DAVIS BOWEN & FRIEDEL, INC.

ARCHITECTS ENGINEERS SURVEYORS

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 LOADING BUILDING
LOADING DOCK REHABILITATION
HERMAN M. HOLLOWAY SR. CAMPUS
NEW CASTLE, DELAWARE
DBF # 0586B031.GG1 ❖ OMB/DFM No. MC3501000018
DECEMBER 19, 2014

ADDENDUM NO. 1

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 pre-bid meeting minutes and sign-in sheet from the December 17, 2014 meeting are attached.

Item No. 2 The State of Delaware Certified Wage Rates are attached.

Item No. 3 Section 00 31 19 - Existing Conditions Information is attached.

Item No. 4 Section 00 31 32 - Geotechnical Data is attached.

Item No. 5 The State of Delaware Interim Life Safety Form is attached.

END OF ADDENDUM

DAVIS BOWEN & FRIEDEL, INC.

ARCHITECTS ENGINEERS SURVEYORS

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Gerald G. Friedel, P.E.

MANDATORY PRE-BID MEETING MINUTES
HERMAN M. HOLLOWAY, SR. CAMPUS
KENT/SUSSEX BUILDING – LOADING DOCK REHABILITATION
RE-BID
1901 N. DUPONT HIGHWAY, NEW CASTLE, DELAWARE
DBF #586B031.GG1 □ OMB/DFM# MC3501000018
DECEMBER 17, 2014

In Attendance

Davis, Bowen & Friedel, Inc.:	Ring Lardner	Phone: 302-424-1441 Fax: 302-424-0430
Contractor attendees:	*See attached sign-in sheets*	

Cc:

OMB/DFM	Rich Glazeski	Phone: 302-739-5644
DHSS:	Danny Episcopo	Phone: 302-255-9335
	Tim Read	Phone: 302-535-6860
	John McDermott	

Items Discussed

1. Project was advertised starting December 8, 2014 on the State of Delaware website.

2. The mandatory pre-bid meeting was conducted on December 23, 2014 at the Herman S. Holloway, Sr. Campus, Administration Building Annex, Room 011.

3. The sign-in sheet was distributed. Attendance at this pre-bid meeting is mandatory for general contractors to submit a bid.

4. All questions during the bidding shall be submitted in writing to Davis, Bowen & Friedel, Inc., attention: Ring Lardner, fax 302-424-0430, or email

rwl@dbfinc.com. Please have requests for information or substitution to Ring by 5:00 P.M. on Friday, January 2, 2015. The final addendum will be issued no later than 12:00 P.M. on Monday, January 5, 2015. No addenda will be issued 4 days prior to the date for receipt of bids except an addendum withdrawing the request for bids or one which extends the time or changes the location for the opening of bids.

5. **Bids will be due January 9, 2015 at 3:00 p.m.**, in conference room 011 of the Main Administration Building Annex at the Herman Holloway Campus, 1901 N. DuPont Highway, New Castle, Delaware 19720. Please allow extra time when submitting bids to account for possible delays. No late bids will be considered.

6. One (1) original and two (2) copies of the bid forms must be submitted along with one (1) original and two (2) copies of a Bid Bond equal to ten percent of the bid price including any alternates. All bid submission documents, including the bid bond, must be completed on the forms provided in the specifications. A Performance Bond equal to 100 percent of the contract amount must also be posted upon execution of the contract. No construction schedules are required with the bid.

7. The subcontractor list must accompany the Bid Forms and be fully completed in order to submit a qualifying bid. All subcontractors must be licensed to practice their trade in the State of Delaware prior to execution of the contract. The prime general contractor must include their Delaware Business License with the bid. The prime contractor must submit their subcontractors business license(s) within 30 days of signing the agreement.

8. The bid form must be completely filled out (do not leave any blanks). Contractors who will be doing their own work must list themselves as a subcontractor on the bid form.

9. General Contractors who wish to receive addenda directly and be on the approved bidders list must purchase a minimum of one (1) set of bid documents from Davis, Bowen & Friedel, Inc. for $100.00.

10. The building will be occupied during construction. Normal work hours are 7:00 a.m. to 5:00 p.m. The contractor will be allowed to work during normal business hours. The contractor will provide a walkway to the dining room door during construction.

11. Funding: The project is state funded. Prevailing Wage Rates will be required. For bidding purposes, contractors should refer to the rates and benefits for Highway Construction effective March 14, 2014. A certified copy of the prevailing wage rates will be included in Addendum 1. The contractor will be responsible to send wage reports to the Department of Labor.

