STATE OF NEW JERSEY
SCHOOLS DEVELOPMENT AUTHORITY
1 WEST STATE STREET
P.O. BOX 991
TRENTON, NJ 08625-0991
609-943-5955

<Addendum #2>

NJSDA
1 West State Street
Trenton, NJ 08625
Phone: 609-292-8775
Fax: 609-656-4642

Date: August 29, 2012

PROJECT #: EL-0006-C01

DESCRIPTION: Elizabeth Academic High School

This addendum shall be considered part of the Bid Documents issued in connection with the referenced project. Should information conflict with the Bid Documents, this Addendum shall supercede the relevant information in the Bid Documents.

A. RFI QUESTIONS & NJSDA ANSWERS

A.1 **Question:** Please provide the details of footing marks F3.0 and F6.22 shown on Drawing S101B at column lines L/3.8 and A/3

Answer: Footing F-3.0 @ L/3.8 is 3'-0 x 3'-0 x 16" with 4 - #5 rebar each way. Footing F-6.22 @ A/3 is actually an F-12.0 footing, not a F-6.22 footing.

A.2 **Question:** Please provide the details such as thickness and reinforcement for concrete ramp located on south side of the building.

Answer: See ramp reinforcement details on revised sheet C-401 (See Attachment #1).

A.3 **Question:** Please provide the reinforcement details for concrete ramp on east side of the building.

Answer: See ramp reinforcement details on revised sheet C-401 (See Attachment #1).

A.4 **Question:** Detail 4/A501 shows concrete bench located on east side of the building. However, it does not show any details. Please provide the details for the concrete bench and its foundations.

Answer: See concrete planter bench detail on revised sheet C-401 (See Attachment #1).

A.5 **Question:** Please clarify the height of concrete foundation wall shown at details 16 and 16A on Drawing S109A. The detail shows that the wall ends at slab-on-grade elevation, however, architectural wall sections 1, 2, 3 on A501 show about 8' high above ground floor slab.

Answer: Architectural wall sections 1, 2, 3 on A501 are similar details; the structural details should be followed for foundation wall heights at these locations.

A.6 **Question:** Please provide exterior wall section at column line 13 between lines A and E.1 (Auditorium Wall).

Answer: As indicated on 2/A-203, see section 1/A-501 SIM. for the exterior wall section at this location.

A.7 **Question:** Top of wall elevation for wall A located at the vehicular ramp is 21'-6" as per drawing C201 and A-002. Per wall detail on C-403, top of wall is 3'-6" higher than the ground elevation and this makes the top of wall elevation around 24.5. Please clarify which information has to be followed.

Answer: The top of wall elevation should be el. 24.50.

A.8 **Question:** Drawing L-100A shows some enclosure walls with gate between the vehicular ramp and existing building. This enclosure is not shown on any other drawings. Please clarify.

Answer: This scope is also shown on A-002.

A.9 **Question:** Please provide the details for retaining walls located on west side of the steps by the vehicular ramp.

Answer: The retaining wall west of the steps is similar to wall B details as shown on Dwg. C-403.

A.10 **Question:** Please advise if the following column lines have concrete piers or not: 1/C-1, 1/B-1, 1/A, A/2, A/2.5, A/3, A/3.5, A/4. If they require piers, please provide pier marks.

Answer: Column lines 1/B.1 and 1/C.1 have no pier (see detail F17/S109A); 1/A has a concrete pier and it is shown in plan as P2 next to the footing mark F-11.0; the following columns along line A (2, 2.5, 3, 3.5 and 4) have no concrete pier see detail F12/S109A

A.11 **Question:** Please confirm that the contractor can list multiple subcontractors for each trade, for example:
If we are to use multiple HVAC contractors, how can we list the multiple names and is there anything else would required to list?

Answer: A Bidder can list multiple subcontractors within the identified trades in the Price Proposal, but only if the bidder intends to enter into direct contracts with **all** such subcontractors identified. Pursuant to N.J.S.A. 52:18A-243, when the work of a school facilities project is procured through a single overall contract, the bid shall "set forth the name or names of all subcontractors to whom the bidder will subcontract for the furnishing of any of the work and materials" in the following statutorily specified trades: 1) plumbing and gas

fitting; 2) steam and hot water heating and ventilating apparatus; 3) electrical work; and 4) structural steel and iron work. A Bidder may not list multiple subcontractors if it does not intend to contract with all of them, i.e., a Bidder may not identify multiple firms as alternatives and then choose among them to contract with fewer than all of the firms named. If a Bidder lists multiple subcontractors for a given trade, the Bidder's failure to execute contracts with all such listed subcontractors would violate the statute, would constitute an unapproved substitution and would be grounds for withdrawing the award to the Contractor, or terminating the contract for cause.

A.12 **Question:** Please confirm the SBE goals for the project are to be met or the efforts for them to be met, to be completed after the award.

Answer: Yes, the documentation of SBE compliance is to be completed after award. The SDA shall notify the successful Bidder by issuing a Notice of Award (NOA). Immediately upon receipt of the NOA, the recipient of the NOA shall complete and deliver the Authority; SBE Form A and SBE Forms C as instructed under Section 5 of the RFP.

A.13 **Question:** Please confirm the architect will provide the CAD files to the contractor at no charge.

Answer: SOM will provide cad files of plans & elevations to the successful bidder.

A.14 **Question:** Please confirm the plans for the project have been reviewed already by DCA and the contractor should pull the permits accordingly upon award.

Answer: The project has been released by DCA.

A.15 **Question:** Please advise when is the SDA planning to award the project and how long it anticipates for completing the constructability review.

Answer: Under the current project schedule, the SDA is anticipating to issue the NTP for Constructability Review by December 21, 2012. The successful contractor is to submit the Constructability Report by March 4, 2012.

A.16 **Question:** Per the Finish at the Kitchen room 120, the walls finishes are noted as "M" which is "FRP01".
FRPOl is listed under Spec. Section 09770 on the Material Summary Schedule on Drawing G-003.
Please provide Spec. Section 09770 which is not provided in the spec book nor is it listed in the Table of Contents.

Answer: FRP01 can be found in spec section 06150.

A.17 **Question:** Pre-Bid Conference Agenda states the last day for questions is Tuesday, August 14, 2012, but the Construction RFP Article 4.1.4 interpretation notes Requests are due no later than ten (l0) business days prior to the Price Proposal Submission date of Thursday, September 13, 2013 which would be Wednesday, August 29, 2012.
Please confirm the Request for Information time frame is per the construction RFP.

Answer: The language of Section 4.1.4 ("Interpretation") of the RFP asserts that "The Bidder shall be responsible for delivery of such requests no later than ten (10) business days prior to the Price Proposal Submission date." That statement sets an outside limit on the NJSDA's selection of a deadline date for submission of bidder requests, but does not preclude NJSDA from fixing an earlier date, in order to allow time to respond to such questions in an addendum that complies with statutory requirements regarding the timing of issuance of addenda. Specifically, N.J.S.A. 52:18A-243(h) requires that addenda be issued "no later than seven days, Saturdays, Sundays and holidays excepted, prior to the bid due date." The NJSDA has discretion to determine a deadline for bidder questions that complies with Article 4.1.4 and which permits compliance with the addendum requirements of N.J.S.A. 52:18A-243(h), and has done so in this procurement by identifying the deadline for bidder questions in the Pre-Bid Conference Agenda. The Authority is therefore under no obligation to respond to bidder requests delivered after the RFI deadline which was extended from August 14, 2012 to September 7, 2012 by way of Addendum #1.

A.18 **Question:** Drawing A-704 Door and Window Elevations and Window Schedules require clarification of the following:

a. Room 146- there are three windows shown on the floor plan but no window type is designated. Please provide.
b. Rooms 188 and 181- there are no window types designated. Please provide.
c. Rooms 325, 326 and 362- there are no window types designated. Please provide.
d. Window Types M05, M07, M35 and M36 are scheduled but are not shown on the plans. Please advise.

Answer: Clarifications:

a. For room 146 see interior elevation 14/A-608 & 6/A-607
b. The windows for rooms 181 & 188 are identified on drawing A-312.
c. The windows for rooms 325 & 326 are identified on drawing 6/A-609. For room 362, see 7/A-610.
d. Provide all windows as indicated on the plans & elevations.

A.19 **Question:** Specification section 08330 identifies three types of overhead coiling doors / grilles being required for this project. Door types OD01, OD02, and OD03. The drawing with the door elevations does not show any coiling doors. The door schedule which is part of division 8 specifications does not identify any coiling doors.
Are any coiling doors required for this project? If so please provide the following information:

- Door number
- Door location
- Door type
- Door size
- Jamb and head details for each type of door

Answer: See interior and exterior elevations for overhead door types, locations & details (example, 3/A-204).

A.20 **Question:** Drawing S-106B Details 1 -4 and A – D dimensions are very small and unreadable. Please reissue in larger font.

Answer: See revised Drawing S-106B (Attachment #5).

B ADDENDUM TO SPECIFICATIONS AND DRAWINGS

B.1 Drawing C-401 titled "Site Details"

Replace Drawing C-401 with:

Attachment #1 – Drawing C-401, revised with added details for:

- Concrete Planter Bench
- Vehicular Concrete Ramp
- Pedestrian Concrete Ramp

B.2 Specification Section 02200 – Earthwork

In Volume 2 of 3 of the Project Manual, replace Section 02200 – Earthwork, dated July 13, 2012 Issued for Bid with:

Attachment #2 – Section 02200 – Earthwork, dated August 3, 2012 – Addendum #1

B.3 Drawing SI-101

Add the following to drawing C-001:

Attachment #3 - Drawing SI-101, titled "Existing Conditions and Foundation Preparation Plan"

B.4 Drawing S-106B

Replace Drawing S-106B with:

Attachment #5 – Revised Drawing S-106B with more legible dimensions on details, in response to Question A.20.

C SUPPLEMENTAL REPORTS

C.1 Supplemental Geotechnical Investigation

Add the following report to Appendix A in Volume 3 of 3 of the Project Manual, dated July 13, 2012, Issued for Bid:

- Attachment #4 - Supplemental Geotechnical Investigation by Langan Engineering & Environmental Services, dated November 7, 2011.

End of Addendum No. #2

Any bidder attempting to contact government officials (elected or appointed), including NJSDA Board members, NJSDA Staff, and Selection Committee members in an effort to influence the selection process may be immediately disqualified.

8.29.12

NJSDA Date
Carl Valenti

NJSDA
1 West State Street
Trenton, NJ 08625
Phone: 609-292-8775
Fax: 609-656-4642

Date: August 29, 2012

PROJECT #: EL-0006-C01

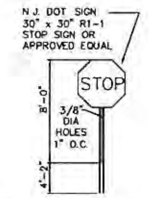
DESCRIPTION: Elizabeth Academic High School

Addendum No. 2

Acknowledgement of Receipt of Addendum

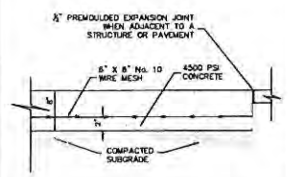
Contractor must acknowledge the receipt of the Addendum by signing in the space provided below and returning via fax to 609-656-4642, or in an attachment via E-mail to djohnson@njsda.gov. Signed acknowledgement must be received prior to the Technical Proposal and Price Proposal Due Date. Acknowledgement of the Addendum must also be made in the Technical Proposal Submission.

Signature	Print Name
Company Name	Date

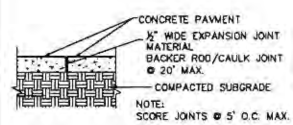


NOTES:
1. ALL POST SHALL BE ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION AS STATED IN THE CURRENT " MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.
2. ALL POST SHALL BE EMBEDDED 4'-2" MINIMUM BELOW GRADE.
3. ALL STEEL POST AND BRACKETS SHALL BE CUT, BENT AND HOLE PUNCHED AND DRILLED BEFORE GALVANIZING. GALVANIZING SHOULD BE IN CONFORMANCE WITH CURRENT ASTM SPECIFICATIONS A123-78 OR LATEST REVISION.
4. POST MAY BE STEEL, ALUMINUM, OR TWO PIECE U-POST.
5. SIGN PANEL SIZES SHALL DETERMINE POST TYPE AND NUMBERS AS SHOWN ON THIS DETAIL.
6. BOLTS SHALL NOT PROTRUDE MORE THAN 3/4" BEYOND THE NUT WHEN TIGHT BUT SHALL ENGAGE ALL THREADS.
7. ALL TRAFFIC AND PEDESTRIAN SIGNAGE AND LOCATION SHALL BE IN ACCOURDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROLL DEVICES AND ALL CURRENT AMENDMENTS.

STOP SIGN

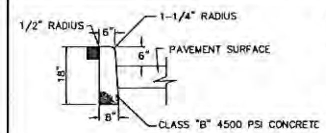


CONCRETE PAD



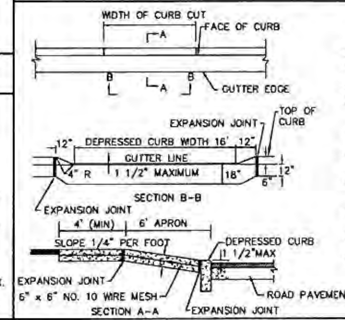
NOTE:
SCORE JOINTS @ 5' O.C. MAX.

EXPANSION JOINT



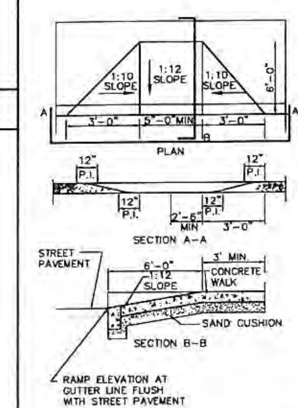
NOTES:
1. CONCRETE TO TEST 4,500 PSI MINIMUM ON 28 DAY TEST AIR ENTRAINMENT 4% TO 7% SLUMP TO BE 3" MAXIMUM.
2. WHEN NEW CURB IS INSTALLED ALONG AN EXISTING PAVED AREA, THE EXISTING PAVEMENT SHALL BE CUT IN A STRAIGHT LINE WITH A SHARP TOOL AND THE NEW PAVEMENT SHALL BE TACKED AND BUTTED TO THE EXISTING PAVEMENT
3. TRANSVERSE JOINTS 1/2" WIDE SHALL BE INSTALLED IN THE CURB 20' APART AND SHALL BE FILLED WITH PREFORMED BITUMINOUS IMPREGNATED FIBER JOINT FILLER, COMPLYING WITH THE REQUIREMENTS OF AASHTO SPEC M-213, RECESSED 1/4" IN FROM FRONT FACE AND TOP OF CURB
4. CURB TO BE UTILIZED WHEN NOT ADJACENT TO SIDEWALK.

6" X 8" X 18" CONCRETE CURB

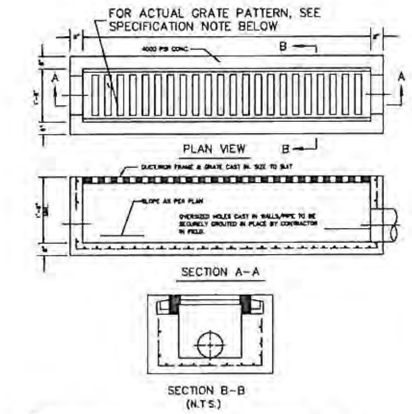


NOTES:
1. SIDEWALK 6" THICK ONLY AT DRIVEWAY 4" THICK AT ALL OTHER LOCATIONS.
2. DOUBLE DRIVEWAY WIDTH = 16' (MINIMUM)
3. DOUBLE DRIVEWAY- CONTRACTION JOINT CONSTRUCTED WITH A 1/8" STEEL PLATE SINGLE DRIVEWAY- BLIND JOINT 1/2"DEEP SURFACE GROVE
4. DOUBLE DRIVEWAY-BLIND JOINTS. SINGLE DRIVEWAY NO TREATMENT REQUIRED
5. SUBGRADE IS TO BE COMPACTED IN A MANNER ACCEPTABLE TO THE TOWNSHIP ENGINEER.
6. EXPANSION JOINTS ARE TO BE 1/2" WIDE AND FILLED WITH PREFORMED BITUMINOUS TYPE JOINT FILLER SHALL BE 1/4" BELOW THE TOP OF THE SURFACE.
7. BLIND JOINTS ARE TO BE SURFACED GROVE CUT INTO SIDEWALK 1/2" DEEP.
8. CONTRACTION JOINTS ARE TO BE CONSTRUCTED WITH 1/8" THICK REMOVABLE STEEL PLATE.
9. ALL EXPOSED SURFACES ARE TO BE COATED WITH A TRANSLUCENT CURING COMPOUND. N.J.D.O.T STD SPEC 8 5 29 IMMEDIATELY FOLLOWING FINAL FINISHING, COVERAGE SHALL NOT BE LESS THAN ONE GALLON PER 200 SQUARE FEET

DRIVEWAY APRON WITH DEPRESSED CURB

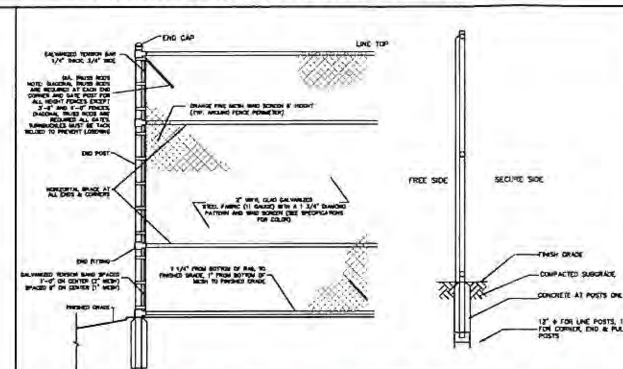


WHEEL CHAIR RAMP

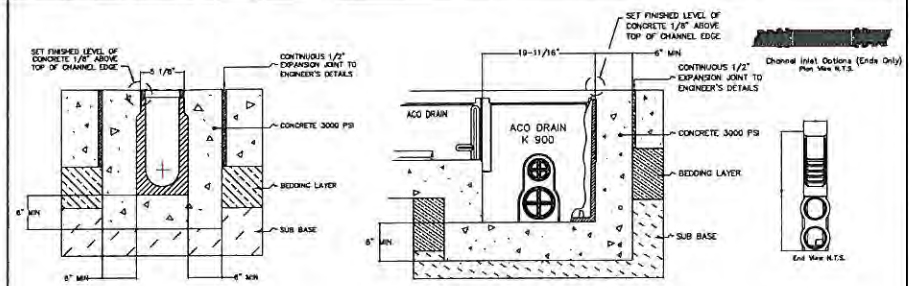


NOTES:
1. TRENCH DRAIN AT LOADING RAMP SHALL BE CAMPBELL FOUNDRY GRATE 4326 OR APPROVED EQUAL.

TRENCH DRAIN @ LOADING RAMP

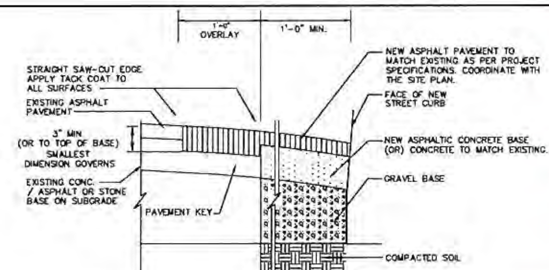


TEMPORARY CONSTRUCTION FENCE WITH WINDSCREEN

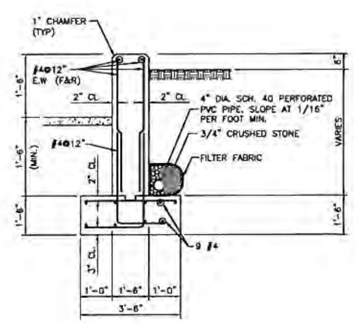


1. TRENCH DRAIN TO BE ACO DRAIN TYPE K100S W/ IN-LINE CATCH BASIN K900 OR APPROVED EQUAL.
2. GRATE TO BE No 478 ADA COMPLIANT OR APPROVED EQUAL.

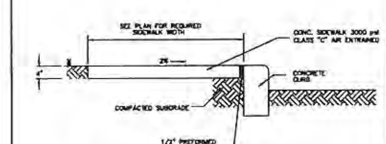
TRENCH DRAIN @ MAIN ENTRY



STREET PAVING AT NEW STREET CURB

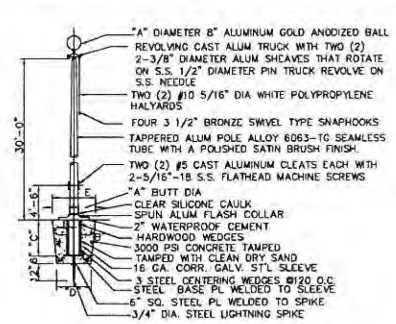


CONCRETE PLANTER BENCH



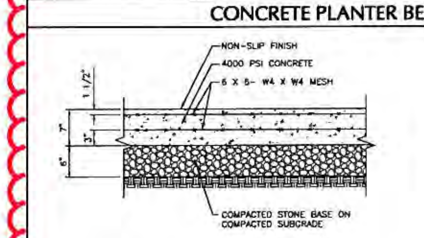
THE FORMS AND DIVIDERS SHALL BE OF STEEL OR WOOD AND OF SUFFICIENT STRENGTH TO RESIST SPRINGING OUT OF SHAPE; DEPTH OF FORMS SHALL BE AT LEAST THE THICKNESS OF CONCRETE AS SPECIFIED ON THIS DRAWING. WALK SHALL BE OF MONOLITHIC CONSTRUCTION FOUR (4) INCHES THICK. TRANSVERSE SURFACE GROOVES MUST BE PROVIDED FOR AT RIGHT ANGLES TO THE SIDEWALK AND AT INTERVALS EQUAL TO WIDTH OF THE SIDEWALK. AFTER THE CONCRETE IS PLACED IT SHALL BE TAMPED, SCREEDED AND FINISHED TO TRUE GRADE AND SURFACE. THE FINISH SHALL BE MADE WITH A WOOD FLOAT, FOLLOWED BY A BRUSHING WITH A WET SOFT HAIR BRUSH TO A NEAT WORKMANLIKE SURFACE. TRANSVERSE EXPANSION JOINTS 1/2 INCH WIDE SHALL BE PROVIDED AT INTERVALS OF NOT LESS THAN 20 FEET AND FILLED WITH PREFORMED BITUMINOUS CELLULAR TYPE JOINT FILLER. SCORE LINES SHALL BE EVERY FIVE (5) FEET OR TO MATCH EXISTING ADJACENT SIDEWALK. LONGITUDINAL JOINTS 1/2 INCH WIDE SHALL BE PROVIDED BETWEEN CURBS AND ABUTTING SIDEWALKS AND SHALL BE FILLED WITH PREFORMED BITUMINOUS TYPE FILLER. DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY SHALL BE 4500 P.S.I. AIR ENTRAINED CONCRETE SIX (6) INCHES THICK

CONCRETE SIDEWALK



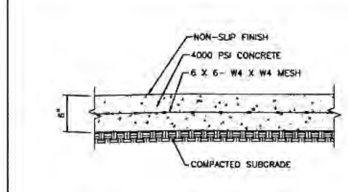
EXPOSED HEIGHT "H"	WALL THICKNESS "T"	SCHEDULE A	B	C	D	E
30'	.188	8"	10"	36"	30"	36"

FLAG POLE DETAIL



NOTE: EXP. JOINTS TO BE PLACED MAX. 20 FT. O.C.

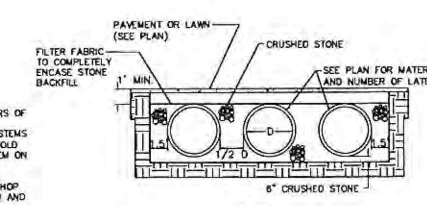
VEHICULAR CONCRETE RAMP



NOTE: EXP. JOINTS TO BE PLACED MAX. 20 FT. O.C.

PEDESTRIAN CONCRETE RAMP

NOTES:
1. INSTALL CLEANOUTS AT CORNERS OF HDPE DETENTION SYSTEM AND MANHOLES AT RCP DETENTION SYSTEMS (SEE PLAN AND SEE VAULT MANIFOLD DETAIL FOR RCP DETENTION SYSTEM ON DWG C-403)
2. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF SYSTEM FOR REVIEW AND APPROVAL BY THE ENGINEER
3. ACTUAL NUMBER OF LATERALS MAY VARY - SEE PLAN



SUBSURFACE DETENTION DETAILS

1 SITE DETAILS

SDA
NJ Schools Development Authority
ELIZABETH ACADEMIC HIGH SCHOOL

Owner
State of New Jersey Schools Development Authority
1 West State Street
Trenton, NJ 08625
(609) 943-5955

Project Management
Bovis Lend Lease
821 Alexander Road
Princeton, NJ 08540
(609) 951-0500

Architect
SOM
SKIDMORE, OWINGS & MERRILL PA
14 Wall Street
New York, NY 10005
(212) 298-9300

Structural Engineering
Consulting Engineers Collaborative, Inc
730 Boulevard
Kenilworth, NJ 07033
(908) 298-1600

Mechanical & Electrical Engineering Plumbing and Fire Protection
Concord Engineering Group, Inc.
520 South Burnt Mill Road
Voorhees, NJ 08043
(856) 427-0200

Surveying and Civil Engineering
Langan Engineering
River Drive Center 1
Elmwood Park, NJ 07407
(201) 794-6900

Landscape Design
MKW & Associates
39 Park Avenue
Rutherford, NJ 07070
(201) 933-7809

Information Technology
Intertech Associates, Inc.
77-55 Schanck Road
Suite A-14
Freehold, NJ 07728
(732) 431-4236

Food Service Consultants
Hopkins Food Service Specialists, Inc.
27 West 24th Street
New York, NY 10010
(301) 320-9200

Fire Protection and Life Safety
Code Consultants, Inc.
330 West 38th Street
New York, NY 10018
(212) 216-9596

SITE DETAILS

N.T.S.
209065

C-401

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SECTION 02200 – EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. The Authority shall retain a Geotechnical Engineer that will provide the necessary foundation and subgrade approvals for this project.

1.2 SECTION INCLUDES

A. Work shall consist of the execution of earthwork and related work as indicated on the Contract Drawings and within these Specifications, including but not limited to the following:

1. Excavation, fill, backfill and compaction to provide subgrades for foundations, building slabs on grade, walks, pavements, and landscaping.

2. Proofrolling

3. Placement of Compacted Fill

4. Dewatering

5. Shoring, bracing and underpinning

6. Placement of bedding layer.

7. Removal and disposal of excavated materials not required for, or not suitable for, the work.

8. Removal and disposal of existing underground utilities.

9. Placement of grass required to stabilize stockpiled soil materials.

10. Performing soil testing and inspection services not covered by the Authority (New Jersey Schools Development Authority).

11. Installation of perimeter foundation drainage system, underslab drainage system, vertical drainage mats and vapor barrier etc.

1.3 RELATED SECTIONS

A. Project Survey and Layout – Section 02120

B. Soil Erosion and Sediment Control – Section 02135

C. Shoring and Bracing – Section 02150

1.4 REFERENCES

A. Site Specific Reports

1. Geotechnical Engineering Report, dated 16 August 2005
2. Summary of Supplemental Geotechnical Investigation, dated 9 November 2011.
3. Notice of Field Condition, dated 26 June 2012
4. Preliminary Assessment Report, dated 12 June 2003
5. Site Investigation Report, dated 18 August 2003
6. Remedial Action Work Plan, dated 18 August 2003
7. Supplemental Environmental Investigation, dated 9 November 2011

B. The current specifications of the New Jersey Department of Transportation.

C. Latest version of American Society for Testing and Materials (ASTM) standards.

D. International Building Code New Jersey Edition (2009).

E. OSHA Safety Regulations.

F. Latest New Jersey Department of Environmental Protection (NJDEP) Regulations.

G. In case of conflict between references, specifications and report, the most stringent shall apply.

1.5 PROJECT CONDITIONS

A. The project is located in an urban area in the City of Elizabeth, NJ. Public streets and an existing school building border the site. The project site is currently vacant but was occupied by former structures which have been removed.

