

Michael R. Wigley, AIA, LEED®AP
Randy B. Duplechain, P.E.
Charles R. Woodward, Jr., LS
W. Zachary Crouch, P.E.
Michael E. Wheedleton, AIA
Jason P. Loar, P.E.
Ring W. Lardner, P.E.
Gerald G. Friedel, P.E.

**KENT/SUSSEX BUILDING
LOADING DOCK REHABILITATION
HERMAN M. HOLLOWAY SR. CAMPUS
NEW CASTLE, DELAWARE
DBF # 0586B031.GG1 ❖ OMB/DFM No. MC3501000018
OCTOBER 7, 2014**

ADDENDUM NO. 3

The following items shall become a part of the contract documents. Contractor must acknowledge receipt of this addendum on the Bid Form. Failure to do so may subject the Bidder to disqualification.

Item No. 1 The following Requests for Information (RFIs) are addressed in bold:

- A. *On the plan (A1) there is an (A) or (I) in reference to the covered canopy sidewalk area. Are there supposed to be lights at the covered canopy sidewalk area?*

On J13 Floor Plan of Sheet A1 lights are indicated by a circle with an A. A lighting legend is also shown on the right side of border. Number 21 of the pre-bid meeting minutes is incorrect. The project does include new lighting.

- B. *Demo note DP states “electrical conduit to be adjusted (as necessary)”. Since the scope of work is unclear, can a dollar allowance or linear foot allowance be applied to this work item?*

A lump sum allowance has been added to the bid form and the Allowance Section has been revised.

- C. *Please provide a detail for the attachment of the steel angle for the loading dock bumpers.*

Attached is Drawing 9-1 showing a detail of how to connect the steel angle for the loading dock bumpers. Delete the pressure treated board reference from floor plan keynote 9 found on Sheet A-1. On the truck dock elevation detail shown on Sheet C-01 revise the angle iron dimensions to meet those shown on Drawing 9-1 and delete the pressure treated board.

D. The drawing is unclear as to where the new fence is to be located. Can you provide additional information?

The fence to be installed can be found on Sheet A-1.

- Item No. 2 Section 01 21 00, ALLOWANCES, has been revised to add Allowance No. 3, and is attached to this addendum.
- Item No. 3 Section 00 31 19, EXISTING CONDITIONS INFORMATION, has been revised to include Utility Surface Location Sketches and is attached to this addendum.
- Item No. 4 Section 00 31 32, GEOTECHNICAL DATA, has been revised to include soil boring data report and is attached to this addendum.
- Item No. 5 Section 00 41 13, BID FORM, has been revised and is attached to this addendum.
- Item No. 6 DHSS Interim Life Safety Measures form is attached hereto. This form shall be completed by the awarded contractor and submitted at the preconstruction meeting.

END OF ADDENDUM

L 5x3 1/2 x 3/8
CONTINUOUS

DOCK
BUMPER

(2) 3/4" DIA.
EPOXY BOLTS
AT 24" O.C.

3/8" SHIM
PLATE

3"

3"



DAVIS, BOWEN & FRIEDEL, INC.
ARCHITECTS, ENGINEERS & SURVEYORS

SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441

LOADING DOCK REHAB
ANGLE IRON / TRUCK BUMPER CONNECTION
DUPONT HIGHWAY
NEW CASTLE, DELAWARE

PROJ. NO. : 0586B031.GG1

DATE : OCTOBER 6, 2014

SCALE: NTS

DWG.

9-1

KENT/SUSSEX LOADING DOCK REPAIR
HERMAN M. HOLLOWAY, SR. CAMPUS
CONTRACT # MC3501000018

SECTION 00 41 13

BID FORM

For Bids Due: _____ **To:** _____

Name of Bidder: _____

Delaware Business License No.: _____ **Taxpayer ID No.:** _____
(A copy of a Bidders Delaware Business License must be attached to this form.)

(Other License Nos.): _____

Phone No.: () _____ - _____ **Fax No.:** () _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

\$ _____
(\$ _____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

UNIT PRICE No. 1: Removal/replacement of soil. \$ _____ /CY

UNIT PRICE No. 2: Removal/replacement of concrete sidewalk and subsurface. \$ _____ /SF

KENT/SUSSEX LOADING DOCK REPAIR
HERMAN M. HOLLOWAY, SR. CAMPUS
CONTRACT # MC3501000018

ALLOWANCES

Allowances conform to applicable project specification section. Refer to the specifications for a complete description of the following allowance.

ALLOWANCE NO. 1: Undercut parking lot shall be included in the base bid.

Add: _____ (\$ _____)

ALLOWANCE NO. 2: Unforeseen conditions shall be included in the base bid.

Add: Fifteen Thousand Dollars _____ (\$15,000.00)

ALLOWANCE NO. 3: Include a lump sum cost to adjust /relocate the existing electric line as called for on Sheet D-01 (Demolition Plan). Submit allowance amount on bid form and include the cost as part of the base bid.

Add: _____ (\$ _____)

KENT/SUSSEX LOADING DOCK REPAIR
HERMAN M. HOLLOWAY, SR. CAMPUS
CONTRACT # MC3501000018

BID FORM

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for sixty (60) days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid.

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within _____ calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

(State of Corporation)

Business Address: _____

Witness: _____

(SEAL)

By: _____
(Authorized Signature)

(Title)

Date: _____

ATTACHMENTS

- Sub-Contractor List
- Non-Collusion Statement
- Bid Security
- (Others as Required by Project Manuals)

KENT/SUSSEX LOADING DOCK REPAIR
 HERMAN M. HOLLOWAY, SR. CAMPUS
 CONTRACT # MC3501000018

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, it is **required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax payer ID # or Delaware Business license #</u>
1. Sitework	_____	_____	_____
2. Concrete	_____	_____	_____
3. Asphalt	_____	_____	_____
4. Fencing	_____	_____	_____
5. Structural Steel	_____	_____	_____
6. Metal Roofing	_____	_____	_____
7. Metal Trusses	_____	_____	_____
8. Metal Siding	_____	_____	_____
9. Electrical	_____	_____	_____

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date *(to the Office of Management and Budget, Division of Facilities Management)*.

All the terms and conditions of Contract No. #MC3501000018 have been thoroughly examined and are understood.

NAME OF BIDDER: _____

**AUTHORIZED REPRESENTATIVE
(TYPED):** _____

**AUTHORIZED REPRESENTATIVE
(SIGNATURE):** _____

TITLE: _____

ADDRESS OF BIDDER: _____

E-MAIL: _____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____ . NOTARY PUBLIC _____ .

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Quantity allowances.
- C. Related Requirements:
 - 1. Section 01 22 00 "Unit Prices" for procedures for using unit prices.
 - 2. Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Quantity Allowance: Include 200 cu. yd. of unsatisfactory soil excavation and disposal off-site and replacement with satisfactory soil material from off-site, as specified in Section 31 20 00 "Earth Moving." Submit allowance amount on bid form and included as part of the base bid.
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Section 01 22 00 "Unit Prices."
- B. Allowance No. 2: Provide an allowance of \$15,000.00 for unforeseen conditions in the base bid.
- C. Allowance No. 3: Lump Sum Allowance: Include a lump sum cost to adjust/relocate the existing electric line as called for on Sheet D-01 (Demolition Plan). Submit allowance amount on bid form and include the cost as part of the base bid.

END OF SECTION

SECTION 00 31 19

EXISTING CONDITIONS INFORMATION

1.1 EXISTING CONDITION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Existing drawings that include information on existing conditions including previous construction at Project site are available for viewing at the office of Architect.
- C. Survey information that includes information on existing conditions, prepared by Davis, Bowen & Friedel, Inc., dated December 2013, is available for viewing as part of Drawings.
- D. The Utility Surface Location Sketch by Soft Dig dated December 18, 2013 is attached to this Section.
- E. Related Requirements:
 - 1. Section 00 21 13 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Section 00 31 32 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