12. Submissions: Fire Marshal has approved the drawings as submitted. DNREC has approved the Detailed Sediment and Stormwater Management Plans. The contractor will be responsible for obtaining a special permit for the retaining wall from New Castle County.

13. Scope: Work to be accomplished in accordance with this contract includes the parking lot rehabilitation, loading dock ramp replacement, loading dock repair, dumpster pad relocation, and ADA compliant walk. Alternates include additional asphalt areas, and relocation of laundry cart storage canopy. Contractor shall refer to drawings for a more detailed scope of work.

14. All soils and concrete testing will not be in the contractor's scope of work. There will be construction coordination required between the general contractor and the State's vendor, Duffield Associates.

15. The contractor will be responsible for having a supervisor on site at all times during work of any subcontractors or their own forces, including punch-list work.

16. The Owner has an 110V electric outlet and hose bib water service available for use by the contractor at no cost. The contractor shall provide their own toilet facility. Contractor shall be prepared to provide additional electric or water if needed. Staging of materials on site should be minimized due to the size of the area.

17. Materials will need to be on site prior to request for payment for those materials by the contractor.

18. Utilities are shown on plan. Contractor is required to mark utilities on site using a locate company like Soft Dig to locate the utilities within the work area.

19. Contractor is reminded that all work carries a 2 year warranty period.

20. Potential bidders may visit the site at any time. Bidders may take pictures of the proposed work but may not include people in the picture.

21. New lighting is not required for this project.

22. The facility is a critical facility. The State wants the work done in the shortest duration. Please include the number of days to complete the work on the bid form.

23. Potential bidders are reminded to review the close out documents to include the required recycling requirements to include required forms included in the Construction Waste Management Section.

24. Campus Specific Items: The facility is a hospital and patients are able to walk the facility. Contractors will keep all tools and equipment secure throughout the

duration of the contract. The campus is a tobacco free campus. Interim Life Safety Measure forms are required to be completed. The form will be provided in a second addendum.

25. A walkthrough of the areas of work took place directly after this prebid meeting.

Any changes, additions or deletions to these minutes should be submitted in writing to Davis, Bowen & Friedel, Inc., within ten (10) days.

Respectfully Submitted,
DAVIS, BOWEN & FRIEDEL, INC.

Ring W. Lardner, P.E.
Principal - Project Manager

P:\DHSS\HOLLOWAY CAMPUS\0586B031-GG1 Kent-Sussex Loading Dock\Docs\Bid Services\Re-Bid\0586B031-GG1 Loading Dock Rebid Mandartory Prebid Minutes.docx

Enc.: Pre-bid sign-in sheets

Cc: All attendees
David Hill (DHSS)

PRE-BID MEETING
DHSS KENT / SUSSEX BUILIDNG – LOADING DOCK REHABILITATION
RE-BID
DBF #586B031.GG1
DECEMBER 17, 2014

Name (Please Print)	Co. / Dept. Name & Address	Email (Please Print)
Kenneth Masciantonio	Kent Construction	Pete@kentconstruction.com
Jeff Norman	George & Lynch, Inc. 150 Lafferty Lane Dover, DE 19901	jnorman@geolyn.com
Bill Michelinie	Brandywine Contrs. 34 Industrial Blvd. New Castle, DE 19720	bmichelinie@bci-online.com
John Rozich	Harbor Stone Construction 100 Elizabeth Way Oxford, PA 19363	JRozich[redacted]@harborstonecc.com
Chris Stayton	GFP Cement Contractors 101 South Mary St Newport DE 19804	Chris.Stayton@gfpcement.com
Teddi King	BRS Consulting P.O. Box 237 293 Jackson Ditch Rd Harrington DE 19952	brianscottschuman@Comcast.Net
Ryan Jackson	Amakor Inc 72 Clinton Street Delaware City DE 19706	Amakor Inc@AOL.com

PRE-BID MEETING
DHSS KENT / SUSSEX BUILIDNG – LOADING DOCK REHABILITATION
RE-BID
DBF #586B031.GG1
DECEMBER 17, 2014

Name (Please Print)	Co. / Dept. Name & Address	Email (Please Print)
VINCENT DILLS	MERIT CONSTRUCTION ENGINEERS, INC. 5700 KIRKWOOD HIGHWAY WILMINGTON, DE 19808	vinced @ mce85.com
Bob Leboffe	Gessler Construction 565 E. ST. Andrews media, Pa. 19063	Gessler Construction @ Comcast.net
Tony Ventresca	Ventresca Bros., Inc. 2300 N. DuPont Hwy. New Castle, DE 19720	Tony @ VentrescaBros.com
MATT TARR	G E S 70 ALBE DRIVE NEWARK, DE 19713	MTARR @ GESONCALL.COM
Louis Deldeo	DELDEO Builders INC 100 NAAMANS Rd SUITE 3F CLAYMONT, DE 19703	loudeldeo @ COMCAST.NET 302-791-0243
		@
		@