B. 2012 Mass Excavation: A mass excavation was performed at this site from May through July 2012 as part of a preliminary site preparation package. Existing fill materials were excavated and removed from the site and replaced with approved materials. The majority of the site was excavated to el 16.5. Slopes remain along the adjacent streets and properties where shown. A 6-inch-thick layer of imported dense graded aggregate (DGA) was placed over the exposed subgrade. Currently the majority of the site is at el 17.

C. Unsuitable Soils: Unsuitable (soft, loose, unstable, saturated) soils were identified in the geotechnical investigations and during the 2012 mass excavation work. Unsuitable soils that remain beneath the proposed building pad as shown on the drawings shall be improved with approved materials as per Part 3 of this section.

D. Contractor shall read the geotechnical engineering reports and addenda and all other contract documents. Subsurface conditions reported in the geotechnical engineering reports are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that the Authority will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data has been made available for convenience of Contractor. Additional test borings and other exploratory operations may be made by Contractor at no cost to the Authority.

E. By submitting his bid, the Contractor represents that he has reviewed the information provided and investigated the site to determine type, quantity, quality, and character of excavation work to be performed. All excavation shall be considered unclassified excavation. Excavation shall be performed in a safe manner in accordance with the applicable regulations. Shoring and bracing shall be used where necessary.

F. The Contractor shall submit an RFI for **any** questions or uncertainties related to subsurface conditions and deviations where foundations, slabs and other site improvements are to be constructed.

1.6 SUBMITTALS

All submittals shall be submitted to the Authority and its Design Consultant for review and approval at least 3 weeks prior to start of related work, unless noted otherwise.

A. Samples:

1. The Contractor shall submit a 100 lb representative sample of the proposed off-site fill.

2. Submit a 12 inch square sample of geotextile (filter fabric).

3. Submit a 12-inch long sample of perforated PVC pipe.

4. The Contractor shall submit a 12 inch by 12 inch sample of the vertical drainage mat.

B. Test Reports:

1. Submit the test reports for each fill material from each source for review and approval. Test reports shall include the results of the following tests:

   a. Soil classification in accordance with ASTM D 2487
   b. Moisture content in accordance with ASTM D 2216
   c. Moisture and Density Relationship in accordance with ASTM D 1557.
   d. Particle Size Analysis in accordance with ASTM D 422 (sieve only)

2. Submit the results of one TAL/TCL +30 test for each 500 cubic yards of soil to be imported.

3. For quarried materials, submit the results of one discreet TAL/TCL +30 test, taken within the last year.

C. Submit the name of each material supplier and specific type and source of each material. Any change in source or soil type during the job requires approval of the Authority and the Design Consultant.

D. Certification:

1. Imported off-site fill shall be free of all hazardous substances as listed by the New Jersey Department of Environmental Protection in New Jersey Administrative Code, Title 7; Chapter 1E, Appendix A. The Contractor shall submit certification of compliance with the criteria and test results substantiating compliance to the Authority not less than 3 weeks prior to its intended use.

E. Catalog Cuts:

1. Submit catalog cuts and manufacturer's literature for the equipment to be used for earthwork (compaction, proofrolling, etc) and dewatering.

F. Shop Drawings:

1. The contractor shall submit drawings and calculations for his proposed temporary excavation support system and dewatering system. Submittal shall be prepared, signed and sealed by a professional engineer licensed in the State of New Jersey.

2. The contractor shall submit a shop drawing showing the layout, slopes and details of the perimeter foundation drainage system and underslab drainage system.

G. Disposal Facility

1. The contractor will submit the name and location of the proposed disposal facility. All licenses, insurance, and authority to accept materials shall also be provided to Authority for approval.

2. The Design Consultant shall provide any required waste classification laboratory testing for any materials excavated to be removed from the site.

H. Precondition Survey and Protection Monitoring Plan

I.

1. Refer to section 3.11 for details regarding monitoring of adjacent structures, streets, and sidewalks.

2. Submit the results of the preconstruction conditions survey, protection and monitoring plan to the Authority and Design Consultant for review and approval.

3. During monitoring, survey control point results must be submitted to the Authority within 48 hours of the survey for review.

1.7 ENVIRONMENTAL CONSIDERATIONS

A. Install erosion control measures in the sequence shown on the Contract Drawings or as directed by the Design Consultant or regulatory agencies to protect adjacent properties and water resources from erosion and sediment damage.

B. Contractor shall read the environmental assessment reports and shall familiarize himself with the existing environmental conditions. Any required excavations, soil removal,

handling and dewatering shall be performed to take into account all environmental restrictions and/or requirements.

C. Materials to be disposed of shall be managed as "non-hazardous" I.D. 27 waste in accordance with state environmental regulations. The contractor's Health and Safety plan shall account for these conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill Materials:

1. On-Site Fill – Contractor may elect to use suitable on-site soils as backfill materials, except for beneath the foundations. On-site "fill" shall consist of those existing materials. Usable materials shall be free of wood, metal, organic, or other deleterious and hazardous materials, and shall meet the gradation requirements for structural fill given below. For on-site fill materials, the amount passing No.200 sieve may be increased to 25% by the inspecting engineer. The increase in fine soil particles will require additional effort to achieve the proper compaction. Contractor shall take measures to protect the existing soils against weather and moisture. Contractor shall process (screening, drying, mixing, etc) on-site soils for reuse as required.

2. Off-Site Fill - Off-site fill shall consist of inorganic soil free of wood, metal, organic and other deleterious and hazardous materials and shall meet the required gradation requirements given in the sections below and in accordance with NJDOT specifications. The fill material shall have a water content such that adequate compaction can be achieved.

3. Structural Fill – Approved on-site or off-site fill meeting the following gradation requirements:

Sieve Size	Percent Passing
2"	100
¾"	70 – 100
No. 4	30 – 80
No. 50	10 – 35
No. 200	5 – 15

4. Crushed Stone - Crushed Stone fill shall be clean, evenly graded, virgin, crushed stone or crushed or uncrushed gravel known in the industry as ¾-inch crushed stone meeting ASTM D448, coarse aggregate grading size 57 and requirements of AASHTO No.57 material specifications. Recycled concrete aggregate is not acceptable and shall not be utilized. When used as a Bedding and Drainage Fill layer, crushed stone shall be at least 6 inches thick or as per the contract drawings, whichever is more stringent.

B. Filter Fabric: The filter fabric to be placed around the perimeter drainage pipe or beneath the drainage fill shall be Mirafi 140 NL or equivalent.

C. Drainage Pipes: The drainage pipe for perimeter drainage system shall be perforated, 6-inch-diameter, schedule 40 PVC pipe. The drainage pipe for underslab drainage system shall be perforated, 4-inch-diameter, schedule 40 PVC pipe.

D. Drainage Mat: The vertical composite drainage mat shall be Miradrain 6000 or equivalent.

E. Vapor Barrier: The vapor barrier beneath the slab shall be plastic sheet having a thickness not less than 15 mil and shall conform to ASTM E 1745 Class A.

2.2 EQUIPMENT

A. Deliver off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

B. Proofrolling Compactor: Proofrolling vibratory compactor shall have a static drum weight of at least 7 tons. For cohesive soils use sheep's foot or padded surface compactors.

C. Compactor: A vibratory plate or a double drum walk behind roller having a static weight not less than 0.5 tons for areas where access or maneuverability is limited.

D. All equipment shall be in good working order.

PART 3 – EXECUTION

3.1 PROTECTION OF PUBLIC, EXISTING STRUCTURES AND STREETS

A. The work shall be executed so that no damage or injury will occur to the existing public, adjacent structures, streets, or utility lines. Should any damage or injury caused by the Contractor or anyone in Contractor's employ or by work under this Contract occur, the Contractor shall, at his own expense, repair such damage and shall assume all responsibility for such injury and damage. Perform work in accordance with OSHA regulations.

B. The site is within an urban area adjacent to an existing school building and busy public streets. Excavations and adjacent structures, foundations, streets shall be protected by means of adequate bracing, shoring and sloping at all times.

C. Protect surrounding trees, light poles, existing utilities, sidewalks, streets and structures.

3.2 GENERAL

A. The Contractor shall refer to the soil erosion and sediment control plans for staging of earthwork operations and for erosion control measures to be implemented prior to commencement of earthwork.

B. Locate and identify existing utilities that are to remain and protect them from damage.

Notify utility companies to allow removal and/or relocation of any utilities that are in conflict with the proposed improvements.

C. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed/relocated it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same at no additional cost to the Authority.

D. Remove from the site, material encountered in grading operations that, in opinion of the Authority, is unsuitable or undesirable for backfilling in subgrade or beneath foundation and slab areas.

E. Identify required lines, levels, contours and datum to bring site grades to the proposed subgrade conditions inferred from the drawings.

F. Do not allow or cause any of the work performed or installed to be covered by work of this section prior to all inspections, tests and approvals.

G. Excess on-site and unsuitable materials, as determined by the Authority, shall be removed and disposed of off-site legally at no cost to the Authority.

H. Suitable excavated material as directed by the Authority shall be stockpiled on site for later reuse. This material consists of materials which may be susceptible to increases in moisture. The Contractor shall maintain the optimum field moisture content of this material via implementing positive drainage and covering the stockpiles.

I. Graded areas outside the building area shall be excavated/filled to within 4 inches of final grades in landscaped areas and to within 0.1 foot of final subgrade within paved areas as shown on the plans.

J. Perform excavation using well-maintained equipment and methods acceptable to the Authority and governing agencies.

K. When performing grading operations during periods of prolonged wet or dry weather, provide adequate measures for surface drainage and ground water control, and moisture control of soils (i.e., wetting or drying by discing) so as to place and compact the soil within the moisture content range a few percentage points of its optimum water content. Any disturbed areas should be proofrolled at the end of each day.

L. Shoring, bracing, and fencing shall be installed in accordance with Federal OSHA requirements as well as the requirements of all state and local authorities having jurisdiction. Shoring and bracing shall also be performed in accordance with Section 02150 of this specification.

M. Protect persons and property from damage and discomfort caused by dust. Water as necessary to quell dust.

N. All underground installation of pipes, conduit, structures etc. in the area to be paved shall be completed prior to placement of any asphalt or concrete paving.

3.3 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill, without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust and to prevent moisture susceptible soils from becoming saturated, and therefore, unsuitable for reuse. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.4 FOUNDATION AND SLAB SUBGRADE PREPARATION

Subgrade preparation for all building foundations (spread footings, combined and continuous footings etc), and slabs of buildings and site improvement (retaining walls, stormwater structure, roadways) shall be accomplished as follows or as directed by the Authority:

A. General (for foundations, slabs and site improvement structures)

1. The building area shall include the building footprint plus a minimum of 5 feet beyond the building limits or as defined in the Contract Documents, whichever is more stringent.

2. Perform all excavations with appropriate safe slopes, shoring, and/or bracing in accordance with Contract Documents and OSHA guidelines. Perform dewatering to maintain water levels below the excavation bases.

3. Protect adjacent structures and streets. Shore and brace where required.

4. In excavations where water is encountered and controlled, the lower part of the excavation shall be backfilled immediately with clean crushed stone. A layer of filter fabric such as Mirafi 140NL shall be placed on top of the crushed stone layer prior to placement of upper compacted structural fill or concrete.

5. All fill shall be placed in lifts and shall be compacted. The fill shall consist of granular materials meeting the requirements given in Part 2 of these specifications. Placement and compaction of fill shall be in accordance with the requirements of "Backfilling and Compaction" section given in Part 3.

6. Unsuitable soils are present below elevation 16.5. These unsuitable soils are encountered between el 7 and el 13 but typically between el 8 and el 12.

7. On-site soils contain a significant amount of silt, which are sensitive to moisture and are hard to work with when saturated. Protect the subgrades against the effects of weather and equipment. Appropriate surface drainage and protection methods such as trenching, positive sloping, and pumping should be implemented to maintain the subgrades in a dry and workable condition at all times. Subgrade shall be protected against moisture and frost prior to placing of bedding materials. Appropriate measures shall be taken to prevent disturbance of the subgrades.

8. Limits of Soil Excavation and Replacement: Approximate limits of unsuitable soils beneath the design elevations, is shown on drawing SI-101. In his bid, Contractor shall include improvement (excavation, removal and replacement with approved materials) of the unsuitable soils.

9. Replacement of Unsuitable Soils beneath Design Elevations: Soils unsuitable for foundation and slab bearing were identified beneath the proposed foundation levels. These unsuitable soils, where encountered, shall be removed to competent materials and replaced with approved materials in the presence of the Authority.

10. Upon completion of building pad preparation, the Contractor shall provide a sealed survey of the building pad elevation on a 50-foot grid to the Design Consultant and the Authority for approval.

B. Building Foundations

1. Foundations shall bear on approved competent materials, which can support an allowable bearing pressure of 1.5 tons per square foot (tsf). Foundations shall bear on competent natural soils or on approved compacted fill placed over competent natural soils. Existing fill, and unsuitable materials, where encountered, shall be removed to reach the suitable natural competent bearing subgrade.

2. Foundation subgrade preparation shall be accomplished in the presence of the Authority. Footing subgrades shall be inspected and approved by a qualified Geotechnical Engineer who shall verify the allowable bearing capacity of the subgrade.

3. Appropriate measures shall be taken to prevent disturbance of the natural subgrade. Once the bearing stratum is encountered, proof roll the subgrade to identify any soft, loose or unstable areas in accordance with the "Proofrolling" section of Part 3. Any areas which exhibit evidence of inadequate subgrade (i.e. pumping, rutting) shall be removed to competent material as described below.

4. In areas identified as containing unsuitable materials and those which exhibit evidence of inadequate subgrade, excavate and remove all unsuitable material within the influence zone of all foundations to competent natural bearing subgrades as determined by the Geotechnical Engineer. Backfill excavated area immediately with crushed stone in lifts not exceeding 24 inches in thickness and compacted with a vibratory compactor not less than 1 ton static weight. A layer of filter fabric such as Mirafi 140NL shall be placed on top of the crushed stone layer prior to placement of upper compacted structural fill or concrete.

5. Influence zone is defined as a 1 horizontal on 2 vertical theoretical line extending downwards from the edge of the footings, but shall not be wider than 20 x 20 feet.

6. If directed by the Geotechnical Engineer, the inspected and approved subgrades shall be protected by a thin protective concrete mat until the footings are cast.

C. Building Slab and Site Improvements

1. Slabs-on-grade of the building shall bear on competent natural soils, on improved natural soils or imported granular fill placed over improved ground. Subgrades shall be improved and shall be inspected by a qualified Geotechnical Engineer.

2. Proofroll the subgrade and identify soft, loose and unstable areas for slab bearing in

accordance with the "Proofrolling" section of Part 3. Any areas which exhibit evidence of inadequate subgrade (weaving, pumping etc), shall be removed and replaced at the direction of the Geotechnical Engineer at no cost to the Authority.

3. Improvement for Site Structures: Proofroll the subgrade for site improvements (roadway pavements, stormwater structures and retaining walls). If unsuitable soils are encountered at the base level, improve the subgrade as described herein. Over excavate the upper 2 feet of the unsuitable soils and replace with compacted granular structural fill.

4. Bedding Layer/Drainage Layer: Once all excavations, improvement, grading and proofrolling are completed, place the specified bedding and drainage layers (3/4 inch crushed stone) over the approved subgrade. Bedding/drainage layer shall conform to the requirements of Part 2 and Part 3. Bedding layer shall be at least 6 inches thick. Drainage layer shall be at least 9 inches thick.

3.5 PAVEMENT SUBGRADE PREPARATION

A. Pavements including parking and roadway subgrade preparation shall be accomplished as follows:

1. Pavement shall bear on improved existing fill, natural soil or imported granular fill. Subgrades shall be inspected by a qualified Geotechnical Engineer.

2. Cut site to design elevations. Proofroll the exposed subgrades that are to receive pavements in accordance with the requirements of the Proofrolling section given below.

3. Where needed, structural fill shall be placed in lifts over the proofrolled subgrade and shall be compacted. The fill materials gradation shall meet the requirements given in Part 2 of these specifications. Placement and compaction of fill shall be in accordance with the requirements given below in the Backfilling and Compaction section.

4. Protect the subgrades against the effects of weather and equipment. Appropriate surface drainage and protection methods such as trenching, sloping, and pumping should be implemented to maintain the subgrades in a dry and workable condition at all times.

3.6 EXCAVATION

1. The suitable materials excavated shall be separated during excavation. The Geotechnical Engineer shall determine which soils are unsuitable. This material shall be removed and disposed of off-site.

3.7 PROOFROLLING

1. The work shall consist of proofrolling all excavated subgrades for slabs and pavements. After completion of excavations and removal of unsuitable materials, proofroll the entire excavation base using a heavy vibratory roller. Maintain water level at least 2 ft below the subgrade during proofrolling.

2. Proofroll the subgrade with the specified 7-ton static drum weight vibratory roller. A minimum of 6 passes shall be carried out over excavated areas. Over-excavate areas which exhibit instability under the action of the vibratory roller. Replace with suitable fill material and compact per the criteria recommended below.

3. As ordered by the inspecting Geotechnical Engineer, any soils noted to be soft or loose as evidenced by significant weaving or movement during proofrolling shall be excavated to competent soil material prior to placement of any fill material.

4. The Contractor shall establish operating procedures whereby uniform coverage of an area is obtained and the number of passes of the compaction equipment can be readily determined.

3.8 BACKFILLING AND COMPACTION

A. Backfill excavations promptly.

B. Place and compact the fill as described below. Suitable on-site and imported off-site fill shall be placed and compacted as required within site improvement areas.

1. Fill placed between the existing subgrade and the base of the proposed structural elements (foundations, slabs, pavements etc) shall be placed in loose lifts not exceeding 12 inches in thickness and compacted with a minimum vibratory compactor not less than 1 ton static weight. Correspondingly thinner loose lifts should be used in areas where smaller compaction equipment must be utilized due to restricted access.

2. No fill shall be placed in standing water. Any seepage or ponding of water shall be pumped from the excavation prior to placement of fill. No fill shall be placed on frozen ground.

3. Each lift of fill placed for foundation, building slab and pavement support, shall be compacted to a minimum dry density equal to 95% of the maximum dry density as determined by ASTM D1557 (Modified Proctor Test). If the water content of the fill is such that proper compaction cannot be achieved, water shall be added or the soil dried in order to obtain a water content at which the required compaction can be achieved. Fill placed for landscaped area subgrade shall be compacted to 92% of the maximum dry density.

4. The Contractor shall establish operating procedures whereby uniform coverage of an area is achieved and the number of passes of the compaction equipment can be readily determined. At the completion of the day's work, the fill surface shall be sealed with the roller.

5. No frozen material shall be used as fill. If the fill material which has been compacted, tested and approved by the Authority becomes frozen, the Authority shall be notified and shall determine whether it can remain in place or shall be removed before additional fill can be placed.

6. During rainy weather, the contractor shall take measures to protect fill from becoming saturated. The Contractor shall not place or attempt to compact fill during rainy weather unless approved by the Authority. Any water collecting in fill areas shall be removed before further fill placement.

7. After fill work has been completed, the area shall be graded smooth to within 0.1 ft of the final subgrade elevations shown on the Contract Drawings and proofrolled with a minimum 6 passes of the 7 ton static weight drum vibratory roller.

3.9 DEWATERING

1. All pumping and dewatering shall be performed, continued and maintained as required for the completion of all work. Provide adequate pumps, wells or other equipment, appurtenances, power, drains, materials and labor necessary to do all the pumping and dewatering needed to keep the project site dry during the work.

2. Obtain necessary permit for discharging. The Contractor shall not convey water to privately owned properties.

3. The dewatering system or systems shall be installed and operated in such a manner as to avoid the movement of fines or loss of ground from below the bearing level and shall not influence the stability of surrounding areas.

4. The Contractor shall utilize gravel sumps and pumps as necessary to remove accumulated water in excavations (foundation, slab, utility, pit excavations, excavations for removal of unsuitable soils below the design elevations, etc) until such time that the subgrade is prepared, backfill is complete or work is completed.

5. Contractor shall supply all necessary labor and dewatering equipment including but not limited to pumps, crushed stone and drainage geotextile. Contractor shall be solely responsible for maintaining the site and the excavations dry, and in workable conditions at all times. Maintain water level at least 2 feet below foundation and slab subgrades, and below subgrades to be proofrolled and fill to be placed.

6. Water collected in fill areas will be removed by conventional sumps and pumps before any fill is placed.

7. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area at all times. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

8. No pipe, concrete or bedding shall be placed in water unless specific approval is obtained

from the Geotechnical Engineer.

9. Water removed from an excavation shall be disposed of in such a manner as to avoid interference with vehicular or pedestrian traffic and to prevent damage to adjacent property or construction. Water may be discharged directly into existing catch basins pending approval by the appropriate local Authority. Discharge directly into manholes or existing pipes will not be permitted unless approved by the appropriate local Authority. It shall be the Contractor's responsibility to discharge the water in such a manner that mud and silt are not discharged into the existing system, to remove from such facilities any mud, silt, and debris which has accumulated and to leave the drainage facility in a condition similar to that which existed prior to his operations.

3.10 SHORING AND BRACING

A. The proposed construction requires deep excavations adjacent to streets and properties. Excavations below the design levels will be required to remove and replace unsuitable soils. Contractor shall take into account the additional excavations below the design elevations in the design of the shoring and bracing.

B. Inspect site, examine existing conditions and make all necessary preparations for the safe and proper sequence of work. Properly guard and protect excavations so as to prevent them from becoming dangerous to person or property.

C. Properly slope sides of excavation or provide shoring, sheeting and bracing to prevent caving, erosion, or gullying of sides of excavations. Follow OSHA guidelines for excavation safety and slope stability.

D. Brace, shore and protect existing structures, streets, and utilities when excavations are made adjacent to the existing structures, streets, utilities or within a distance that they will be affected by the excavation.

E. Maintain sides and slope of excavation in safe condition until backfilling or other work is complete. Maintain shoring and bracing in place until completion of work.

F. Provide materials for work in good working order.

G. All shoring, bracing, sheet piling, etc. is to be removed upon completion of the work where they are installed, including any portion thereof, outside of street and lot lines. Within the lot, remove all wood and cut steel elements to a minimum of 4 feet below grade. Where they interfere with new work and utilities, remove in their entirety.

H. Install appropriate temporary excavation support systems as required. All sheeting, shoring and underpinning shall be designed by a professional engineer retained and paid for by the Contractor.

I. Establish vertical and lateral control points on adjacent structures, streets and sidewalks to monitor movements during construction. Points shall be monitored once a week by a licensed surveyor retained by the Contractor. Submit results to the Design Consultant for review and direction.

3.11 MONITORING OF ADJACENT STRUCTURES, STREETS AND SIDEWALKS

A. Adjacent structures, streets and utilities may be affected by construction operations. Prepare a protection and monitoring plan for adjacent structures. The plan shall be prepared by a professional engineer retained by the Contractor. Establish vertical and lateral control points to monitor movements of adjacent buildings, structures and streets during construction. Points shall be monitored once a week by a licensed surveyor. Submit results of the survey to the Design Consultant for review and direction.

B. Establish at least 6 control points on each surrounding structure and street or as determined by the inspecting Geotechnical Engineer.

C. Control points on the existing surrounding structures shall be surveyed once a week. Survey results shall be transmitted to the Authority within 48 hours of the survey for review. Construction work shall be halted if vertical or lateral deflections exceed the following limits.

	Consecutive	Cumulative
Lateral Movement	0.125 inch	0.25 inch
Vertical Movement	0.125 inch	0.25 inch

D. If movements exceed tolerable limits shown above or as determined by the Geotechnical Engineer, take all necessary measures to stop further movement. Take all measures to repair the damage. The contractor shall take all appropriate measures to maintain the deflections within the allowable limits.

E. Pre-Construction Conditions Survey: The contractor shall retain a qualified professional engineer to perform a preconstruction conditions survey of the structures within 50 ft of the site. The survey shall document conditions of the existing structures prior to construction work and shall be used as a reference document for potential claims. The survey shall include photographs, sketches and measurements. Crack monitoring gages shall be installed on existing structural cracks.

3.12 DRAINAGE MAT

A. Place vertical drainage mats specified in the contract drawings behind the foundation walls prior to backfilling. Installation shall be in accordance with the manufacturer's recommendations.

B. Protect the drainage mats during backfilling.

C. Connect the vertical drainage mats with the perimeter drainage pipe and/or the underslab drainage system.

3.13 PERIMETER DRAINAGE PIPE

A. A perimeter drainage pipe shall be installed behind the below–grade walls as indicated on the Contract drawings. The contractor shall prepare a shop drawing showing the layout, slopes and details of the drainage pipe for review by the Geotechnical Engineer.

B. The perimeter drainage system shall consist of 6-inch diameter, schedule 40, perforated PVC pipes embedded in an 18- inch thick ¾-inch clean crushed stone layer.

C. A layer of filter fabric such as Mirafi 140NL shall be wrapped around the crushed stone layer. Recycled concrete aggregate shall not be used as drainage course.

3.14 UNDERSLAB DRAINAGE SYSTEM

A. An underslab drainage system shall be installed beneath the slabs at or below el 16.5.

B. Contractor shall prepare a drawing showing the details of the underslab drainage system for review and approval.

C. The underslab drainage system shall consist of perforated PVC pipes embedded in a drainage fill layer and connected to a discharge system. The materials shall be in accordance with Part 2.

D. The pipes shall be 4-inch diameter perforated PVC pipes. The pipes shall be spaced in a grid pattern no greater than 30 ft apart and shall be connected to a discharge system.

E. The drainage fill layer shall consist of ¾ inch clean crushed stone. The thickness of drainage fill shall be 6 inches and the crushed stone layer shall be increased to 12 inches at the pipe locations. Cleanouts shall be provided to allow for future maintenance. A geotextile fabric such as Mirafi 140NL shall be placed beneath the crushed stone layer.

3.15 FIELD QUALITY CONTROL

A. Authority's Responsibilities:

1. The Authority shall hire a qualified Geotechnical Engineer to inspect the earthwork (excavation, subgrade preparation, backfilling, compaction, shoring, perimeter drainage).

2. The Geotechnical Engineer shall inspect and approve subgrades for foundations and slabs. The inspecting Geotechnical Engineer shall verify allowable bearing pressures for foundations. In-place density testing is required for structural fills placed beneath the foundations.

3. The Geotechnical Engineer shall also inspect placement of backfill, compaction, subgrade and subgrade preparation. The Geotechnical Engineer shall perform field in-place density tests where required, using a nuclear densometer in accordance with ASTM D 2922.

4. When tests results indicate that subgrades, fills, or backfills are below specified density, recompact and retest until the required density is obtained. If the required density is unachievable due to a lack or excess of moisture, scarify and

moisten or aerate, or remove and replace soil to the depth required, recompact and retest until the required density is obtained.

B. Contractor's Responsibilities:

1. Contractor shall retain a professional engineer who shall design and inspect dewatering and excavation support.

2. Contractor shall retain a licensed surveyor who shall install and monitor lateral and vertical control points, where required.

3. Contractor shall be also responsible for retaining qualified professional engineers, certified testing agencies and licensed surveyors to perform inspections not covered by the Authority.

3.16 PROTECTION

A. Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to depth directed by the Design Consultant; reshape and recompact at appropriate moisture content to the required degree of compaction.

