Information To Build On
Engineering • Consulting • Testing

October 16, 2009

NBBJ
1555 Lake Shore Drive
Columbus, Ohio 43204

Attention: Ms. Peggy Reed
Senior Associate

Re: Geotechnical Engineering Report
Proposed VA Hospital – Phase I
Canal Street and South Galvez Street
New Orleans, Louisiana
PSI File No.: 267-95001-1

Dear Ms. Reed:

Professional Service Industries, Inc. (PSI) is pleased to transmit our Geotechnical Engineering Report for the referenced project. This report includes the results of field exploration and laboratory testing for Phase I geotechnical investigation as well as recommendations for foundation and pavement design, construction considerations and general site development.

We appreciate the opportunity to perform this Geotechnical Study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please do not hesitate to call.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Malay Ghose Hajra, Ph.D., P.E.
Regional Engineer

Tony Y. Maroun, P.E.
Vice President

STATE OF LOUISIANA
TONY Y. MAROUN
License No. 25169
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
10/16/09

MGH/TYM:gsm

GEOTECHNICAL ENGINEERING REPORT

PROPOSED VA HOSPITAL – PHASE I
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

PSI FILE NUMBER 267-95001-1

PREPARED FOR

NBBJ
1555 LAKE SHORE DRIVE
COLUMBUS, OHIO 43204

OCTOBER 16, 2009

BY

PROFESSIONAL SERVICE INDUSTRIES, INC.
724 CENTRAL AVENUE
JEFFERSON, LOUISIANA 70121

TABLE OF CONTENTS

RFI 014

1.0 EXECUTIVE SUMMARY

An exploration and evaluation of the subsurface conditions have been completed for the proposed new VA Hospital complex that will be constructed at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana. Since the proposed site is presently occupied by various structures, the geotechnical exploration will be conducted in two (2) phases. This report presents the results of our field exploration and laboratory testing for Phase I, as well as recommendations for foundation and pavement design and general site development.

The area of the proposed construction encompasses about 30 acres of previously developed land and is bounded by Canal Street, South Galvez Street, Tulane Avenue and South Rocheblave Street in New Orleans, Louisiana. Most of the area is currently occupied by several residential and commercial buildings, existing streets, and associated parking areas which will be demolished to accommodate the new construction. Other areas are undeveloped and covered with surface vegetation.

The project will include the construction of several multi-story buildings having a total footprint of approximately 460,000 square feet. The project includes the construction of a staff garage, a patient garage, inpatient and outpatient buildings, transitional living building, Diagnostic and Treatment (D&T) buildings, Research (Dixie) building and a Central Energy Plant facility. The number of floors for the buildings will vary between four (4) and ten (10). The staff and patient garages will be cast-in-place concrete structures and the remaining buildings will be of structural steel frame construction. Current plans also include the construction of below grade storm water collection tanks within the footprint of the two (2) parking garages.

Topographic information provided to us by Mr. Chris Jenkins, P.E. of Schrenk and Peterson Consulting Engineers indicate that existing ground surface elevation ranges between -1.8 and -3.6 feet. Considering a finished floor elevation of +1.33 feet, about 3 to 5 feet of fill will be needed to achieve the floor slabs design elevation.

The subsurface soil conditions at this site will be characterized by a total of 66 soil borings drilled to depths ranging between 20 and 220 feet. However, due to the presence of existing buildings and limited site access at the present time, 22 borings were drilled to a depth of 220 feet below the existing ground surface at accessible locations along the roadways. Based on the borings, about three (3) to four (4) inches of asphalt or five (5) to six (6) inches of concrete covered the ground surface. This was generally followed by soft lean clay or fat clay, very soft dark brown and dark gray organic clay to depths ranging between 10 and 15 feet. Below this, there was very soft to soft gray silty clay, sandy clay or fat clay to depths ranging between 42 and 50 feet and followed by loose to medium dense gray silty sand to poorly graded sand to depths ranging between 102 and 107 feet. Below the sand, firm to stiff gray fat clay or sandy clay was encountered and extended to depths ranging between 133 and 148 feet. This was generally followed by firm to stiff gray and brown sandy clay, lean clay, or fat clay to depths ranging between 210 and 213 feet. The

borings were terminated in very dense sand at a maximum depth of 220 feet. Groundwater was measured at depths ranging between four (4) and 7.5 feet below the existing ground surface upon completion of drilling. Delayed groundwater was measured at depths ranging between four (4) and seven (7) feet.

The results of this exploration indicate that the near surface soils present at this site are compressible in nature and poor in bearing quality and hence subject to excessive settlement induced by the needed fill and the anticipated drilling loads. Due to the high magnitude of the anticipated structural loads and the amount of fill needed to raise the slabs to design grade, a deep pile foundation system is recommended to support the proposed buildings including the floor slabs. Consideration was given to pre-cast square concrete piles for the heavily loaded structures and large treated timber piles, and composite timber piles for the lightly loaded buildings. Details related to site preparation, foundation and pavement design and construction considerations are presented in subsequent sections of this report.

The owner/designer should not rely solely on this Executive Summary and must read and evaluate the entire contents of this report prior to utilizing our engineering recommendations in preparation of design/construction documents.

2.0 PROJECT INFORMATION

2.1 Project Authorization

Professional Service Industries, Inc. (PSI) has completed a geotechnical exploration for the proposed VA Hospital that will be constructed at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana. This exploration was accomplished in general accordance with PSI Proposal Number 254-850144, Revision 2 dated June 23, 2009.

2.2 Project Description

The project includes the construction of several multi-story buildings having a total footprint of approximately 460,000 square feet. The buildings will be continuous and connected via a series of corridors. Based on our understanding, the VA complex will include the following components:

Building	Number of Floors	Approximate Footprint (sq. ft.)	Construction Type	Maximum Column Load
Staff Parking Garage	10	58,000	Cast-in-place Concrete	Exterior Column Dead Load=1630 kips, live load=400 kips Interior Column Dead Load=2220 kips, Live Load=665 kips
Patient Parking Garage	10	53,500	Cast-in-place Concrete	Exterior Column Dead Load=1630 kips, live load=400 kips Interior Column Dead Load=2220 kips, Live Load=665 kips
Inpatient Beds	6	46,000	Structural Steel Frame	Dead Load=570 kips Live Load=460 kips
Outpatient	7	53,000	Structural Steel Frame	Dead Load=1165 kips Live Load=1210 kips
Transitional Living	4	54,000	Structural Steel Frame	Dead Load=855 kips Live Load=575 kips
Diagnostic and Treatment (D&T) North	4	124,000	Structural Steel Frame	Dead Load=997 kips Live Load=1265 kips
Diagnostic and Treatment (D&T) South	4		Structural Steel Frame	Dead Load=821 kips Live Load=757 kips
Research (Dixie) Building	4	31,800	Cast-in-place Concrete	Dead Load=1204 kips Live Load=366 kips
Central Energy Plant	4	39,400	Structural Steel Frame	Dead Load=1400 kips Live Load=800 kips

It is understood that the existing Pan American building on Canal Street will remain and will be renovated as part of the new VA Medical Center. A portion of the existing Dixie Brewery will also remain and will be improved to become a part of the new Research Facility. Current plan also includes the construction of below-grade storm water retention basement below the staff and patient garages. The depth of the water retention basement will vary between 9.2 and 13.7 feet below the existing grade.

The geotechnical recommendations presented in this report are based on the available project information, building locations, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

2.3 Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site of the proposed VA Hospital to enable evaluation of acceptable foundation and pavement types for the proposed construction. The geotechnical exploration includes drilling a total of 66 soil borings to depths ranging between 20 and 220 feet below the existing ground surface. However, due to the presence of existing structures and access limitations, a total of 22 soil borings (B-1 through B-22) were drilled to a depth of 220 feet below the existing ground

surface at this time (Phase I). After demolition of the existing structures, 14 additional soil borings will be drilled to 200 feet and 30 borings will be advanced to 20 feet below the existing ground surface to verify the subsurface conditions at the actual building locations and provide supplemental recommendations, as necessary.