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **HIGHWAY CONSTRUCTION** EFFECTIVE MARCH 14, 2014

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	48.08	48.08	14.51
CARPENTERS	43.15	50.91	40.47
CEMENT FINISHERS	30.88	26.13	26.33
ELECTRICAL LINE WORKERS	22.50	22.50	21.25
ELECTRICIANS	62.10	62.10	62.10
IRON WORKERS	42.20	23.87	25.35
LABORERS	33.01	38.68	37.97
MILLWRIGHTS	16.11	15.63	13.49
PAINTERS	60.64	60.64	60.64
PILEDRIVERS	66.42	23.75	26.95
POWER EQUIPMENT OPERATORS	41.18	27.61	28.47
SHEET METAL WORKERS	22.75	20.31	18.40
TRUCK DRIVERS	33.90	21.03	22.19

CERTIFIED: 12/17/14 BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: Kent-Sussex Loading Dock Repairs, New Castle County

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 •

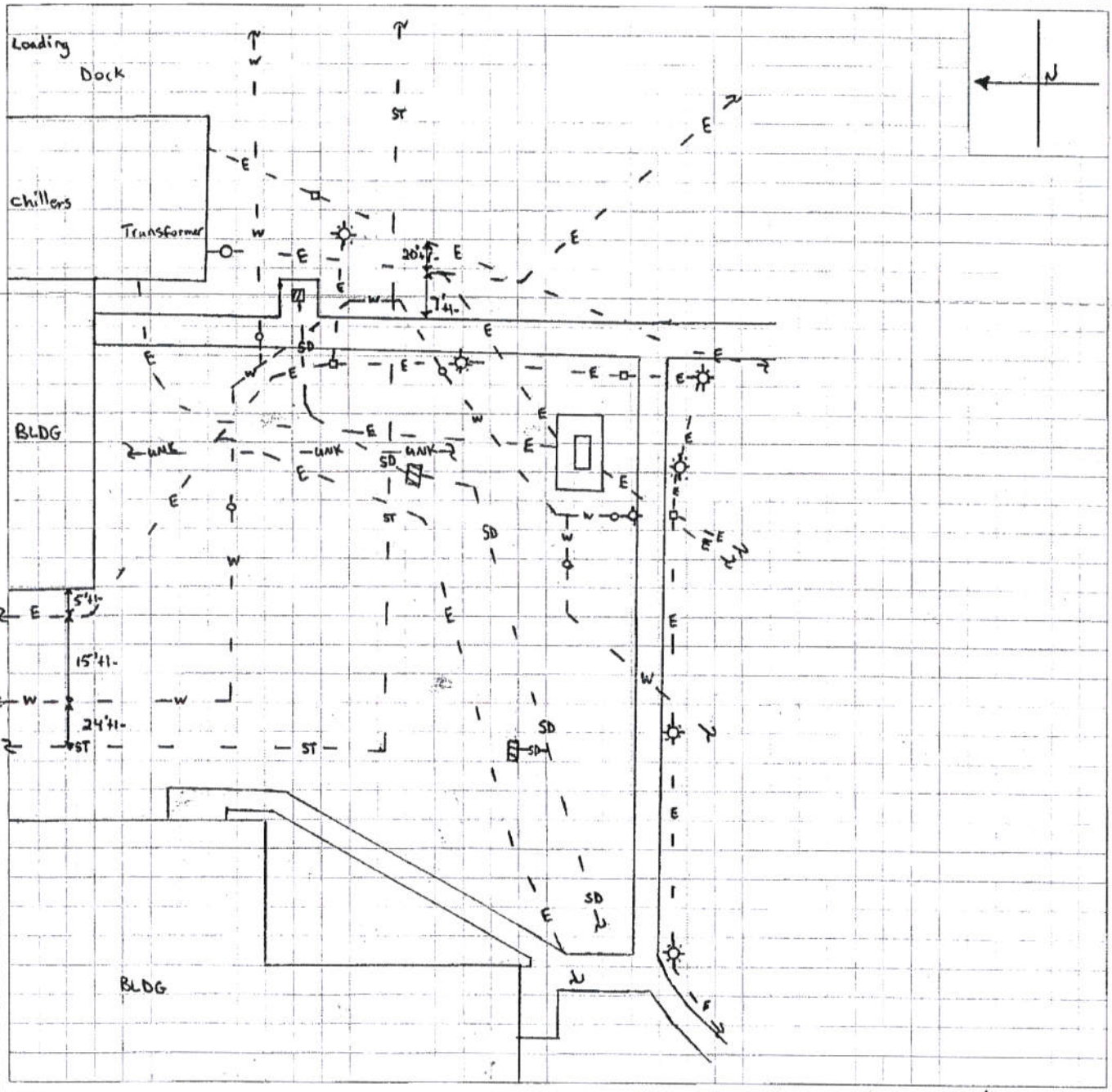
Pre-Surface Location Information

Intended construction in project limits: ✓ Excavation ___ Trenching ___ Soil Borings/Wells ___ Other ___ (Describe)