C. Where settling occurs during the project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration.

END OF SECTION 02200

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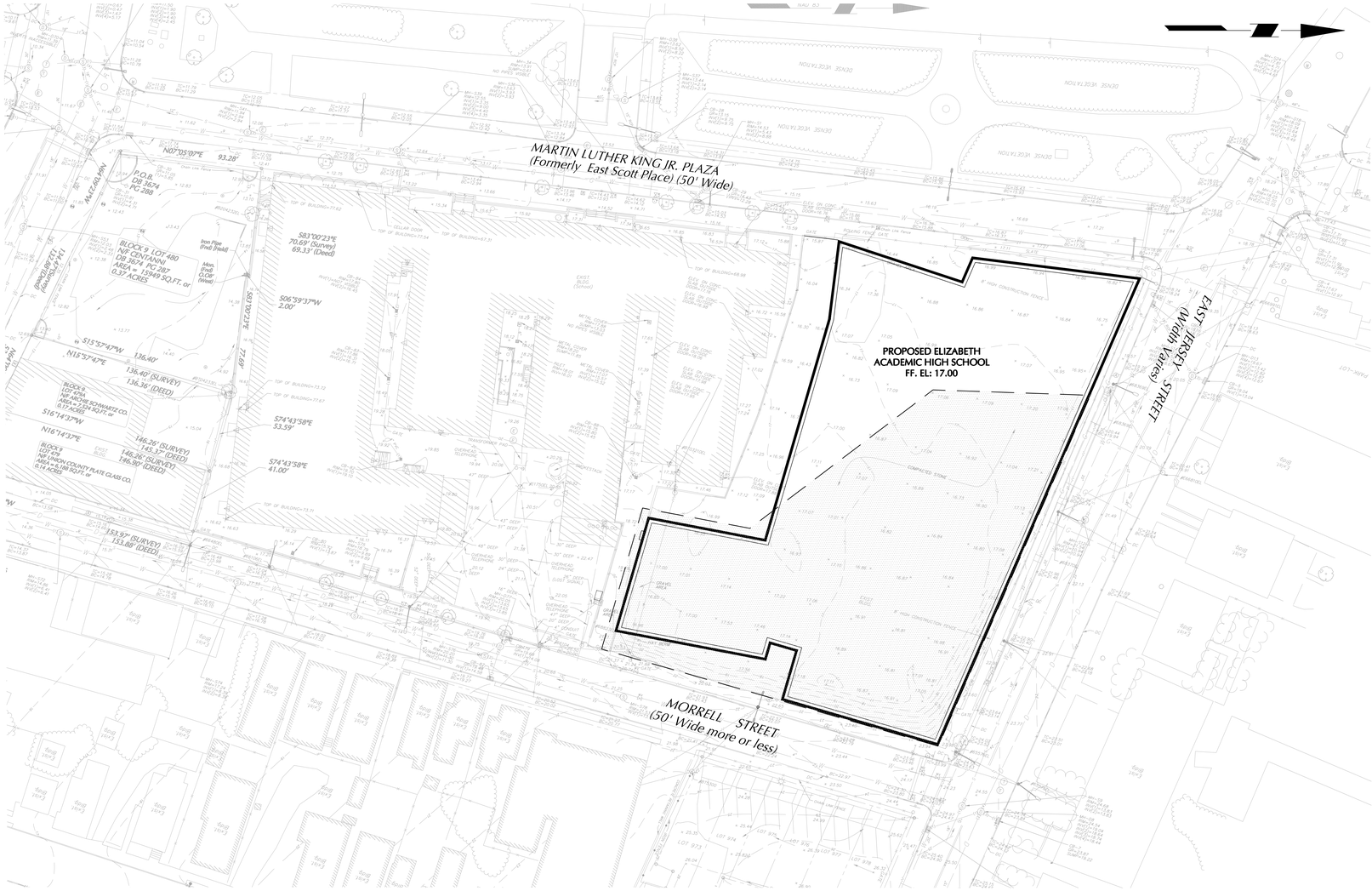
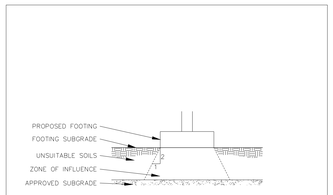
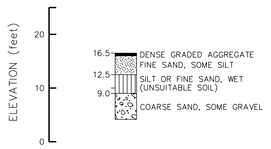


GENERAL NOTES

1. REPLACEMENT OF UNSUITABLE SOILS BENEATH DESIGN ELEVATIONS: SOILS UNSUITABLE FOR FOUNDATION AND SLAB BEARING WERE IDENTIFIED BENEATH THE PROPOSED FOUNDATION LEVELS. THESE UNSUITABLE SOILS, WHERE ENCOUNTERED, SHALL BE REMOVED TO COMPETENT MATERIALS AND REPLACED WITH APPROVED MATERIALS. EXCAVATED UNSUITABLE SOILS SHALL BE REMOVED FROM THE SITE.
2.
3. APPROPRIATE MEASURES SHALL BE TAKEN TO PREVENT DISTURBANCE OF THE SUBGRADE. ONCE THE BEARING STRATUM IS ENCOUNTERED, PROOF ROLL THE SUBGRADE TO IDENTIFY ANY SOFT, LOOSE OR UNSTABLE AREAS IN ACCORDANCE WITH THE "PROOFROLLING" SECTION OF PART 3 OF THE SPECIFICATIONS. ANY AREAS WHICH EXHIBIT EVIDENCE OF POOR SUBGRADE (I.E. PUMPING, RUTTING) SHALL BE REMOVED TO COMPETENT MATERIAL AS DESCRIBED BELOW.
4. WITHIN AREAS CONTAINING UNSUITABLE MATERIALS AND THOSE WHICH EXHIBIT EVIDENCE OF POOR SUBGRADE, EXCAVATE AND REMOVE ALL UNSUITABLE MATERIAL WITHIN THE INFLUENCE ZONE OF ALL FOUNDATIONS TO COMPETENT NATURAL BEARING SUBGRADES AS DETERMINED BY THE GEOTECHNICAL ENGINEER. BACKFILL EXCAVATED AREA IMMEDIATELY WITH CRUSHED STONE IN LIFTS NOT TO EXCEED 24 INCHES IN THICKNESS AND COMPACTED WITH A VIBRATORY COMPACTOR NOT LESS THAN 1 TON STATIC WEIGHT. A LAYER OF FILTER FABRIC SUCH AS MIRAFI 140NL SHALL BE PLACED ON TOP OF THE CRUSHED STONE LAYER PRIOR TO PLACEMENT OF UPPER COMPACTED STRUCTURAL FILL OR CONCRETE. APPROXIMATE LOCATION OF UNSUITABLE SOIL AND INFLUENCE ZONE SHOWN BELOW.
5. IN SLAB AREAS, PROOFROLL THE SUBGRADE AND IDENTIFY SOFT, LOOSE AND UNSTABLE AREAS FOR SLAB BEARING IN ACCORDANCE WITH THE "PROOFROLLING" SECTION OF PART 3 OF THE SPECIFICATIONS. ANY AREAS WHICH EXHIBIT EVIDENCE OF POOR SUBGRADE (WEAVING, PUMPING ETC), SHALL BE REMOVED AND REPLACED AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER.
6. PERFORM ALL WORK IN ACCORDANCE WITH OSHA REGULATIONS, BUILDING CODE, AND CONTRACT DOCUMENTS. IN CASE OF CONFLICT THE MOST STRINGENT SHALL APPLY.
7. ALL WORK MUST BE DONE IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER RETAINED BY OWNER.
8. INSTALL ADEQUATE SHORING, SLOPING OR BENCHING AND PERFORM ADEQUATE DEWATERING WHERE REQUIRED.
9. INFLUENCE ZONE IS DEFINED AS A 1 HORIZONTAL ON 2 VERTICAL THEORETICAL LINE EXTENDING DOWNWARDS FROM THE EDGE OF THE FOOTINGS, BUT SHALL NOT BE WIDER THAN 20 X 20 FEET.



TYPICAL FOUNDATION



TYPICAL SUBSURFACE PROFILE

SCALES: HORIZONTAL 1 INCH = 10 FEET
VERTICAL 1 INCH = 10 FEET

LEGEND

APPROXIMATE AREA OF UNSUITABLE SOILS ENCOUNTERED BETWEEN APPROXIMATELY EL. 13 AND EL. 7

30 0 15 30
SCALE IN FEET

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North

Seal

Key Plan

No.	Date	Issue
2	AUG 28, 2012	ADDENDUM #2

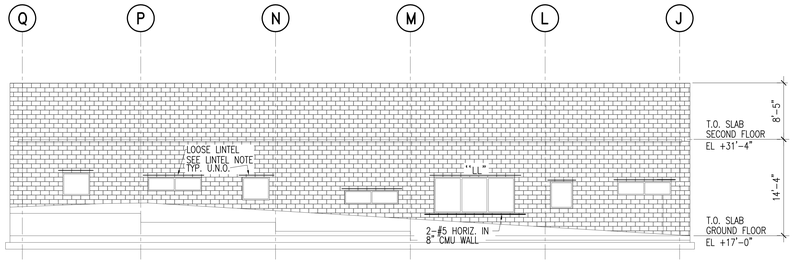
Sheet Name:

EXISTING CONDITIONS AND FOUNDATION PREPARATION PLAN

Date: 8/28/2012
Scale: 1" = 30'
SOM Job No.: 209065
File name:

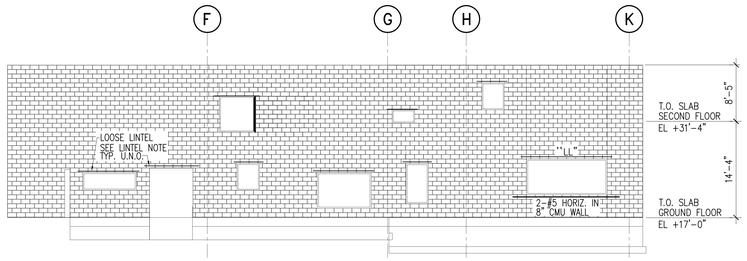
Sheet No.: SI-101

Filename: \\langan.com\data\EP\data3\109206368\Cadd Data - 109206368\SheetFiles\109206368-SI-101-01.dwg Date: 8/28/2012 Time: 13:05 User: drooney Style Table: Langan.stb Layout: E Size Sheet (SOM)



EAST ENTRANCE ELEVATION–EAST

SCALE: 1/8" = 1'–0"

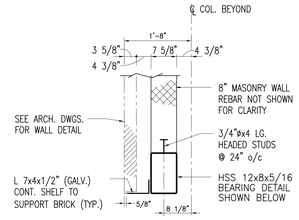


WEST ENTRANCE ELEVATION

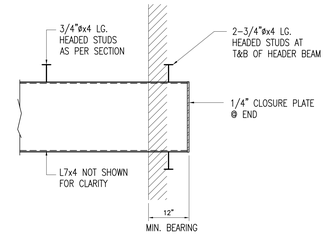
SCALE: 1/8" = 1'–0"

"LL" INDICATES HSS12x8x5/16" LOOSE LINTEL
SEE TYPICAL DETAIL ON DWG. S–106B

SEE DWG. S–110B FOR LOOSE LINTEL NOTE



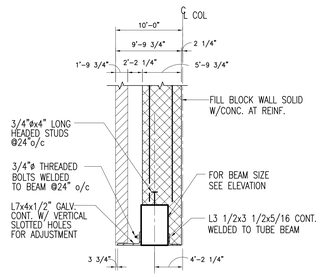
SECTION AT SPAN



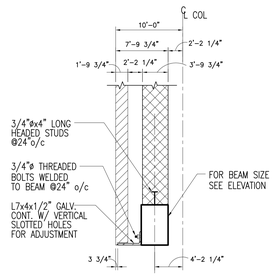
NOTE: PROVIDE 2#5 VERTICAL REBAR FULL HEIGHT
INTO WALL AT EACH BEARING END
FILL VOIDS SOLID WITH CONCRETE

DETAIL AT END

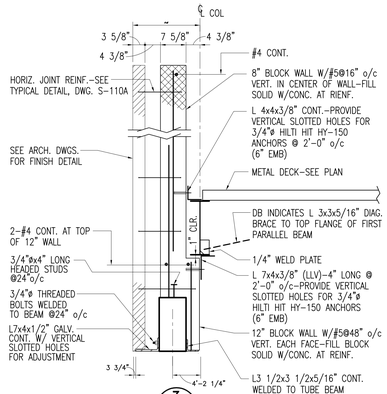
HEADER DETAIL FOR 12'–0" M.O.



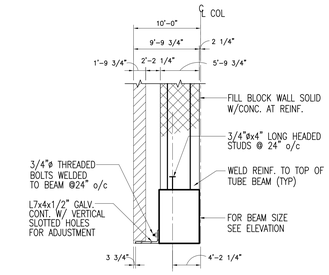
1 S106B @ 12" CMU WALL



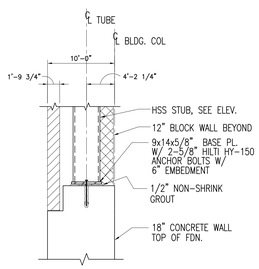
2 S106B @ 8" CMU WALL



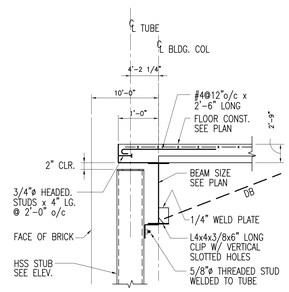
3 S106B



4 S106B

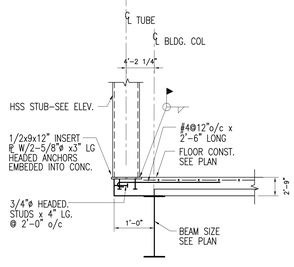


DETAIL 'A'

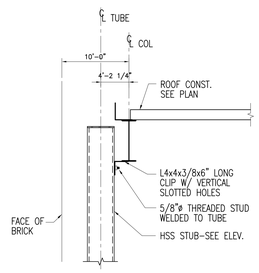


DB INDICATES L 3x3x1/4" DIAGONAL BRACE
TO TOP FLANGE OF FIRST PARALLEL BEAM

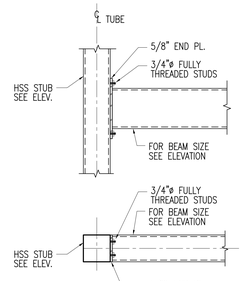
DETAIL 'B'



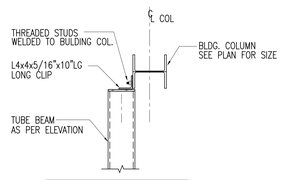
DETAIL 'C'



DETAIL 'D'



DETAIL 'E'



CONNECTION AT BUILDING COLUMN

DETAIL 'F'

M. JEFF LING N.J.P.E. # 31744

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CONSULTING ENGINEERS COLLABORATIVE, INC.
730 BOULEVARD KENILWORTH, NJ 07033
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Seal

Key Plan

No.	Date	Issue
1	JULY 13, 12	ISSUED FOR BID

Sheet Name:

WALL ELEVATION SECTIONS AND DETAILS

Date:
Scale:
SOM Job No.: 209065
File name:
Sheet No.: S-106B

CEC 09019

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7 November 2011

Mr. Carl Valenti
New Jersey Schools Development Authority
1 West State Street
P.O. Box 991
Trenton, NJ 08625-0991

Re: Summary of Supplemental Geotechnical Investigation
Academic High School
Elizabeth, New Jersey
Langan Project No. 9206368
NJSDA Task Order No.17.3

Dear Mr. Valenti:

This letter report presents the results of a supplemental geotechnical investigation for the Academic High School project in Elizabeth, New Jersey. The objective of this investigation is: (a) to confirm current site-wide geotechnical and environmental[1] conditions and (b) to prepare bid documents in support of obtaining bids to prepare the site for construction.

GEOTECHNICAL PROJECT SETTING

The Academic High School project will be built on a parcel of land west of Morrell Street in the city of Elizabeth, N.J. The property at block 9, Lot 433, is immediately north of the existing Thomas Jefferson High School and is bound by East Jersey Street to the north, Martin Luther King Jr. Plaza to the west and Morrell Street to the east. This property was formerly occupied by religious, residential and commercial structures that have been demolished. Currently, the property is a vacant field being used as supplemental parking for the adjacent high school. The

[1] A supplemental environmental investigation was performed in conjunction with this report; findings are recounted in a separate document.

site is relatively flat with elevations varying between about elevation (el) 25 and el 17, sloping downward from east to west.

The latest contract drawings dated August 2010 indicate that the proposed building will be L-shaped, two to four- stories, with a footprint of about 60,000 square feet. The majority of the lowest floor slab will be approximately at el 17 (up to 8 ft below current grades). However, the northeast part (auxiliary gymnasium) and northwest part (auditorium) of the lowest floor will be at el 16.8 and el 15.8, respectively.

The proposed lowest floor will require up to 8-foot-deep excavations, and the proposed foundations will require additionally 3 to 4-foot-deep excavations below the lowest floor.

REGULATORY PROJECT BACKGROUND

The design for the Academic High School was completed and permitted for construction in the early 2000s, and the project was put on hold in 2005. Langan previously prepared a geotechnical engineering report dated 16 August 2005 and a geotechnical design review in 2009. Since then, the site conditions and building design have changed slightly.

This investigation was performed to confirm previous investigation findings and investigate areas that were previously inaccessible. This scope of the supplemental investigation was determined in collaboration with the NJSDA and was tailored to provide supplemental information regarding the following issues:

1. Confirm groundwater levels.
2. Investigate groundwater "recharge" rates.
3. Confirm soil conditions at the proposed slab elevation.
4. Investigate soft soil conditions encountered during previous investigations.
5. Investigate the presence of demolition debris and foundations of former structures.
6. Perform laboratory tests on site soils to generate data for use during construction.

The following sections provide a brief description of the supplemental investigation and its findings, and our foundation recommendations.

SUPLEMENTAL INVESTIGATION

The supplemental investigation was performed on October 5, 6, and 17, 2011, under full-time supervision of a representative of Langan Engineering. The investigation consisted of excavating 17 test pits, advancing five direct-push Geoprobe™ borings, and installing one temporary monitoring well. Locations of the work performed are shown in Figure 1, and logs of the test pits and borings are provided in Appendices A and B, respectively.

The test pits, identified as LTP-1 through LTP-17, were excavated by Cesario Construction Co. Test pits extended about 6 to 17 feet below existing grades using a rubber-tire backhoe.

Geoprobe™ borings identified as LGP-1 through LGP-5 were advanced by Summit Drilling, Inc. A temporary monitoring well was installed in boring location LGP-1.

INVESTIGATION RESULTS

Groundwater

Water was encountered in the test pits, as shown in the table below, ranging from el 4 to el 10.5. Comparatively, groundwater elevations from the 2005 geotechnical investigation range between el 6.5 and el 14.5. This October 2011 work was performed after a rainy month of September. Seasonal groundwater fluctuations, up to 4 feet, can be expected. A summary of the current findings is presented below. See Table 2 for all groundwater measurements.

Summary of 2011 Groundwater Measurements			
Test Pit	**Date**	**Depth (ft)**	**Elevation (ft)**
LTP-2	10/17/11	12.5	6.5
LTP-3	10/5/11	13.2	5.8
LTP-4	10/17/11	14.0	7.0
LTP-5	10/5/11	11.5	10.5
LTP-6	10/5/11	11.7	9.3
LTP-9	10/6/11	NE	below 5
LTP-10	10/17/11	14.0	5.5
LTP-11	10/6/11	NE	below 8
LTP-12	10/6/11	16.0	6.5
LTP-13	10/6/11	15.0	8.0
LTP-14	10/17/11	NE	below 8.5

Furthermore, perched water conditions may exist within the fill and also within the more impermeable (silty) soil stratum on site. Significant water seepage was observed within thicker

natural sandy soils, which were underlain by more impermeable silty and clayey soils in test pits LTP-4 and LTP-5.

Groundwater Recharge

A "draw-down" test was performed to estimate the rate of groundwater recharge (i.e., groundwater flow into an excavation). Water was pumped out of test pit LTP-3 and bailed out of a temporary monitoring well at LGP-1. The rate at which the water level returned to its initial level was measured.

In LTP-3, groundwater required 1.75 hours to recover 1 foot of water (0.57 ft/hour), and groundwater in LGP-1 required 2.5 hours to recover 1 foot of water (0.4 ft/hour). The details of the recharge measurements are provided in Table 3.

Please note that these test results are approximations and should be used accordingly. If this information is used in the context of construction dewatering, then the contactor's professional engineer should advise accordingly. The infiltration rates depend on the actual groundwater conditions, subsurface conditions that vary across the site, and seasons.

Soil Conditions at the Proposed Slab Level

Soil conditions at the proposed slab level consist of natural soils (sands and silts) and areas with miscellaneous fill and debris. Natural soils encountered in the test pits contained fine soil particles (i.e. silt and clay) that are known to be sensitive to moisture. These soils can prove difficult to work or compact in wet weather. Silt is also prone to erode on slopes during heavy rainfall.

Test pits that were excavated within the footprints of former buildings encountered miscellaneous fill at the proposed lowest floor at el 17. The fill at these areas typically consisted of demolition debris (concrete fragments, granite blocks, cinders, wood, etc.). These materials are unsuitable for construction, and must be removed prior to construction of foundations.

Soft/Loose Soils Below the Proposed Foundations

Some of the borings and test pits from previous investigations identified soft or loose natural soils below the anticipated lowest floor slab and foundation levels. These areas consisted predominantly of silt with high water content (approximately 30%), such as were found at boring NB-9, test pits TP-1 and TP-3 through TP-5.

During this investigation, the test pit LTP-11 and geoprobe borings LGP-2 through LGP-5 encountered layers of highly saturated soft silt within the natural strata, often above the

observed groundwater levels. This highly saturated silt is too soft to support the building foundations and must be removed from the area beneath the proposed foundations.

Demolition Debris and Buried Elements

Historical Sanborn maps included in the 2005 geotechnical report show that numerous structures existed on the site from as early as 1889. Test pits were dug within the footprints of these demolished structures to determine whether buried elements such as foundations, demolition debris, and slabs exist.

It was confirmed that all former buildings, with the exception of the former building footprint around LTP-5, contain various amounts of demolition debris. Buried foundation walls (stone or brick) were encountered in test pits LTP- 6, LTP-9, LTP-10, LTP-13, and LTP-15. No slab sections were identified during the investigation, but slab remnants may still exist in unexplored areas. The fill thickness within the former building locations ranged from 4 to 9 feet, but may be thicker in certain areas.

Environmental issues associated with the fill are addressed in the supplemental environmental investigation. Test pit logs can be found in Appendix A.

Supplemental Laboratory Tests:

Four soil samples were collected to obtain various geotechnical parameters. Some of these soils may be reused during construction work. The geotechnical laboratory analyzed water content determinations, particle-size distribution tests and modified Proctor compaction tests. The soil samples were taken from depths ranging from 10 to 15.5 feet below existing grade or elevations ranging from about el 4.5 to el 16. Predominantly sandy soil samples were collected in test pits LTP-3 and LTP-5 and predominantly silty soil samples were collected in test pits LTP-2 and LTP-11. The findings are summarized below and detailed laboratory test results are provided in Appendix C.

Location	Depth (ft)	Water Content (%)	Fines passing no. 200 sieve (%)	Maximum dry density (pcf)	Optimum Water Content (%)
TP-2	12	15.6	44.7	129.8	10.5
TP-3	15.5	23	17.2	-	-
TP-5	10	15.2	10.2	127.8	11.1
TP-11	12	20.2	89.5	114.5	14.0

The on-site sandy soils appear to meet structural fill requirements. The more silty on-site soils, can be reused as structural fill if they are mixed with dry granular materials to meet the structural fill gradation requirements. However, the silt sample collected in LTP-11, is unsuitable for reuse as structural fill unless significant measures, (such as drying or mixing), time and effort are spent to bring the material into a compactable state. This silt material can be used in landscape areas, if any, outside of the building footprint.

SUPPLEMENTAL CONCLUSIONS

The foundation recommendations provided in the 16 August 2005 geotechnical engineering report remain the same. For convenience, we repeat here a few key items recommendations from the 2005 report and provide supplemental conclusions from the current investigation.

1. Groundwater elevations vary throughout the site and fluctuate drastically with the seasons. We recommend the installation of an under slab drainage system beneath floor slabs that are lower than el 16.5. This differs from the recommendations given in the 2005 geotechnical engineering report, where el 17 was the recommended threshold. As previously stated, the drainage system should consist of perforated PVC pipes embedded in a crushed stone drainage media and connected to a discharge system.

2. Many test pits extended into the natural soils below the proposed foundation elevations. All of these disturbed soils within the proposed foundation footprints should be excavated and replaced with compacted fill. Additionally, natural soft and loose soils which are encountered below the proposed foundations should be removed and replaced with compacted structural fill. Fill placement and compaction should be performed in accordance with the "Backfilling and Compaction" section of the 2005 geotechnical engineering report.

3. The groundwater recharge rates observed during this investigation suggest that the groundwater can be controlled by conventional dewatering methods during foundation construction. Sump pumps placed in gravel pits can be utilized to control the groundwater and perched water encountered at the site. Deeper excavations, such as those required to remove and replace soft or loose soils, may require more extensive dewatering efforts.

4. Site soils are sensitive to moisture. Preventive measures such as positive sloping, trenching, and pumping should be taken to maintain a dry, stable site which remains workable. The initial mass excavation will create a depressed area which will collect surficial water and soften the exposed subgrade. We

recommend positive sloping of the excavated subgrade and installation and operation of sump pumps throughout the proposed building footprint between phases of construction. This will help prevent surface ponding and excessive saturation of the proposed subgrades and will allow exposed surfaces dry quicker. Furthermore, it is essential that the construction start immediately after the mass-excavation of the basement area to reduce the time of exposure.

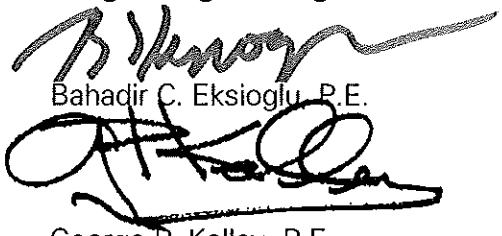
5. Historic structures once occupied the site. Remnants of the demolished structures and unsuitable demolition debris were encountered within their former footprints. All fill and debris must be removed and backfilled with structural fill in accordance with the "Backfilling and Compaction" section of the 2005 geotechnical engineering report.

6. Some on-site natural soils can be utilized as structural fill provided they meet gradation requirements. As per the 2005 geotechnical report, all structural fill (imported or on-site) should consist of clean, well-graded granular soils having no more than 15% by weight passing the No. 200 sieve and a maximum particle size no greater than 4 inches. The on-site sandy soils collected in LTP-5 appear to meet these requirements. The more silty on-site soils may be reused as structural fill if proper measures (drying, mixing with dry granular materials) are taken.

7. The recommendations given in the 16 August 2005 report and 20 May 2009 memorandum are still valid and should be implemented in conjunction with this memorandum. In case of conflict, the most stringent criteria shall apply.

Very truly yours,

Langan Engineering & Environmental Services, Inc.



Bahadir C. Eksioglu, P.E.