The scope of services also included conducting laboratory tests on selected samples recovered from the soil borings and preparing this geotechnical report. This report presents the results of our field exploration and laboratory testing for Phase I borings and provides engineering analyses and recommendations based on the data available to date. It briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions and provides recommendations regarding the following:

- Foundation types, allowable pile capacities, and an estimate of settlement.
- Seismic site classification.
- Retaining walls recommendations.
- Concrete and asphalt pavement section recommendations.
- Site preparation including fill placement and compaction requirements.
- Recommendations regarding earth retention systems.
- Grading procedures for site development.
- Comments regarding factors that will impact construction and performance of the proposed construction.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes. Prior to development of this site, an environmental site assessment is advisable. A geologic fault study to evaluate the possibility of surface faulting at this site was beyond the scope of this investigation.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Location and Description

The area of the proposed construction encompasses about 30 acres of previously developed land near downtown New Orleans. The site covers about twelve city blocks and is bounded by Tulane Avenue to the south, Canal Street to the north, South Rocheblave Street to the west and South Galvez Street to the east. The site is currently occupied by several commercial and residential buildings and associated parking areas. Several streets cross the property in north-south and east-west directions. The streets within the construction area and the existing buildings will be demolished to accommodate the new construction. Several above ground and underground utility lines were present at the site. In general, the ground surface appeared level, firm, and dry at the time of our field exploration.

Preliminary topographic information was provided to us by Mr. Chris Jenkins, P.E. of Schrenk & Peterson Consulting Engineers, Inc. The following table summarizes the existing grades and proposed finished floor elevation at the various building locations.

Building Name	Existing Ground Surface Elevation (ft.)	Proposed Finished Floor Elevation (ft.)	Average Amount of Fill (ft.)
Staff Parking Garage	-2.6 to -3.0	Hospital level = +1.33 Bottom of Storm Water basement = -13.5	3.93 to 4.33
Patient Parking Garage	-2.8 to -3.3	Hospital level = +1.33 Bottom of Storm Water basement = -18.0	4.13 to 4.63
Inpatient Beds	-1.8 to -2.5	+1.33	3.13 to 3.83
Outpatient Building	-2.0 to -3.5	+1.33	3.33 to 4.83
Transitional Living Building	-2.7 to -3.6	+1.33	4.03 to 4.93
Diagnostic and Treatment (D&T)-North	-2.0 to -3.0	+1.33	3.33 to 4.33
Diagnostic and Treatment (D&T)-South	-2.0 to -3.0	+1.33	3.33 to 4.33
Research (Dixie) Building	-2.1 to -3.1	+1.33	3.43 to 4.43
Central Energy Plant Building	-2.6 to -3.0	+1.33	3.93 to 4.33

3.2 Field Exploration for Phase I

The Phase I field exploration, which was performed to evaluate the engineering characteristics of the foundation materials, included a reconnaissance of the project site, drilling the soil borings and recovering undisturbed and representative disturbed soil samples. Water level measurement of any groundwater encountered in the soil borings was also measured and recorded.

At the present time, a total of 22 soil borings were drilled to a depth of 220 feet below the existing grade at accessible locations along the existing streets. A summary of the boring schedule for the various structures is presented in the following table:

Proposed Building	Boring No.	Boring Depth,* (ft.)
Staff Parking Garage	B-7, B-8, B-9, B-10	220
Patient Parking Garage	B-17, B-18	220
Outpatient Building	B-11, B-12, B-13, B-14	220
Transitional Living Building	B-15, B-16	220
Research (Dixie) Building	B-22	220
Diagnostic and Treatment Building (D&T)-North	B-1, B-2, B-3, B-4	220
Diagnostic and Treatment (D&T)-South	B-5, B-6	220
Central Energy Plant	B-19, B-20, B-21	220

***Boring depth is in reference to existing ground surface at the time of drilling.**

The boring depth is in reference to the existing ground surface at the time of the field exploration. The number and depths of the borings were determined by PSI in consultation with NBBJ and Mr. Subash Kulkarni, P.E. of Kulkarni Consultants and were located in the field by representatives of PSI. The approximate locations of the borings are indicated on a plan included in the Appendix of this report, which is a reproduction of a site plan provided by NBBJ.

3.3 Drilling and Sampling Procedures

The borings were drilled with SIMCO 2800 HS/HT truck mounted drill rigs. Wet rotary drilling techniques were used to advance the boreholes. Samples were generally obtained continuously from the ground surface to a depth of about ten feet and at maximum five foot intervals thereafter. Drilling and sampling techniques were accomplished in general accordance with ASTM Standard Procedures.

Undisturbed samples of cohesive soils were generally obtained using thin-wall tube sampling procedures in general accordance with the procedures for "Thin-Walled Tube Geotechnical Sampling of Soils" (ASTM D1587). These samples were extruded in the field with a hydraulic ram.

For cohesionless and semi-cohesive soils, Standard Penetration Tests (SPT) were performed at intervals to obtain standard penetration values of the soil. The standard penetration value (N) is defined as the number of blows of a 140 pound hammer, falling 30 inches, required to advance the split-barrel sampler 1 foot into the soil. To perform the test and obtain a sample, the sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three successive increments of six inches penetration. The "N" value is obtained by adding the second and third incremental numbers. The results of the standard penetration test indicate the relative density of cohesionless soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components. Samples of soils were obtained utilizing a two inch O.D. split-barrel sampler in general accordance with procedures for "Penetration Test and Split-Barrel Sampling of Soils""(ASTM D1586).

The samples were identified according to boring number and depth, were placed in polyethylene plastic wrapping to protect against moisture loss, and were transported to the laboratory in special containers to prevent disturbance. All of the samples obtained from the field exploration were identified and evaluated by experienced geotechnical personnel upon arrival at the laboratory.

3.4 Laboratory Testing Program

In addition to the field exploration, a supplemental laboratory testing program was conducted to evaluate additional pertinent engineering characteristics of the foundation materials necessary in analyzing the behavior of the foundation system for the proposed

construction. The laboratory testing program was conducted in general accordance with applicable ASTM Standard Procedures.

The soil samples obtained from the drilling operation were classified in general accordance with ASTM D2487 or ASTM D2488. Laboratory testing was performed on selected soil samples to evaluate the classification, strength, and other engineering characteristics of the subsurface materials. The geotechnical laboratory testing included the following tests:

- Moisture Content (ASTM D2216)
- Atterberg Limits (ASTM D4318)
- Percent Passing No. 200 Sieve (ASTM D1140)
- Unconfined Compression Testing (ASTM 2166)
- Triaxial UU Test (ASTM D2850)
- One Dimensional Consolidation (ASTM D2435)
- Unit Weight

Additional estimates of undrained shear strength and unconfined compressive strength were determined through the use of a hand torvane and a pocket penetrometer, respectively. Laboratory test data along with detailed description of the soils can be found on the logs of borings included in the Appendix of this report.

4.0 LOCAL GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Local Geology

Most of the present landmass of southeast Louisiana was formed by deltaic processes of the Mississippi River over the past several centuries. In general, New Orleans and its immediate suburbs lie within the Holocene deltaic plain of the Mississippi River. The deltaic to marine deposits consist of interbedded and interfingered clays, silts, and sands. All sediments are unconsolidated. Rock formation is completely absent. Compared to the overlying Holocene sediments, the Pleistocene sediments, which are present at greater depths, are generally much stronger or denser in the case of non-cohesive sediments, have lower water contents and are less organic in composition.

4.2 Subsurface Conditions

Based on the borings, about three (3) to four (4) inches of asphalt or five (5) to six (6) inches of concrete covered the ground surface. This was generally followed by soft lean clay or fat clay, very soft dark brown and dark gray organic clay to depths ranging between 10 and 15 feet. Below this, there was very soft to soft gray silty clay, sandy clay or fat clay to depths ranging between 42 and 50 feet and followed by loose to medium dense gray silty sand to poorly graded sand to depths ranging between 102 and 107 feet. Below the sand, firm to stiff gray fat clay or sandy clay was encountered and extended to depths ranging between 133 and 148 feet. This was generally followed by firm to stiff gray and brown

sandy clay, lean clay, or fat clay to depths ranging between 210 and 213 feet. The borings were terminated in very dense sand at a maximum depth of 220 feet.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, penetration resistances, locations of the samples and laboratory test data. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. The samples, which were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded.