END OF SECTION

• UTILITY SURFACE LOCATION SKETCH •

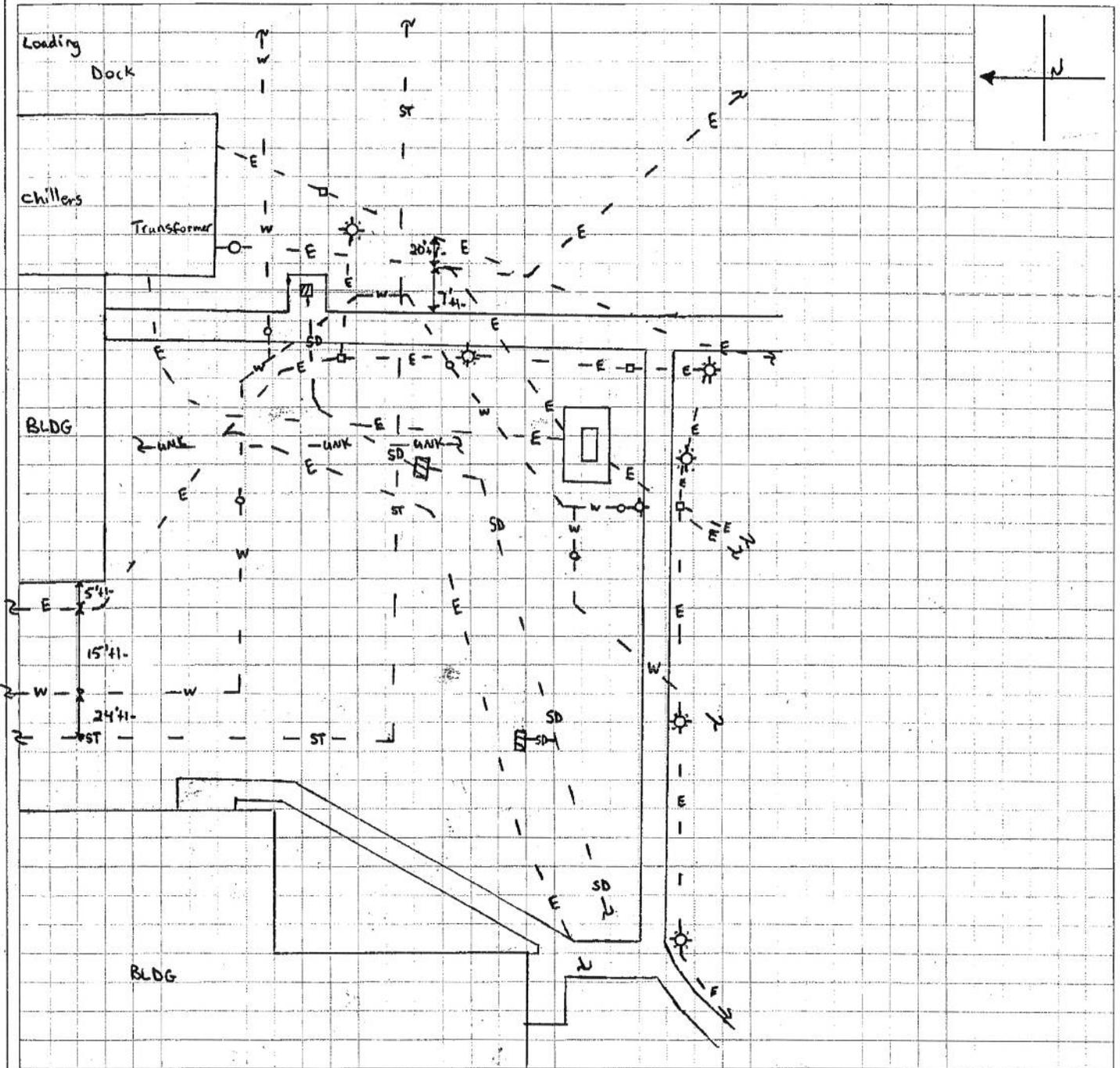
Pre-Surface Location Information

Intended construction in project limits: Excavation Trenching Soil Borings/Wells Other _____ Describe _____

Project limits defined by: Flagging Paint Sketch Other Designation

Utilities requested to be surface located in project limits: Water Comm. Gas Elec. CATV San. Swr. St. Swr. Other _____

Utilities requested not to be surface located in project limits: _____



- Notes:**
- SoftDig exercised its best professional expertise & geophysical prospecting techniques to designate subsurface utilities.
 - SoftDig does not guarantee that utilities marked constitute all utilities within the project area.
 - Prior to actual construction, utilities must be subsurface located by SoftDig at potential conflict points to avoid personal injury and/or property damage.

Locator's Signature: Stan Smith
 Client's Signature: _____

Corporate Headquarters West Chester, PA (877) SOFTDIG (877) 763-8344	Job#	Date	Prepared by	Checked by
	135420	12/18/13	S. Smith	
Client	Location			
Davis Bowen Friedel	1901 North Dupont Highway New Castle, De			

• UTILITY SURFACE LOCATION SKETCH •

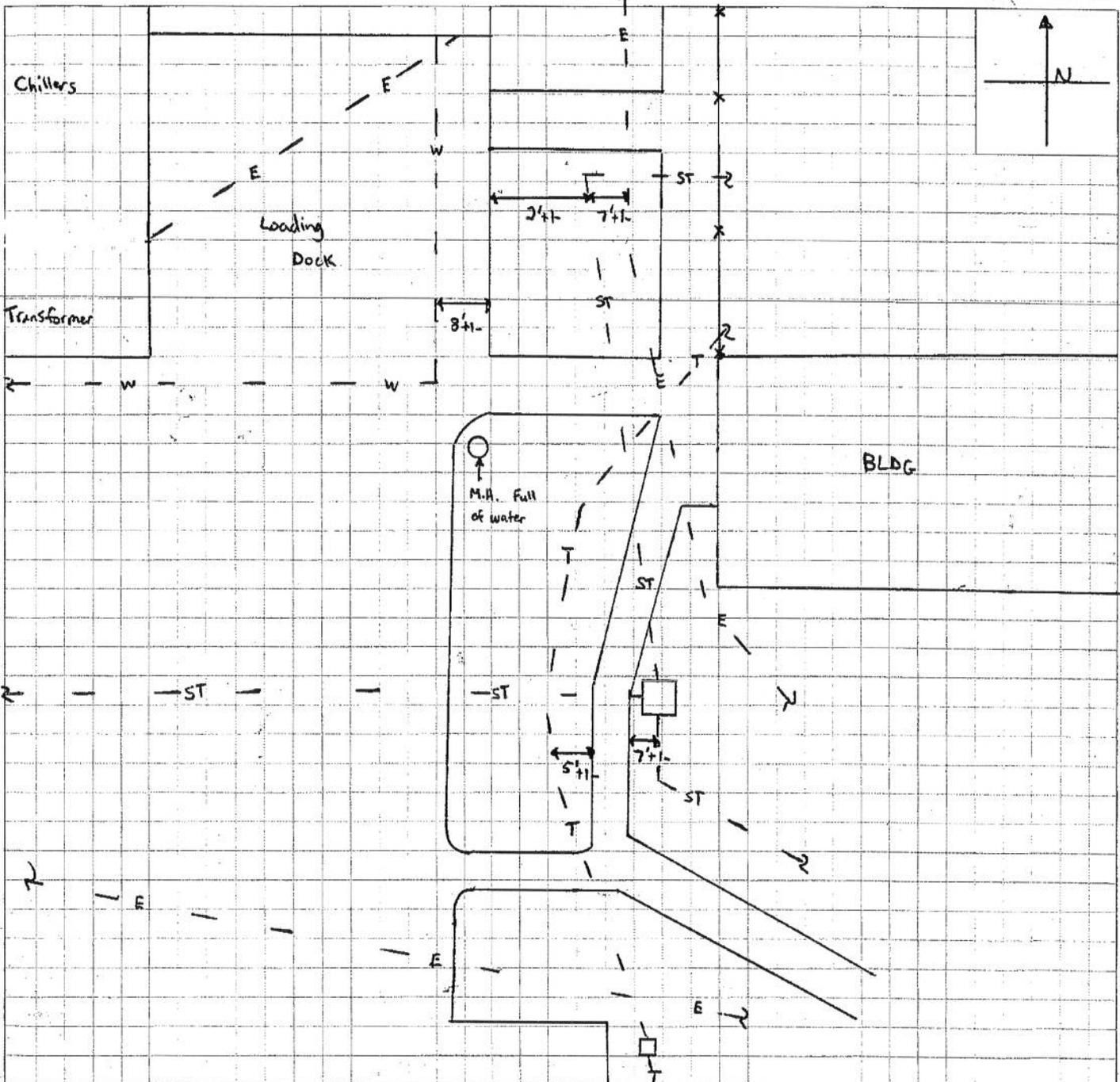
Pre-Surface Location Information

Intended construction in project limits: Excavation Trenching Soil Borings/Wells Other _____ Describe _____

Project limits defined by: Flagging Paint Sketch Other Designation

Utilities requested to be surface located in project limits: Water Comm. Gas Elec. CATV San. Swr. St. Swr. Other _____

Utilities requested not to be surface located in project limits: _____



Notes:
 • SoftDig exercised its best professional expertise & geophysical prospecting techniques to designate subsurface utilities.
 • SoftDig does not guarantee that utilities marked constitute all utilities within the project area.
 • Prior to actual construction, utilities must be subsurface located by SoftDig at potential conflict points to avoid personal injury and/or property damage.

Locator's Signature: Stan Smith
 Client's Signature: _____

Corporate Headquarters West Chester, PA (877) SOFTDIG (877) 763-8344	Job#	Date	Prepared by	Checked by
	135420	12/18/13	S. Smith	
Client	Location			
Davis Bowen Friedel	1901 North Dupont Highway New Castle, De			

NOTES

Crew: S. Smith
C. Loesch

12/17/13
25°/cloudy

Arrived onsite at 7am. No client was onsite. Talked to client from David's Bowen & Friedel named Ringharder over the phone last night about job. Marked out utilities in area. man hole near loading dock that client was concerned about in email is full of water and looks like an old underground transformer. we were unable to connect or get signal on it because its full of water. Left site at 2:30pm.