George P. Kelley, P.E.
Chairman

cc: M. Connors, D. Rooney - (Langan)

LIST OF ATTACHMENTS

Figures:

1. **Boring and Test Pit Location Plan**

Tables:

1. **Summary of Site Investigation Activities**
2. **Summary of Groundwater Measurements**
3. **Summary of Drawn-Down Groundwater Measurements**

Appendices:

A. **Logs of Test Pits**
B. **Logs of Geoprobe Borings**
C. **Results of Geotechnical Laboratory Tests**

FIGURE 1

BORING AND TEST PIT LOCATION PLAN

MARTIN LUTHER KING JR. PLAZA
(Formerly East Scott Place)

NAD 83

1,000-GALLON UST

EXISTING SCHOOL BUILDING

LIMITS OF PROPOSED SCHOOL BUILDING
(4-STORY BUILDING, LOWEST FLOOR F.F.EL. 15.8 TO 17)

EAST JERSEY STREET

MORRELL STREET

LTP-1 6' N/D
LTP-2 7' el 12
LTP-3 4' el 15
LTP-4 1' el 20
LTP-5 1' el 21
LTP-6 11" el 10
LTP-7A 5' N/D
LTP-7B 6' N/D
LTP-7C 9' el 13
LTP-8 2' el 19
LTP-9 4' el 18
LTP-10 4' el 15.5
LTP-11 6' el 17
LTP-12 3' el 19.5
LTP-13 7' el 16
LTP-14 1' el 22.5
LTP-15 4' el 20
LTP-16 6' N/D
LTP-17 3.5' el 18.5

LGP-1 1' el 20.5
LGP-2 2' el 19
LGP-3 2.5' el 20
LGP-4 3' el 17.5
LGP-5 1.5' el 20

TP-1 0.5' el 21
TP-2 4' N/D
TP-3 2' el 21.5
TP-4 1' el 23
TP-5 0.5' el 22.5

B1 4.5' el 13
B1(OW) 2.5' el 17
B2 3' el 18.5
B3(OW) 2' el 22
B4 3' el 20
B5 3.5' el 18.5
B6 1.5' el 21.5
B7 2.5' el 24
B8 5' el 20

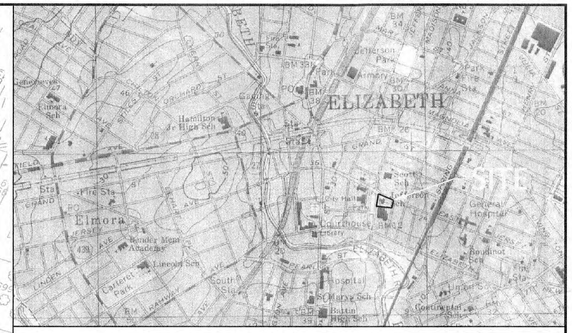
NB-1 2' el 19
NB-2 2' el 20
NB-3 (OW) 2' el 20.5
NB-4 4' el 18.5
NB-5 10' el 10.5
NB-6 6.5' el 13
NB-7 6' el 12.5
NB-8 7' el 13
NB-9 2.5' el 20
NB-10 7' el 17
NB-11 2' el 21.5
NB-12 4' el 19.5
NB-13 5' el 19
NB-14 2' el 21.5
NB-15 6' el 16
NB-16 6' el 16
NB-17 (OW) 2' el 19
NB-18 6' el 15

TMW1
TMW2

DISTURBED SOILS BACKFILLED LOOSELY DURING TEST PIT EXCAVATIONS SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL IF THEY ARE BENEATH PROPOSED FOUNDATIONS. TYPICAL FOR ALL TEST PITS.

AREAS WHERE SOFT OR LOOSE SOILS ARE IDENTIFIED INCLUDE BUT NOT LIMITED TO NB-9, TP-1,TP-3, TP-4, TP-5 AND LTP- 11. THESE SOFT/LOOSE SOILS SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL IF THEY ARE BENEATH THE PROPOSED FOUNDATIONS (TYP).

SITE BENCH MARK NO.2
LANGAN CONTROL POINT NO.103
P.K.NAIL SET IN SIDEWALK
N=666485.315
E=572635.528
EL=21.28



SITE LOCATION MAP
NTS

LEGEND

- B5 — BORINGS DRILLED IN 2003
- NB-8 — BORINGS DRILLED IN 2005
- TMW1 — ENVIRONMENTAL PROBES PERFORMED IN 2003 (USED FOR GROUNDWATER MONITORING)
- LGP-1 — GEOPROBE BORINGS DRILLED IN 2011
- TP-2 — TEST PITS EXCAVATED IN 2003
- LTP-1 — TEST PITS EXCAVATED IN 2011 (LTP-1 THUR LTP-17)
- (OW) — GROUNDWATER OBSERVATION WELL
- APPROXIMATE LIMITS OF FORMER BUILDINGS FROM SANBORN MAPS 1889-1980
- LIMITS OF EXISTING BUILDINGS
- LIMITS OF PROPOSED SCHOOL BUILDING
- [6' el 15] THICKNESS OF FILL IN FEET / TOP OF NATURAL SOILS ELEVATION
- N/D — NOT DETERMINED
- AREAS WHERE SOFT OR LOOSE SOILS AT OR BELOW FOUNDATION LEVELS WERE ENCOUNTERED DURING INVESTIGATIONS. SOFT MATERIALS MAY ALSO EXIST IN OTHER AREAS.

NOTES

1. BASE PLAN WAS TAKEN FROM THE DRAWING ENTITLED "SITE PLAN No. C-1.01" PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, INC. (LANGAN) THE BASE SURVEY DOES NOT REFLECT CURRENT CONDITIONS. SITE CONDITIONS HAVE CHANGED SINCE THEN.
2. PREVIOUS BORINGS B1 THROUGH B8 WERE DRILLED BY CMI SUBSURFACE INVESTIGATIONS INC. BETWEEN 28 AND 30 MAY 2003 UNDER FULL-TIME INSPECTION OF LANGAN.
3. TP-1 THROUGH TP-5 WERE EXCAVATED BY MIKE'S EXTERIOR CONTRACTING CORP. ON 26 NOVEMBER 2003 UNDER FULL-TIME INSPECTION OF LANGAN. TWO GROUNDWATER OBSERVATION WELLS WERE INSTALLED IN BOREHOLES B1 AND B3 BY CMI AT DRILLING COMPLETION.
4. ENVIRONMENTAL PROBES TMW1 AND TMW2 WERE PERFORMED ON 12 JUNE 2003, AND WERE ALSO USED FOR GROUNDWATER MONITORING.
5. BORINGS NB-1 THROUGH NB-14 WERE DRILLED BY CRAIG TEST BORING CO. INC, (CRAIG) BETWEEN 9 AND 13 JUNE 2005 UNDER FULL-TIME INSPECTION OF LANGAN. TWO GROUNDWATER OBSERVATION WELLS WERE INSTALLED IN BOREHOLES NB-3 AND NB-17 BY CRAIG UPON COMPLETION.
6. TEST PITS LTP-1 THROUGH LTP-17 WERE EXCAVATED ON 5, 6, and 17 OCTOBER 2011 BY CESARIO CONSTRUCTION CORP UNDER THE FULL-TIME INSPECTION OF LANGAN.
7. GEOPROBES LGP-1 THROUGH LGP-5 WERE PUSHED ON 17 OCTOBER 2011 BY SUMMIT BORINGS, INC. UNDER THE FULL TIME INSPECTION OF LANGAN.
8. ELEVATIONS ARE APPROXIMATE AND REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88).
9. LOCATIONS OF BUILDING BORINGS, WELLS, AND TEST PITS AND DIMENSIONS ARE APPROXIMATE.
10. SOFT AND LOOSE SOILS WERE IDENTIFIED DURING INVESTIGATIONS. THESE SOILS SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL IF THEY ARE BENEATH PROPOSED FOUNDATIONS. LIMITS OF SOFT/LOSSE SOILS SHOWN ON DRAWING ARE APPROXIMATE AND SHALL BE VERIFIED BY INSPECTING ENGINEER.
11. TEST PITS WERE BACKFILLED LOOSELY WITH EXCAVATED SOILS. THESE DISTURBED AND LOOSE SOILS SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL IF THEY ARE BENEATH PROPOSED FOUNDATIONS.

20 0 5 10 20
SCALE IN FEET

LANGAN
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NJ Certificate of Authorization No: 24GA28000400

Project	Drawing Title	Project No.	Figure
ACADEMIC HIGH SCHOOL	BORING AND TEST PIT LOCATION PLAN	9206368/1926502	1
ELIZABETH NEW JERSEY		Date 10/18/2011	
		Scale 1"=20'	
		Drawn By HL/AY/DR	
		Checked By BCE	

Filename: \\langan.com\data\EP\data5\1926502\Cadd Data – 1926502\dwg\Geotech\Sheetfiles for Geotech Plans\009206368-BI101-0102 101711.dwg Date: 11/9/2011 Time: 13:52 User: drooney Style Table: Langan.stb Layout: D Size Sheet (Bottom)

TABLES

Table 1
Summary of Site Investigation Activities
Academic High School
Elizabeth, NJ

	Testing			Investigation Activities							
ID	Compaction Sample Depth	VO+10 Sample	Soil testing for TAL/TCL	GPR Anomoly	Former Building?	Depth of Fill (ft)	Soft Area?	Grade El.	Depth El.	GW El.	Pump Test
LTP-1	-	-	X	UST	0-6'	6	-	20	14	NE	-
LTP-2	@ 12	-	X	-	-	6	-	19	5	6.5	-
LTP-3	@ 15.5	-	X	-	-	4	-	19	3.5	4	0.57 ft/hr
LTP-4	-	-	-	-	-	-	-	21	6	7	-
LTP-5	@ 10	-	X	-	-	-	X	21	9.5	10.5	-
LTP-6	-	-	-	-	0-6'	11	-	21	9	9.3	-
LTP-7	-	-	X	N/E	0-9'	9	-	22	13	NE	-
LTP-8	-	-	X	-	-	2	-	21	14	NE	-
LTP-9	-	-	X	-	0-4'	4	X	22	5	NE	-
LTP-10	-	-	-	-	0-4'	4	-	19.5	4.5	5.5	
LTP-11	@ 12	-	X	Pipes	-	6	X	23	8	NE	-
LTP-12	-	-	X	Metal	-	3	-	22.5	6.5	NE	-
LTP-13	-	011, 012	X	-	0-7'	7	-	23	6	8	-
LTP-14	-	-	-	-	-	-	-	23.5	8.5	NE	-
LTP-15	-	-	X	-	0-4'	4	X	24	10	NE	
LTP-16	-	-	-	-	-	6	-	22	16.5	NE	-
LTP-17	-	-	-	-	-	3.5	-	21.5	16	NE	-
LGP-1	-	013	-	-	-	-	-	21.5	22	9	0.4 ft/hr
LGP-2	-	-	-	-	-	4	-	21	14	NE	-
LGP-3	-	-	-	-	-	2.5	-	22.5	12	NE	-
LGP-4	-	-	-	-	-	3	-	20.5	13	NE	-
LGP-5	-	-	-	-	-	1.5	-	21.5	14	NE	-

LGP-"x" = Geoprobe work
LTP-"x" = Test pit work

Table 2
October 2011 Groundwater Measurements
Academic High School
Elizabeth, NJ

Test Pit	Date of Measurement	Depth to Groundwater (ft)	Groundwater Elevation (ft)
LTP-2	17-Oct-2011	12.5	6.5
LTP-3	5-Oct-2011	13.2	5.8
LTP-4	17-Oct-2011	14.0	7.0
LTP-5	5-Oct-2011	11.5	10.5
LTP-6	5-Oct-2011	11.7	9.3
LTP-9	6-Oct-2011	NE	Below 5
LTP-10	17-Oct-2011	14.0	5.5
LTP-11	6-Oct-2011	NE	Below 8
LTP-12	6-Oct-2011	16.0	6.5
LTP-13	6-Oct-2011	15.0	8.0
LTP-14	17-Oct-2011	NE	Below 8.5

Table 3
October 2011 "Draw Down" Groundwater Measurements
Academic High School
Elizabeth, NJ

DATE	TIME	LGP-1 SURFACE @ EL 21.5		REMARKS
		DEPTH TO WATER (ft)	WATER LEVEL ELEVATION (ft)	
17-Oct-11	12:50	12.5	9.0	Before Bailing/Pumping
17-Oct-11	13:05	15.2	6.3	After 10 bailers
17-Oct-11	13:10	15.0	6.5	
17-Oct-11	13:15	15.0	6.5	
17-Oct-11	13:20	15.0	6.5	
17-Oct-11	13:40	14.7	6.8	
17-Oct-11	13:50	14.7	6.8	
17-Oct-11	14:00	14.7	6.8	
17-Oct-11	15:00	14.4	7.1	
18-Oct-11	7:20	11.7	9.8	Bottom 5' of screen fully silted up upon removal

DATE	TIME	LTP-3 SURFACE @ EL 19.5		REMARKS
		DEPTH TO WATER (ft)	WATER LEVEL ELEVATION (ft)	
5-Oct-11	12:00	13.2	6.3	Before Bailing/Pumping
5-Oct-11	12:15	14.2	5.3	Pumped out 12 inches of water
5-Oct-11	13:15	13.6	5.9	
5-Oct-11	13:30	13.4	6.1	
5-Oct-11	14:00	13.2	6.3	

Notes:
1- Temporary observation well was constructed of 1" diameter PVC pipes (10' screen and 12' solid)
2- Well in LGP-1 was installed in borehole after completion of geoprobe investigation.
3- Well was removed at the end of the investigation and borehole backfilled to existing surface.

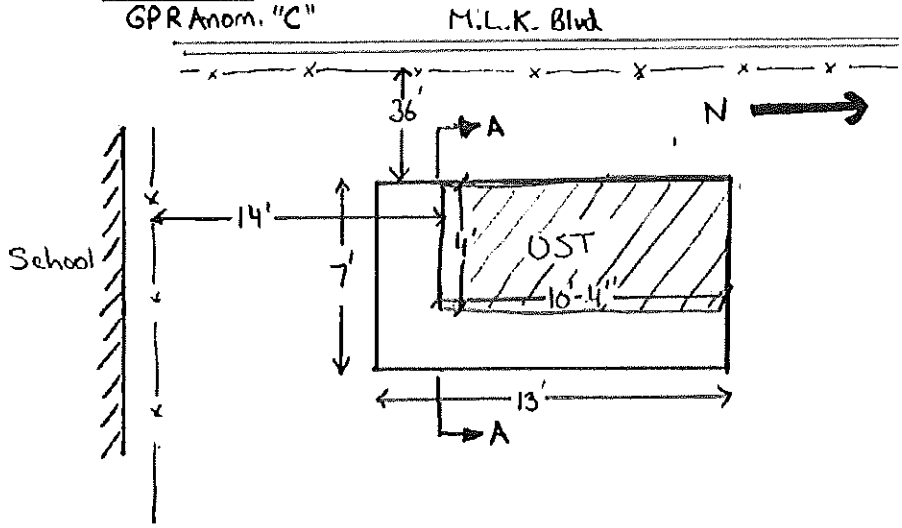
APPENDIX A

LOGS OF TEST PITS

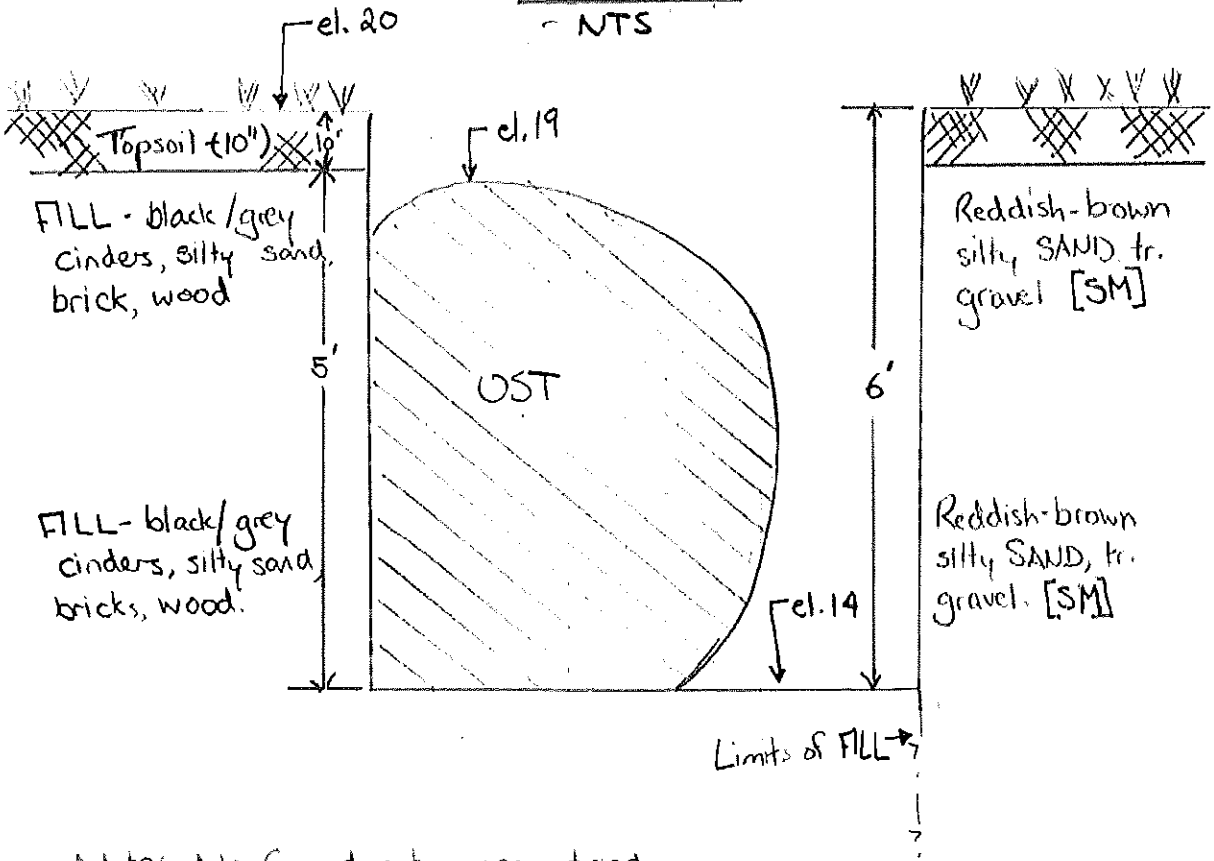
Drawings N.T.S.

LTP-1

GPR Anom. "C"



Plan View
- NTS



Note: No Groundwater encountered

Section A-A
NTS

Elizabeth Academic - T.P.1	BY D.R. DATE 10/5/11	PROJ. NO. 9206368
N.T.S.	CKD. DATE	SHEET OF

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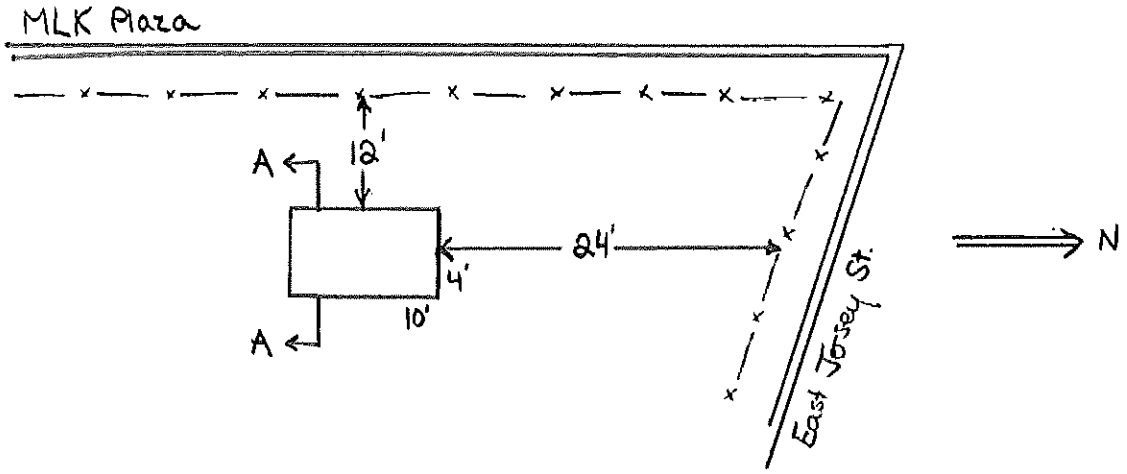
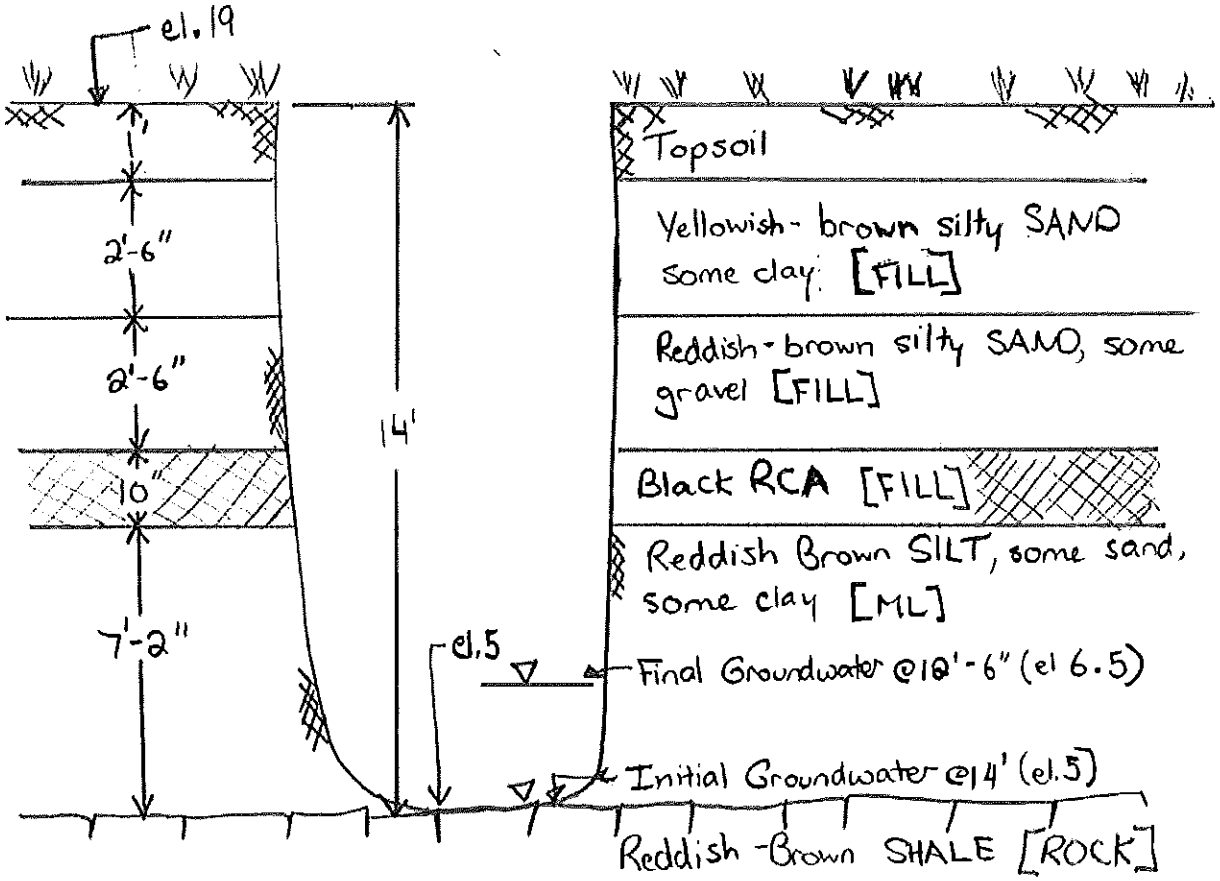
LTP-2



Plan View
N.T.S.



Note: Excavation kept open for 8 hours for "Final" G.W. reading

Section A-A
NTS

Elizabeth Academic - TP #2	BY D.R. DATE 10/17/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

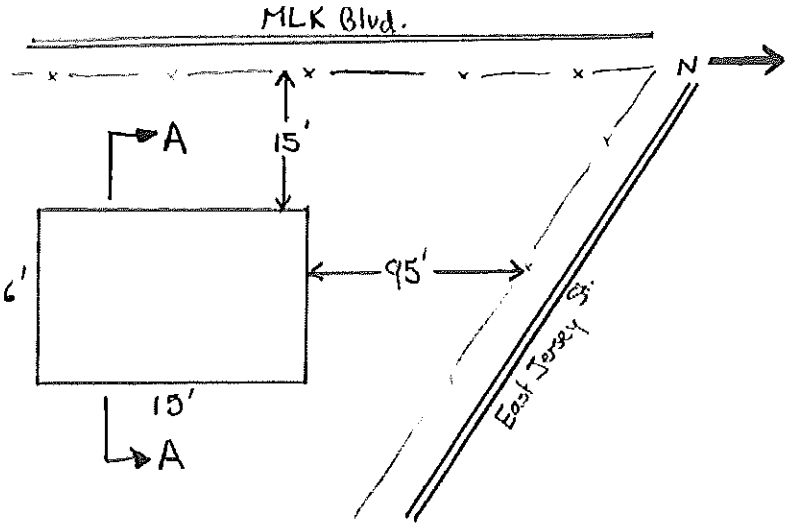
LTP - 3

Note: Water in excavation pumped out to observe recharge time. Observations are as follows:

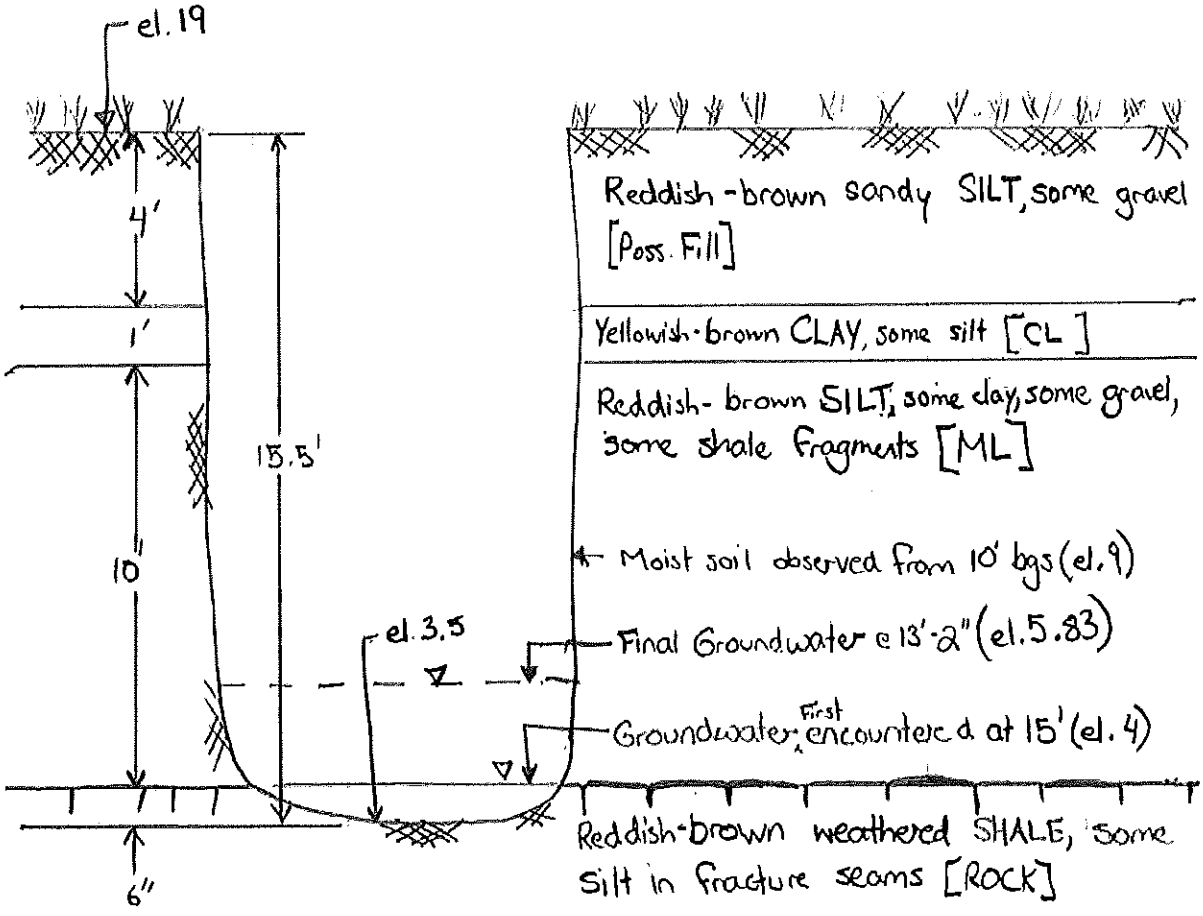
12:15	pumped out 12"
1:15	8" total recharge
1:30	10" total recharge
2:00	12" total recharge

Total Time: 1.75 hrs/ft

Collect Geotech Sample @ 14'