4.3 Soil pH and Resistivity

Steel/metal and concrete structures in contact with soil are subject to corrosion or degradation due to the soil chemical activity which should be considered in the design. Laboratory soil resistivity and pH tests were performed on selected samples of the near surface soils. The pH and soil resistivity tests were performed in general accordance with EPA Method SW 9245 and U.S. Department of Agriculture Handbook 60, Chapter 6, respectively. Additional tests were performed on selected soil samples including soluble chlorides (U.S.D.A. Agriculture Handbook 60, Chapter 6), soluble sulfates (U.S.D.A. Agriculture Handbook 60, Chapter 6), acid soluble sulfides (EPA-SW 9030B/9034), and Redox Potential (SM 2580 B, Modified). The results of the laboratory testing are provided in the following table:

Boring Number	Sample Depth (ft.)	Boring Location	Soil Resistivity (ohm-cm)	pH	Soluble Chlorides (ppm)	Soluble Sulfates (ppm)	Acid Soluble Sulfides (ppm)	Redox Potential (mv)
B-1	1-2	D&T	1610	6.12	80	28	<2	+28
B-2	2-4	D&T	1359	7.05	80	43	<2	+123
B-11	5-6	Outpatient	940	6.95	80	238	119	+85
B-17	4-6	Patient Garage	604	6.75	140	510	<2	+57
B-15	6-8	Transitional Living	453	6.14	110	657	<2	+157
B-7	8-10	Staff Garage	482	5.83	170	58	<2	+150

Based upon the above laboratory test data and based on ACI Manual of Concrete Practice (ACI 201.2R-10), it appears that the soils are highly corrosive to ductile iron piping. For long term purposes, we consider it necessary to provide appropriate wrappings or cathodic protection for buried metal utility pipelines or other structures.

Based on the test results, the water soluble sulfate concentration is generally below 1000 ppm and the potential for reactions within concrete exposed to sulfate is generally low. Type I Portland Cement should be suitable for use on this project, which is the type

of cement generally used in this area. The actual cement type and additive, if used, should be determined by the project structural engineer. However, since only a limited number and set of tests were performed, other soil conditions may be present throughout the site requiring the use of a different type of cement.

4.4 Seismic Conditions

The Standard Building Code, 1999 edition, was reviewed to determine the seismic classification at the proposed site. As outlined in Section 1607, the subsurface conditions at this site consist of more than 40 feet of soft clay, which corresponds to a soil profile type S_4 and a site coefficient (S) of 2.0. The International Building Code (IBC), 2003 edition was also reviewed to determine the site classification of the project area. Based on the results of field and laboratory tests performed on the subsurface materials, the subject property can be classified as site class "E" based on section 1615.1.1. of IBC 2003.

4.5 Groundwater Information

Groundwater was encountered in the borings at depths ranging between four (4) and 7.5 feet below grade upon completion of drilling. Delayed groundwater level was measured at depths ranging between four (4) and seven (7) feet below existing grade after 24 hours of drilling. Detailed groundwater level measurements at the different boring locations are presented in the following table:

Building Name	Boring Number	Groundwater Level Below Existing Grade (ft.)	
		Upon Drilling Completion	After 24 Hours
Staff Garage	B-7	5.0	5.0
	B-8	4 ½	4.0
	B-9	4.0	5.0
	B-10	5.0	5 ½
Patient Garage	B-17	4 ½	5 ½
	B-18	4 ½	5.0
Outpatient	B-11	6 ½	6.0
	B-12	4 ½	5.0
	B-13	5 ½	5.0
	B-14	5 ½	4 ½
Transitional Living	B-15	5.0	5.0
	B-16	5 ½	5.0
Research (Dixie) Building	B-22	5 ½	6 ½
Diagnostic and Treatment (D&T)-North	B-1	7 ½	7.0
	B-2	7 ½	7.0
	B-3	7 ½	7.0
	B-4	4 ½	4.0
Diagnostic and Treatment (D&T)-South	B-5	6.0	5 ½
	B-6	4 ½	4.0
Central Energy Plant	B-19	6 ½	7.0
	B-20	5.0	4 ½
	B-21	6.0	4 ½

It should be noted that the groundwater levels were measured at the time of our drilling activities and may not have become fully static at the time of measurement. The groundwater level at this site may fluctuate due to seasonal precipitation, drought, etc. We recommend that the actual groundwater level at the site be determined by the contractor at the time of the construction activities.

5.0 EVALUATION AND RECOMMENDATIONS

5.1 General

The type and depth of foundation suitable for a given structure primarily depends on several factors including the subsurface conditions, the function of the structure, the loads it may carry, the cost of the foundation and the criteria set by the Design Engineer with respect to vertical and differential movements which the structure can withstand without damage.

The results of this exploration indicate that the near surface soils present at this site are compressible and poor in bearing quality. Furthermore, due too the high magnitude of structural loads and the amount of anticipated fill needed to achieve the slabs design grade, a deep pile foundation system, consisting of pre-cast square concrete piles was considered to support the proposed heavily loaded buildings. As an alternative, large treated timber pile (7" tip – 12" butt) or timber/concrete composite piles were also recommended for support of lightly loaded structures including the floor slabs. Details related to site preparation, foundation and pavement design, and construction considerations are presented in subsequent sections of this report.

5.2 Site Preparation

The site is currently occupied by several buildings, residences, pavement elements, and city streets. Consequently, site preparation is expected to include, but not be limited to the demolition and removal of the existing buildings, foundation elements, and pavements. The utility lines in the area should be located and re-routed as necessary. Any voids left by removal of the below grade components should be backfilled with properly compacted structural fill. Furthermore, any topsoil, organics, vegetation, and any other deleterious materials should be stripped and removed from the areas to be developed. Based on the borings, about 10 inches of brown silty topsoil with organics was encountered at the ground surface in some of the borings. However, the actual stripping depth should be determined by a representative of the geotechnical engineer at the time of construction.

Consideration should be given to the presence of any existing foundations and their effect on the proposed construction. It is expected that the existing structures are pile supported; therefore, a review of existing piles should be made to determine if they are in conflict with the new piles. If such a conflict exists, the existing piles could be left in-place and cut off at least two (2) feet below the new pile supported foundation.

Additionally, any existing piles located in the proposed pavement areas should be cut off at least three (3) feet below the subgrade.

The subgrade in the non-pile supported areas of the site should be proofrolled with a tandem axle dump truck or a similar heavily loaded rubber tired vehicle. Soils which are observed to rut or deflect excessively under the moving load should be undercut and replaced with properly compacted structural fill. The proofrolling and undercutting activities should be witnessed by a representative of the geotechnical engineer and should be performed during a period of dry weather.

After subgrade preparation and observation have been completed, the first layer of structural fill should be placed in a relatively uniform horizontal lift and should be adequately keyed into the stripped and scarified soils. Locally available "pumped" river sand having less than ten (10) percent passing the #200 sieve may be used as structural fill. The structural fill should be compacted to at least 95 percent of the Standard Proctor maximum dry density as determined by ASTM Designation D-698 (Standard Proctor). Proofrolling of the subgrade and compaction of the fill in the pile supported areas may be waived.

The structural fill should be placed in maximum lifts of eight (8) inches of loose material and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted structural fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. In-place density measurements should be taken to assure that the above degree of compaction is achieved. The compacted structural fill should extend five (5) feet beyond the perimeter of the buildings prior to sloping.

5.3 Garage Basement Preparation

5.3.1 General

The project includes the construction of one (1) level of below grade water retention basement structures underneath the staff and parking garages. It is understood that the basement will be used as water retention areas. Based on our conversations with the design team, the following information was gathered.

1. The elevation at the hospital level for the patient and staff garage is +1.33 feet.
2. Existing ground surface elevation at the patient garage location ranges between -2.8 and -3.3 feet. At the staff garage area, existing ground surface elevation ranges between -2.6 and -3.0 feet.
3. The proposed lowest finished floor elevation of the basement bottom slab at the patient garage location is -18 feet and -13.5 feet at the staff garage location.

4. Based on ground water levels measured in the borings, the groundwater elevation ranged between four (4) feet and 5.5 feet.

As a result, the excavation will require (1) dewatering system and (2) temporary/permanent bracing system. It should be noted that the presence of any contaminants may impact the construction of the basement excavation. Contaminated soil may require special excavation plans and disposal criteria. Also, the presence of contaminants in the groundwater may impact the dewatering plans and disposal of groundwater. At this time, PSI has based the following recommendations based on the assumption that the subsurface material and groundwater are free of contamination.

5.3.2 Basement Slab Area Preparation

Difficult site preparation should be anticipated due to presence of high ground water level in the general area and very soft to soft organic clays encountered at the level of the basement slab. These soils are poor in bearing quality and highly compressible. In light of the condition of the soft organic clays encountered at the basement level, it is recommended that bedding material be placed beneath the base of the slab to distribute the load and provide a working platform during construction. The bedding should be at least 24 inches in thickness and could consist of aggregate meeting the gradation of No. 57 stone.

Consideration should be given to the presence of the existing foundations which may interfere with the new foundation system. Prior to construction of the basement slab, the excavation should be braced with temporary sheet pile wall and dewatered and any soft, saturated soil that exists at the bottom should be removed or improved as recommended herein. In addition, disturbance of the subsoils should be minimized and adequate dewatering system should be provided to facilitate future construction work.