IF LOST CALL:

SECTION 00 31 32

GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Soil-boring data for Project, obtained by Duffield Associates, dated February 26, 2012, is available for viewing as appended to this Document.
- C. Related Requirements:
 - 1. Section 00 21 13 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF SECTION



DUFFIELD ASSOCIATES

Water/Civil



Geotechnical



Natural Resources



Environmental



Construction



**Project No. 6292.NN
Delaware Health and Social Services
Herman M. Holloway, Sr. Campus
Pavement Evaluation
Kent/Sussex Building Parking Lots
1901 North DuPont Highway
New Castle, Delaware**

February 26, 2012

Ms. Beverly Bartlett
State of Delaware
OMB/DFM
540 South DuPont Highway, Suite 1
Dover, Delaware 19901

RE: Project No. 6292.NN (Duffield Associates)
Pavement Evaluation
Delaware Health and Social Services – Herman M. Holloway, Sr. Campus
Kent/Sussex Building Parking Lots (DFM No. MC3501000018)
1901 North DuPont Highway
New Castle, Delaware

Dear Ms. Bartlett:

Duffield Associates, Inc. (Duffield Associates) has completed our evaluation of the pavement within the existing roadways and parking lots located on the southeastern side of the Kent/Sussex Buildings at the Herman M. Holloway, Sr. Campus located at 1901 North DuPont Highway, New Castle, Delaware. The following discussion generally summarizes our evaluation for the site. The enclosed report provides more detailed information regarding the field testing program, subsurface conditions encountered, as well as recommendations for the design and construction of the pavement improvements.

On February 5, 2014, seven Standard Penetration Test borings were performed at the project site to review the pavement and subgrade conditions at the site. The depth of the test borings performed ranged from a depth of approximately 5 to 20 feet below the existing pavement surface. The test borings were located in the field in areas accessible to the drilling rig, and clear of existing utilities and other vehicles. The attached test boring location sketch shows the study area and approximate locations of the test borings performed.

Based on observations made during the field program, the site's bituminous concrete pavement (asphalt) surface varied in condition and thickness. The asphalt appeared to be underlain by a base material that varied in thickness, composition, and texture as well. The asphalt thickness across the site was observed to range from approximately 1- to 4-inches, with some areas exhibiting "cracking" and "yielding" conditions. The base material beneath the asphalt consisted of materials with varying gradations ranging from crusher run to a blackish silty gravelly sand often containing large stone (up to 3-inch nominal size). The thickness of the pavement base was observed to range from approximately 4 to 13 inches across the study area. The total "pavement box" thickness ranged between 7 to 14 $\frac{1}{8}$ inches across the site. Areas exhibiting pavement failure (i.e., cracking) was observed to yield approximately $\frac{1}{4}$ to $\frac{1}{2}$ inches under the weight of our truck-mounted drilling rig. Numerous utilities existing beneath the pavement were observed, many of which pavement patching was evident at the utility locations.

Beneath the “pavement box,” the subgrade soil conditions also varied and were observed to consist of near-surface layers of granular to fine-grained (i.e., silt and clay) fill material overlying generally undisturbed, slowly permeable, fine-grained soils truncated by utility lines and its backfill materials. The near-surface fill materials presumably placed to grade the pavement subgrade was observed locally absent, have a medium density or medium consistency depending on texture, and (where encountered) extend down to a depth ranging from 2 to 3 feet below the top of pavement. An increase in the soil moisture content and relative decrease in soil bearing capacity was also observed at the transition between the fill material and the undisturbed soil strata. Borings performed adjacent to an apparent utility trench-line exhibiting cracking, depression, and deflection under the drilling equipment was observed to be underlain by granular soils similar to select borrow. The depth of the fill material in the vicinity of the utility line where borings P-5 and P-6 were performed was observed to approximately 6.5 feet or greater below the top of pavement. It is likely that this utility trench was constructed with less than desirable compaction effort.

In some locations, the undisturbed soil strata generally consisted of localized, shallow, very soft and moist silts with an organic odor transitioning into hydraulically restrictive, predominantly silty and clayey soils with a medium to very stiff consistency and varying moisture contents and sand fractions. At deeper depths (approximately 6 to 8 feet below the top of paving), the hydraulically restrictive overburden was underlain with localized water bearing zones consisting of sandy gravels, silty sands, and poorly-graded sands. These near-surface fine-grained soils and granular water bearing zones appeared generally consistent with the descriptions of the undifferentiated Delaware Bay Group (Scotts Corner and/or Lynch Heights Formations) and possibly eroded Columbia Formation soils. Stiff to very stiff clays consistent with the descriptions of the Potomac Formation, a regional hydraulic restriction, were encountered at a depth of 8 feet below the top of existing pavement.

Based on review of the subsurface conditions encountered during this evaluation, it is Duffield Associates’ opinion that the existing asphalt pavement and pavement base materials beneath the bituminous concrete are highly variable, and new pavement should include full depth pavement preparation. Although the majority of the natural subgrade soils are likely suitable to support the proposed pavement section, localized shallow and soft conditions were observed and may require undercutting. In addition, the subgrade conditions are hydraulically restrictive, which impedes drainage of the pavement base material, and as such underdrains should be considered where the fine-grained soils are encountered.

Prior to construction, the existing bituminous concrete and base material should be removed to a depth of approximately 12 inches below the proposed top of pavement elevation, and the parking lot area should be roughly graded and proof rolled with a fully-loaded, tandem-wheel dump truck to identify yielding or soft subgrade conditions. Further recommendations for pavement design and improvements for yielding subgrade conditions are provided in detail in the enclosed report.

The project will also include construction of a new retaining wall near the existing loading dock. Based on the soils encountered near the existing loading dock, the foundations could be sized for the currently designed net allowable bearing capacity of 2,000 pounds per square foot. Further recommendations for foundation construction are detailed in the enclosed report.

Mr. Beverly Bartlett
RE: Project No. 6292.NN
February 26, 2014
Page 3

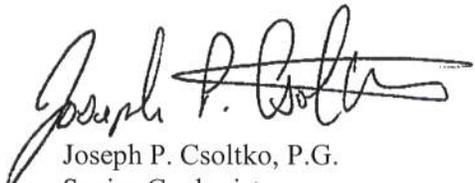


The recommendations of this report have been prepared according to generally accepted soil and foundation engineering standards, and are based on the conditions encountered by the test borings performed at the site. It is noted that, although soil quality has been inferred from the interpolation of the sampling data, subsurface conditions beyond the test borings are, in fact, unknown. Should any conditions encountered during construction differ from those described in this report, this office should be notified immediately in order to review, and possibly modify, these recommendations. This report applies solely to the size, type, and location of the structures described herein. In the event that changes are proposed, this report will not be considered valid unless the changes have been reviewed and the recommendations of this report modified and re-approved in writing by Duffield Associates, Inc.

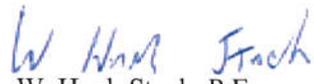
We appreciate this opportunity to be of service to you. Should you have any questions concerning this evaluation, please contact us.

Very truly yours,

DUFFIELD ASSOCIATES, INC.



Joseph P. Csoltko, P.G.
Senior Geologist



W. Hank Stack, P.E.
Field Services Division Director

JPC/WHS:jst
WORD\6292NN.0214-DHSS_Pavement Evaluation.RPT

**Project No. 6292.NN - Pavement Evaluation
Kent / Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



TABLE OF CONTENTS

A.		PROJECT SUMMARY	1
B.		FIELD WORK.....	2
C.		SUBSURFACE CONDITIONS.....	2
D.		ANALYSIS AND DESIGN RECOMMENDATIONS	4
E.		CONSTRUCTION RECOMMENDATIONS.....	7
F.		SKETCHES AND TEST BORING LOGS	10

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



A. PROJECT SUMMARY

PROPOSED CONSTRUCTION

- Rehabilitation of the existing Kent/Sussex Building Loading Dock and Parking lots located at the Delaware Health and Social Services (DHSS) Herman M. Holloway, Sr. Campus at 1901 North DuPont Highway, New Castle, Delaware.
- The primary purpose of the parking lots is for passenger car parking. In addition, services vehicles (e.g., trash and delivery trucks) are anticipated to use the circulation, access roads and loading dock area.

REFERENCES UTILIZED FOR THIS EVALUATION

- Drawings titled “Kent/Sussex Loading Dock Repair – Site (C-01) and Demolition (D-01) Plans,” dated November 2013, prepared by Davis, Bowen, & Friedel, Inc., illustrating the existing site layout and proposed area of pavement rehabilitation.
- A drawing titled “Utility Surface Location Sketch,” prepared by SoftDig, dated December 18, 2013, indicating the approximate location of underground utilities delineated during SoftDig’s evaluation of the site.