Plan View
NTS

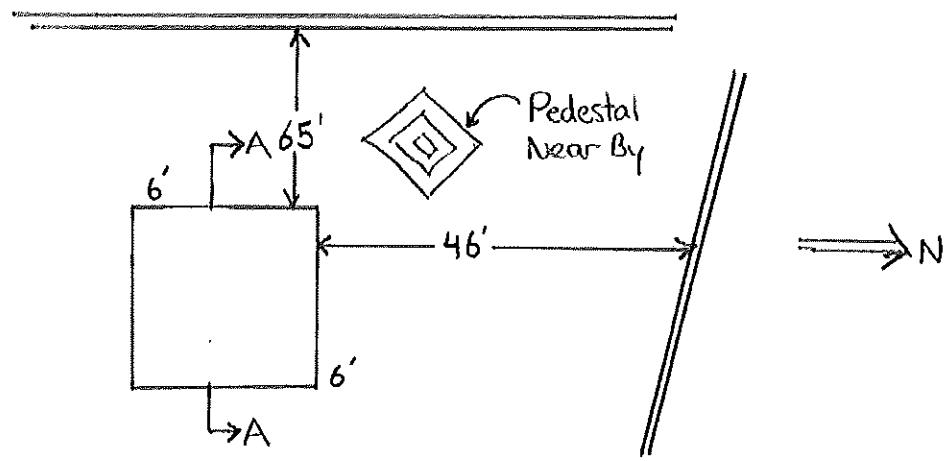


SECTION A-A NTS

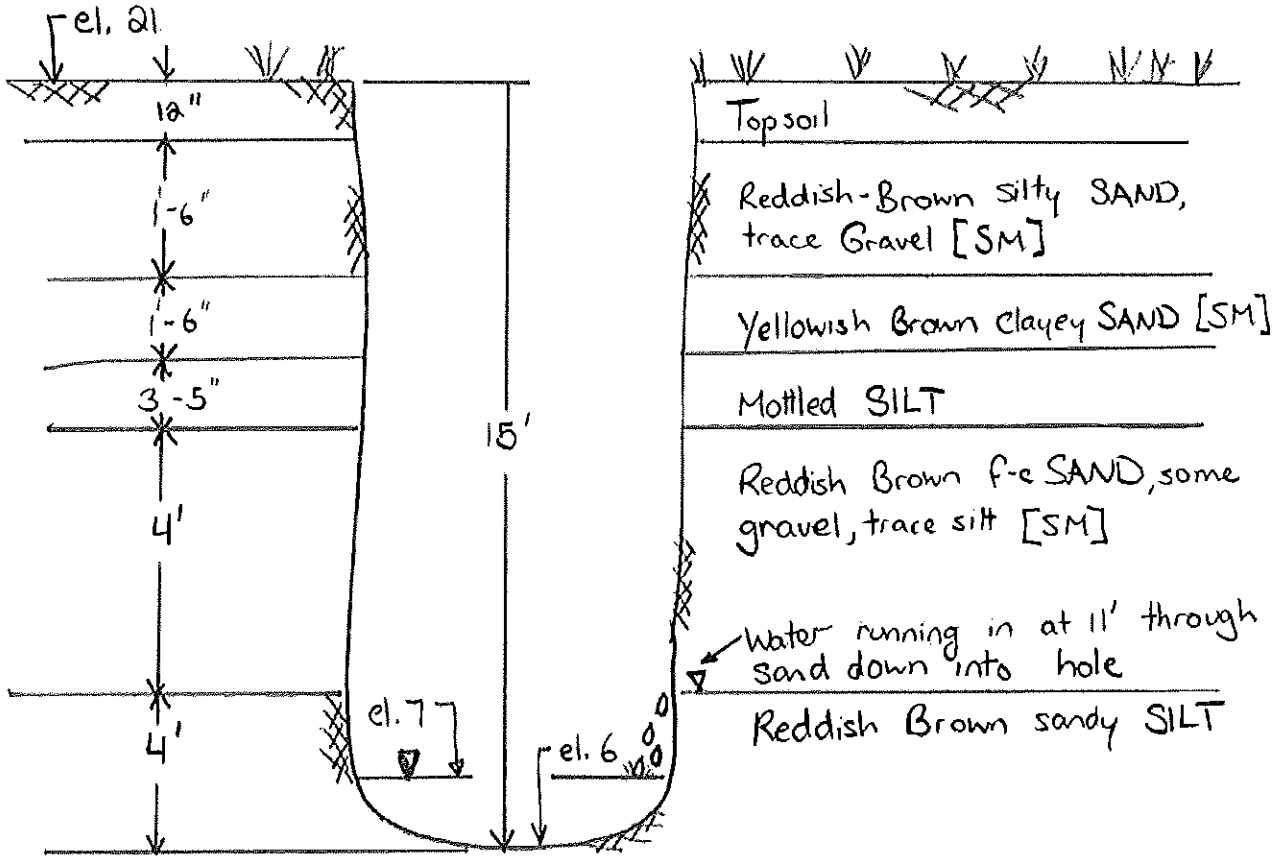
Elizabeth Academic - TP #3	BY D.R DATE 10/5/11	PROJ. NO. 9206368
N.T.S.	CKD. DATE	SHEET OF

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-4



Plan View
NTS



Note: Excavation left open for 6± hours for water observation

Section A-A
NTS

Elizabeth Academic - TP#4	BY DR DATE 10/17/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

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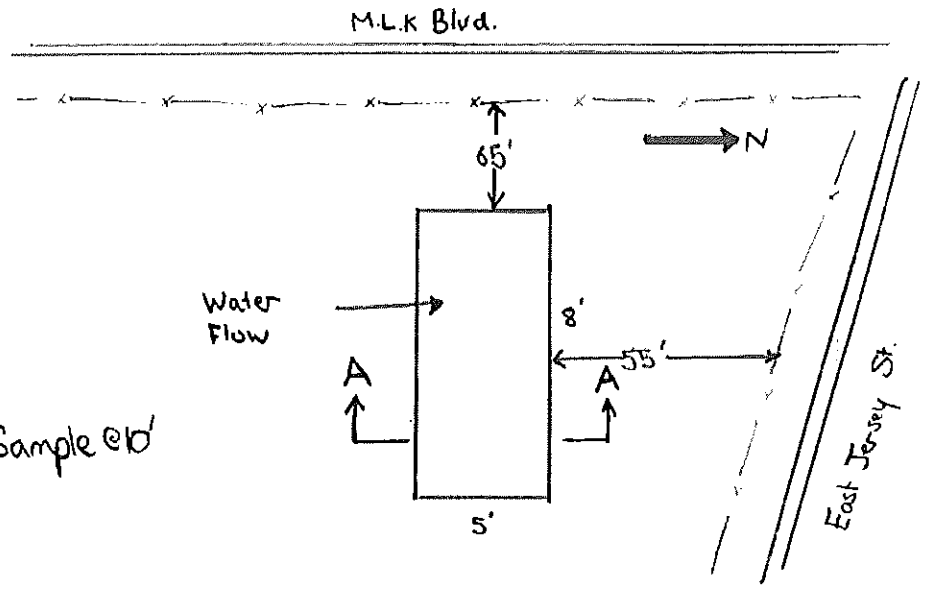
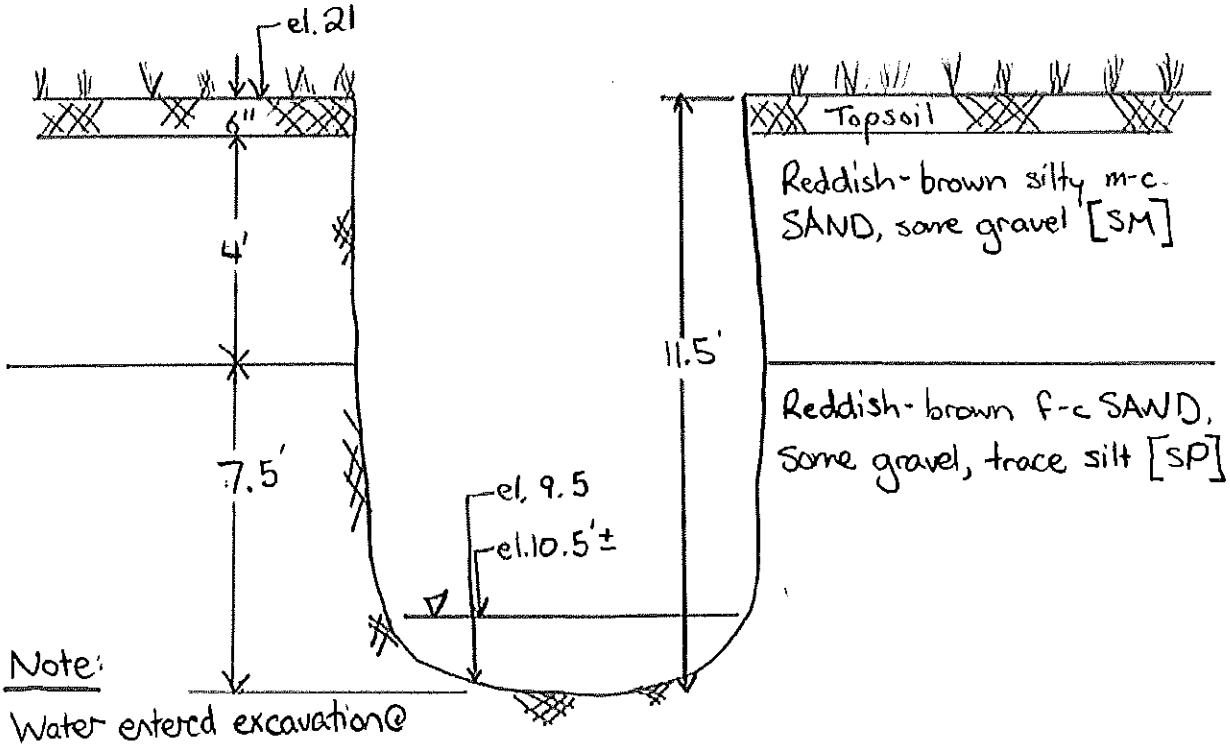
LTP-5



Note:
Collected Geotech Sample @10'

Plan View
NTS



Note:
Water entered excavation @ 10.5'. Water level fluctuated as water seeped in from south wall, and seemingly drained down into bottom of excavation.

Section A-A
NTS

Elizabeth Academic - TP #5	BY D.R. DATE 10/5/11	PROJ. NO. 9206368
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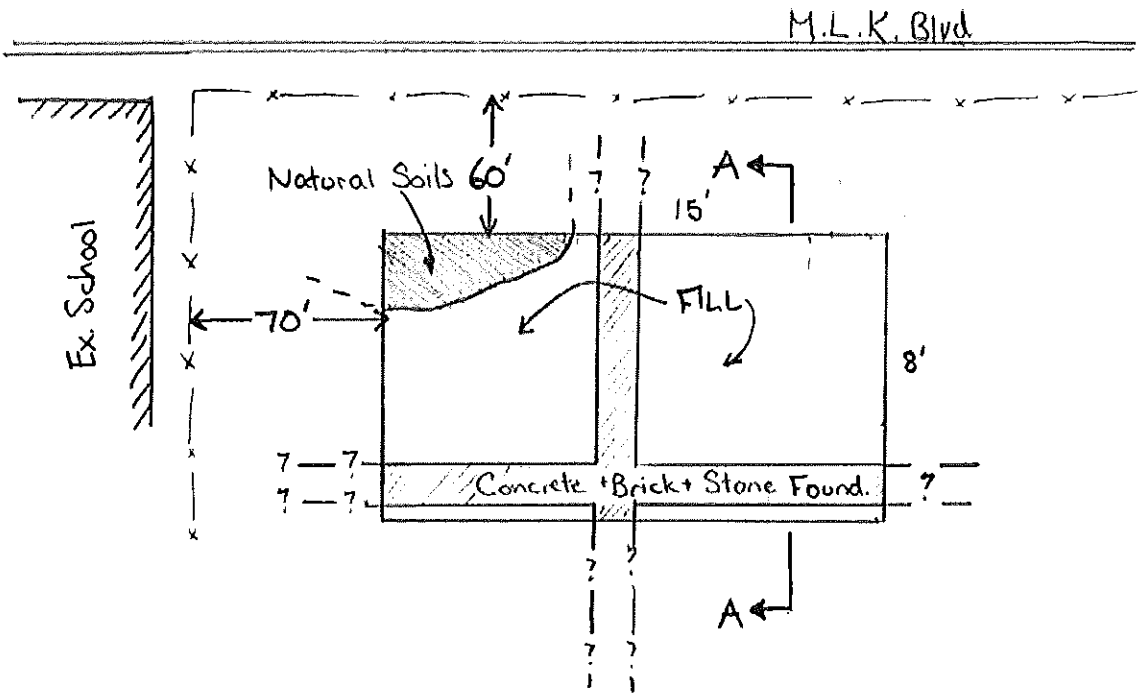
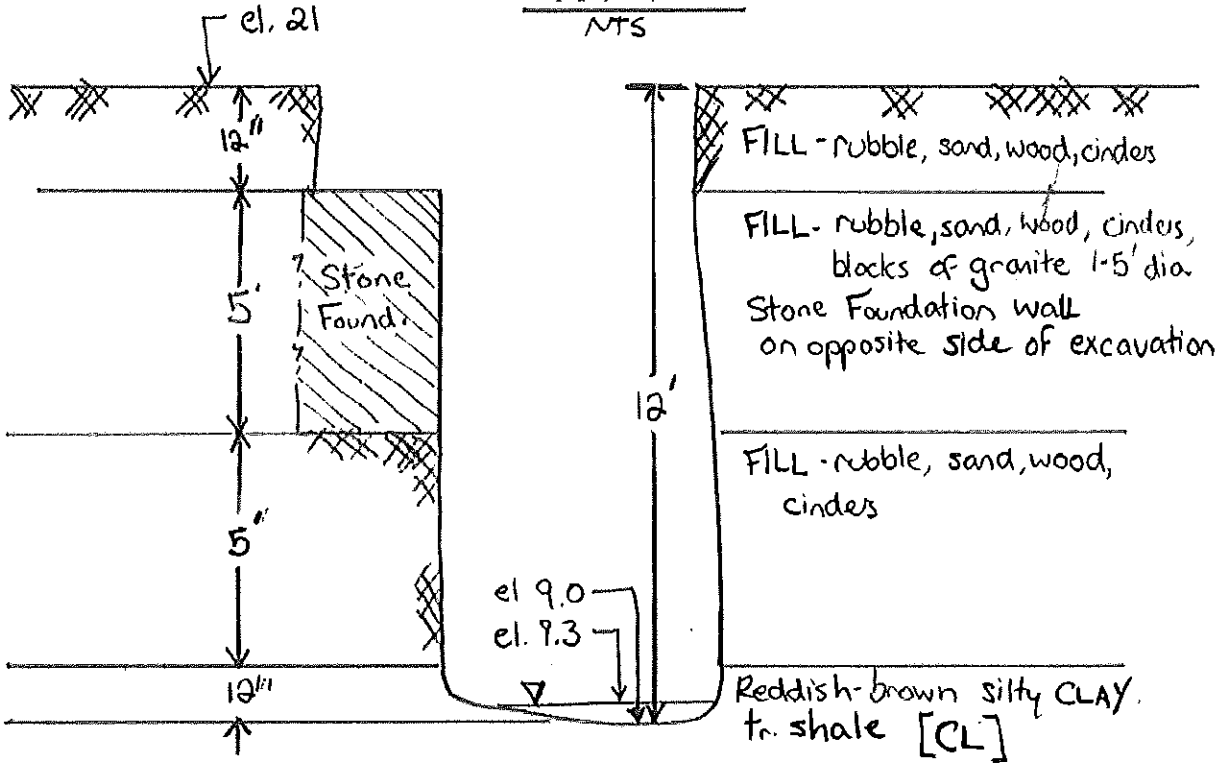
LTP - 6



Plan View
NTS



Section A-A

Note: 4" of Groundwater observed after leaving hole open for 15 minutes.

Elizabeth Academic - TP # 6	BY O.R. DATE 10/5/11	PROJ. NO. 9206368
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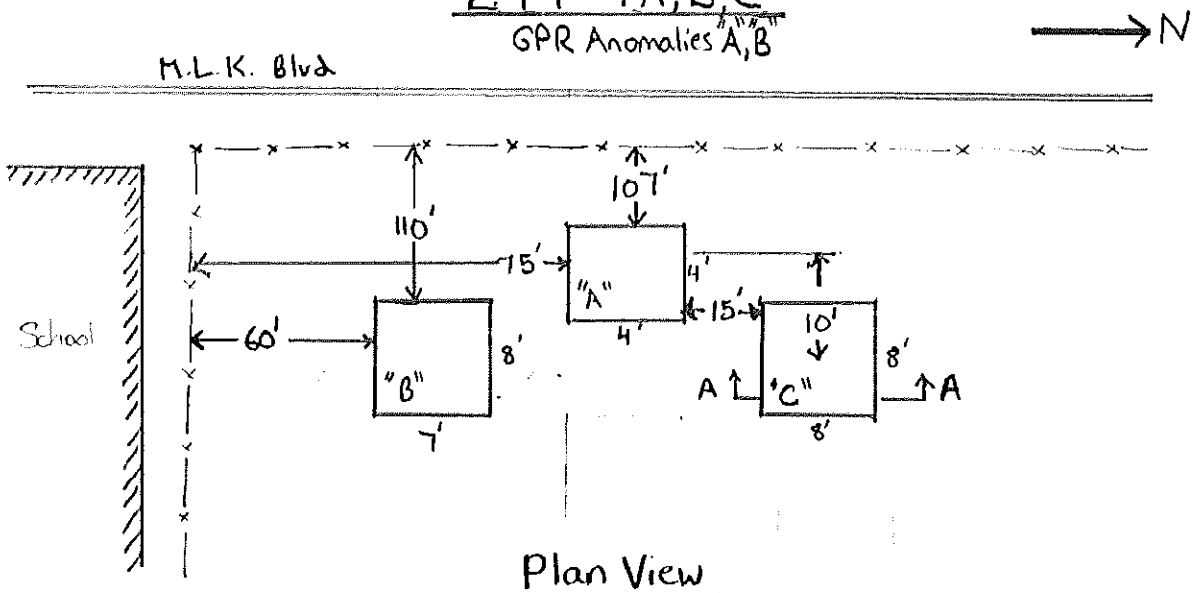
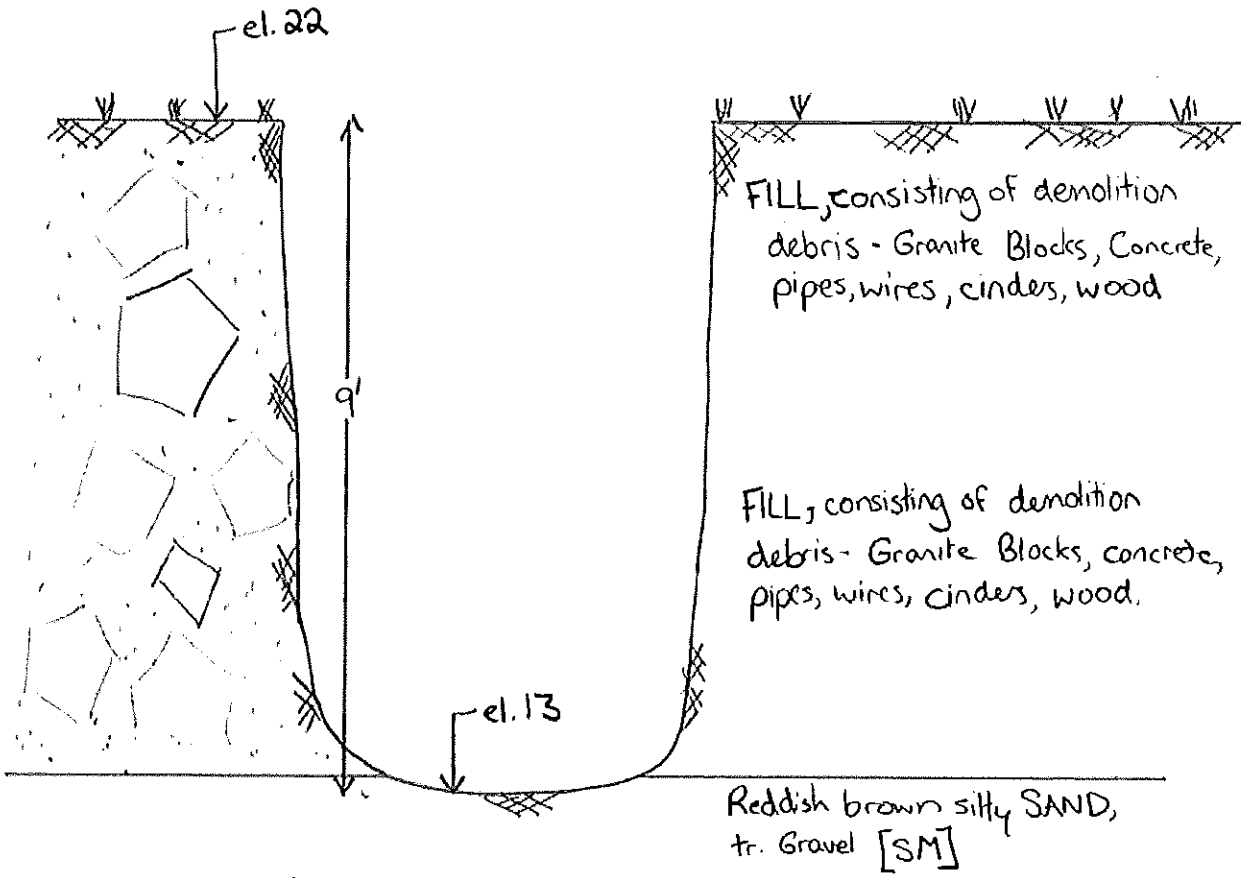
LTP-7A, B, C

GPR Anomalies "A", "B"



Plan View

NTS



Notes: - No Groundwater encountered
- Possible Boiler Piping found in TP-7"C"
- No GPR Anomalies encountered in "A" or "B"

Section A-A

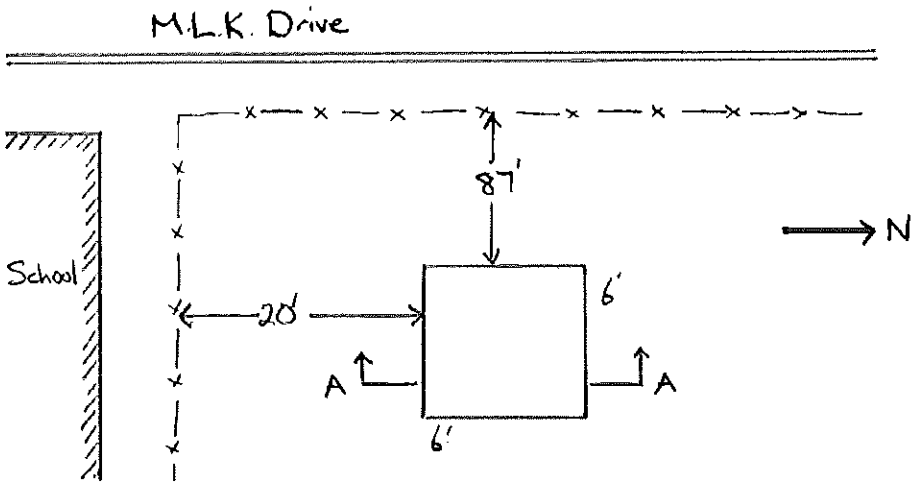
NTS

Elizabeth Academic - TP #7A, B, C N.T.S.	BY D.R. DATE 10/5/11 CKD. DATE	PROJ. NO. 9206368 SHEET OF

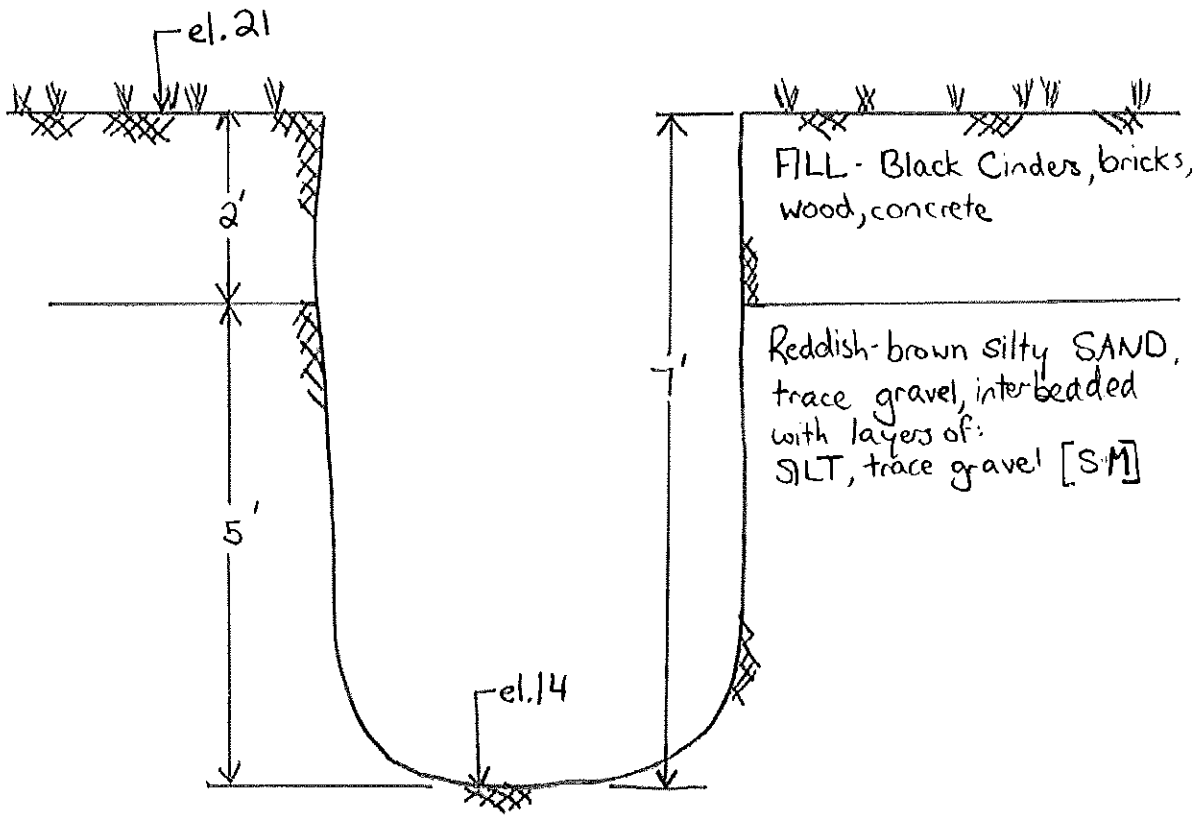
LANGAN

ENGINEERING & ENVIRONMENTAL SERVICES

LTP-8



Plan View
NTS



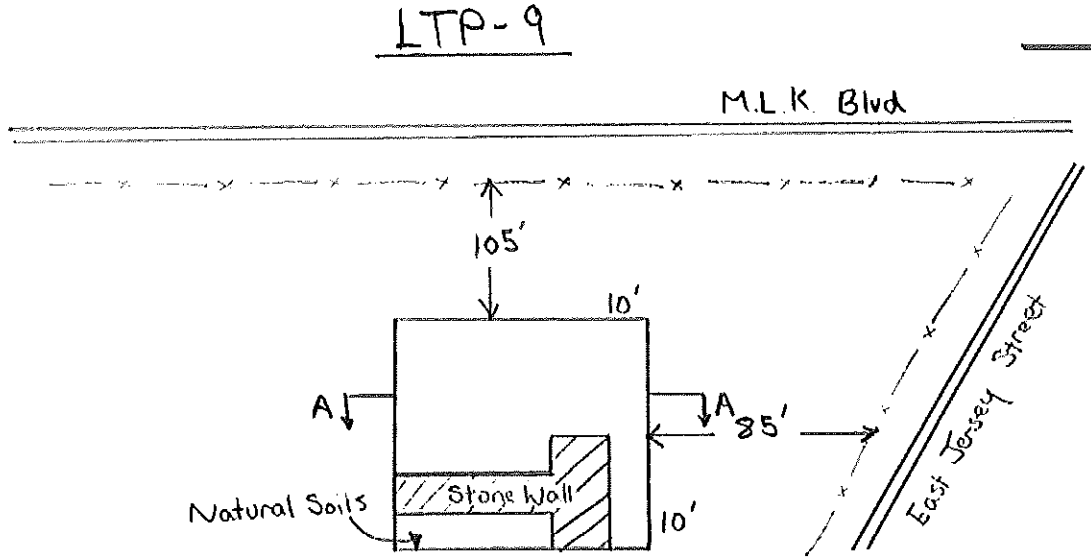
Note: No Groundwater Encountered

Section A-A
NTS

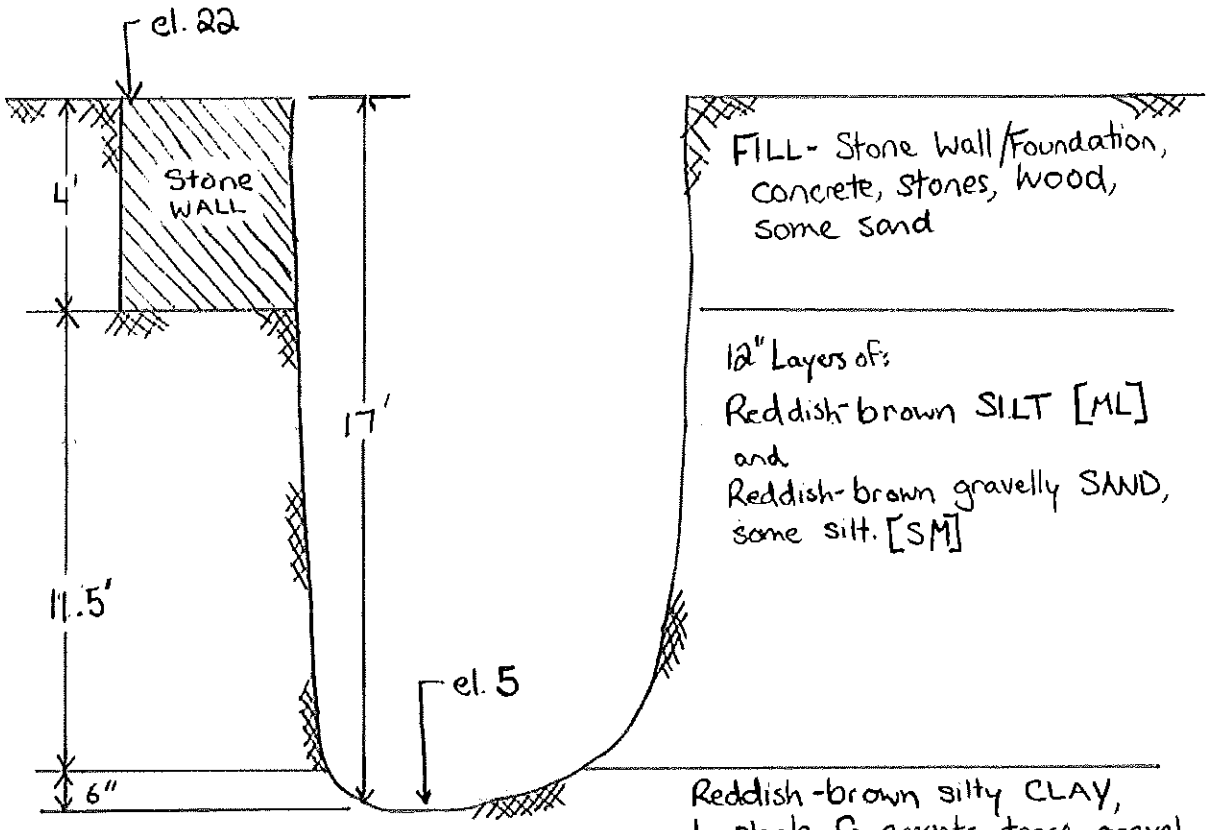
Elizabeth Academic	BY D.R. DATE 10/6/11	PROJ. NO. 9206368
N.T.S.	CKD. DATE	SHEET OF

LANGAN

LTP-9



Plan View
N.T.S.