5.3.3 Excavation Dewatering and Impact of Dewatering on Adjacent Structures

The finished floor elevation of the basement floor slab for the garages ranges between -13.5 and -18 feet. Based on the borings drilled, groundwater level elevation ranged between four (4) and 5.5 feet at the garage locations. Therefore, the basements will require a dewatering system. Consideration should be given to well points or other means of withdrawal of groundwater in the event that normal sump pumping is not adequate. It is understood that a dewatering contractor will be hired to design and construct the well-point dewatering systems. It is recommended that the water level be lowered such that the ground water level is maintained at least five (5) feet below the bottom of the basement excavation during construction. PSI recommends that the basement walls be waterproofed to prevent infiltration of surface water as well as ground water. Bituminous material specifically designed for this type of application must be used in strict accordance with the manufacturer's requirements.

Due to the lowering of the water table, the slab on grade systems of the adjacent structures will likely experience additional settlement. Furthermore, it is anticipated that structures that are located within 60 feet of the perimeter of the excavation may experience some settlement. The estimated distance of influence zone is based on experience; however, it will depend on the rate of pumping, size of wells, well spacing and location and number of wells. The dewatering contractor should make a proper estimate of the influence area where the water levels are lowered based on the design of the dewatering system. In order to reduce the settlement, cut off walls may need to be installed such that the water levels behind the excavation (i.e., behind the cutoff wall) are maintained or not altered; while the water levels in front of the cutoff walls, within the excavation can be lowered. The design of the cut off wall should be the responsibility of the dewatering contractor.

5.3.4 Basement Retaining Wall Recommendations

It is understood that some of the temporary retaining wall systems may become permanent basement retention system or the temporary systems may be converted into permanent walls with structural modifications. The following recommendations are for typical retaining systems constructed with backfill behind the wall.

The earth pressure on the retaining wall depends on the extent, degree of compaction and the type of backfill that will be placed behind the retaining wall. Equivalent fluid pressure values (for active earth pressure condition) for various back-fill material types are shown in Table 1. Table 2 shows active and at rest earth pressure coefficients. The active earth pressure condition is applicable if horizontal movement can occur along the wall height. If the walls are restrained at the top, at-rest earth pressure condition is applicable.

The equivalent fluid pressure values shown in Table 1 are applicable for a horizontal backfill surface. Also, the values are applicable if the backfill behind the wall extends to a minimum distance equal to the wall height. For sloping backfill the lateral earth pressure values could be significantly different. The earth pressure values for the above water table condition correspond to the total unit weight of soil and the earth pressure values for the below water table condition correspond to the buoyant or submerged unit weight of soil.

Drainage systems should be provided to collect/remove water and to prevent hydrostatic pressure on the walls. If provisions to prevent accumulation of water behind the walls are not provided, the walls should be designed to resist the hydrostatic head in addition to the buoyant lateral earth pressures. The hydrostatic pressures should be accounted for the full height of the wall. For temporary open excavations less than 15 feet deep, side slopes of 2.5-horizontal to 1-vertical (2.5H:1V) or flatter are recommended. It should be realized that the design slopes of 2.5H:1V are for temporary purposes. Additional surcharge loads imposed on the side slopes from heavy construction vehicles or excavated stockpile material are not taken into account. Therefore, it is recommended that all

construction vehicles, structures as well as construction materials be placed a minimum of 15 feet away from the top of the slope. The side slopes should be constantly monitored. If any cracks develop on or near the slopes, PSI should be contacted.

Any additional lateral loads due to surcharge and live loads should also be included in the design. A minimum uniform surcharge pressure of 250 psf should be included in the design for the pavement and traffic loads. The lateral pressure on the wall due a uniform surcharge load can be taken as earth pressure coefficient values shown in Table 2 multiplied by the surcharge pressure. PSI should be contacted to assess the earth pressures, if any structures are located within the close proximity of the retaining wall.

TABLE 1: EQUIVALENT FLUID PRESSURES
(POUNDS PER SQUARE FOOT PER FOOT OF WALL HEIGHT)

Type of Properly Compacted Backfill Behind the Retaining System Soil Parameters	Active Condition (Horizontal Backfill)		At Rest Condition (Horizontal Backfill)	
	Above W.T.	Below W.T. [a]	Above W.T.	Below W.T. [a]
Lean Clay (CL) soils free of organics, other deleterious materials and with a maximum particle size of 3 inches and having a liquid limit less than 35 and a plasticity index of 8 to 20. Unit weight of 125 pcf, Effective Friction Angles of 25°	51	25	72	36
Clayey Sands (SC) or Silty Sands free of organics and other deleterious materials. Unit weight of 125 pcf, Effective Friction Angle of 30°	42	21	63	31
Sands (SP) or Sand with silt (SP-SM) containing no more than 10% fines, free of organics and other deleterious materials. Unit weight of 125 pcf, Effective Friction Angle of 35°	34	17	53	27

Notes:
(a) Buoyant lateral earth equivalent fluid pressures; does not include the hydrostatic fluid weight effect of 62.4 pcf; (W.T.)" Water Table.
(b) Values provided assume that the materials are compacted to at least 95 percent of the standard Proctor maximum dry density (ASTM D698), within two percentage points of the optimum moisture content.
(c) If granular soils are used, a minimum of two feet of clay should be placed over the granular soils near to the top of the wall.

TABLE 2: LATERAL EARTH PRESSURE COEFFICIENTS

Type of Properly Compacted Backfill Behind the Retaining System Soil Parameters	Active Condition (Horizontal Backfill)	At-Rest Condition (Horizontal Backfill)
Lean Clay (CL) soils free of organics, other deleterious materials and with a maximum particle size of 3 inches and having a liquid limit less than 35 and a plasticity index of 8 to 20. Unit weight of 125 pcf, Friction Angle of 25°	0.41	0.58
Clayey Sands (SC) or Silty Sands free of organics and other deleterious materials. Unit weight of 125 pcf, Effective Friction Angle of 30°	0.33	0.50
Sands (SP) or Sand with silt (SP-SM) containing no more than 10% fines, free of organics and other deleterious materials. Unit weight of 125 pcf, Effective Friction Angle of 35°	0.27	0.43
Note: Values provided assume that the materials are compacted too at least 95 percent of the standard Proctor maximum dry density (ASTM D 698), within two percentage points of the optimum moisture content.		

5.4 Pile Foundation Recommendations

Based on the field data and laboratory test results, a deep pile foundation system was evaluated for support of the various structures. Consideration was given to using 14, 16, and 18 inch square pre-cast concrete piles to support the proposed buildings including floor slabs. PSI has also evaluated large treated timber piles (7" tip-12" butt) and concrete-timber composite piles for supporting other lightly loaded structures, including the floor slabs.

Since varying site conditions were encountered across the site, the borings at each building location were evaluated to estimate the pile capacity. The piles at the site will mostly derive their support through "skin friction" along their embedded lengths as well as "end bearing" when tipped in dense sand. Taking into consideration the field and laboratory data, the estimated allowable single pile compression and tension capacities for the various buildings are presented in the subsequent sections of the report.

5.4.1 Staff and Patient Parking Garages

The parking garage structures will be constructed of cast-in-place concrete and will be 10 stories tall. A below-grade water retention basement will be constructed below the staff and patient garages. The depth of the basement varies between 9.2 and 13.7 feet below existing ground surface. Borings B-7 through B-10 were drilled in the staff parking garage area and borings B-17 and B-18 were drilled in the patient parking garage area. The recommended pile lengths are from the bottom of the floor slab of the water retention basement structure. Although some of the piles will be extended to the ground

floor surface elevation, the additional pile capacity contributed by the upper 15 feet will be negated by the drag loads caused by the fill. Therefore, all piles in the staff parking garage should be designed in accordance with the following tabbles:

Proposed Staff Parking Garage
Estimated Allowable Single Pile Load Capacity in Tons*
F.S. = 2.0 in Compression
F.S. = 3.0 in Tension
(Borings B-7, B-8, B-9, B-10)

Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
90***	75	40	85	45	96	51
95***	80	45	91	51	102	57
100***	85	50	96	57	109	64
105	90	55	102	62	115	70
110	95	61	108	69	122	78
115	103	66	117	75	132	85
120	110	71	125	80	140	91
125	118	76	134	86	150	97
130	125	80	142	91	160	102
135	133	85	151	96	170	109
140	140	90	160	102	180	115
145	150	95	170	108	192	122

***Capacities are soil pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Pile lengths are measured from the bottom of storm water basement elevation at -13.5 feet.**
***** Piles driven to firm embedment in sand.**

Proposed Patient Parking Garage
Estimated Allowable Single Pile Load Capacity in Tons*
F.S. = 2.0 in Compression
F.S. = 3.0 in Tension
(Borings B-17 and B-18)

Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
85***	90	46	100	52	115	59
90***	97	51	110	58	125	65
95***	106	57	120	65	136	73
100***	115	62	130	70	147	79
105***	117	68	133	77	150	87
110	120	73	136	83	154	93
115	125	80	142	91	160	102
120	130	85	148	96	167	109
125	141	91	160	103	181	116
130	150	97	170	110	185	125

***Capacities are soil pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Pile lengths are measured from the bottom of storm water basement elevation at -18.0 feet.**
***** Piles driven to firm embedment in sand.**

5.4.2 Diagnostic and Treatment (D&T) Building

The proposed four (4) story D&T building will be constructed of structural steel frame having a footprint of approximately 124,000 square feet. Borings B-1 through B-6 were drilled to a depth of 220 feet below grade within the D&T building. Considering the results of field exploration and laboratory testing, the estimated single pile capacities are presented in the following tables:

Proposed D&T Building - North
Estimated Allowable Single Pile Load Capacity in Tons*
F.S. = 2.0 in Compression
F.S. = 3.0 in Tension
(Borings B-1 through B-4)

Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
85***	71	37	81	42	92	47
90***	75	42	85	47	96	53
95***	80	48	91	54	103	61
100	85	53	97	60	109	68
105	88	59	100	67	113	75
110	95	64	108	72	122	82
115	101	69	115	78	130	88
120	110	73	125	83	141	93
125	117	78	133	88	150	100
130	124	83	141	94	159	106
135	132	88	150	100	165	113
140	140	93	159	106	170	119
145	145	98	165	111	177	125
150	150	103	171	117	185	132

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

Proposed D&T Building - South Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension (Borings B-5 and B-6)						
Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
90***	95	49	108	55	122	62
95***	100	55	114	62	128	70
100***	105	61	119	69	135	78
105	107	67	121	76	137	86
110	110	74	125	84	140	95
115	119	80	135	91	152	102
120	125	85	142	96	160	109
125	136	91	155	103	175	117
130	145	97	165	110	185	124

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

An alternate timber and composite pile systems were evaluated and may be used for the support of the floor slabs in lieu of the pre-cast piles as will be discussed in the floor slabs section of the report. It should be noted that the timber piles should conform to ASTM D25 for treatment and quality and have the minimum dimensions discussed herein. The composite pile consists of untreated timber lower section (7" tip-12" butt) and 12 inch diameter concrete filled steel can upper section. Typical composite can connectors do not transfer tensile loads to the timber portion of the composite pile, therefore, no tensile capacities are recommended. Based on the field data and laboratory test results, the recommended pile capacities for the timber and composite piles are as follows:

Proposed D&T Building – North (Floor Slab) Estimated Allowable Single Pile Load Capacity in Tons* F.S.=2 in Compression F.S.=3 in Tension (Borings B-1 and B-4)				
Pile Length in Feet**	Large Treated Timber Pile (7" Tip-12" Butt)		Composite Pile (7" tip-12" butt Lower timber Section and 12" Diameter Concrete Filled Steel Can Upper Section)	
	Compression	Tension	Compression	Tension
55***	16	7	--	--
60***	18	9	--	--
65***	20	11	--	--
70***	--	--	22	--

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

Proposed D&T Building – South (Floor Slab) Estimated Allowable Single Pile Load Capacity in Tons* F.S.=2 in Compression F.S.=3 in Tension (Borings B-5 and B-6)				
Pile Length in Feet**	Large Treated Timber Pile (7" Tip-12" Butt)		Composite Pile (7" tip-12" butt Lower timber Section and 12" Diameter Concrete Filled Steel Can Upper Section)	
	Compression	Tension	Compression	Tension
55***	16	7	--	--
60***	18	9	--	--
65***	20	11	--	--
70***	--	--	22	--

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Pile lengths are measured from existing ground surface at the time of drilling.**
***** Piles driven to firm embedment in sand.**

5.4.3 Outpatient Building

The proposed outpatient building is a seven (7) story structural steel framed structure having a footprint of about 53,000 square feet. Borings B-11 through B-14 were drilled to a depth of 220 feet within the outpatient building footprint. The estimated single pile compression and tension capacities for the outpatient building are presented in the following tables:

Proposed Outpatient Building Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension (Borings B-11 through B-14)						
Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
90***	72	43	82	49	92	55
95***	85	46	96	52	109	59
100***	90	51	102	58	115	65
105	95	57	108	65	122	73
110	100	63	114	71	128	80
115	102	68	116	77	131	87
120	110	74	125	84	141	95
125	119	80	135	91	152	102
130	127	85	144	96	163	109
135	133	91	150	103	170	116
140	145	97	165	110	185	124

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Pile lengths are measured from existing ground surface at the time of drilling.**
***** Piles driven to firm embedment in sand.**

Proposed Outpatient Building (Floor Slab) Estimated Allowable Single Pile Load Capacity in Tons* F.S.=2 in Compression F.S.=3 in Tension (Borings B-11 through B-14)				
Pile Length in Feet**	Large Treated Timber Pile (7" Tip-12" Butt)		Composite Pile (7" tip-12" butt Lower timber Section and 12" Diameter Concrete Filled Steel Can Upper Section)	
	Compression	Tension	Compression	Tension
55***	16	7	--	--
60***	18	9	--	--
65***	20	11	--	--
70***	--	--	22	--

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

5.4.4 Transitional Living Building

The proposed Transitional Living Building is a four (4) story structural steel framed structure having a footprint of about 54,000 square feet. Borings B-15 and B-16 were drilled to 220 feet within the transitional living building footprint. Based on the field and laboratory test date, the estimated single pile compression and tension capacities are presented in the following tables:

Proposed Transitional Living Building Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension (Borings B-15 and B-16)						
Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
100	45	28	51	32	57	36
105	47	30	53	34	60	38
110	50	32	57	36	64	41
115	55	35	62	40	70	45
120	65	40	74	45	83	51
125	70	45	80	51	90	57
130	75	50	85	57	96	64
135	85	57	96	65	109	73
140	95	62	108	70	122	80

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

Proposed Transitional Living Building (Floor Slab) Estimated Allowable Single Pile Load Capacity in Tons* F.S.=2 in Compression F.S.=3 in Tension (Borings B-15 and B-16)				
Pile Length in Feet**	Large Treated Timber Pile (7" Tip-12" Butt)		Composite Pile (7" tip-12" butt Lower timber Section and 12" Diameter Concrete Filled Steel Can Upper Section)	
	Compression	Tension	Compression	Tension
50***	16	6	--	--
55***	17	7	--	--
60***	18	9	--	--
65***	20	11	--	--
70***	--	--	22	--

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

5.4.5 Central Energy Plant Building

The proposed Central Energy Plant building will be a four (4) story structural steel framed building having a footprint of about 39,400 square feet. Borings B-19 through B-21 were drilled to a depth of 220 feet within the Central Energy Plant building. The estimated single pile capacities are presented in the following tables:

Proposed Central Energy Plant Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension (Borings B-19 through B-21)						
Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
95***	80	38	90	43	102	48
100***	90	44	102	50	115	56
105***	95	51	108	58	122	65
110***	107	57	120	65	137	73
115	110	63	125	71	141	80
120	114	69	130	78	146	88
125	117	76	133	86	150	97
130	123	82	140	93	158	105
135	131	88	150	100	168	113
140	140	93	160	106	180	120

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

Proposed Central Energy Plant (Floor Slab) Estimated Allowable Single Pile Load Capacity in Tons* F.S.=2 in Compression F.S.=3 in Tension (Borings B-19 through B-21)				
Pile Length in Feet**	Large Treated Timber Pile (7" Tip-12" Butt)		Composite Pile (7" tip-12" butt Lower timber Section and 12" Diameter Concrete Filled Steel Can Upper Section)	
	Compression	Tension	Compression	Tension
55***	12	7	--	--
60***	16	9	--	--
65***	18	11	--	--
70***	--	--	20	--

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

5.4.6 Research (Dixie) Building

The Research building will be four (4) story high and constructed of cast-in-place concrete having a footprint of approximately 31,800 square feet. One (1) boring (B-22) was drilled to a depth of 220 feet within the Research building. Based on the field and laboratory test data, the estimated single pile compression and tension capacities are presented in the following tables:

Proposed Research Building Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension (Boring B-22)						
Pile Length in feet**	14" square Pre-cast Concrete Pile		16" square Pre-cast Concrete Pile		18" square Pre-cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
90	63	44	71	50	80	56
95	65	46	74	52	83	59
100	67	47	76	53	86	60
105	70	48	80	54	90	61
110***	75	52	85	59	96	66
115***	90	58	102	66	115	75
120	100	64	114	73	128	82
125	107	71	122	81	137	91
130	115	77	131	87	147	99
135	124	83	141	94	160	106
140	133	89	151	101	170	114