Project limits defined by: ___ Flagging ___ Paint ___ Sketch ___ Other Designation (Describe)

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: ___

SoftDig
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 •

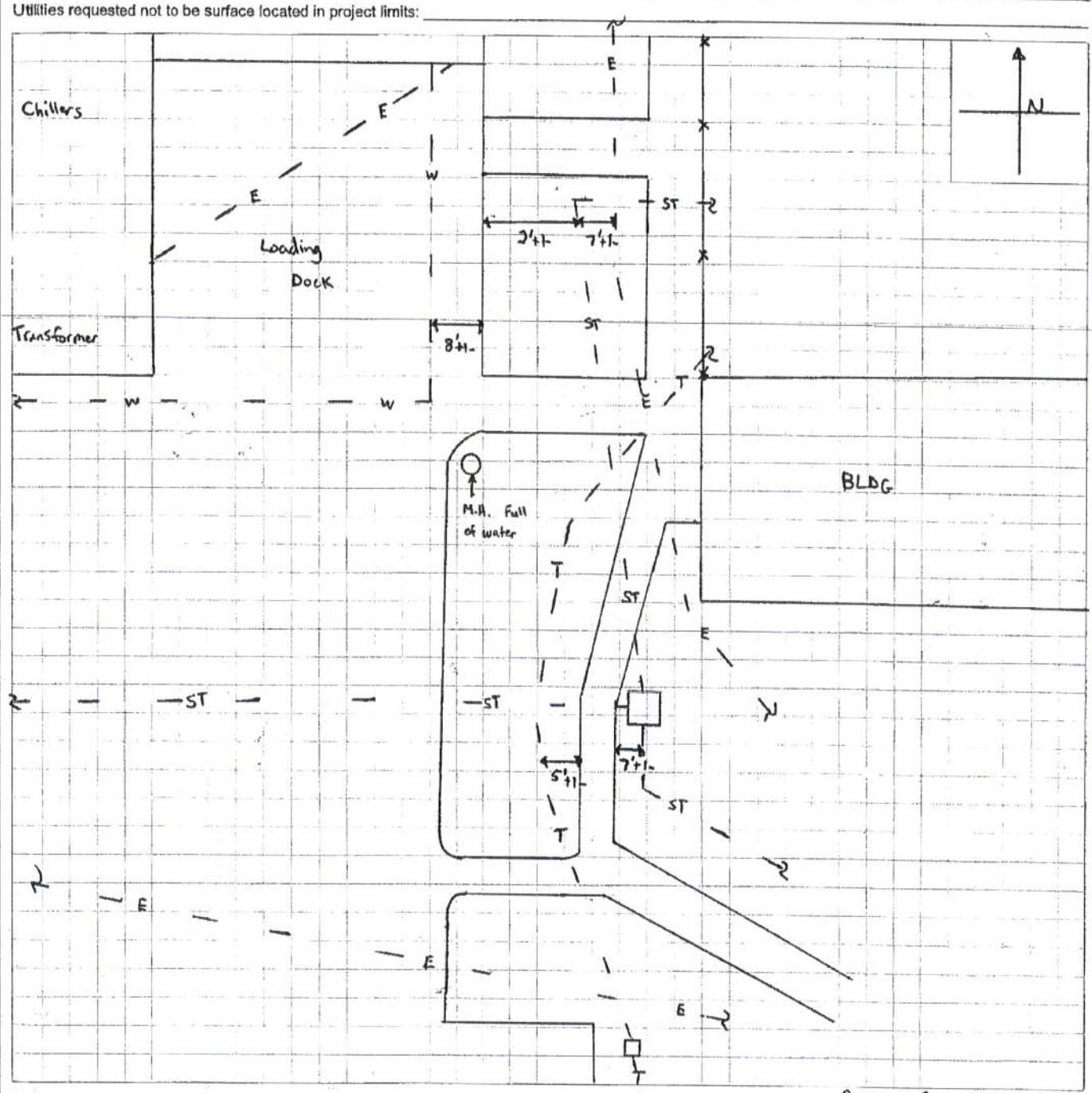
Pre-Surface Location Information

Intended construction in project limits: ✓ Excavation ___ Trenching ___ Soil Borings/Wells ___ Other ___ (Describe)