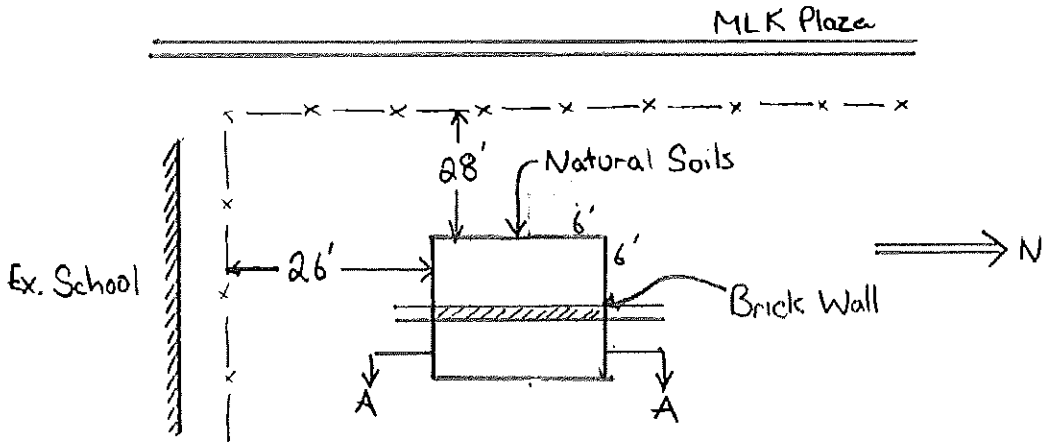


Section A-A
N.T.S.

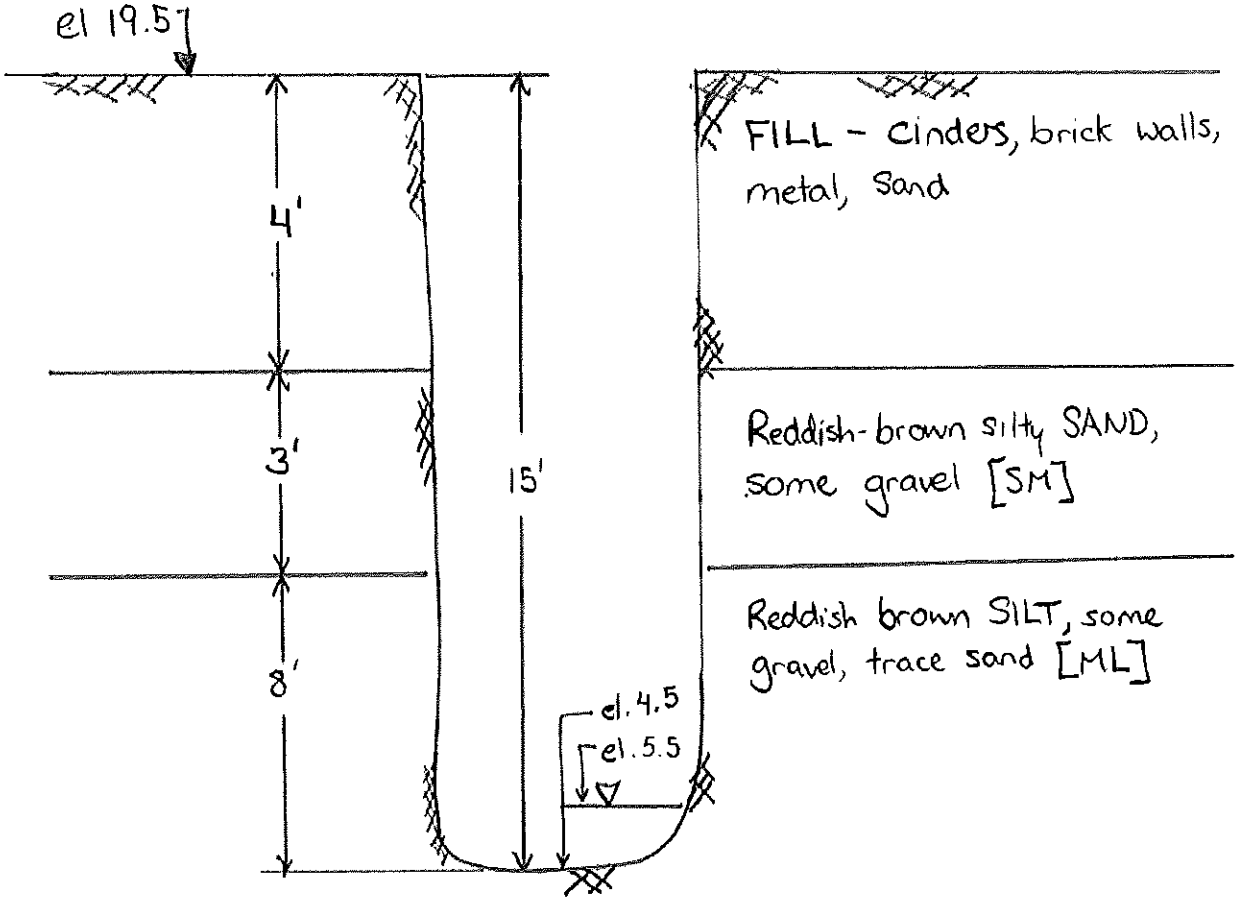
Elizabeth Academic	BY D.R. DATE 10/6/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-10



Plan View
NTS



Section A-A

Elizabeth Academic	BY DR DATE 10/17/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

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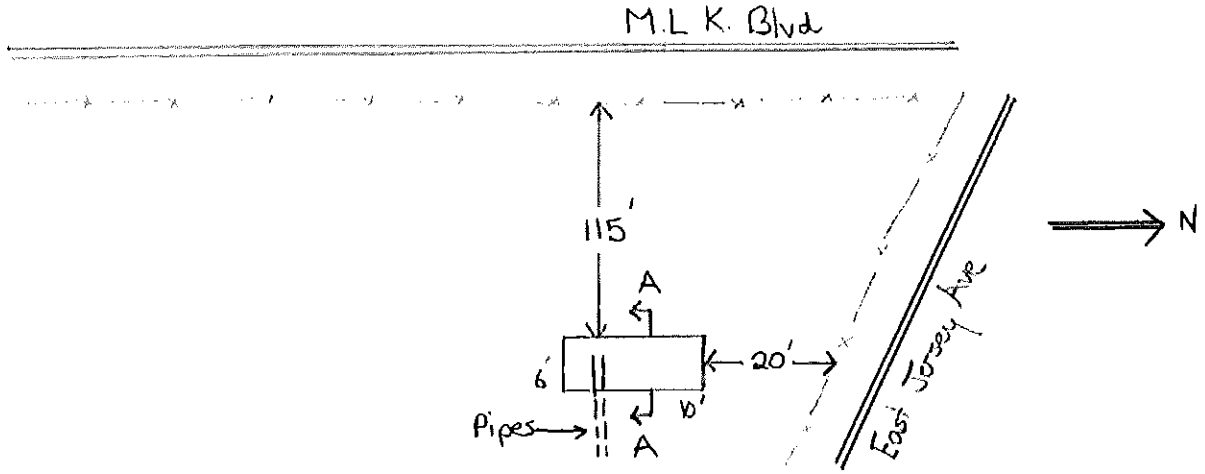
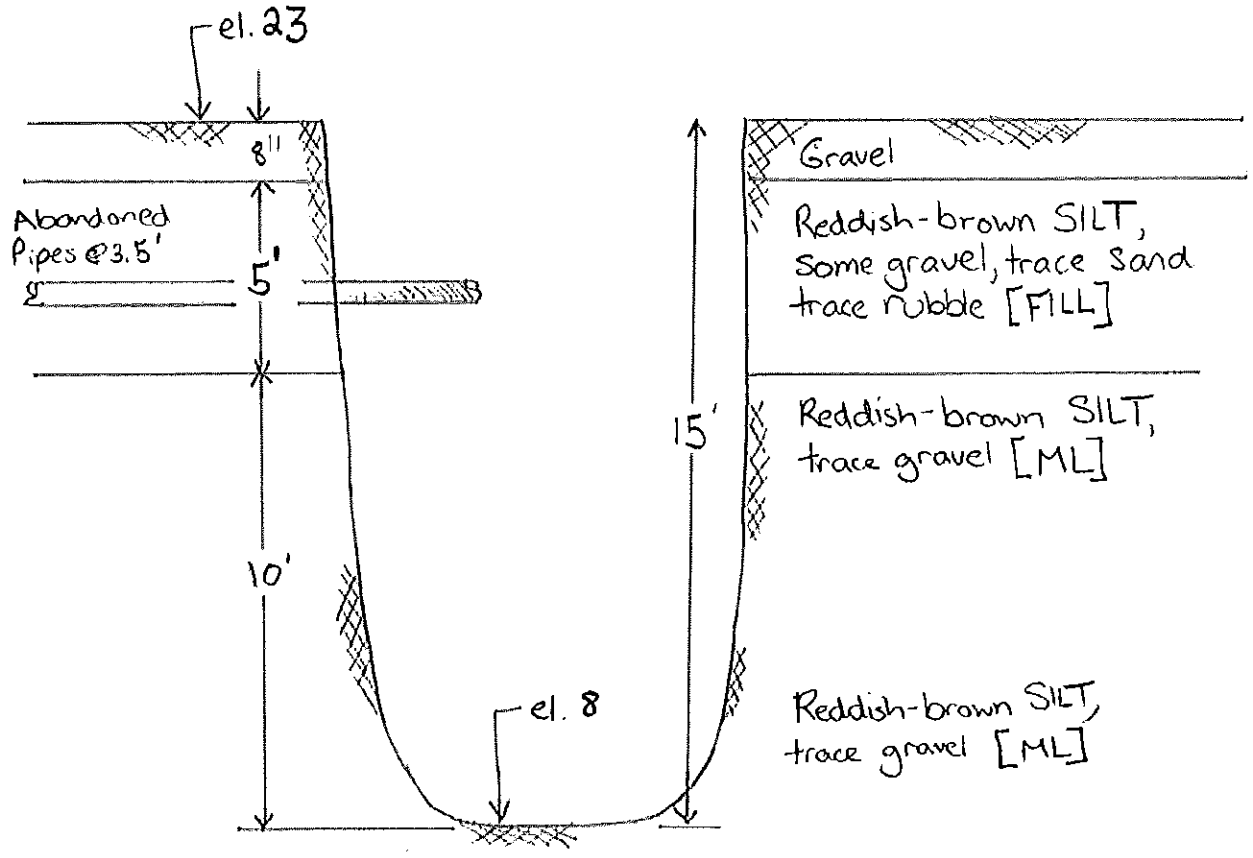
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-11



Plan View
NTS



Note: No Groundwater encountered in excavation

Section A-A
NTS

Elizabeth Academic	BY D.R. DATE 10/6/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

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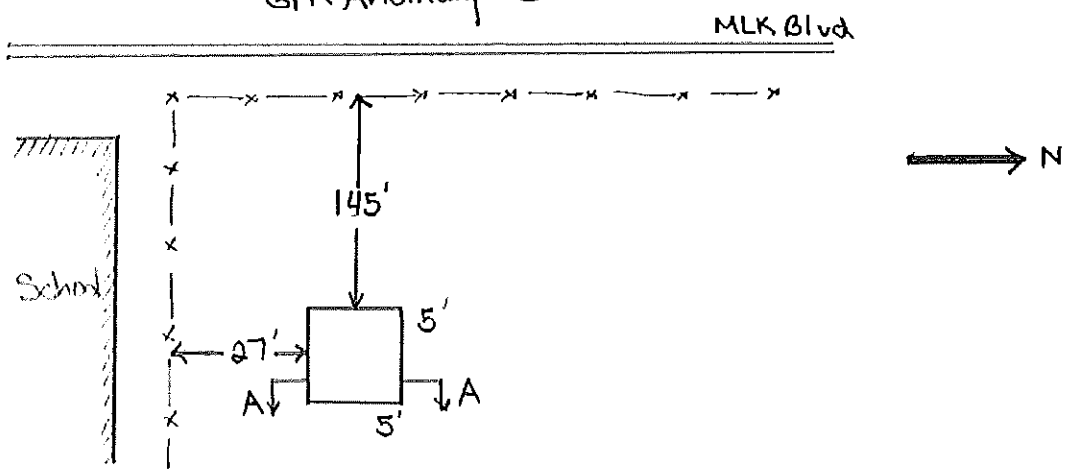
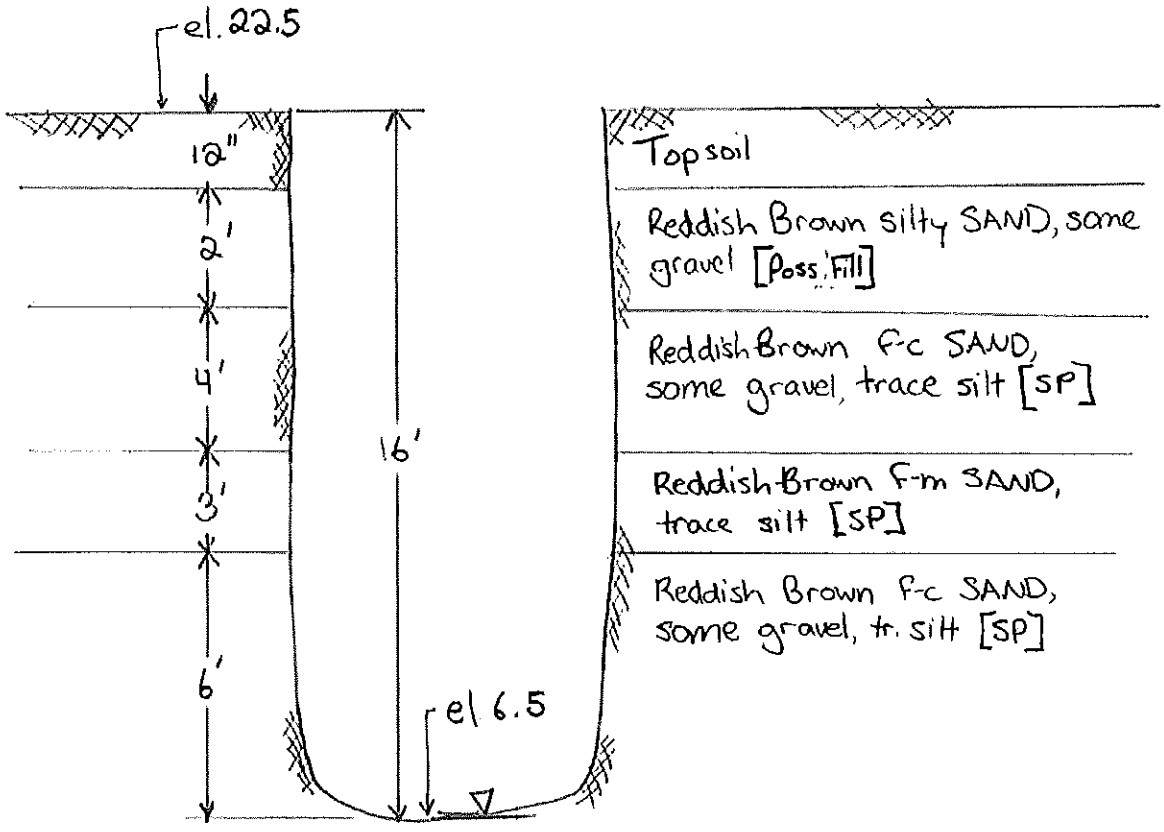
LTP-12
GPR Anomaly "D"



Plan View
N.T.S.



Note: Small Hot Water Boiler (No ACM) Found in Anomaly area
Groundwater encountered at 16' bgs

Section A-A
NTS

Elizabeth Academic	BY D.R. DATE 10/6/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

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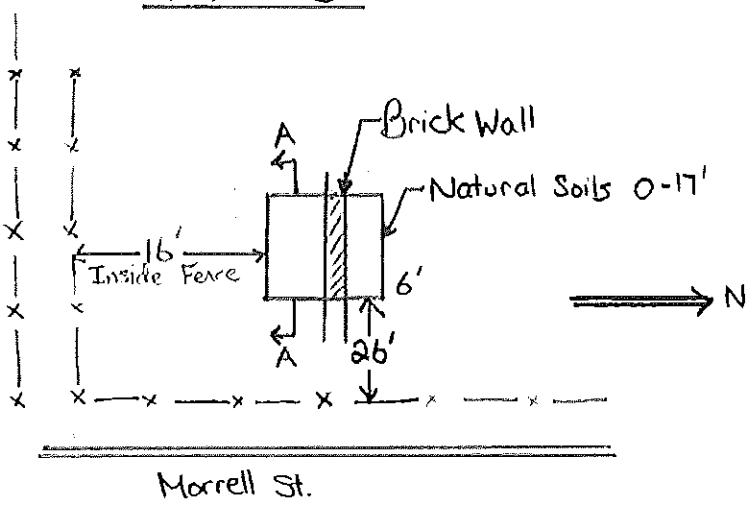
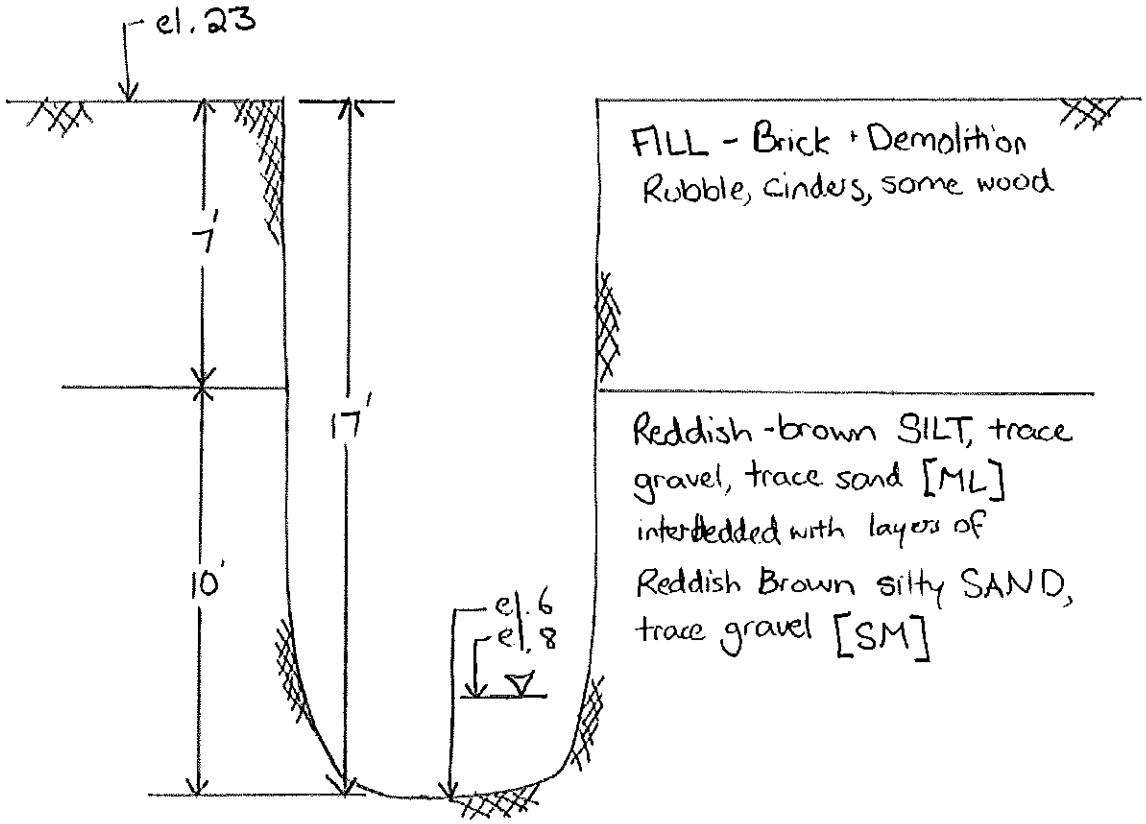
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-13



Plan View
NTS



Note: Groundwater encountered 15' bgs. Recharge not performed.
Collected Groundwater sample: 011-TP13-100611
012-TP13D-100611

Section View
NTS

Elizabeth Academic.	BY DR DATE 10/6/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

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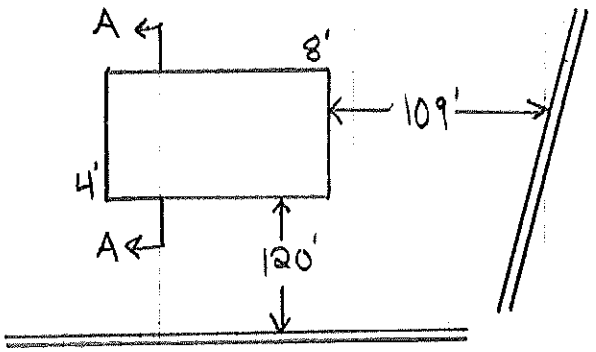
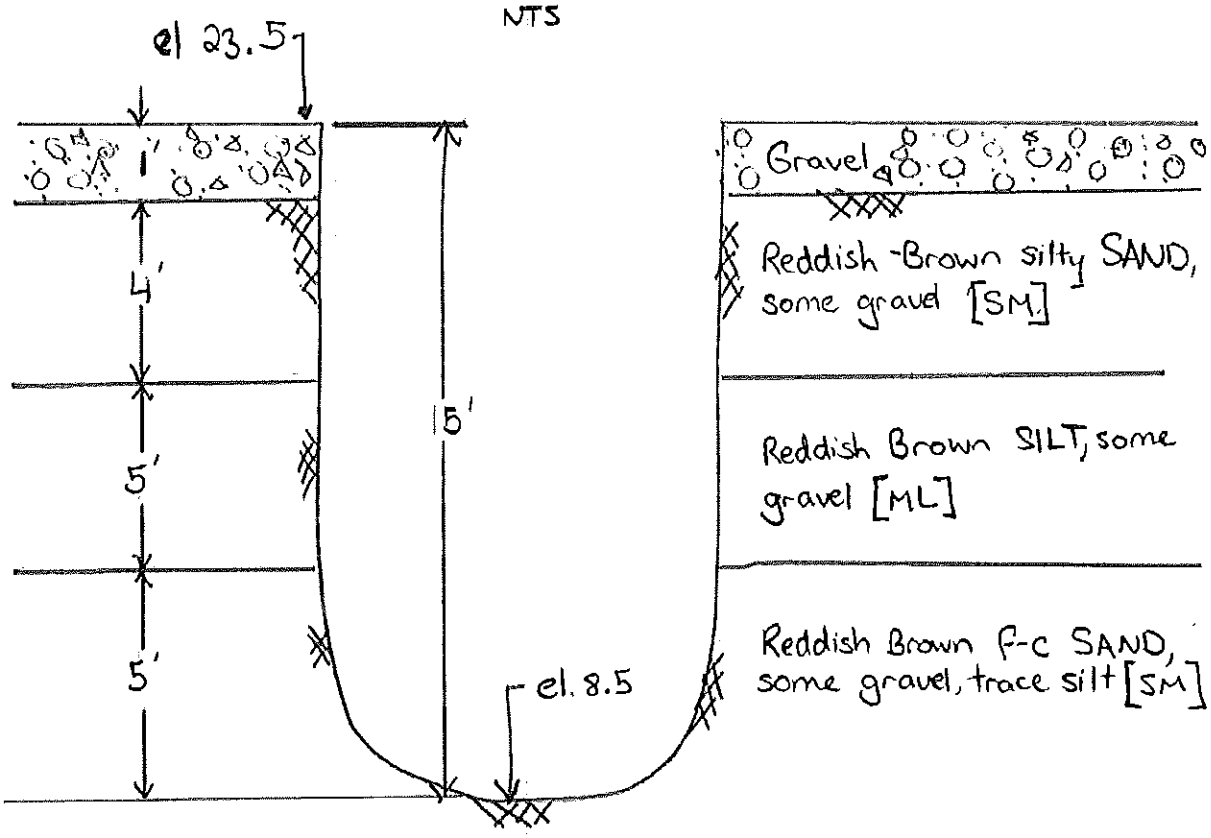
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-14