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**

**** Pile lengths are measured from existing ground surface at the time of drilling.**

***** Piles driven to firm embedment in sand.**

Proposed Research Building (Floor Slab) Estimated Allowable Single Pile Load Capacity in Tons* F.S.=2 in Compression F.S.=3 in Tension (Boring B-22)				
Pile Length in Feet	Large Treated Timber Pile (7" Tip-12" Butt)		Composite Pile (7" tip-12" butt Lower timber Section and 12" Diameter Concrete Filled Steel Can Upper Section)	
	Compression	Tension	Compression	Tension
55***	16	9	--	--
60***	18	10	--	--
65***	20	12		--
70***	--	--	22	--

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Pile lengths are measured from existing ground surface at the time of drilling.**
***** Piles driven to firm embedment in sand.**

5.4.7 Ancillary Structures

Although limited project information was available at this time, lightly loaded ancillary structures such as generator pads, equipment buildings will likely be constructed at the site to support the hospital. Consequently, large treated timber piles (7" tip – 12" butt) were evaluated to support these lightly loaded structures. Using a typical soil profile of the near surface soil, the recommended capacities for large treated timber piles are tabulated below:

Lightly Loaded Structures Estimated Allowable Single Pile Load Capacities F.S.=2 in Compression F.S.=3 in Tension		
Pile Length in Feet**	Large Treated Timber Pile (7" Tip – 12" Butt)	
	Compression	Tension
40	6	4
45	8	5
50	10	6
55***	16	7
60***	18	9
65***	20	11

***Capacities are soil-pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Pile lengths are measured from existing ground surface at the time of drilling.**
***** Piles driven to firm embedment in sand.**

5.4.8 Dragloads Consideration on Piles

When fill is placed on the site, the underlying compressible soils will consolidate resulting in surface settlement. As the compressible soils consolidate, "negative skin friction" or drag loads which are non-structural loads will be imparted on the piles in

addition to the building structural loads causing an increase of the settlements. As a result, the pile capacities are reduced to account for the drag loads which are generally dependent on the thickness of the fill, compressibility of the underlying soil, time rate of consolidation, and pile tip elevation.

Based on grading information provided to us, about four (4) to five (5) feet of fill will be needed throughout the project area to achieve floor slabs design grade. Therefore, the pile capacities provided in this report have been reduced to account for the dragloads caused by the addition of up to five (5) feet of fill. If more than five (5) feet of fill is required in the building areas, PSI should be contacted to further evaluate the pile capacities to account for additional dragloads imparted on the piles.

5.5 Settlement of Piles

It is estimated that long term settlements of piles loaded to their allowable capacities will be on the order of one (1) inch. This assumes that fill thickness will be limited to a maximum of five (5) feet. Differential settlement is anticipated to be on the order of 50 percent of the total settlement.

5.6 Spacing and Group Effect

A group of driven piles subjected to vertical loads may not necessarily have the same capacity as the sum of the capacities of the individual piles. For axially loaded driven piles, published results indicate that the ratio of capacity per pile in a group to that of a single isolated pile typically ranges from 0.5 to 1.0. This efficiency factor depends on the spacing or distance between each pile. In planning groups of driven piles, a minimum center-to-center spacing of 3D (where D is the pile diameter or width) is recommended to avoid the reduction in capacity. Group action should be checked after the actual pile spacing is determined.

A group of driven piles subjected to lateral loads may not have the same capacity as the sum of the capacity of the individual piles. For laterally loaded driven piles, published results indicate that the ratio of capacity per pile in a group to that of a single isolated pile typically ranges from 0.5 to 1.0. This efficiency factor depends on the pile spacing (distance between each pile) and on the direction of loading with respect to the orientation of the pile group. Research indicates a minimum spacing of three (3) diameters to six (6) diameters is required depending on the direction of loading with respect to the orientation of the piles in a group.

5.7 Lateral Load Analyses of Piles

For deep foundations, the lateral loads are resisted by the soil as well as the rigidity of the pile. Analyses can be performed by methods ranging from chart solutions to finite difference methods. Once the pile type, depth, and group dimensions are determined, PSI can perform a lateral load analysis including a detailed computer analysis

based on finite difference methods and the results will be submitted in an addendum report. It should be noted that composite timber piles do not support lateral loading due to the inherent weakness at the connection of the can to the timber pile.

5.8 Light Pole Foundation

Due to the soft soil conditions encountered on this site, it is recommended that a pile foundation system consisting of ASTM D25 southern yellow pine treated timber piles be used to support the light poles. The piles should have minimum 6-inch tip and 8-inch butt diameters with a minimum embedded length of 40 feet.

Furthermore, it is recommended that a minimum 3-pile cap be used for each light pole to provide lateral stability. The allowable tensile and compressive capacities for piles embedded at least 40 feet below the existing ground surface are noted in the table below and incorporate a factor of safety of two (2) in compression and three (3) in tension.

Pile Type	Driven Depth, Ft.	Allowable Pile capacity, Tons	
		Compression	Tension
ASTM D25 treated timber pile with minimum 6" tip and 8" butt	40	5	4

5.9 Pile Installation

Driving hammers used to install the foundation piles should be selected according to the type, length, size, and weight of pile, as well as potential vibrations resulting from pile driving operations. Care should be taken to assure that the hammer selected is capable of achieving the desired penetration without causing damage to the piles or causing excessive vibrations which could damage existing nearby structures.

Medium dense to dense sand was encountered at depths ranging between 50 and 120 feet in the majority of borings through the project area. Driving of the piles into the upper dense sand layer could be met with high and erratic driving resistance. Therefore, pre-drilling to facilitate driving the piles below the shallow sand layer will be required. Pre-drilling should be performed with a "fish tail" bit no larger than 75 percent of the pile diameter or width and should be terminated at least 10 feet from the pile tip.

Driving hammers having a rated energy in the range of about 30,000 to 40,000 foot-pounds are believed to be satisfactory to drive the pre-cast concrete piles. For small treated timber piles (6" tip – 8" butt), hammers having a rated energy in the range of 7,500 to 12,000 foot-pounds are recommended. Hammers having a rated energy in the range of 15,000 to 20,000 foot-pounds are satisfactory for the large treated timber (7" tip – 12" butt) and timber/concrete composite piles.

Each pile should be driven to the desired tip elevation and driving resistance should be monitored without interruption in the driving operations. Driving of the center piles in

the cluster first will better facilitate driving operations. Accurate records of the final tip elevation and driving resistances should be obtained during the pile driving operations. Supplemental techniques like pile holes or jetting may reduce the pile capacity and should be avoided. Some pile heaving may be experienced during installation of adjacent displacement type piles. It is therefore recommended that the tip elevation of the piles be recorded and if significant heave is noted after driving of subsequent piles, provisions must be made for reseating them.

5.10 Pile Load Test

It is recommended that the pile capacities be verified by field load tests. It is recommended that at least one (1) pile of each type used for the various structures be installed to the design tip elevation and load tested. The pile load tests should be performed under the guidance of the Geotechnical Engineer so that the data may be interpreted and the recommended pile capacities adjusted, if necessary, according to the load tests results.

5.11 Vibration Survey and Monitoring

Thresholds of vibration induced cracking are generally site specific and depend on the type and age of the structure, the frequency of ground vibration, and the type of soil supporting the structure. Research by the U.S. Bureau of Mines (USBM) and other investigative groups have established criteria relating the occurrence of structural damage to certain frequencies and level of ground motion. According to the USBM, within the range of four (4) to 12 hertz, the maximum particle velocity recommended to preclude the threshold damage to plaster-on-wood for old structures is 0.5 inch per second (ips). A threshold of 0.25 ips has been adopted by the local engineering community and is recommended for the project. Furthermore, a site specific survey to collect vibration data during performance of the load test and during driving of the job piles is recommended.

5.12 Above Ground Retaining Walls

If any above ground retaining walls will be constructed, it is recommended that large treated timber or timber/concrete composite piles be used to support the retaining walls. The foundation should be designed as recommended in the previous sections. The planned walls must also be designed to resist lateral earth pressures that will be induced by the weight of the backfill materials, hydrostatic pressures on the walls and any adjacent slab surcharge loads exerted on the walls. It is recommended that the walls be backfilled with a free draining material such as clean sand. A drainage system should be provided near, or at the base of the walls to collect and remove groundwater and prevent build-up of hydrostatic pressures.