Project limits defined by: ___ Flagging ___ Paint ___ Sketch ___ Other Designation (Describe)

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: S. Smith

Client's Signature: ___

SoftDig
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 Higway New Castle, De

NOTES

IF LOST CALL:

Crew: S. Smith 12/17/13
C. Loesch 25°/cloudy

Arrived onsite at 7am. No client was onsite. Talked to client from Davis, Bowen & Friedel named Ring Liardner 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.

Crew: S. Smith 12/18/13
C. Loesch 30°/sunny

Arrived onsite at 7 am. Continued mark out of utilities in area. We were unable to get signal on chilled water lines near loading dock. Completed job and left site at 11 am.

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

DUFFIELD
ASSOCIATES

5400 Limestone Road
Wilmington, DE 19808
Phone: 302.239.6634
Fax: 302.239.8485
duffnet.com

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 14⅛ inches across the site. Areas exhibiting pavement failure (i.e., cracking) was observed to yield approximately ¼ to ½ 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 underline 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.

DUFFIELD ASSOCIATES

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

DUFFIELD ASSOCIATES

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

TABLE OF CONTENTS

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.

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.

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

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 3.5 feet. This is reflective of a seasonally perched water table condition determined based upon redoxiomorphic 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

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 14⅛ 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
	Geotextile Fabric, Geotex 315 or equivalent
12 inches	Total Depth

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.

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_O. 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_O	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.

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.

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

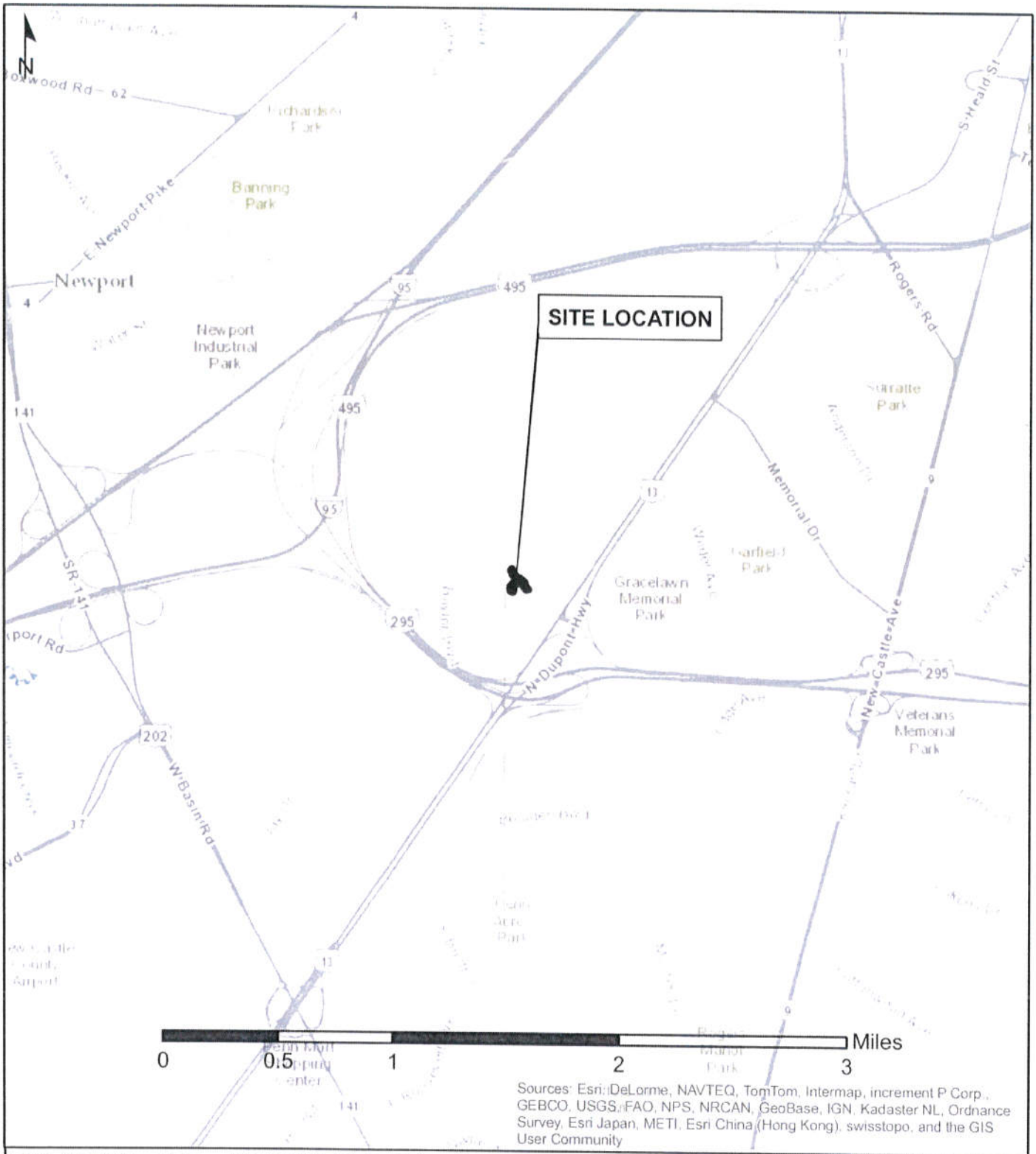
All contractors interested in bidding on phases of this work that involve subsurface conditions should be given full access to this report so that they can develop their own interpretations of the available data.