Plan View
NTS



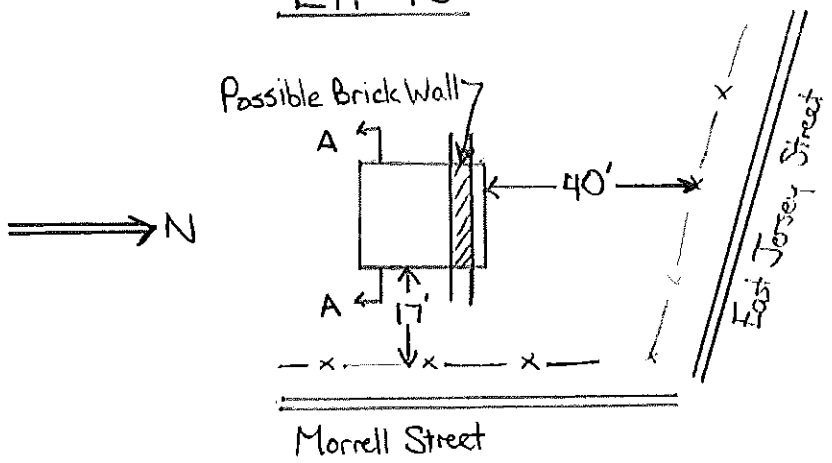
Note: No Groundwater encountered

Section A-A
NTS

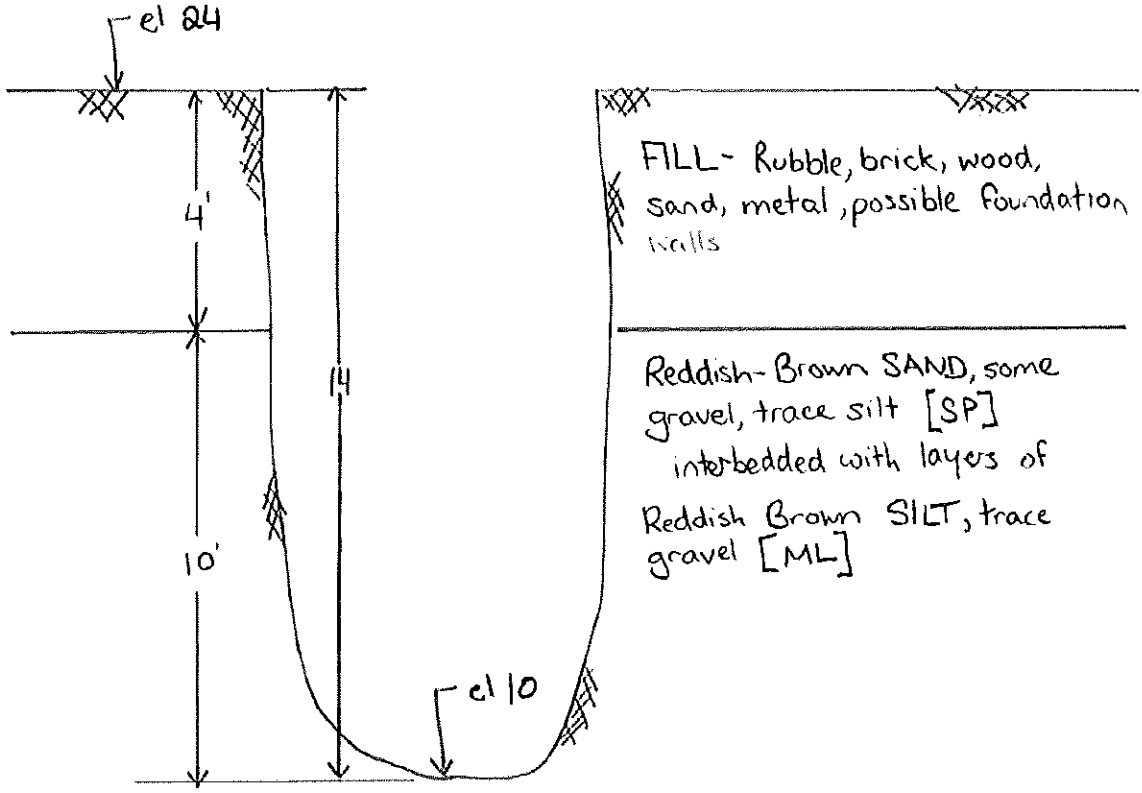
Elizabeth Academic -TP#14	BY DR DATE 10/17/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-15



Plan View
NTS

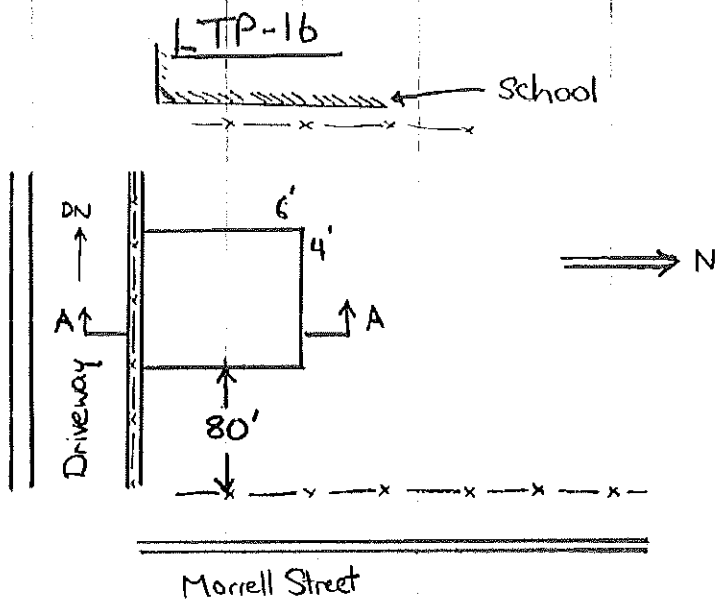


Note: No Groundwater encountered.

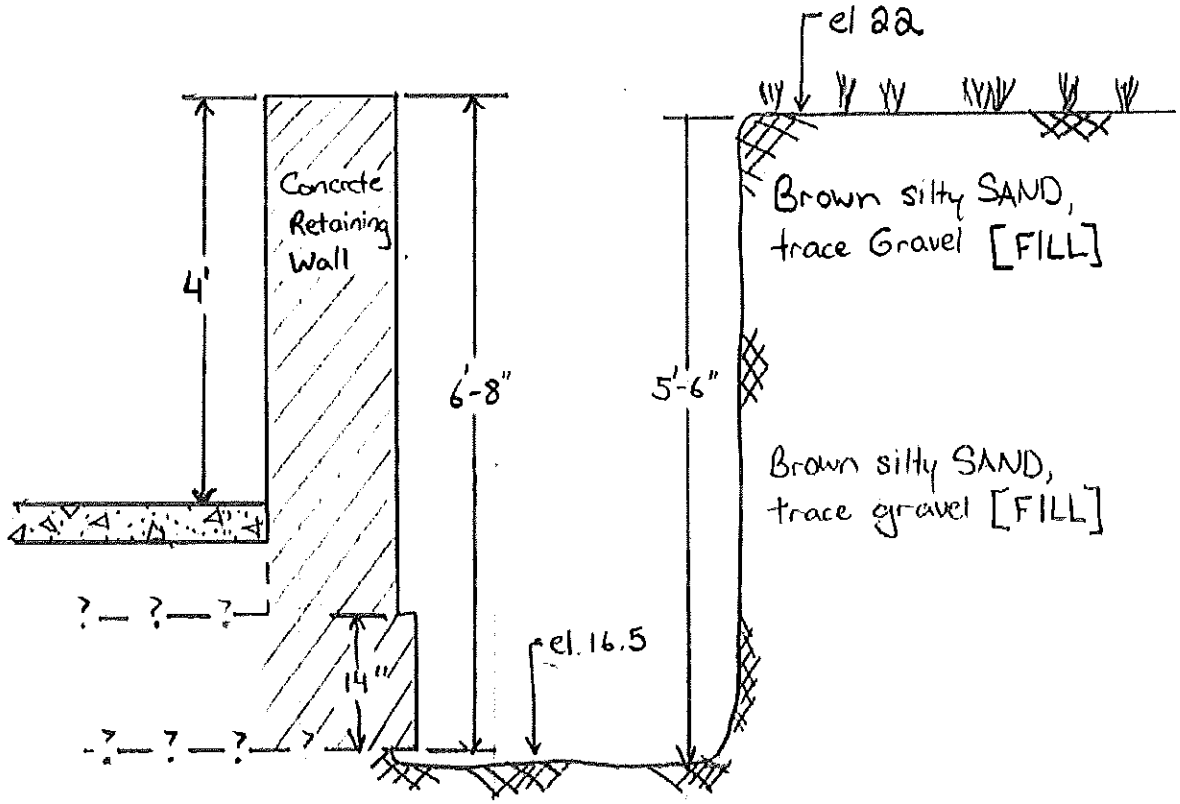
Section A-A
NTS

Elizabeth Academic	BY DR DATE 10/6/11	PROJ. NO. 9206368
	CKD. ____ DATE ____	SHEET ____ OF ____

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES



Plan View
NTS

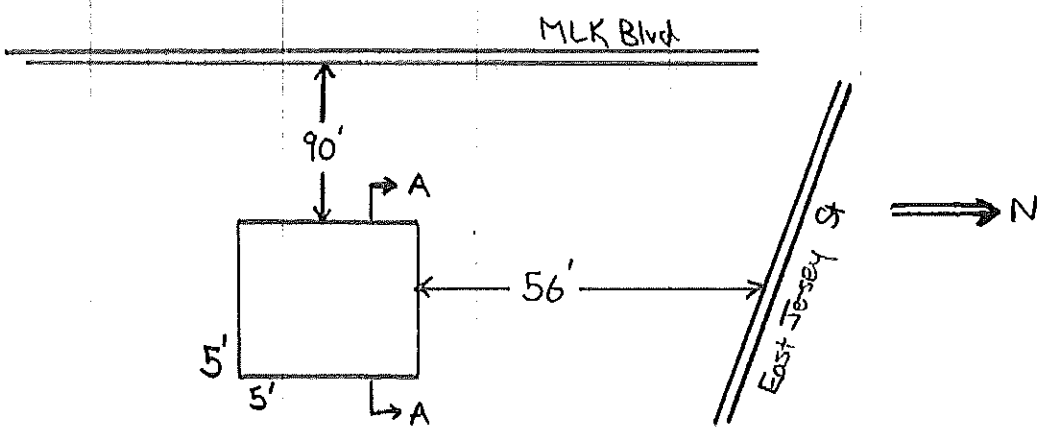


Section A-A
NTS

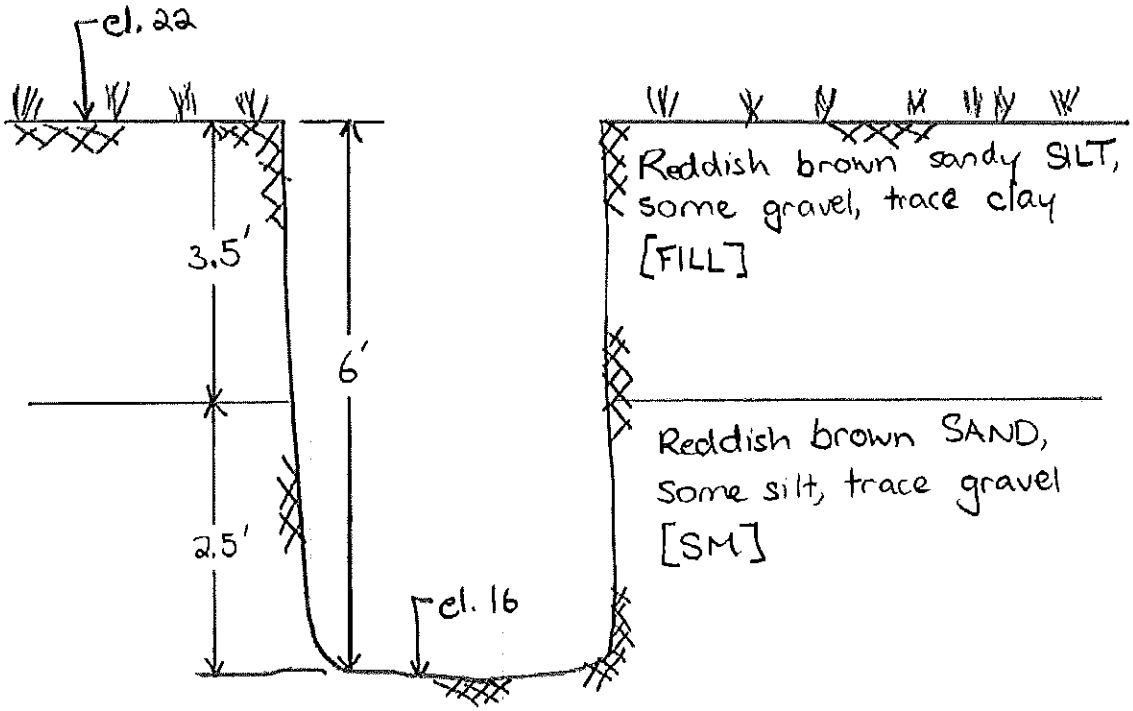
Elizabeth Academic - TP#16	BY DR DATE 10/17/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LTP-17



Plan View
NTS



Note: No Groundwater encountered

Section A-A
NTS

Elizabeth Academic - TP #17	BY DR DATE 10/17/11	PROJ. NO. 9206368
	CKD. DATE	SHEET OF

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

APPENDIX B

LOGS OF GEOPROBE BORINGS

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LOG OF BORING LGP-1 **SHEET** 1 **OF** 2

PROJECT	Elizabeth Academic	PROJECT NO.	9206368
LOCATION	Elizabeth, NJ	ELEVATION AND DATUM	el. 21.5
DRILLING AGENCY	Summit Drilling, Inc.	DATE STARTED 10/17/11	DATE FINISHED 10/17/11
DRILLING EQUIPMENT	Truck-mounted Geoprobe	COMPLETION DEPTH 22'	ROCK DEPTH 22'
SIZE AND TYPE OF BIT		NO. SAMPLES — DIST. —	UNDIST. — CORE —
CASING		WATER LEVEL FIRST —	COMPL. — 24 HR. —
CASING HAMMER	WEIGHT / DROP	FOREMAN	Fred
SAMPLER	2" Acetylene Tubing (Macrocore)	INSPECTOR	Diana Rooney
SAMPLER HAMMER	WEIGHT / DROP		

SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO./LOC.	SAMPLES TYPE	SAMPLES RECOV. FT.	SAMPLES PENETR. RESIST BLWS/in.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
Topsoil (12") Reddish-brown sandy SILT, some sand, trace clay (stiff to very loose and wet) [ML]	1 2 3	—	MACROCORE	48"		Take core #1 0'-4'
Reddish brown gravelly SILT (dry) [ML]	4 5	2	MACROCORE	48"		Take core #2 4'-8'
Reddish brown fine SAND, some silt (dry) [SM]	6 7					
Reddish brown gravelly SILT; some sand (dry) [ML]	8 9	3	MACROCORE	48"		Take core #3 8'-12'
Reddish brown silty SAND; trace gravel (moist) [SM] Reddish brown clayey SILT (wet) [ML] Reddish brown SILT, (saturated) [ML] "Bulls Liver"	10 11 12 13 14	4	MACRO	48"		Take core #4 12'-16'

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

JOB NO. 1206368
DATE 10/17/11

LOG OF BORING NO. GP-1

SHEET 2 OF 2

SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO./LOC.	SAMPLES TYPE	SAMPLES RECOV. FT.	SAMPLES PENETR. RESIST BLWS/FT.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
Reddish brown clayey SILT, some gravel (moist) [ML]	15	4	MACRO	48"		
Reddish brown SILT, some sand, (very wet) [ML]	16					Take core #5 16'-20'
Reddish brown gravelly SILT, trace sand (wet) [ML]	17	5	MACROCORE	48"		
	18					
	19					
DECOMPOSED/WEATHERED ROCK- Reddish brown SHALE	20					Take core #6 20' - 22'
	21	6	MACRO	24"		
el. -0.5'	22					Refusal @ 22'
Reddish Brown SHALE [ROCK]	23					Install 1" dia. temp. well-
	24					10' screen
	25					12' riser to grade
	26					no sand pack
	27					collect 013-GP1-101711 sample
	28					Initial GW @ 12.5' bgs (el. 9)
	29					Bailed 10 times w/ Bailer
	30					
	31					

Time	BGS	El
13:05	15.2'	6.3
13:10	15.0'	6.5
13:15	15.0'	6.5
13:20	15.0'	6.5
13:40	14.7'	6.8
13:50	14.7'	6.8
14:00	14.7'	6.8
15:00	14.4'	7.1
7:20 (10/18/11)	11.7'	9.8

Bottom 5' of well silted up upon removal of well on 10/18

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LOG OF BORING LGP-2 **SHEET** 1 **OF** _____

PROJECT	Elizabeth Academic	PROJECT NO.	9206368
LOCATION	Elizabeth, NJ	ELEVATION AND DATUM	el. 21
DRILLING AGENCY	Summit Drilling, Inc	DATE STARTED 10/17/11	DATE FINISHED 10/17/11
DRILLING EQUIPMENT	Truck-mounted Geoprobe	COMPLETION DEPTH 14'	ROCK DEPTH 14'
SIZE AND TYPE OF BIT		NO. SAMPLES — DIST. —	UNDIST. — CORE —
CASING		WATER LEVEL FIRST —	COMPL. — 24 HR. —
CASING HAMMER — WEIGHT — DROP		FOREMAN	Fred
SAMPLER	2" Acetylene Tubing (Macrocore)	INSPECTOR	Diana Rooney
SAMPLER HAMMER — WEIGHT — DROP			

SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO./LOC.	SAMPLES TYPE	SAMPLES RECOV. FT.	SAMPLES PENETR. RESIST BLOWS/ft.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
4" Asphalt						Take core #1 -0'-4'
16" DGA						
Reddish brown silty SAND, trace brick, concrete, gravel [FILL] (dry)	1	1	MACROCORE	48"		
	2					
	3					
	4					Take core #2 4'-8'
Reddish brown SILT, some gravel (dry) [ML]	5	2	MACROCORE	48"		
Reddish brown Fine SAND, some gravel, trace silt (dry) [SM]	6					
	7					
	8					Take core #3 8'-12'
Reddish brown SILT, some gravel, some clay, trace sand (moist)	9	3	MACROCORE	48"		
	10					
	11					
	12					Take core #4 - 12'-14'
Reddish brown SILT, some gravel, some clay, trace sand (moist)	13	4	MACRO	24"		Refusal @ 14'
el. 7	14					No Groundwater encountered
Reddish brown SHALE [Rock]						

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LOG OF BORING LGP-3 **SHEET** 1 **OF** _____

PROJECT: Elizabeth Academic	PROJECT NO.: 9206368
LOCATION: Elizabeth, NJ	ELEVATION AND DATUM: el 22.5
DRILLING AGENCY: Summit Drilling, Inc.	DATE STARTED: 10/17/11 — DATE FINISHED: 10/17/11
DRILLING EQUIPMENT: Truck-Mounted Geoprobe	COMPLETION DEPTH: 12' — ROCK DEPTH: 12'
SIZE AND TYPE OF BIT	NO. SAMPLES — DIST. — UNDIST. — CORE —
CASING	WATER LEVEL — FIRST — COMPL. — 24 HR. —
CASING HAMMER — WEIGHT — DROP	FOREMAN: Fred
SAMPLER: 2" Acetylene Tubing (Macrocore)	INSPECTOR: Diana Rooney
SAMPLER HAMMER — WEIGHT — DROP	

SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES: NO./LOC.	TYPE	RECOV. FT.	PENETR. RESIST BL/6 in.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
Asphalt + Subbase (12")	1	1	MACROCORE	48"		Take Core #1 0-4'
Brown sandy SILT, trace gravel, concrete [FILL] (dry)	2					
Reddish brown SILT, trace gravel (dry) [ML]	3					
Reddish brown SILT, some gravel, trace fine sand (dry) [ML]	4	2	MACROCORE	48"		Take core #2 4'-8'
	5					
	6					
	7					
Reddish brown SILT, some gravel, trace fine sand (dry) [ML]	8	3	MACROCORE	48"		Take core #3 8'-12'
	9					
	10					
	11					
el. 10.5 Reddish brown SHALE [ROCK]	12					Refusal @ 12' No Groundwater encountered
	13					
	14					

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LOG OF BORING LGP-4 SHEET 1 OF ____

PROJECT: Elizabeth Academic	PROJECT NO.: 9206368
LOCATION: Elizabeth, NJ	ELEVATION AND DATUM: el. 20.5
DRILLING AGENCY: Summit Drilling, Inc	DATE STARTED: 10/17/11 — DATE FINISHED: 10/17/11
DRILLING EQUIPMENT: Truck-Mounted Geoprobe	COMPLETION DEPTH: 13' — ROCK DEPTH: 13'
SIZE AND TYPE OF BIT	NO. SAMPLES — DIST. ~ — UNDIST. ~ — CORE ~
CASING	WATER LEVEL — FIRST ~ — COMPL. ~ — 24 HR. ~
CASING HAMMER — WEIGHT — DROP	FOREMAN: Fred
SAMPLER: 2" Acetylene Tube (Macrocore)	INSPECTOR: Diana Rooney
SAMPLER HAMMER — WEIGHT — DROP	

SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO./LOC.	SAMPLES TYPE	SAMPLES RECOV. FT.	SAMPLES PENETR. RESIST BLWS/in.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
6" Asphalt + Subbase						Take core #1 - 0'-4'
Brown silty SAND, tr. clay [FILL]	1					
	2	1	MACROCORE	48"		
Reddish Brown SILT, some fine gravel, trace sand (dry) [ML]	3					
Reddish Brown SILT (dry) [ML]	4					Take core #2 4'-8'
	5					
	6	2	MACROCORE	48"		
Reddish Brown SILT, (saturated) [ML] "Bulls Liver"	7					
Reddish Brown SILT (saturated) [ML] "Bulls Liver"	8					Take Core #3 8'-12'
	9					
Reddish Brown SILT, some gravel, trace sand, trace clay (moist) [ML]	10	3	MACROCORE	48"		
	11					
Reddish Brown SILT, some gravel, trace sand, trace clay (moist) [ML]	12					Take Core #4 - 12'-13'
el. 7.5 Reddish Brown SHALE [ROCK]	13	4	MACRO	~12"		Refusal @ 13' No Water encountered
	14					

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

LOG OF BORING LGP-5 **SHEET** 1 **OF** 1

PROJECT: Elizabeth Academic	PROJECT NO.: 9206368
LOCATION: Elizabeth, NJ	ELEVATION AND DATUM: el. 21.5
DRILLING AGENCY: Summit Drilling, Inc.	DATE STARTED: 10/17/11 — DATE FINISHED: 10/17/11
DRILLING EQUIPMENT: Truck-Mounted Geoprobe	COMPLETION DEPTH: 14' — ROCK DEPTH: 14'
SIZE AND TYPE OF BIT	NO. SAMPLES — DIST. — UNDIST. — CORE —
CASING	WATER LEVEL — FIRST — COMPL. — 24 HR. —
CASING HAMMER — WEIGHT — DROP	FOREMAN: Fred
SAMPLER: 2" Acetylene Tubing (Macro-core)	INSPECTOR: Diana Rooney
SAMPLER HAMMER — WEIGHT — DROP	

SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO./LOC.	SAMPLES TYPE	SAMPLES RECOV. FT.	SAMPLES PENETR. RESIST BLI6 in.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
4" Asphalt						Take Core #1 -0-4'
DGA 12"						
Reddish Brown SILT, trace sand, trace clay, trace gravel (dry) [ML]	1	1	MACRO CORE	48"		
	2					
	3					
	4					Take core #2 - 4'-8'
Reddish Brown sandy SILT, trace gravel (dry) [ML]	5					
	6					
Reddish Brown and mottled SILT, some sand, trace clay (dry) [ML]	7	2	MACRO CORE	48"		
	8					Take core #3 8'-12'
Reddish Brown clayey SILT, some sand, trace gravel (moist/dry) [ML]	9					
	10					
	11	3	MACRO CORE	48"		
	12					Take core #4 12' - 14"
Reddish Brown clayey SILT, some gravel [ML] (moist)	13	4	MACRO	24"		No Groundwater encountered
el. 7.5	14					refusal @ 14'
Red [illegible] SHALE [DRY]						

APPENDIX C

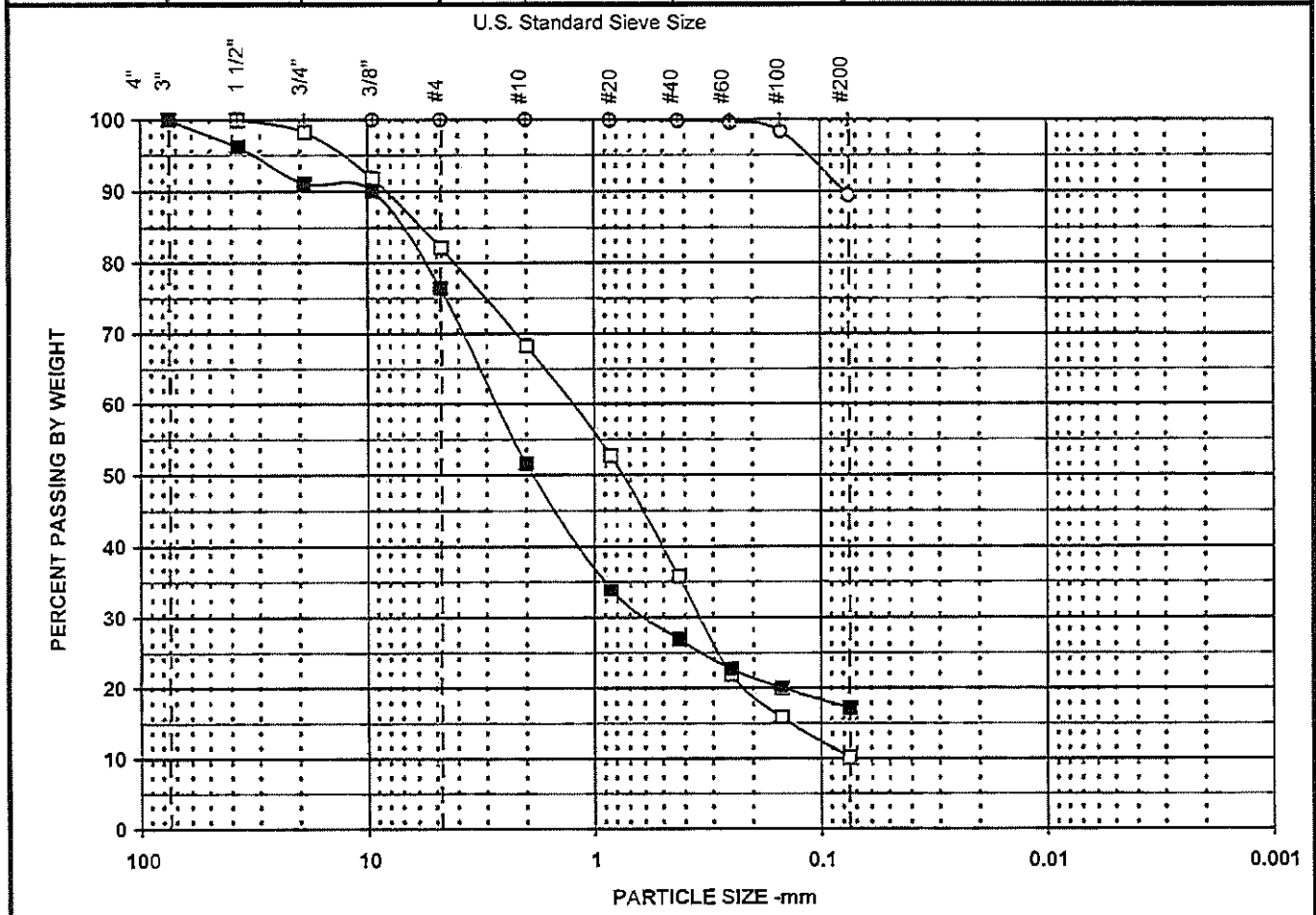
RESULTS OF GEOTECHNICAL LABORATORY TESTS

Langan #9206368
Elizabeth Academic
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS			COMPACTION							REMARKS
			WATER CONTENT (-3/4") (%)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	ASTM STD.	OPT. WATER CONTENT (%)	MAX . DRY UNIT WGT. (pcf)	- 3/8	- 3/4	PREP wet	PREP dry	
LTP-5	1	10	15.2	SW-SM	10.2	D1557	11.1	127.8		X	X		
LTP-3	2	15.5	23.0	SM	17.2								
LTP-11	3	12	20.2*	ML	89.5	D1557	14.0	114.5	X		X		*-3/8"

Note: (1) USCS symbol based on visual observation and Sieve reported.