EXISTING SITE CONDITIONS

- The project site is located at 1901 North DuPont Highway, New Castle, Delaware. The study area of this evaluation is located on the southern side of the building area’s loading dock, and extends southward along the roadways and parking areas.
- The site is relatively flat and primarily consists of bituminous concrete pavement parking lot and drive areas, with sidewalk and landscaped areas surrounding existing single-story buildings. The existing condition of the pavement surface is generally degraded with numerous areas showing signs of cracking and post-construction repair patches. Pavement elevations generally slope to the northwest with drainage becoming increasingly impeded in the vicinity of the approach to the Kent/Sussex building loading dock, garbage dumpster pad, and gravel parking areas.
- Several underground utilities including water, sanitary sewer, stormwater, communication, gas, and electric lines were delineated in the field prior to the performance of the field work by Underground Services, Inc. (SoftDig) and “Miss-Utility.” Several unmarked lines and manholes were also observed.

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



B. FIELD WORK

- Seven Standard Penetration Test borings were performed at the project site on February 6, 2014, in areas accessible to the drilling rig, clear of utilities and parked vehicles at the time of our field investigation (see enclosed test boring location sketch for approximate locations).
- The borings were each extended to depths ranging from approximately 5 to 20 feet below the top of existing pavement, by directly driving a 2-inch sampling “spoon” into the subgrade soils starting at a depth just below the pavement base materials or a maximum depth of 1 foot below the top of existing pavement.
- At completion of the sampling, the boreholes were backfilled with the auger cuttings generated from the borings and “cold patch” bituminous concrete at the surface. Further restoration of the borehole locations was beyond the scope of work performed for this geotechnical evaluation. Material that could not be backfilled was transported to a disturbed area adjacent to the study area and roughly graded. Additional settlement of the boreholes may occur, resulting in a depression or hole in the ground surface. Consequently, future maintenance and restoration of the site may be required.
- Based on our initial understanding of the project scope, we proposed to perform a concrete core in the existing loading dock area. During performance, difficulty in penetrating the slab, likely due to the aggregate type and presence of reinforcing steel, was encountered. We contacted the project design team who indicated the loading dock area is not scheduled for replacement. The partial core was abandoned by grouting the annular saw cut space with a high strength grout.

C. SUBSURFACE CONDITIONS

SITE GEOLOGY

The site of the proposed structure is located within the Atlantic Coastal Plain Physiographic Province, approximately 4 miles southeast of the Fall Line. The Fall Line represents the boundary between the upland Piedmont region, characterized by rolling topography and exposed crystalline bedrock, and the Coastal Plain, a wedge-shaped accumulation of unconsolidated sediments deposited on a sloping shelf of Piedmont-type bedrock. Based on Delaware Geologic Survey (DGS) mapping, the depth to weathered bedrock in the general area of the site is estimated to be greater than 90 feet.

Surficial geologic mapping by the DGS indicates that the stratigraphy of the Coastal Plain in the vicinity of the site consists of middle Pleistocene Age Columbia Formation. The Columbia Formation is typically underlain by the Cretaceous Age Potomac Formation. In addition and given the site’s proximity to the Christina and Delaware River, vertically and laterally discontinuous soils of the Delaware Bay Group are also typically encountered in the area.

Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware



Undifferentiated, the Delaware Bay Group consists of the Scotts Corner and Lynch Heights Formation, and described by the DGS to consist of grayish brown silt overlying a fine to medium-grained silty quartz sand. Organic-rich silty clay and peat to sandy gravel are common within the Delaware Bay Group. The Columbia Formation typically consists of yellowish brown to reddish brown gravelly, fine to medium sands with some interbedded silts and clays. The Potomac Formation is described as a dark red, pink, gray to white silty clay to clayey silt with very fine to medium-grained sand beds.

SITE STRATIGRAPHY

- Stratum A: Bituminous Concrete Pavement (approximately 1 to 4 inches)
- Stratum B: Base Material (approximately 4 to 13 inches): Gray Crusher Run to Black fine to coarse Gravelly Silty SAND with and without larger stone (3-inch nominal size)
- Stratum C: Fill/Possible Fill (or disturbed soils): Varicolored (brown, dark brown, dark gray, gray, yellowish brown, reddish yellow) fine to medium Silty SAND to Sandy SILT with varying amounts of gravel (damp to moist, medium dense/consistency) – USCS: SM to ML
- Stratum D: Fill (utility trechline backfill): Brown, yellowish brown, gray, dark gray fine to medium Silty SAND with varying amounts of gravel and silt lenses (damp to moist, medium density) – USCS: SM
- Stratum E: Dark gray, gray Clayey SILT to SILT with varying amounts of sand and trace organics (damp to moist, very soft to soft consistency, faint to strong organic odor) – USCS: ML to CL-ML – Apparent Delaware Bay Group
- Stratum F: Light brown, yellowish brown, light gray, reddish yellow Clayey Silt to Silty Clay with varying amounts of fine to medium sand and trace amounts of gravel (dry to wet, medium to very stiff consistency, faintly to prominently mottled, hydraulically restrictive, low plasticity) – USCS: ML to CL-ML – Apparent Delaware Bay Group
- Stratum G: Brown fine to medium Silty to Poorly-graded Sandy GRAVEL (moist to wet water bearing zone, medium to dense) – USCS: GM to GP-GM – Delaware Bay Group or Columbia Formation
- Stratum H: Brown medium Silty to Poorly-graded SAND with varying amounts of gravel (wet, water bearing zone, loose to medium density) – USCS: SM to SP-SM – Delaware Bay Group or Columbia Formation
- Stratum I: Varicolored (light gray, gray, bluish gray, dark red, pink, white) Silty CLAY to CLAY with varying amounts of sand (moist to damp, regional hydraulic restriction, medium to very stiff consistency, low to high plasticity) – USCS: CL to CH – Apparent Potomac Formation

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



GROUNDWATER CONDITIONS

- Measureable ground water was encountered during the performance of test borings at locations P-2 and P-4 at depths of 8.2 and 7 feet below the top of the existing pavement surface, respectively.
- An increase in soil moisture content and “free water” was typically observed perching on top of the Potomac Formation clays, which serves as a regional hydraulic restriction.
- Groundwater mapping the Delaware Geological Survey indicates ground water levels in a “dry-year” and “wet-year” may range from approximately elevation 27 to 33 feet (NAVD 88).
- The State of Delaware, Department of Natural Resources and Environmental Control generally defines the seasonal high water table (SHWT) as the highest zone of soil or rock that is seasonally or permanently saturated by a perched or shallow water table. The SHWT is typically based on the depth to first observe soil mottles or the depth-to-water as measured in piezometers or wells during a normal year of precipitation. Given that definition, the SHWT at the site ranges in depth from approximately 3.5 to 6 feet below the top of the existing pavement surface, which equates to an elevation ranging from 33 to 35 feet. This is reflective of a seasonally perched water table condition determined based upon redoximorphic features (e.g., soil mottles) and conditions of soil moisture observed in the borings performed. However, it should be noted that “wet” conditions were observed as shallow as 1.7 feet below the top of the existing pavement surface at boring location P-3 at the transition from relatively more permeable fill to more slowly permeable fine-grained silty soils.
- Perched and ground water levels at this site are likely to be affected by seasonal and annual variations in precipitation. In addition, variations in ground water levels of several feet lower or higher than those that were observed to exist at site boring locations P-2 and P-4, performed during this evaluation, could be experienced during extreme variations in precipitation.

D. ANALYSIS AND DESIGN RECOMMENDATIONS

DISCUSSION OF ANALYSIS

While pavement and pavement base materials were present throughout the parking area, considerable variations in the condition and thickness of the pavement, as well as the pavement base material thickness and gradation, were observed. Field observations indicate that numerous utilities exist within the pavement area and have likely contributed to the existing condition of the pavement in some areas. During the performance of the field borings, a portion of “cracked” pavement on the northern side of the Campus Garden Café

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



was observed to yield under the weight of the drilling rig. Although several areas appear to have been previously “patched” in an effort to repair apparent previous pavement failures (i.e., cracking or settlement), patched “pot-holes” were apparent along some of the edges of the pavement repairs.

Subgrade conditions also appeared variable throughout areas of the existing parking lot. A majority of the natural subgrade soils (in areas previously place fill materials were not observed) are considered “poor” subgrade, as defined by the State of Delaware Department of Transportation design manuals. The bituminous concrete thicknesses ranged between 1 and 4 inches, and the pavement base materials (GABC) were observed to range between 4 and 13 inches in thickness. The total pavement “box” thickness was observed to range between 7 to 14 $\frac{1}{8}$ inches. The subgrade beneath the pavement base materials varied in texture, with a majority of the area either underlain by predominantly fine-grained (i.e. silty to clayey) soils or fill material associated with utilities or previous pavement construction. The majority of pavement failures on the northern side of the Campus Garden Café appear to be associated with utility line construction and/or backfill, while the area on the eastern side of the Campus Garden Café appeared to be associated with poorly-draining subgrade conditions of shallow very soft soils.