For design purposes, equivalent fluid pressures of 38 pounds per square foot and 80 pounds per square foot per foot of wall height may be used as the horizontal components of the active earth pressure on the retaining walls, above and below the groundwater, respectively. The following soil parameters should be used in the design:

MATERIAL	UNIT WEIGHT, PCF	FRICTION ANGLE, ϕ	COEFFICIENT OF EARTH PRESSURE			FRICTION COEFFICIENT
			Ko	Ka	Kp	
Free Draining Granular fill	115	30°	0.5	0.33	3.0	0.42

5.13 Utility Lines

It is recommended that aggregate bedding material be placed beneath the RCP culverts to distribute the load and minimize initial subsidence. Depending on the subsurface soil encountered at the pipe invert elevation, the bedding should be at least 12 to 18 inches in thickness and should extend one-half of the pipe diameter beyond the edge of either side of the pipe or a minimum of 12 inches, whichever is greater. The RCP should be side bedded to the mid-height of the pipe or to the pipe spring line if arch pipe is used. The bedding material should consist of well-graded, free draining stone, such as #57 stone or equivalent. A geotextile fabric should be placed at the interface of the bedding material and natural subgrade to minimize migration of the bedding material into the underlying subsoils. A geotextile fabric should also be placed around the pipe at each joint to reduce potential migration of the sand fill or base into the joints of the pipe.

The trench excavation should be backfilled to the surface with granular fill. The fill should be placed in lifts not exceeding eight (8) inches and compacted to 95 percent of the maximum dry density, as determined by ASTM D698.

5.14 Ground Floor Slabs

It is understood that consideration is being given to structurally supporting the building floor slabs on pre-cast concrete piles or timber/concrete composite piles. The slabs may also be designed to span over adjacent grade beams. The selected piles should be designed for the appropriate allowable capacities previously recommended in the report. Should the floor slab be supported on timber or composite piles tipped at a shallower depth than the building piles, consideration should be given to providing joints or a mechanism at the interface of the pile caps to allow independent movement of both systems and minimize structural distress from potential differential settlements.

The floor slabs should have an adequate number of joints to reduce cracking resulting from any differential movement or shrinkage. Utility lines should be hung from the slabs. Hangers and connections used should be made of stainless steel meeting the applicable Building Code. Depending on the amount of fill the structures will receive, flexible connections must be provided at the interface of pile supported and non-pile supported areas to accommodate at least 20 inches of settlement over the life of the structures.

6.0 PAVEMENT EVALUATION AND RECOMMENDATIONS

6.1 Pavement Recommendations

The performance of pavements depends upon several factors including (1) the characteristics of the supporting soils; (2) the magnitude and frequency of wheel load applications; (3) quality of construction materials; (4) the contractor's placement and workmanship abilities, and (5) the desired period of design life. PSI has evaluated both flexible and rigid pavements for use at this site.

Detailed grading information of the surface parking lot was not available at the time of this report preparation. However, it is assumed that up to three (3) feet of fill will be needed to achieve the parking lot design grades. Although detailed traffic information was not available at the time the report was prepared, the traffic is assumed to consist of passenger cars, light trucks, ambulances, occasional solid waste collection vehicles and heavy duty delivery trucks.

Our scope of services did not include extensive sampling for determination of Coefficient of Subgrade Reaction (K) value and California Bearing Ratio (CBR) of existing subgrade or potential sources of imported fill for the specific purpose of a detailed pavement analysis. Instead, we have assumed pavement related design parameters that are considered to be typical for the area soil types. For our analysis, a California Bearing Ratio (CBR) of three (3) and a modulus of subgrade reaction (k) of 100 psi/in have been assumed for the near surface soils.

The recommended pavement sections presented are considered typical and minimum for the assumed parameters in the general site area and anticipated traffic condition. We understand that budgetary considerations sometimes warrant thinner pavement sections than those presented. However, the owner, and the project designers should be aware that thinner pavement sections may result in increased maintenance costs and lower than anticipated pavement life. The pavement subgrade should be prepared as discussed in the site preparation section of this report.

The general pavement design information presented in this report is based on information published by AASHTO and the Portland Cement Association as well as past experience in this area. The published information was utilized in conjunction with the available field and laboratory test data to develop general pavement recommendations.

Specific design parameters considered in the pavement analyses are as follows:

CBR	3
Modulus of subgrade reaction, k	100 pci
Reliability	85%
Deviation	0.45 Asphalt
	0.35 Rigid

Initial Serviceability	4.2
Terminal Serviceability	2.0
Modulus of Rupture	550 psi
Modulus of Elasticity	3.4×10^6 psi
Load Transfer	3.2 Dowels or Keys
Drainage Coefficient	1.0
Design Life	10 Years
Layer Coefficients	0.41 Asphalt
	0.14 Base Course
	0.08 Granular Select Fill

The recommended minimum pavement sections for the light and heavy duty areas are as follows:

FLEXIBLE PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Standard Duty**	**Heavy Duty**
Asphaltic Concrete Wearing Course	3"	4"
Base Course (Compacted Crushed 610 Limestone)	8"	10"
Compacted Granular Structural Fill	12"	12"

RIGID PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Light Duty**	**Heavy Duty**
Portland Cement Concrete	6"	7"
Compacted Granular Structural Fill	12"	12"

Portland Cement Concrete pavements should be utilized where waste disposal containers are located. The concrete paved area should be sufficiently large so that the front wheels of the collection truck are supported on the rigid pavement. In this area and in areas, which will be accessed by heavy trucks (solid waste trucks, delivery trucks, etc.), a minimum concrete pavement thickness of eight (8) inches underlain by 12 inches of compacted structural fill is recommended.

Proper finishing of concrete pavement requires the use of appropriate construction joints to reduce the potential for cracking. Construction joints should be designed in accordance with current Portland Cement Association and the American Concrete Institute guidelines. Joints should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. Load transfer devices at the pavement joints should be designed in accordance with accepted codes. The concrete should have a minimum compressive strength of 4,000 psi at 28 days. The concrete should also be designed with 5 ± 1 percent entrained air to improve workability and durability.

The asphaltic concrete should meet the requirements of the latest edition of the Louisiana Standard Specification for Roads and Bridges (LSSRB), and should be compacted to a minimum of 95 percent of the density of the laboratory molded specimen.

The crushed limestone base should also conform to the Louisiana Standard Specification for Roads and Bridges (LSSRB) Section 1003.3, and be compacted to at least 95 percent of the maximum dry density determined by ASTM D 698 (Standard Proctor) within 3 percent of optimum moisture content. The granular fill should have a maximum of 10 percent fine and be compacted to 95 percent of the maximum dry density as determined by ASTM D698.

Due to the soil conditions at the site and long term settlement potential, it is recommended that a proper design be considered at the pavement and pile supported structures interface to accommodate the settlement of the pavement, provide a smooth transition from the pavement to the pile supported sidewalk, and avoid abrupt and excessive grade change. Taking into consideration the subsurface conditions at the site and the placement of up to three (3) feet of fill in the parking area, settlement in the parking lot is estimated to be up to 14 to 16 inches in the center of the loaded area over the life of the pavement. However, flexible connections, capable of accommodating at least 20 inches of settlement, should be provided for lines exiting the pile supported building areas to non-pile supported areas.

6.2 Geotextile Fabric

Should soft conditions be encountered in the pavement areas, as an alternate to extensive undercutting and replacement of the soft soil, a woven geotextile consisting of MIRAFI 600X or equivalent can be placed over the soft subgrade in the parking areas to improve the subgrade condition. The geotextile which is sold in rolls of various sizes, should be installed per the manufacturer's recommendations and be overlapped a minimum of 2 feet. The geotextile fabric should meet or exceed the following properties.

Property	Test Method	Minimum Average Roll Values
Grab tensile strength, lbs.	ASTM D4632	315
Grab tensile elongation, %	ASTM D4632	15
Mullen burst strength, psi	ASTM D3786	600
Puncture resistance, lbs.	ASTM D4833	120
Trapezoid tear strength, lbs.	ASTM D4533	120
UV resistance after 500 hrs, % strength resistance	ASTM D4355	70

7.0 CONSTRUCTION CONSIDERATIONS

It is recommended that PSI be retained to provide observation and testing of construction activities involved in the foundations and pavements, earthwork, and related activities of this project. PSI cannot accept any responsibility for any conditions, which deviated from those described in this report, nor for the performance of the foundations and pavements if not engaged to also provide construction observation and testing for this project to ensure that the recommendations presented herein are implemented.