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



Symbol	□	■	○
Boring	LTP-5	LTP-3	LTP-11
Sample	1	2	3
Depth	10'	15.5'	12'
% +3"	0.0	0.0	0.0
% Gravel	17.8	23.6	0.0
% SAND	72.0	59.2	10.5
%C SAND	13.8	24.9	0.0
%M SAND	32.6	24.6	0.1
%F SAND	25.6	9.7	10.3
% FINES	10.2	17.2	89.5
% -2μ			
D_{100} (mm)	37.50	75.00	4.75
D_{60} (mm)	1.38	2.93	
D_{30} (mm)	0.35	0.60	
D_{10} (mm)	0.07		
Cc	1.2		
Cu	19.1		

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"		100.0	
1 1/2"	100.0	96.3	
3/4"	98.4	91.2	
3/8"	91.9	90.1	100.0
4	82.2	76.4	100.0
10	68.4	51.6	100.0
20	52.8	34.1	100.0
40	35.8	27.0	99.9
60	22.0	22.8	99.7
100	15.9	20.1	98.4
200	10.2	17.2	89.5

SYMBOL	w (%)	LL	PL	PI	USCS	DESCRIPTION AND REMARKS	Date Tested
□					SW-SM	Dark brown, Well-graded sand with silt and gravel	10/11/2011
■					SM	Reddish brown, Silty sand with gravel (shale - material breaks down)	10/11/2011
○					ML	Brown, Silt	10/12/2011

TerraSense, LLC	Langan
7920-158	9206368

PARTICLE SIZE DISTRIBUTION
Elizabeth Academic

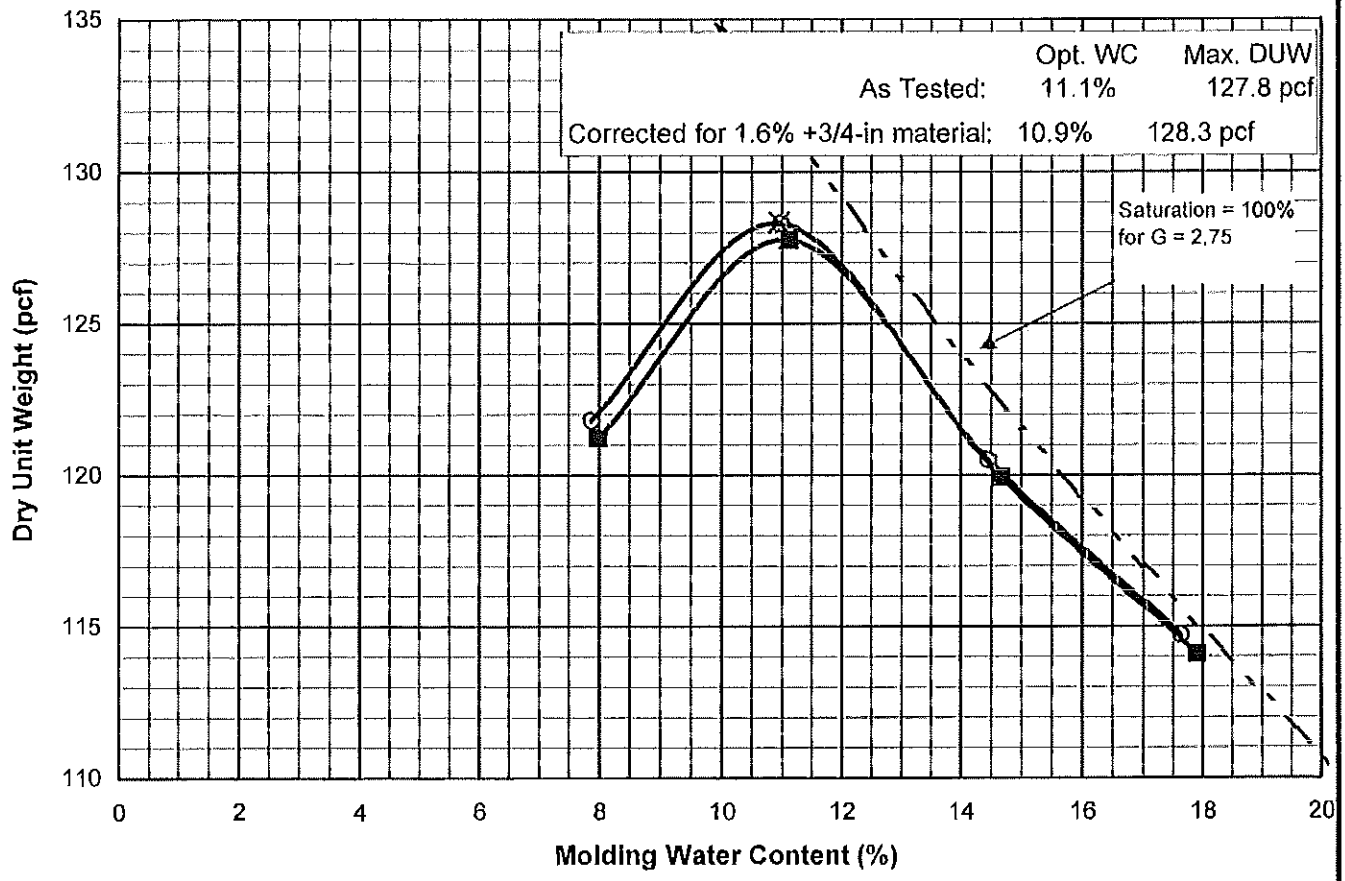
Analysis File: 3SV-MasterRev3

siev1a.xls 10/19/2011

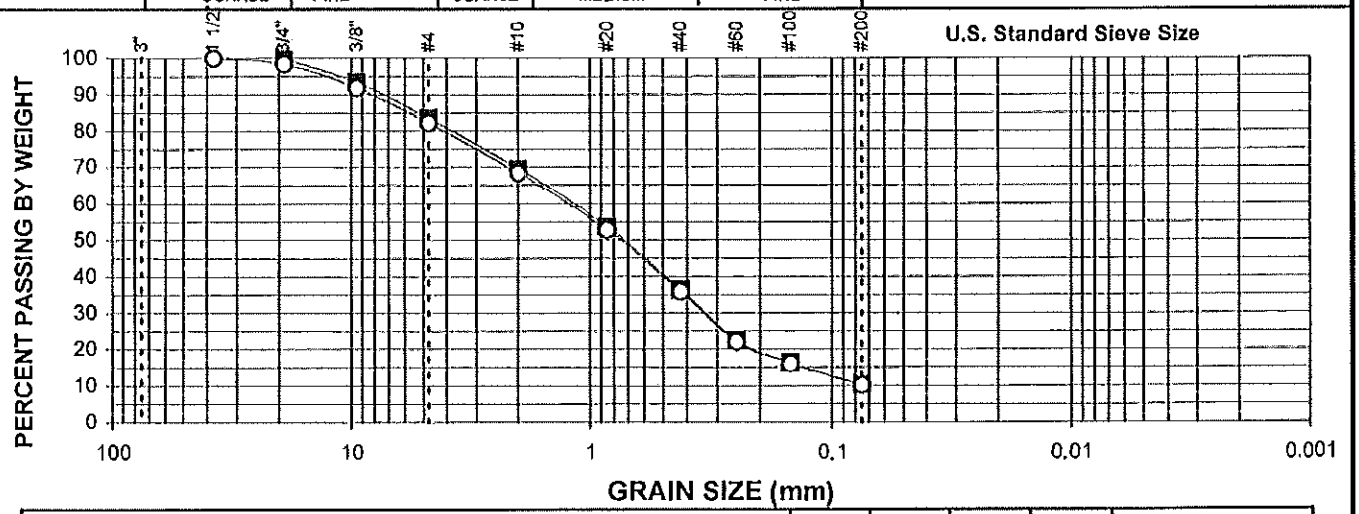
COMPACTION CURVE

Test Method: ASTM D1557 Compaction Procedure: C Specimen Preparation Method: Moist

NOTATION: ○ Representative of entire sample ■ Compaction Test specimen X Selected Optimum Point



PARTICLE-SIZE DISTRIBUTION CURVE



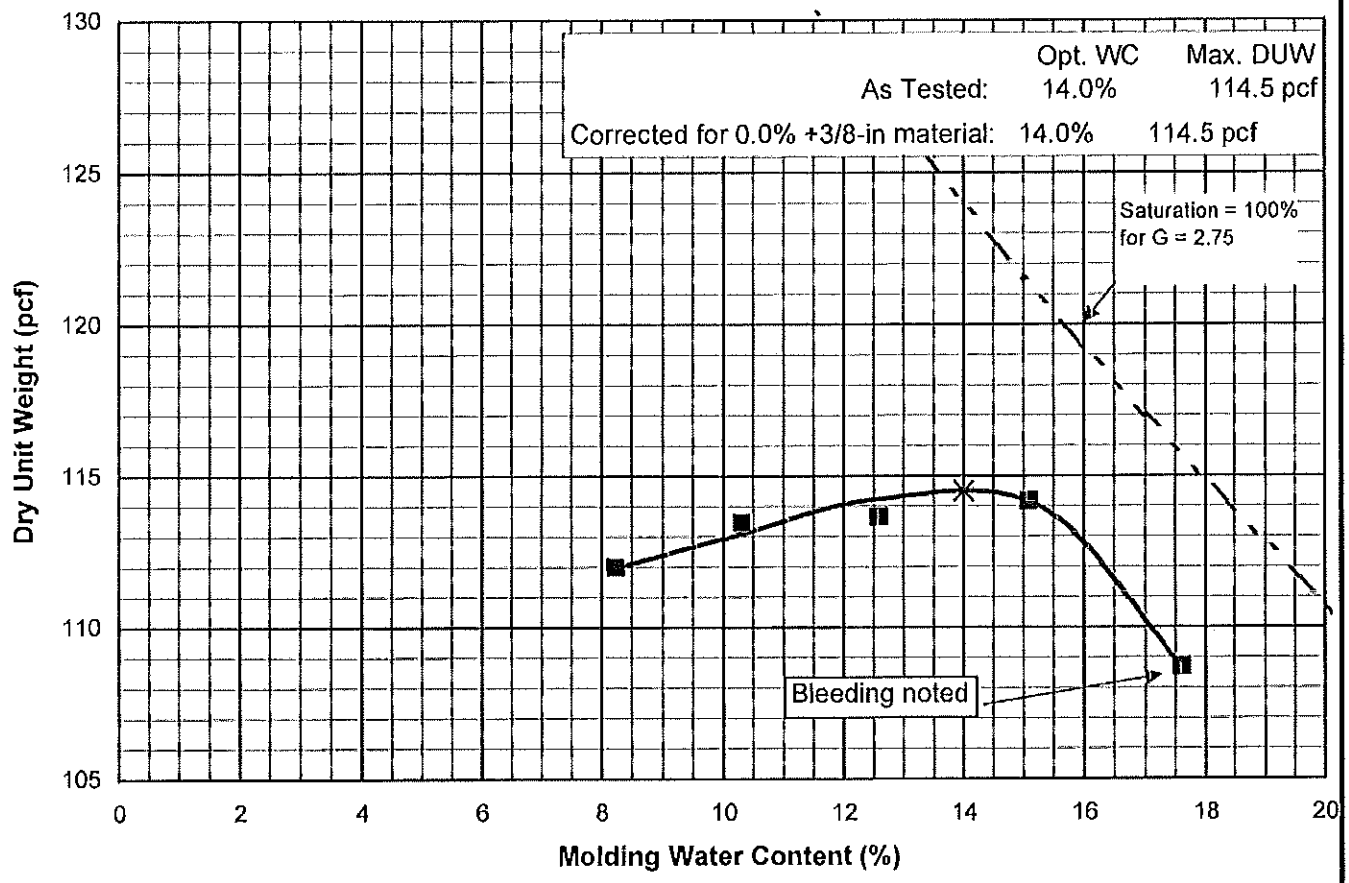
Description and/or Classification	LL	PL	PI	% Fines	Specific Gravity
SW-SM, dark brown, Well-graded sand with silt and gravel				10.2	2.75 (Assumed)

Elizabeth Academic		LTP-5 SAMPLE: 1 DEPTH: 10' ft
Langan	Project No. 9206368	COMPACTION AND INDEX PROPERTY DATA
TerraSense, LLC	Project No. 7920-158	

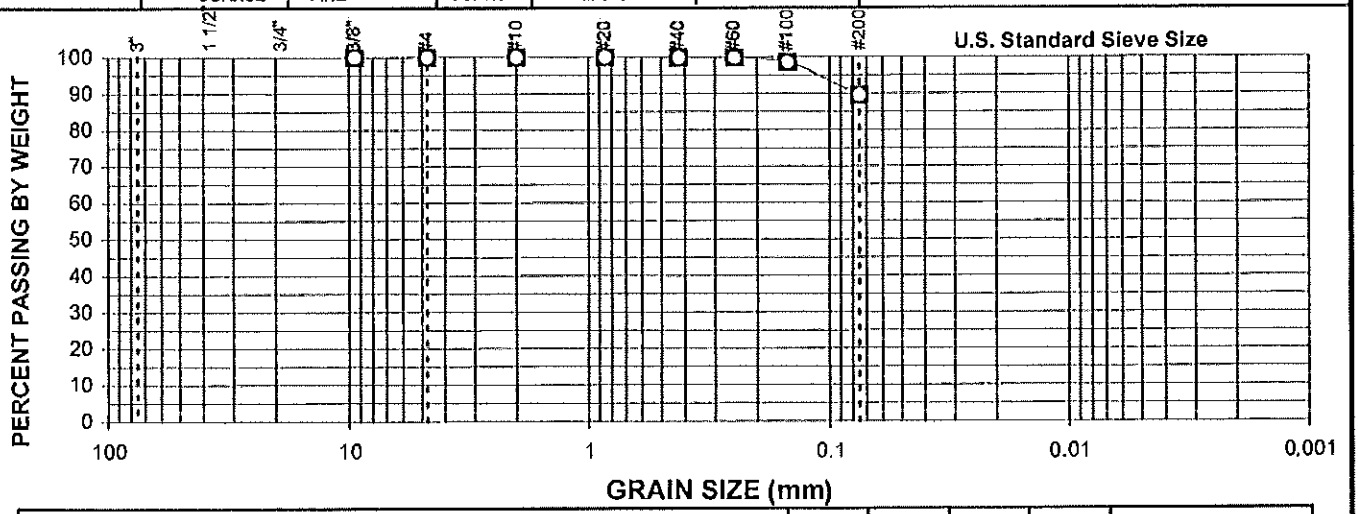
COMPACTION CURVE

Test Method: ASTM D1557 Compaction Procedure: B Specimen Preparation Method: **Moist**

NOTATION: ○ Representative of entire sample ■ Compaction Test specimen X Selected Optimum Point



PARTICLE-SIZE DISTRIBUTION CURVE



Description and/or Classification	LL	PL	PI	% Fines	Specific Gravity
ML, brown, Silt				89.5	2.75 (Assumed)

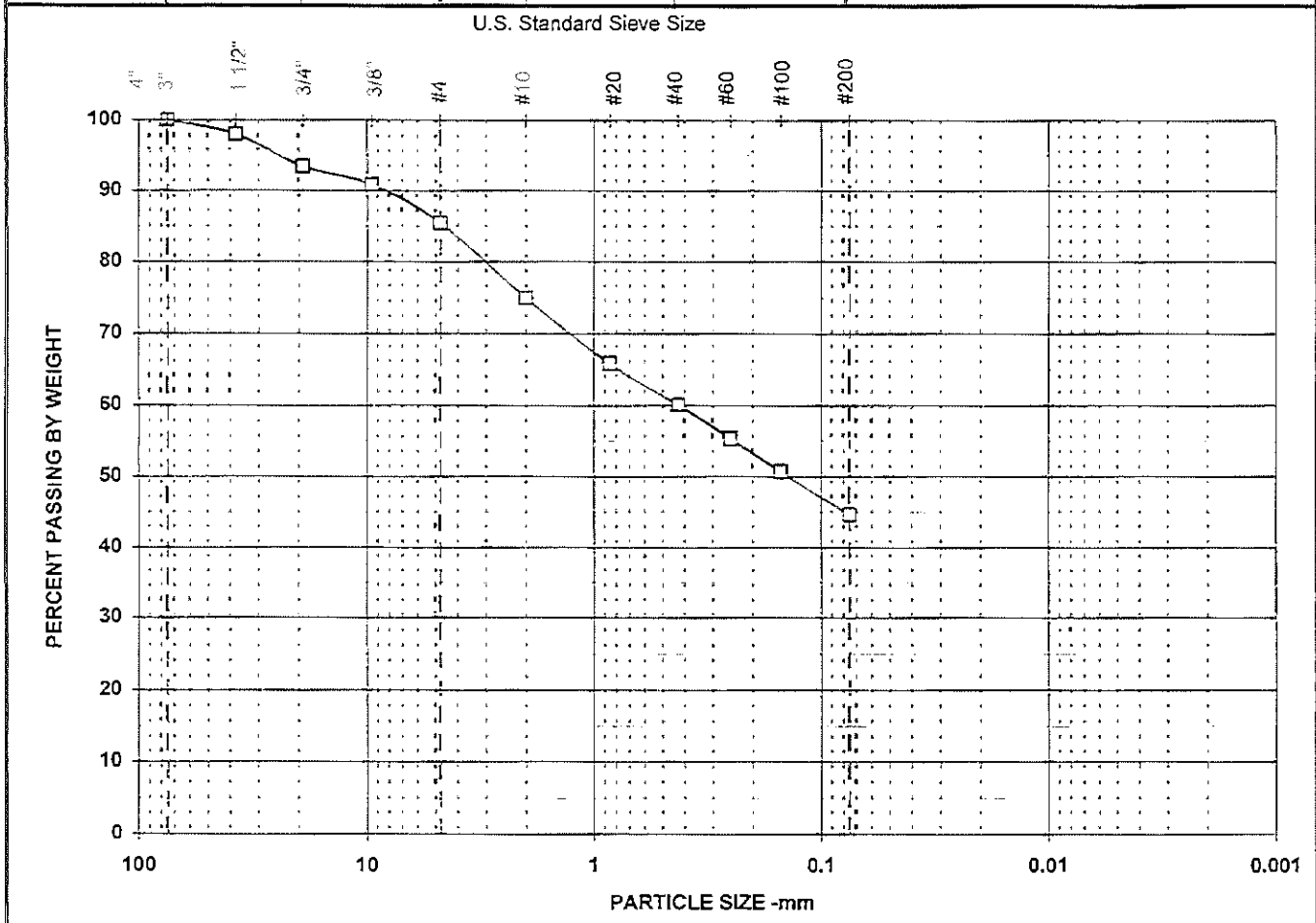
Elizabeth Academic		LTP-11 SAMPLE: 3 DEPTH: 12' ft
Langan	Project No. 9206368	COMPACTION AND INDEX PROPERTY DATA
TerraSense, LLC	Project No. 7920-158	

Langan #9206368
Elizabeth Academic
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS			COMPACTION							REMARKS
			WATER CONTENT (-3/4") (%)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	ASTM STD.	OPT. WATER CONTENT (%)	MAX. DRY UNIT WGT. (pcf)	- 3/8	- 3/4	PREP wet	PREP dry	
LTP- 2	4	12	15.6	SC	44.7	D1557	10.5	129.8		X	X		

Note: (1) USCS symbol based on visual observation and Sieve reported.

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	[illegible]	COARSE	MEDIUM	FINE	



Symbol	□	■	○
Boring	LTP-2		
Sample	4		
Depth	12'		
% +3"	0.0		
% Gravel	14.5		
% SAND	40.8		
%C SAND	10.4		
%M SAND	15.0		
%F SAND	15.4		
% FINES	44.7		
% -2μ			
D_{100} (mm)	75.00		
D_{60} (mm)	0.42		
D_{30} (mm)			
D_{10} (mm)			
Cc			
Cu			

Particle Size (Sieve #)	PERCENT FINER □	■	○
4"			
3"	100.0		
1 1/2"	97.9		
3/4"	93.4		
3/8"	90.8		
4	85.5		
10	75.0		
20	65.8		
40	60.1		
60	55.3		
100	50.7		
200	44.7		

SYMBOL	w (%)	LL	PL	PI	USCS	DESCRIPTION AND REMARKS	Date Tested
□					SC	Reddish brown, Clayey sand (shale - material breaks down)	10/18/2011
■							
○							

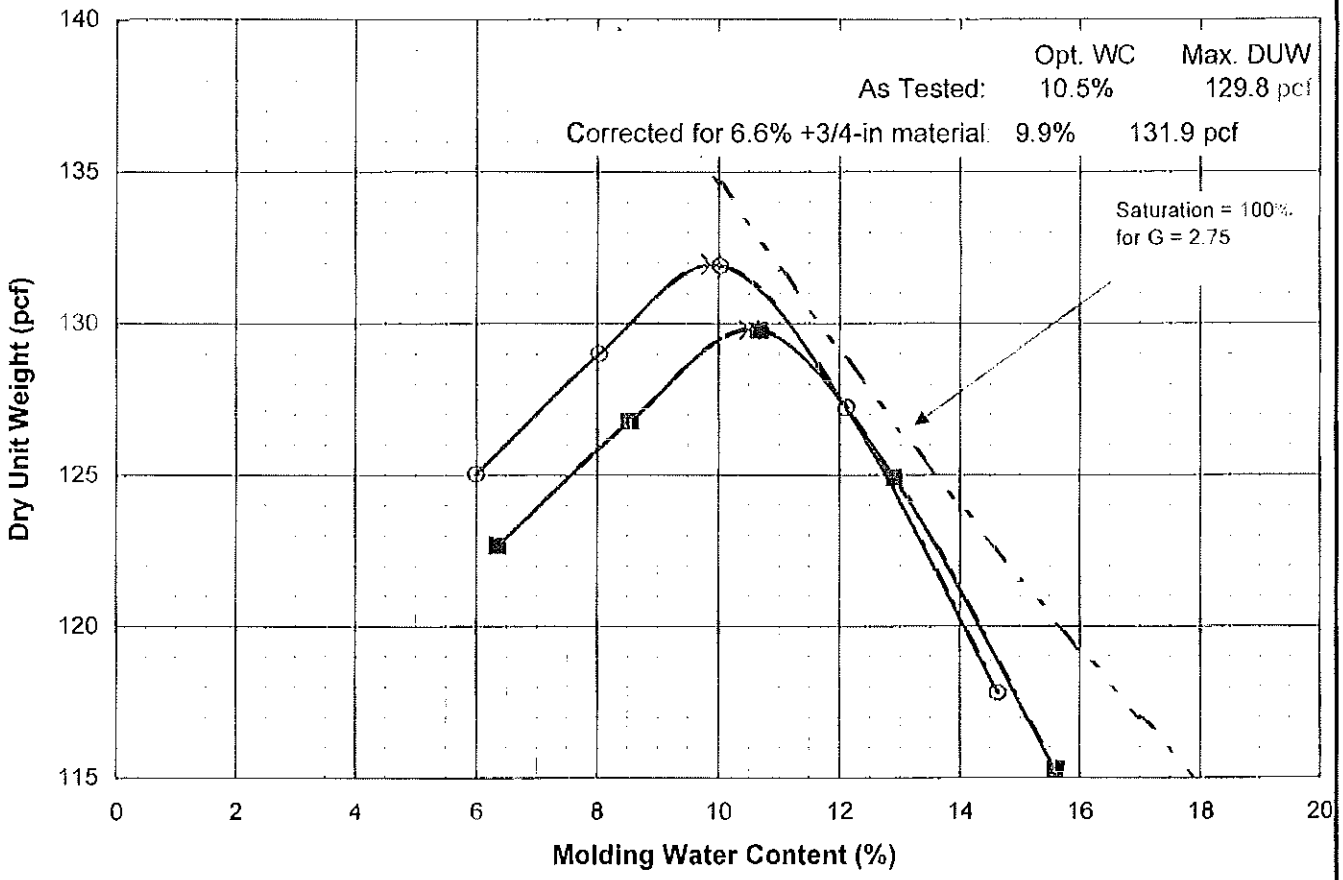
TerraSense, LLC	Langan
7920-158	9206368

PARTICLE SIZE DISTRIBUTION
Elizabeth Academic

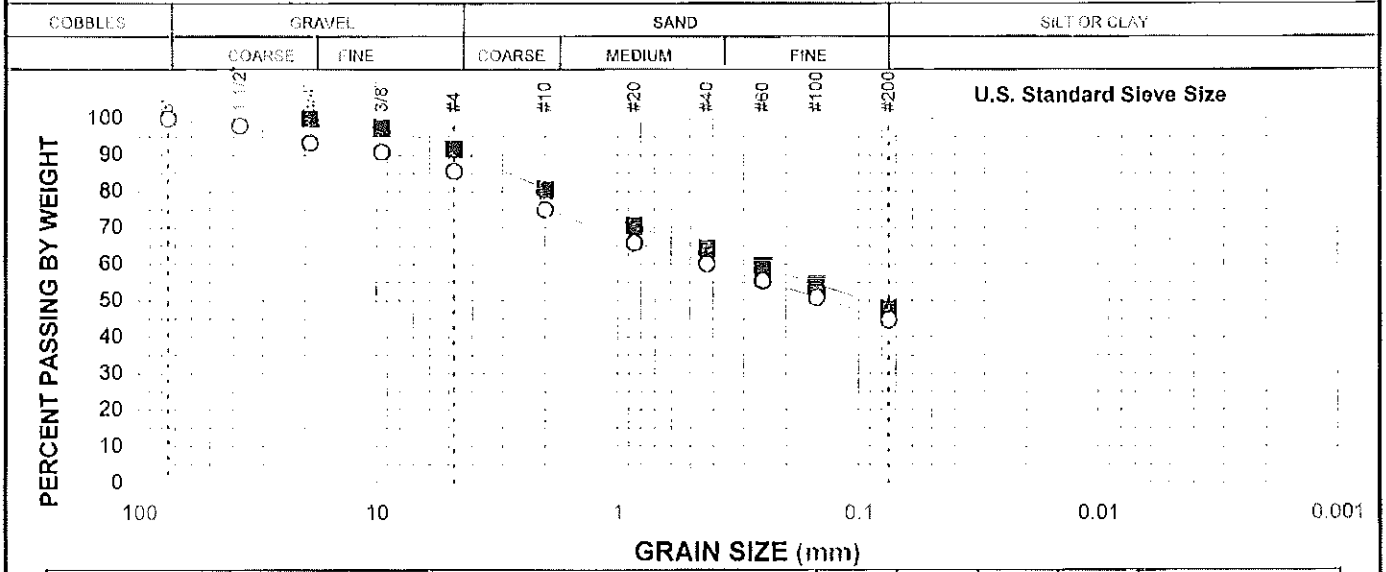
COMPACTION CURVE

Test Method ASTM D1557 Compaction Procedure: C Specimen Preparation Method: **Moist**

NOTATION: ○ Representative of entire sample ■ Compaction Test specimen X Selected Optimum Point



PARTICLE-SIZE DISTRIBUTION CURVE



Description and/or Classification	LL	PL	PI	% Fines	Specific Gravity
SC, reddish brown, Clayey sand (shale - material breaks down)				44.7	2.75 (Assumed)

Elizabeth Academic

LTP 2

SAMPLE: 4 DEPTH: 12 ft

Langan Project No. 9206368

TerraSense, LLC Project No. 7920-158

COMPACTION AND INDEX PROPERTY DATA