DESIGN RECOMMENDATIONS

1. PAVEMENT DESIGN

Based on our understanding of the project objectives, it is our opinion that a full depth replacement program to rehabilitate the pavement areas for this project should be considered. We recommend that a minimum of 8 inches of Graded Aggregate Base Course (GABC) be considered. We recommend a minimum of 3 inches of bituminous concrete paving for parking areas, as well as 4 inches for travel and access roads.

To aid in further evaluating if yielding subgrade conditions are present, we have provided a recommended proofrolling procedure in the construction recommendations below. If yielding subgrade conditions are observed during proofrolling of the site, the subgrade should be undercut to firm subgrade conditions and the following pavement section is recommended:

1½ inches	Bituminous Concrete Wearing Course, Type C
2½ inches	Bituminous Concrete Binder Course, Type B
8 inches	Graded Aggregate Base Course, Type A
	<u>Geotextile Fabric, Geotex 315 or equivalent</u>
12 inches	Total Depth

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



All pavement construction and materials should conform to the State of Delaware Department of Transportation Standard Specifications for Roadway and Bridge Construction, dated August 2001 and as subsequently revised. Additionally, localized undercutting and underdrains are recommended to facilitate drainage within the pavement base course if any yielding subgrade conditions are observed during proofrolling of the site. A typical underdrain system consists of 4-inch perforated polyethylene pipe (e.g., ADS or equivalent) in an AASHTO SP-57 stone bedding. The stone bedding should be at least 12 inches wide, have 4 inches of stone below the ADS pipe, and should be wrapped in a geotextile fabric (e.g., Geotex 315 or equivalent).

2. FOUNDATIONS

We understand that the design will include construction of a retaining structure near the existing loading dock. It is Duffield Associates' opinion that the "natural" medium stiff or stiffer consistency fine-grained or medium dense (Stratum F) encountered beneath the bituminous concrete pavement (Stratum A), pavement base (Stratum B), fill material (Strata C and D) and the very soft to soft consistency silts (Stratum E), are generally suitable for supporting the proposed retaining wall structures on a shallow foundation. Structural fill, placed over natural soils of Stratum F and compacted as recommended in this report, is also considered suitable for supporting a shallow foundation system.

Analysis indicates that the foundations on soils of Stratum F or deeper, or on compacted structural fill placed and compacted as recommended here in, could be sized for the currently assumed design bearing capacity of allowable "net" bearing pressure of 2,000 pounds per square foot. This analysis has assumed a shallow foundation system with a minimum width of 3 feet for isolated footings and 2 feet for continuous footings, and a minimum burial depth of 32 inches for exterior footings.

Estimations of foundation settlement were performed to aid in evaluating the effects of the retaining wall loads on the subsurface conditions. Based on this analysis, it is estimated that maximum total foundation settlement for the proposed below-grade structures should be relatively small (on the order of 1½ inches or less) if constructed over the material identified as Stratum F. Soft unsuitable soils of Stratum E, where observed to a depth on the order of 3 feet, should be removed beneath the foundation area. Post-construction total and differential settlement is estimated to be on the order of ¾ inch or less over a distance of 20 feet. These magnitudes of total and differential settlement are generally considered to be within tolerable limits for retaining structures design with control joints. However, the actual settlement tolerance of the structures should be verified with the project's structural engineer.

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



If the proposed retaining walls will be constructed adjacent to existing structures, the selection of foundation burial depths for the proposed foundations should consider effects on the existing structures. To reduce the potential for additional loading of existing footings, the foundations for the new structures should be constructed such that the bottom of the proposed footing is at or below the base of the existing foundations. However, the construction practices should consider means and methods to protect the stability of the existing structure during construction.

3. FOUNDATION BURIAL DEPTH AND SIZE

The base of all exterior spread footings in areas exposed to frost should be placed at least 32 inches below final exterior grade. If interior foundations (not subject to the effects of frost) are anticipated they should be placed at least 18 inches below the proposed finished grade elevation. All isolated column footings should be at least 3 feet wide, and all continuous wall footings should be at least 2 feet wide, regardless of bearing pressure. If a winter construction schedule is proposed for the foundations, provisions for the protection of shallow foundations from frost heave during construction should be included in the contract specifications.

4. RETAINING WALL DESIGN

Backfill pressures on “unyielding” retaining walls restrained from rotation at the top, including below grade portions of the building foundation walls, should be analyzed using the “at rest” earth pressure coefficient, K_0 . The “active” and “passive” earth pressure coefficients (K_A and K_P , respectively) should be utilized for the design of “yielding” retaining walls, such as cantilevered walls. All retaining walls (i.e., below grade portions of the structures) should be provided with free-draining granular backfill materials, as well as a drainage system and/or weep holes to relieve hydrostatic pressures on the walls. For design of retaining walls, it is recommended that the following design lateral earth pressure parameters are used:

Soils	K_A	K_P	K_0	Coeff. of Sliding Friction	Moist Unit Weight (pcf)
Imported Granular Fill (with less than 10% passing a No. 200 sieve)	0.28	3.54	0.44	0.45	130

5. SEISMIC DEISGN PARAMETERS

Based on subsurface conditions encountered during the field exploration at the site and review of regional geologic maps, a “D” soil profile type, as defined by Table 1615.1.1 of the 2012 International Building Code, is recommended for design.

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



6. SITE GRADING

Site grading should be designed to provide positive drainage away from the building and towards the drainage outlets. Positive site drainage should be maintained throughout the construction activities.

E. CONSTRUCTION RECOMMENDATIONS

1. PROOFROLLING AND SUBGRADE PREPARATION

At the start of construction, the existing bituminous concrete pavement and GABC should be removed in the parking lot and drive areas. Based on the likelihood of the GABC materials being mixed with other soils, they should be removed to firm soil conditions and stock piled for use as bulk fill or backfill. Following rough grading, it is recommended that the exposed subgrade in the parking lot and drive areas be proof-rolled using a fully-loaded, tandem-wheel dump truck. Proofrolling should include densifying with a large smooth drum roller, then utilizing a fully-loaded, tandem dump truck to aid in identifying soft or yielding subgrade conditions. The proofrolling should be performed in the presence of a qualified soils technician working under the supervision of a geotechnical engineer familiar with this report.

Yielding subgrade conditions encountered with the proposed roadway and parking lot area, which cannot be improved in place, should be undercut to firm subgrade conditions and backfilled with GABC, or granular “select” fill in accordance with the recommendations of this report. Provisions for the undercutting and the subsequent replacement of these materials should be anticipated by the construction contract documents and project budget estimates. The geotechnical engineer’s representative should also confirm the consistency and texture of the exposed soils with the conditions encountered by this evaluation as described herein, since localized loose and yielding subgrade conditions may be encountered.

2. GROUNDWATER CONTROL

Shallow “perched water” conditions was observed in the test borings performed in this evaluation; however, for most areas, will likely be several feet below the subgrade elevations during construction, with exception of the area in the vicinity of boring P-3. However, if “perched” ground water or inclement weather during construction is encountered during any undercuts performed in the parking lot or drive areas, localized sumping may be required.

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



3. RE-USE OF ON-SITE SOILS AS STRUCTURAL FILL

Portions of the existing pavement base materials observed (Stratum B) are generally considered suitable for use in the pavement rehabilitation and may be re-used as structural fill in the parking lot and drive areas. However, because the thickness and gradation of this material varied, sufficient quantities of sufficient material may not be available. As such, it may be necessary to bring in additional graded aggregate materials to backfill any areas that are undercut following subgrade proofrolling and to add to the base course thickness in areas where relatively thin thicknesses of GABC were observed. Further, careful segregation of these materials from other more fine-grained soils should be performed if re-use is anticipated. Imported borrow consisting of predominately granular soils conforming to the requirements of the State of Delaware Department of Transportation Standard Specifications Type A Borrow may also be utilized. AASHTO SP-57 stone could also be utilized as structural fill at locations as recommended by the project engineer, and should be considered for localized, relatively deep fills such as foundation undercuts.

4. COMPACTION REQUIREMENTS

Structural fill utilized within the parking lot and drive areas should be placed in loose lifts with a maximum thickness of 8 inches. Structural fill for pavement areas and foundations areas should be compacted to at least 90% and 95% (respectively) of the maximum dry density, as determined by the Modified Proctor test (ASTM D 1557). The placement and compaction of structural fill should be monitored on a full-time basis by a qualified technician under the supervision of a geotechnical engineer.

5. PROTECTION OF SUBGRADE SOILS

Subgrade soils disturbed by precipitation and construction traffic should be either scarified and re-compacted, or undercut and replaced with structural fill as previously discussed. Subgrade disturbance could be reduced by maintaining positive surface drainage, by establishing and maintaining a sump throughout the construction period, and by limiting construction traffic on the exposed subgrade soils.

6. SUBSURFACE DATA

All contractors interested in bidding on phases of this work that involve subsurface conditions should be given full access to this report so that they can develop their own interpretations of the available data.