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.

F. SKETCHES AND TEST BORING LOGS

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



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	SITE LOCATION SKETCH **DHSS** **HERMAN M. HOLLOWAY, SR. CAMPUS** **1910 NORTH DUPONT HIGHWAY** PAVEMENT EVALUATION NEW CASTLE, NEW CASTLE COUNTY, DELAWARE	BASEMAP: Aerial Photography	DUFFIELD ASSOCIATES
SCALE: AS SHOWN		DRAWN BY: JPC	
PROJECT NO. 6292.NN		CHECKED BY: WHS	
SHEET: 1 OF 1		FILE: 6292.NN.0214.SITELOCSKTCH.mxd	

5400 LIMESTONE ROAD
WILMINGTON, DE 19808
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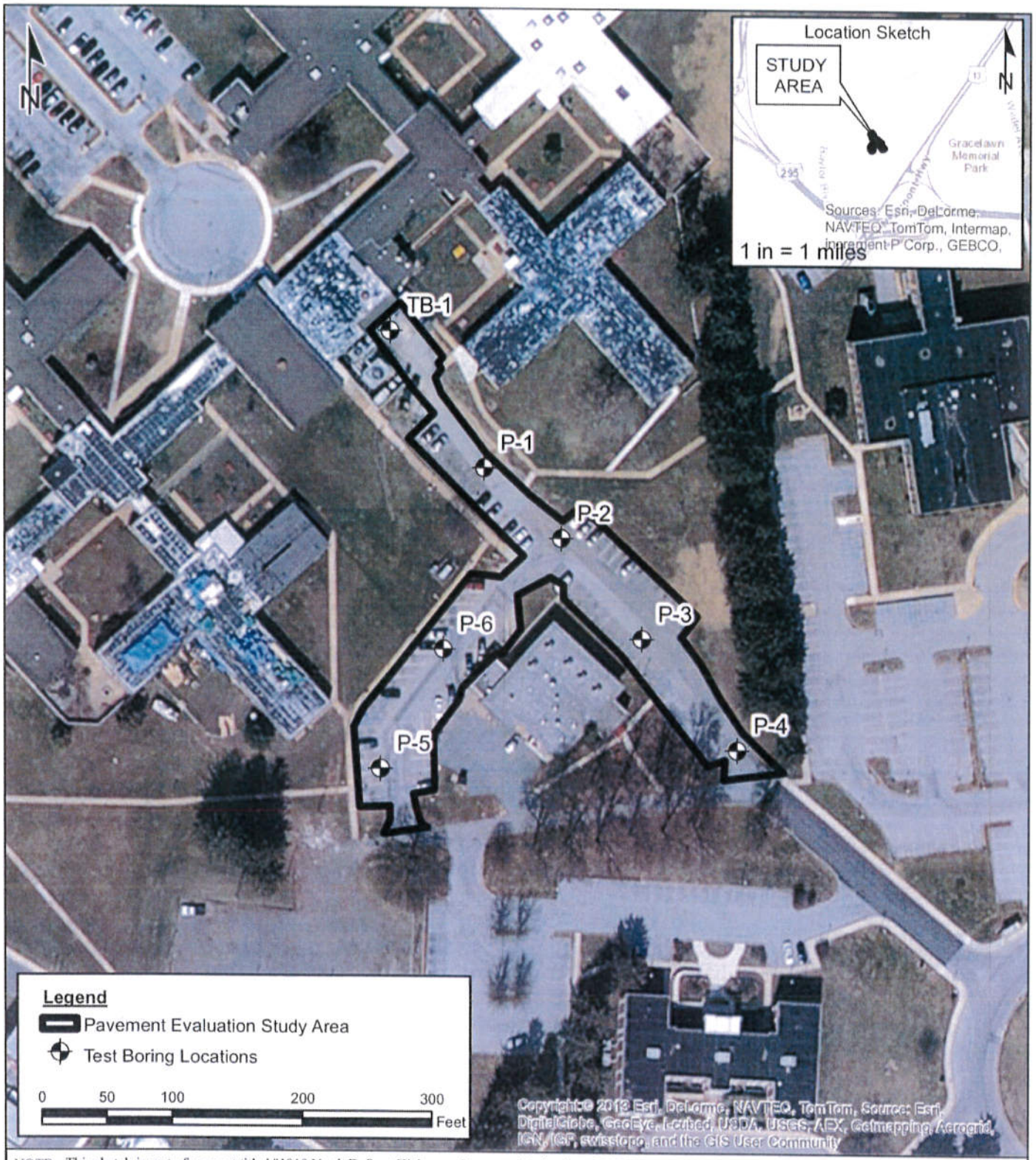

