
(Company Name)

_____
(Street Address)

_____
(City) (State) (Zip)

_____
(Contact Name)

(_____) _____
(Phone Number) (Email)

BASE BID:

The undersigned has examined the drawings, specifications, existing conditions, and acknowledges receipt of all attachments indicated in the Invitation to Bid. The undersigned also is fully informed as to the nature of the work and conditions relating to its performance. By submitting this proposal, the undersigned hereby proposes to execute the work called for herein relating to the **Metropolitan Library**. Work shall include furnishing all labor, services, materials, equipment, tools, taxes, permits and all other items necessary for the proper and complete execution of the work in accordance with the drawings, specifications, and other listed documents and all applicable OSHA, life safety, and building codes.

The base bid for the referenced scope of work is:

_____

_____ Dollars $(_____)

BOND :

Bond Rate: _____% Bonding Company: _____

BASE BID BREAKDOWN: Winter Johnson is a strong supporter of MBE/WBE businesses. We strongly encourage you to use MBE/WBE participation when possible. (example: AABE, HABE, FBE, APABE).

Bid Package #	Scope of Work	MWBE Type	MWBE Participation $	Total Price
_____	_____	_____	$_____	$_____
_____	_____	_____	$_____	$_____
_____	_____	_____	$_____	$_____
_____	_____	_____	$_____	$_____

Total Bid (Excluding Bond) $_____

I. **Unit Prices – Earthwork / Utilities**: The Contract Sum will be increased or decreased according to quantities of added or omitted Work based on unit prices accepted by Winter Johnson.

A. Inclusions: Unit prices shall cover and include all costs and charges including, without limitation, costs for material, labor, fabrication, delivery, unloading, handling, protection, storage, hoisting, scaffolds, tools, equipment, rentals, utilities, installation or application, lower tier subcontractors, supervision, taxes, employer's contributions, insurance, overhead, and profit.

B. Exclusions: Unit prices exclude cost of Performance and Payment Bonds.

C. Duration: All unit prices shall be held good and unchanged for the duration of the contract unless specified or agreed upon.

	Description	**Unit**	**Cost**
1.	Mass Rock removed & hauled offsite.	CY	$_____
2.	Trench Rock removed & hauled offsite.	CY	$_____
3.	Unsuitable Soils removed & hauled offsite.	CY	$_____
4.	Suitable Fill hauled onsite & installed.	CY	$_____

II. **Alternates:** Provide pricing for the following Alternate items or in the space provided indicate any voluntary alternates (these items are not included in the base bid). These alternates are found in Specification Section 012300 – Alternates.

No. 1 – Exposed Metal Roof Decking/Ceiling	ADD/DEDUCT (circle one)	$ _____
No. 2 –	ADD/DEDUCT (circle one)	$ _____
No. 3 –	ADD/DEDUCT (circle one)	$ _____
No. 4 –	ADD/DEDUCT (circle one)	$ _____

This proposal is valid for 60 days

Submitted by:

Subcontractor Name: _____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

PLEASE ATTACH TO THIS BID FORM ALL PRICE QUOTES ASSOCIATED WITH YOUR BID ON COMPANY LETTERHEAD FOR REFERENCE.