7. CONSTRUCTION REVIEW

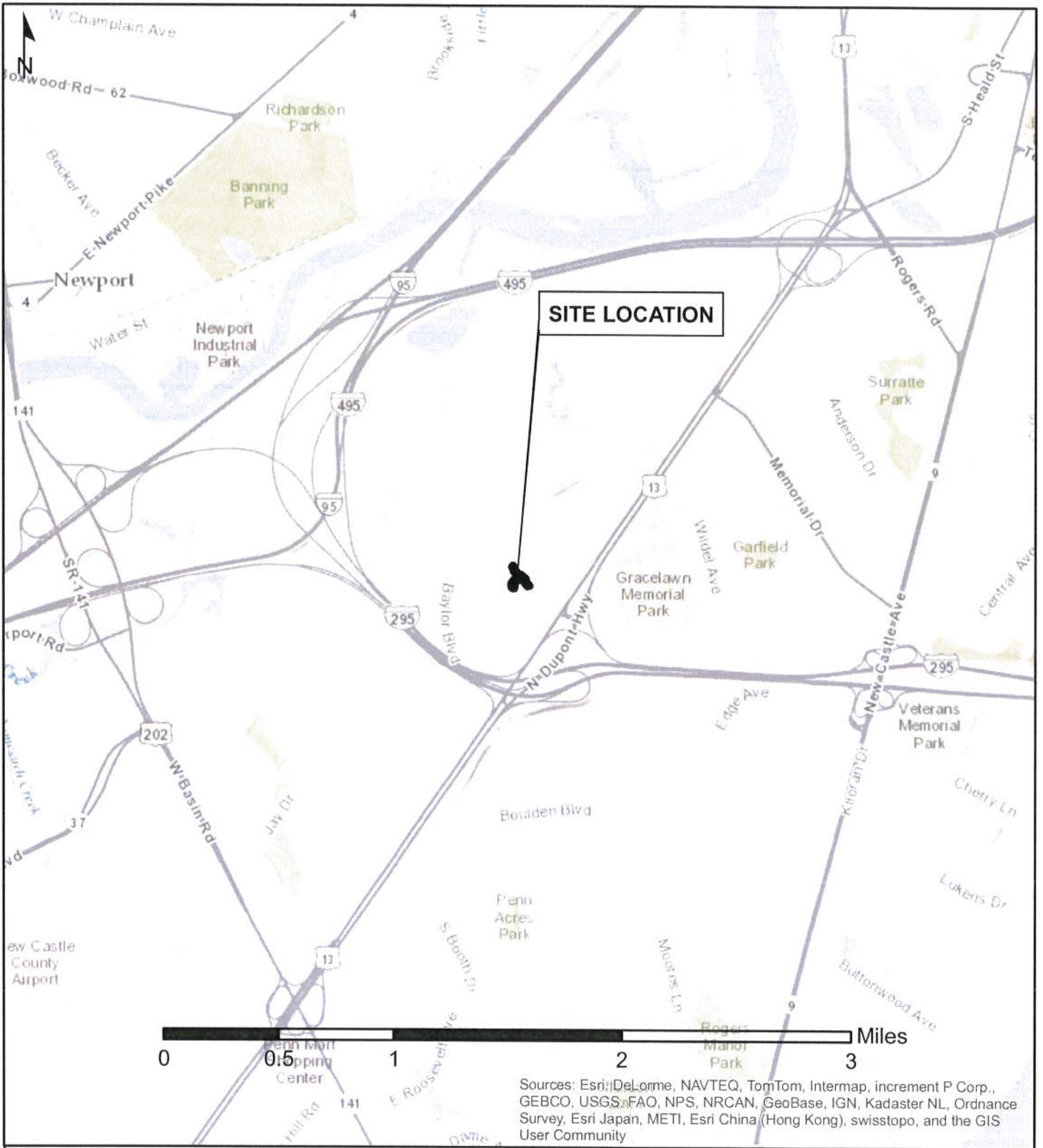
It is recommended that the project budget include provisions for the cost for independent construction monitoring of the earthwork and pavement construction by a qualified engineering firm, retained by the owner to evaluate conformance of construction with the recommendations of the project geotechnical evaluation, and the project plans and specifications.

**Project No. 6292.NN - Pavement Evaluation
Kent/Sussex Buildings Parking Lots
DHSS Herman M. Holloway, Sr. Campus
New Castle, Delaware**



F. SKETCHES AND TEST BORING LOGS

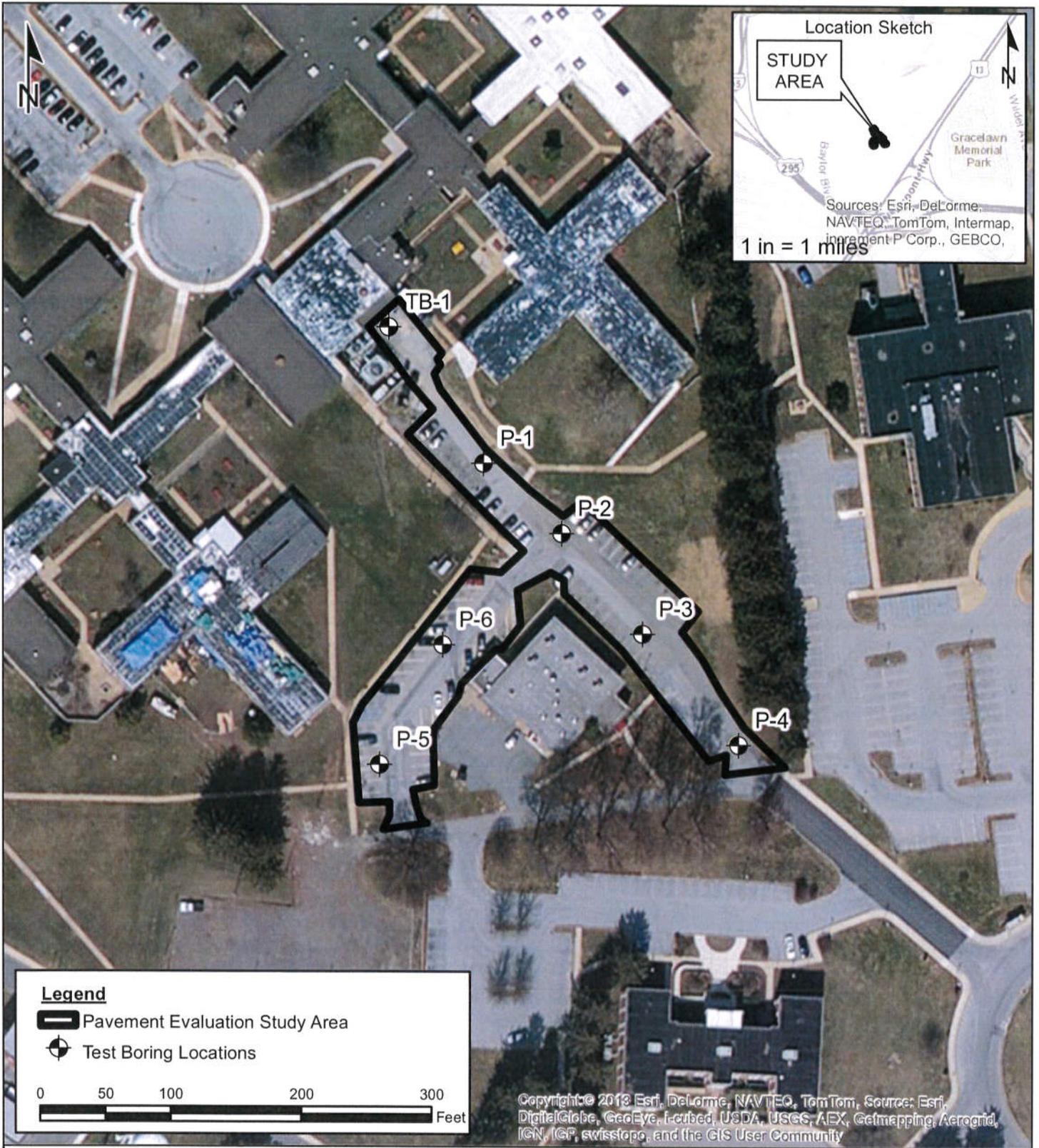
- **SITE LOCATION SKETCH**
- **TEST BORING LOCATION SKETCH**
- **TEST BORING LOGS (7)**
- **GENERAL NOTES**



Sources: Esri; DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

NOTE: This sketch is part of a report titled "1910 North DuPont Highway - Pavement Evaluation - DHSS Herman M. Holloway, Sr. Campus," dated February 2014 and prepared by Duffield Associates, Inc.; and as such, this sketch should only be used in the context of that report.