NOTE: This sketch is part of a report titled "1910 North DuPont Highway - Pavement Evaluation - DHSS Herman M. Holloway, Sr. Campus," dated February 2014 and prepared by Duffield Associates, Inc.; and as such, this sketch should only be used in the context of that report.

DATE: FEBRUARY 2014	TEST BORING LOCATION SKETCH	BASEMAP: Aerial Photography	DUFFIELD ASSOCIATES
SCALE: AS SHOWN	**DHSS HERMAN M. HOLLOWAY, SR. CAMPUS**	DRAWN BY: JPC	
PROJECT NO. 6292.NN	**1910 NORTH DUPONT HIGHWAY**	CHECKED BY: WHS	
SHEET: 1 OF 1	PAVEMENT EVALUATION	FILE: 6292.NN.0214.TBLOCSKTCH.mxd	
	NEW CASTLE, NEW CASTLE COUNTY, DELAWARE		

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DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING TB-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		

Sample Condition: Remolded; Auger Cuttings
Water Levels: ▼ During Drilling; ▽ At completion

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

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

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING P-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	: 38 feet (Project Datum)
Weather	: Clear, 20s		
Driller/Agency	: D. Wilson/CGCG		

Sample Condition: ☒ Remolded

Water Levels

Depth in feet	Surf. Elev. 38 ft	GRAPHIC	USCS	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
0	37.7			Bituminous Concrete (± 4 inches)							
	37.2			Pavement Base (± 5.5 inches) - gray, dark gray fine to coarse gravel and fine to coarse sand, little silt (crusher run)							
	36.7			FILL: yellowish brown fine to medium sand, little to some silt (wet)	☒	S-1A	6-13-9-9	1.1			
2	35.9			FILL: gray gravel and fine to coarse sand, little silt (crusher run) (moist)	☒	S-1B					
	34.7			FILL: Brown, dark gray, grayish brown silt, trace fine sand (moist)	☒	S-2A	9-5-6-8	0.9			
4			CH	Brown, red, light gray CLAY/SILT, little fine sand (moist) (high plasticity) (Apparent Potomac Formation)	☒	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.

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING P-2

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	: 39 feet (Project Datum)
Weather	: Clear, 20s		
Driller/Agency	: D. Wilson/CGCG		

Sample Condition: ⊠ Remolded
Water Levels: ▼ During Drilling

Depth in feet	Surf. Elev. 39 ft	GRAPHIC	USCS	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
0	38.7			Bituminous Concrete (± 3.5 inches)							
	38.2			Pavement Base (± 6 inches) - black gravel (up to 3"+) and fine to coarse sand, little silt (dry to damp)							
	37.8			FILL: black fine to coarse sand, some silt (moist)		S-1A	8-7-6	1.1			
2	37.0			FILL: brown, yellow-brown fine to medium sand, some silt, trace gravel (moist)		S-1B S-1C			8.6	22.4	
			ML	Dark gray, gray SILT, trace to little fine sand, trace medium sand (moist)							
	36.0										
4				Light gray, brown, reddish yellow SILT/CLAY, little fine to medium sand, trace gravel (moist) (prominently mottled)		S-2	9-18-21	1.4	14.9	68.5	
6			CL-ML	SAME (clay content increasing with depth) (lensed with sand) (damp)		S-3	13-15-21	1.2			
8											▼
	30.4			SAME		S-4A	10-26-35	0.9			
	29.9		CL	Brown, red, light gray CLAY, little fine to medium sand (moist)		S-4B S-4C					
			GM								
10	29.0			Brown GRAVEL and fine to medium SAND, trace to little silt, trace coarse sand							
12											
14											
16											
18											
20											