DATE: FEBRUARY 2014	<p style="text-align: center;">SITE LOCATION SKETCH DHSS HERMAN M. HOLLOWAY, SR. CAMPUS 1910 NORTH DUPONT HIGHWAY PAVEMENT EVALUATION NEW CASTLE, NEW CASTLE COUNTY, DELAWARE</p>	BASEMAP: Aerial Photography	 <p>5400 LIMESTONE ROAD WILMINGTON, DE 19808 TEL. (302)239-6634 FAX (302)489-2303</p> <p>OFFICES IN DELAWARE, MARYLAND, PENNSYLVANIA, AND NEW JERSEY</p> <p>E-MAIL: DUFFIELD@DUFFNET.COM</p>
SCALE: AS SHOWN		DRAWN BY: JPC	
PROJECT NO. 6292.NN		CHECKED BY: WHS	
SHEET: 1 OF 1		FILE: 6292.NN.0214.SITELOCSKTCH.mxd	



NOTE: This sketch is part of a report titled "1910 North DuPont Highway - Pavement Evaluation - DHSS Herman M. Holloway, Sr. Campus," dated February 2014 and prepared by Duffield Associates, Inc.; and as such, this sketch should only be used in the context of that report.

DATE: FEBRUARY 2014	<p style="text-align: center;">TEST BORING LOCATION SKETCH DHSS HERMAN M. HOLLOWAY, SR. CAMPUS 1910 NORTH DUPONT HIGHWAY PAVEMENT EVALUATION NEW CASTLE, NEW CASTLE COUNTY, DELAWARE</p>	BASEMAP: Aerial Photography	 <p>5400 LIMESTONE ROAD WILMINGTON, DE 19808 TEL. (302)239-6634 FAX (302)489-2203</p> <p>OFFICES IN DELAWARE, MARYLAND, PENNSYLVANIA, AND NEW JERSEY</p> <p>E-MAIL: DUFFIELD@DUFFNET.COM</p>
SCALE: AS SHOWN		DRAWN BY: JPC	
PROJECT NO. 6292.NN		CHECKED BY: WHS	
SHEET: 1 OF 1		FILE: 6292.NN.0214.TBLOCSKTCH.mxd	



DUFFIELD ASSOCIATES

Consultants in the Geosciences

TEST BORING TB-1

(Page 1 of 1)

Subsurface Investigation Kent Sussex Buildings Loading Dock and Paving DHSS - Herman M. Holloway, Sr. Campus New Castle, Delaware Project No. 6292.NN	Date Started : February 6, 2014 Date Completed : February 6, 2014 Logged by : JPC Weather : Clear, 20s Driller/Agency : D. Wilson/CGCG	Drilling Equipment : Truck-Mounted Diedrich D-50 Drilling Methods : HSA (SPT, ASTM D 1586) Surface Elevation : 37 feet (Project Datum)
---	--	--

Depth in feet	Surf. Elev. 37 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				Remolded Auger Cuttings	During Drilling At completion							
				DESCRIPTION								
0	36.9			Bituminous Concrete (± 1 inch)								
				Pavement Base (± 13 inches) - gray, dark gray fine to medium gravel and fine to coarse sand - crusher run								
2	35.8			FILL: bituminous concrete paving overlying cementitious concrete fragments			S-1A S-1B	27-12-7	0.9			
				FILL: brown, yellowish brown, gray silt/clay, trace to little fine to medium sand, trace fine gravel (damp to moist)								
	34.3		ML	Dark gray, blueish gray SILT, some fine to medium sand, trace coarse sand, trace gravel (moist) (very soft consistency) (faint organic odor)			S-2					
4	33.7		SM	Light gray fine to medium SAND and SILT, trace coarse sand (moist) (very soft consistency)			S-3A S-3B	2-11-12	1.0	11.6	34.4	
	33.1		SM	Brown, pale brown, light gray medium SAND, little to some silt/clay, trace fine sand, trace coarse sand, trace gravel (moist) (faintly mottled)			S-4	7-9-10	1.0	15.6	58.9	
6	31.8		CL-ML	Brown, light gray, reddish brown SILT/CLAY and fine SAND (dry to damp) (low plasticity) (prominently mottled)			S-5	8-10-10	1.3	19.9	70.9	
8	29.5		SM	Brown Gravelly SAND (wet) (observed in drill cuttings only)			S-6	3-7-16	0.7			
	29.0		CH	Red CLAY, some fine to medium sand (moist to wet) (high plasticity) (Apparent Potomac Formation)			S-7	4-6-8	1.0			
10			CH	Red, brown, yellow CLAY, trace fine to medium sand (damp) (high plasticity)								
12			CH	Red, white, brown CLAY, trace fine sand (moist) (high plasticity)								
14			CH									
16			CH									
18			CH									
20	17.0		CH									

- NOTES:
- Test boring terminated at 20.0 ± feet below existing ground surface (b.e.g.s.).
 - Measurable ground water levels within the augers not encountered during drilling. Apparent "perched" water observed at ± 7.5 feet b.e.g.s.
 - Borehole caved at 18.4 ± feet with water level at 16.2 ± feet b.e.g.s. upon removal of augers.
 - Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
 - Soil descriptions performed in accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).
 - SHWT estimated at approximately 5.5 feet b.e.g.s. based on redoximorphic features and observed groundwater conditions.



DUFFIELD ASSOCIATES

Consultants in the Geosciences

TEST BORING P-1

(Page 1 of 1)

Subsurface Investigation
 Kent Sussex Buildings Loading Dock and Paving
 DHSS - Herman M. Holloway, Sr. Campus
 New Castle, Delaware
 Project No. 6292.NN

Date Started : February 6, 2014
 Date Completed : February 6, 2014
 Logged by : JPC
 Weather : Clear, 20s
 Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-Mounted Diedrich D-50
 Drilling Methods : HSA (SPT, ASTM D 1586)
 Surface Elevation : 38 feet (Project Datum)

Depth in feet	Surf. Elev. 38 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<input type="checkbox"/> Remolded								
DESCRIPTION												
0												
37.7												
37.2												
36.7							S-1A	6-13-9-9	1.1			
2							S-1B					
35.9												
34.7							S-2A	9-5-6-8	0.9			
4			CH				S-2B			34.8	89.0	
33.0												
6												
8												
10												
12												
14												
16												
18												
20												

NOTES:

1. Test boring terminated at ± 5.0 feet below existing ground surface (b.e.g.s.).
2. Measureable groundwater not encountered during drilling.
3. Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
4. Soil descriptions performed in accordance with ASTM D 2488, the Practice for

Description and Identification of Soils (Visual-Manual Procedure).

5. SHWT estimated to be greater than the termination depth of the boring.



Subsurface Investigation
 Kent Sussex Buildings Loading Dock and Paving
 DHSS - Herman M. Holloway, Sr. Campus
 New Castle, Delaware
 Project No. 6292.NN

Date Started : February 6, 2014
 Date Completed : February 6, 2014
 Logged by : JPC
 Weather : Clear, 20s
 Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-Mounted Diedrich D-50
 Drilling Methods : HSA (SPT, ASTM D 1586)
 Surface Elevation : 39 feet (Project Datum)

Depth in feet	Surf. Elev. 39 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> During Drilling							
DESCRIPTION												
0	38.7											
	38.2											
	37.8											
2	37.0						S-1A S-1B S-1C	8-7-6	1.1	8.6	22.4	
	36.0		ML									
4							S-2	9-18-21	1.4	14.9	68.5	
6			CL-ML				S-3	13-15-21	1.2			
8												
	30.4						S-4A S-4B S-4C	10-26-35	0.9			
	29.9		CL									
10	29.0		GM									
12												
14												
16												
18												
20												

NOTES:

- Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
- Groundwater observed at ± 8.2 feet b.e.g.s. with augers at ± 8.5 feet b.e.g.s.
- Borehole caved and dry at ± 6.0 feet b.e.g.s. upon removal of augers.
- Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
- Soil descriptions performed in accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).
- SHWT estimated at approximately 3.5 feet b.e.g.s. based on redoximorphic features and observed groundwater conditions.



DUFFIELD ASSOCIATES

Consultants in the Geosciences

TEST BORING P-3

(Page 1 of 1)

Subsurface Investigation
 Kent Sussex Buildings Loading Dock and Paving
 DHSS - Herman M. Holloway, Sr. Campus
 New Castle, Delaware
 Project No. 6292.NN

Date Started : February 6, 2014
 Date Completed : February 6, 2014
 Logged by : JPC
 Weather : Clear, 20s
 Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-Mounted Diedrich D-50
 Drilling Methods : HSA (SPT, ASTM D 1586)
 Surface Elevation : 40 feet (Project Datum)

Depth in feet	Surf. Elev. 40 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<input checked="" type="checkbox"/> Remolded								
DESCRIPTION												
0	39.8											
	39.2											
2	38.1					<input checked="" type="checkbox"/>	S-1A	4-7-5-6	1.4			
						<input checked="" type="checkbox"/>	S-1B			21.9	71.2	
4			ML			<input checked="" type="checkbox"/>	S-2	1-2-2-7	1.9			
	35.0											

NOTES:

1. Test boring terminated at ± 5.0 feet below existing ground surface (b.e.g.s.).
2. Measureable groundwater not encountered during drilling.
3. Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
4. Soil descriptions performed in accordance with ASTM D 2488, the Practice for

Description and Identification of Soils (Visual-Manual Procedure).