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

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Consultants in the Geosciences

TEST BORING P-3

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	: 40 feet (Project Datum)
Weather	: Clear, 20s		
Driller/Agency	: D. Wilson/CGCG		

Sample Condition: ⊠ Remolded

Water Levels

Depth in feet	Surf. Elev. 40 ft	GRAPHIC	USCS	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
0	39.8			Bituminous Concrete (± 2 inches)							
	39.2			Pavement Base (± 8 inches) - crusher run							
				FILL: brown, gray, dark gray fine to medium sand, some to and silt, trace coarse sand, trace gravel (moist to wet at 1.7')		S-1A	4-7-5-6	1.4			
2	38.1			Dark gray SILT, trace fine to medium sand (damp to moist) (very soft consistency) (organic odor)		S-1B			21.9	71.2	
			ML								
4				Dark gray to light gray SILT, some fine sand, trace medium sand (moist to wet) (color change at 3.1')		S-2	1-2-2-7	1.9			
	35.0										
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 at approximately 4.3 feet b.e.g.s. based on perched water conditions.

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING P-4

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		

Sample Condition: ☐ ☒ Remolded
Water Levels: ▼ During Drilling; ▽ At completion

Depth in feet	Surf. Elev. 41 ft	GRAPHIC	USCS	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
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				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			
	35.5										
6			CL-ML	Brown, light gray SILT/CLAY, little fine sand (moist) (prominently mottled)	☒	S-3A	6-15-25	1.0			▽
	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			▼
10	31.0										
12											
14											
16											
18											
20											

NOTES:
1. Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
2. Groundwater observed at ± 7.7 feet b.e.g.s. with augers at ± 8.5 feet b.e.g.s.
3. 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.
4. Borehole backfilled with soil cuttings upon completion and patched with asphalt cold-patch.
5. Soil descriptions performed in accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).
6. SHWT estimated at approximately 4.3 feet b.e.g.s. based on redoxiomorphic features and observed groundwater conditions.

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING P-5

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		

Sample Condition: ☒ Remolded

Water Levels

Depth in feet	Surf. Elev. 37 ft	GRAPHIC	USCS	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
0	36.7			Bituminous Concrete (± 3 inches)							
	36.4			Pavement Base (± 4 inches) - crusher run							
				FILL: brown, reddish brown, grayish brown silt, trace gravel, little fine to medium sand (damp to moist) (faintly mottled)	☒	S-1A	3-4-15	1.1	19.2	77.0	
2	35.0			FILL: brown, yellowish red fine to medium sand, little to some silt (damp)		S-1B					
				FILL: brown, yellowish brown fine to medium sand, little silt, trace gravel (moist) with thin brown silt, trace fine sand layers (damp)	☒	S-2	4-4-3	0.6			
4											
6				FILL: brown, yellowish brown, dark gray fine to medium sand, little silt, trace gravel (moist to wet)	☒	S-3A	5-5-5	0.8			
	30.5					S-3B					
	30.3		CL-ML	Possible FILL: dark gray, brown fine to medium sand, some silt (moist to wet)		S-3C					
8	29.0			Light gray SILT, trace to little fine to medium sand, trace gravel (dry to damp) (undisturbed)							
			CL	Light gray, blueish gray SILT/CLAY, little to some fine sand, trace medium to coarse sand, trace gravel (damp) (low plasticity) (Potomac Formation?)	☒	S-4	4-5-8	1.3			
10	27.0										
12											
14											
16											
18											
20											

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

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING P-6

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		

Sample Condition: ⊠ Remolded

Water Levels

Depth in feet	Surf. Elev. 38 ft	GRAPHIC	USCS	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
0	37.9			Bituminous Concrete (± 1 inches)							
	37.3			Pavement Base (± 7 inches) - black fine to coarse gravel (up to 3") and fine to coarse sand (damp)							
2				FILL: brown, dark brown, reddish yellow fine to medium sand, little silt, trace gravel interlayered with silt, little fine to medium sand (moist)	⊠	S-1	6-10-6-5	1.0	11.5	43.7	
	35.5										
4				FILL: reddish yellow fine to medium sand, little silt, little coarse sand, trace fine gravel (damp to moist at 4')	⊠	S-2	6-5-6-4	1.3			
	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. Groundwater level 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.

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
Yel - Yellow
Br - Brown
Blk - Black
Gr - Gray
R - Red
Vc - Varicolored
Dk - Dark
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: _____