5. SHWT estimated at approximately 4.3 feet b.e.g.s. based on perched water conditions.



DUFFIELD ASSOCIATES

Consultants in the Geosciences

TEST BORING P-4

(Page 1 of 1)

Subsurface Investigation Kent Sussex Buildings Loading Dock and Paving DHSS - Herman M. Holloway, Sr. Campus New Castle, Delaware Project No. 6292.NN	Date Started : February 6, 2014	Drilling Equipment : Truck-Mounted Diedrich D-50
	Date Completed : February 6, 2014	Drilling Methods : HSA (SPT, ASTM D 1586)
	Logged by : JPC	Surface Elevation : 41 feet (Project Datum)
	Weather : Clear, 20s	
	Driller/Agency : D. Wilson/CGCG	

Depth in feet	Surf. Elev. 41 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<input type="checkbox"/> <input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> During Drilling <input type="checkbox"/> At completion							
DESCRIPTION												
0	40.7			Bituminous Concrete (± 3 inches)								
	40.0			Pavement Base (± 8 inches) - black fine to coarse sand, some silt, little to some fine to medium gravel (damp)								
2			ML	Brown, yellowish brown SILT, little to some fine sand (damp)			S-1	6-5-6	0.7	20.0	79.7	
4			ML	Light gray, reddish yellow SILT, trace to little clay, little fine sand (dry to damp) (faintly to prominently mottled)			S-2	8-15-18	1.5			
6	35.5		CL-ML	Brown, light gray SILT/CLAY, little fine sand (moist) (prominently mottled)			S-3A	6-15-25	1.0			<input type="checkbox"/>
	34.4		GM	Brown GRAVEL and fine to coarse SAND, some to little silt (moist to wet at 6.9')			S-3B					
8	34.0		SP	Brown medium SAND, little fine sand, trace coarse sand, trace gravel, trace silt (wet)			S-4	4-8-5	0.5			<input checked="" type="checkbox"/>
10	31.0											

NOTES:

- Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
- Groundwater observed at ± 7.7 feet b.e.g.s. with augers at ± 8.5 feet b.e.g.s.
- Borehole caved at ± 6.4 feet b.e.g.s. with water level at ± 6.1 feet b.e.g.s. upon removal of augers.
- Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
- Soil descriptions performed in accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).
- SHWT estimated at approximately 4.3 feet b.e.g.s. based on redoximorphic features and observed groundwater conditions.



DUFFIELD ASSOCIATES

Consultants in the Geosciences

TEST BORING P-5

(Page 1 of 1)

Subsurface Investigation Kent Sussex Buildings Loading Dock and Paving DHSS - Herman M. Holloway, Sr. Campus New Castle, Delaware Project No. 6292.NN	Date Started : February 6, 2014	Drilling Equipment : Truck-Mounted Diedrich D-50
	Date Completed : February 6, 2014	Drilling Methods : HSA (SPT, ASTM D 1586)
	Logged by : JPC	Surface Elevation : 37 feet (Project Datum)
	Weather : Clear, 20s	
	Driller/Agency : D. Wilson/CGCG	

Depth in feet	Surf. Elev. 37 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<input checked="" type="checkbox"/> Remolded								
DESCRIPTION												
0	36.7											
	36.4											
2	35.0						S-1A S-1B	3-4-15	1.1	19.2	77.0	
4							S-2	4-4-3	0.6			
6							S-3A S-3B S-3C	5-5-5	0.8			
	30.5		CL-ML									
	30.3											
8	29.0											
			CL				S-4	4-5-8	1.3			
10	27.0											
12												
14												
16												
18												
20												

- NOTES:
- Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
 - Groundwater level not encountered during drilling.
 - Borehole caved and dry at ± 5.5 feet b.e.g.s. upon removal of augers.
 - Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
 - Soil descriptions performed in accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).
 - SHWT estimated at approximately 6 feet b.e.g.s. based on perched water conditions.



Subsurface Investigation Kent Sussex Buildings Loading Dock and Paving DHSS - Herman M. Holloway, Sr. Campus New Castle, Delaware Project No. 6292.NN	Date Started : February 6, 2014	Drilling Equipment : Truck-Mounted Diedrich D-50
	Date Completed : February 6, 2014	Drilling Methods : HSA (SPT, ASTM D 1586)
	Logged by : JPC	Surface Elevation : 38 feet (Project Datum)
	Weather : Clear, 20s	
	Driller/Agency : D. Wilson/CGCG	

Depth in feet	Surf. Elev. 38 ft	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<input checked="" type="checkbox"/> Remolded								
DESCRIPTION												
0	37.9											
37.3												
2	35.5					<input checked="" type="checkbox"/>	S-1	6-10-6-5	1.0	11.5	43.7	
4						<input checked="" type="checkbox"/>	S-2	6-5-6-4	1.3			
33.0												

NOTES:

- Test boring terminated at ± 5.0 feet below existing ground surface (b.e.g.s.).
- Groundwater level not encountered during drilling.
- Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
- Soil descriptions performed in accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).
- SHWT estimated to be greater than the termination depth of the boring.

GENERAL NOTES

DUFFIELD ASSOCIATES uses the following definitions and terminology to classify and correlate the field and laboratory samples.

VISUAL UNIFIED CLASSIFICATIONS: The soil samples are described by color, major constituent, modifiers (by percentage), and density (or consistency). Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a No. 200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a No. 200 sieve; they are described as: clays or clayey silts if they are cohesive and silts if they are noncohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

The Unified Soil Classification symbols are:

COARSE GRAINED SOILS

GW - Well graded gravels
 GP - Poorly graded gravels
 GM - Silty gravels
 GC - Clayey gravels
 SW - Well graded sands
 SP - Poorly graded sands
 SM - Silty sands
 SC - Clayey sands

FINE GRAINED SOILS

ML - Silts of low plasticity
 CL - Clays of low to medium plasticity
 OL - Organic silt clays of low plasticity
 MH - Silts of high plasticity
 CH - Clays of high plasticity
 OH - Organic silt clays of high plasticity
 PT - Peat and highly organic soils

SIZE DESCRIPTION

F - Fine
 M - Medium
 C - Coarse
 G - Gravel

MODIFIERS (PERCENTAGE)

Tr - Trace	1 - 10%
Ltl - Little	11 - 20%
Some	21 - 35%
& - And	36 - 50%

COLOR

Or - Orange	Blk - Black	Vc - Varicolored
Yel - Yellow	Gr - Gray	Dk - Dark
Br - Brown	R - Red	Lt - Light

DENSITY: COARSE GRAINED SOILS

Very loose	4 blows/ft or less
Loose	5 to 10 blows/ft
Medium	11 to 30 blows/ft
Dense	31 to 50 blows/ft
Very Dense	51 blows/ft or more

CONSISTENCY: FINE GRAINED SOILS

Very soft	2 blows/ft or less
Soft	3 to 4 blows/ft
Medium	5 to 8 blows/ft
Stiff	9 to 15 blows/ft
Very stiff	16 to 30 blows/ft
Hard	31 blows/ft or more

NOTE: The Standard Penetration Test "N" value is the number of blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.



INTERIM LIFE SAFETY MEASURES

- I. The Herman Holloway Campus is a non-smoking campus that houses 2 resident mental patient areas, Kent/Sussex and Mitchell buildings. Patients may be on the grounds or in any of the campus buildings. Anyone working on the Herman Holloway site should be aware that patients are **not** in uniforms and that the utmost care must be taken in not giving our Clients any lighters, rides or money. All tools must be secure from client access. Please implement the following Interim Life Safety Measures. If you are experiencing any problems or need help, please contact the maintenance office for assistance. Maintenance Phone number is (302) 255-9325
- II. Ensuring free and unobstructed exits. Personnel receive additional training when alternative exits are designated. Buildings or areas under construction must maintain escape routes for construction workers at all times. Means of exiting construction areas are inspected daily.
- III. Ensuring free and unobstructed access to emergency services and for fire, police, and other emergency forces.
- IV. Ensuring fire alarm, detection, and suppression systems are in good working order. A temporary but equivalent system shall be provided when any fire system is impaired. Temporary systems must be inspected and tested monthly.
- V. Ensuring temporary construction partitions are smoke tight and built of noncombustible or limited combustible materials that will not contribute to the development or spread of fire.
- VI. Providing addition fire-fighting equipment and training personnel in its use.
- VII. Prohibiting smoking according to EC/5 throughout the organization's buildings, and in and adjacent to construction areas.
- VIII. Developing and enforcing storage, housekeeping, and debris removal packages that reduce the building's flammable and combustible fire load to the lowest feasible level.
- IX. Conduction a minimum of two fire drills per shift per quarter.
- X. Increasing hazard surveillance of buildings, grounds, and equipment, with special attention to excavations, construction areas, construction storage, and field offices.
- XI. Training personnel to compensate for impaired structural or compartmentalization features of fire safety.
- XII. Conducting organization wide safety education programs to promote awareness of LSC deficiencies, construction hazards, and ILSM.

Date: _____

Company: _____

Principal: _____