7.1 Moisture Sensitive Soils/Weather Related Concerns

The upper soils encountered at this site are relatively sensitive to disturbance caused by construction traffic and changes in moisture content. During wet weather periods, an increase in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

7.2 Drainage and Groundwater Concerns

Water should not be allowed to collect in floor slab areas, or prepared subgrades in the construction area, either during or after construction. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slab.

Groundwater was measured at depths of four (4) to 7.5 feet in the borings upon completion of drilling and 24 hours after drilling. However, it is possible that seasonal variations will cause fluctuations of the water table. Additionally, perched water may be encountered in discontinuous zones within the overburden. Any water accumulation should be removed from the excavations by pumping. Should excessive and uncontrolled amounts of seepage occur, the geotechnical engineer should be consulted.

7.3 Excavations

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

We are providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties compliance with local, state, and federal safety or other regulations.

8.0 REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by PSI. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of NBBJ for the specific application to the proposed VA Hospital complex to be constructed at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana.

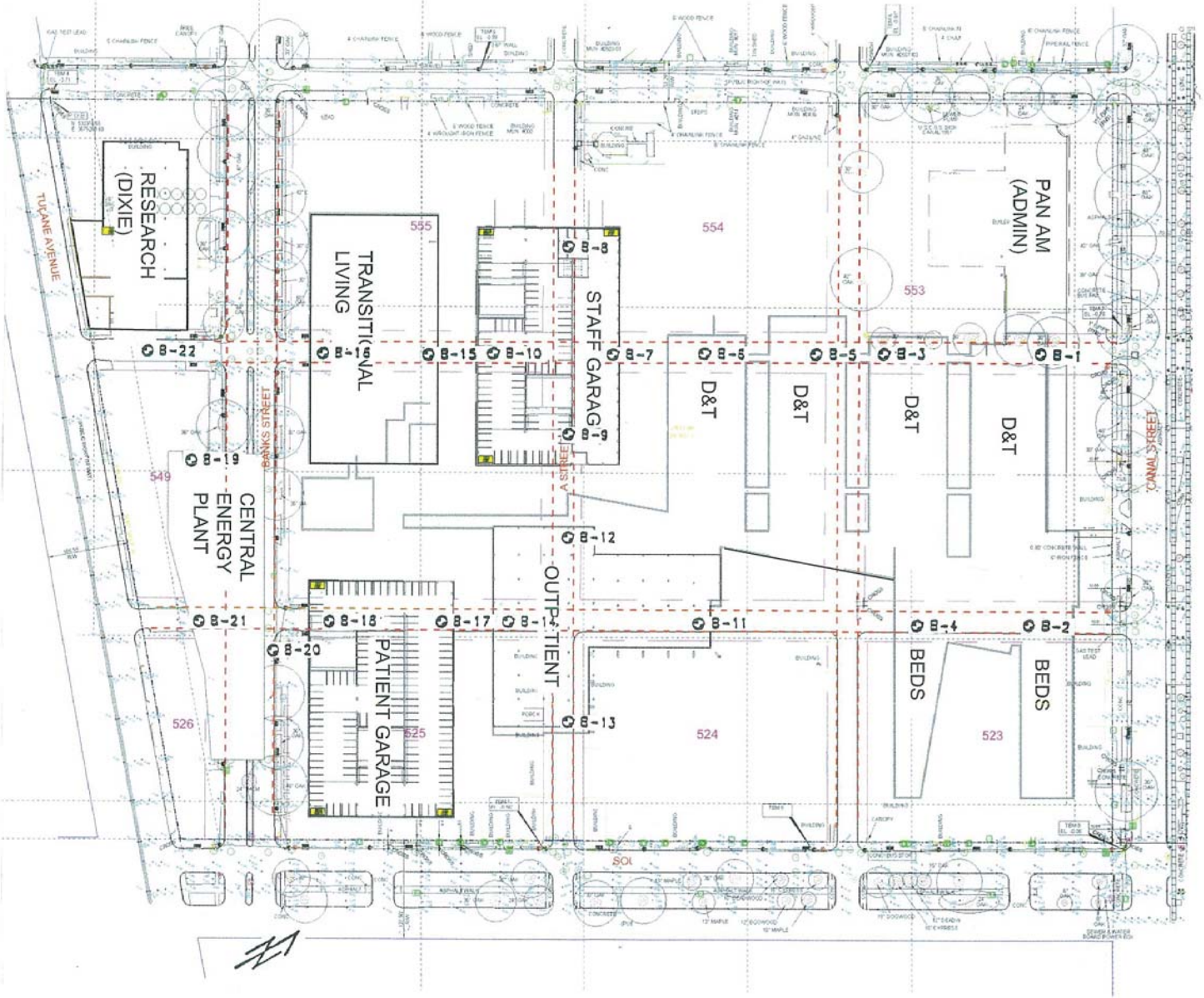
APPENDIX

Boring Location Plan

Boring Logs

Keys to Terms and Symbols Used on Logs

Generalized Soil Profiles



Boring Location

Proposed VA Hospital – Phase I
Canal Street and S. Galvez Street
New Orleans, Louisiana

Boring Location Plan

Professional Service Industries, Inc.
724 Central Ave
Jefferson, LA 70121 Ph. (504) 733-9411

Date: 10/12/09 | PSI Project No.: 367-95001
Drawing Provided by: NBBJ

LOG OF BORING B-1

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			2.5" asphalt, 6.5 concrete										
			Firm gray Fat Clay with trace of				1.0			39			
			silt seams and roots			0.45	1.0		72	47			
			Very soft to soft gray Fat Clay					0.20		68			
5			-with trace of organics, 4' to 5'			0.16		0.15	53	71			
			Very soft dark gray organic Clay					0.10		137			
			▼			0.09		0.05	35	121			
								0.05		175			
								0.10	104	74			
10			Very soft gray Sandy Fat Clay with trace of					0.10		55			
			organics										
15			Very loose gray Silty Sand		WOH					29			15
20			Very soft gray Sandy Clay		2					37			
			Very soft gray Fat Clay					0.05	43	97			
25			- with organics, 23' to 25'										
			-with trace of sand seams, 28' to 30'		2					58	54	36	
30													
						0.37		0.20	66	60			
35													
40			-with sand layers, 38' to 40'					0.20		53			
			Loose gray Silty Sand with trace of clay pockets		6					31			18
			-with clay pockets and shell fragments, 43' to 45'		3					53			
45													
					5					34			
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 7.5 feet after 24 hours

DATE: 8-09-09 to 8-11-09

LOG OF BORING B-1 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose gray Silty Sand with clay pockets										
55			Medium dense gray poorly graded Sand with shell fragments		19					26			7
60					33					22			
65			Firm gray Silty Clay with shell fragments		11					37			
70			Medium dense gray Silty Sand with shell fragments		23					28			
75			Soft gray Sandy Clay		2					41			58
			Soft gray Fat Clay with sand layers			0.33		0.20	76	42			
80			Very loose to medium dense gray Silty Sand		3					37			
85					7					32			30
90			-dense, 88' to 90'		31					29			
95			-clay pockets, 93' to 95'		14					40			
100					13					35			43

DEPTH OF BORING: 220 Feet
DATE: 8-09-09 to 8-11-09

LOG OF BORING B-1 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand with clay pockets										
105			Firm to stiff gray Fat Clay -with sand layers, 103' to 125'			1.14	1.5		87	29			
							1.0			38			
110													
						0.38	1.0		79	42			
115													
							1.25			41	69	48	
120													
						1.7	1.5		80	44			
125													
							1.25			45			
130													
135			Firm gray Sandy Clay with shell fragments		12					31			55
140			Very dense gray Silty Sand -with clay pockets and shell fragments, 138' to 140'		50					27			
					53					27			21
145													
150			Loose gray Clayey Sand		8					26			

DEPTH OF BORING: 220 Feet
DATE: 8-09-09 to 8-11-09

LOG OF BORING B-1 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
155			Loose gray Clayey Sand							26			
160			Stiff gray Sandy Clay		19					34			
165			Firm to very stiff gray Fat Clay with silt seams			2.12	2.0		89	32			
170			-with silt and sand layers, 168' to 170'				2.0			24			
175						0.73	1.0		92	35			
180							1.25			37	75	51	
185						2.95	3.0		85	34			
190							2.25			38			
195						1.84	1.50		88	32			
200						3.62	2.25		81	39			

DEPTH OF BORING: 220 Feet
DATE: 8-09-09 to 8-11-09

LOG OF BORING B-1 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray Fat Clay										
						2.79	2.25		79	43			
205													
						3.77	2.5		83	40	75	49	
210													
			Firm gray Lean Clay with shell fragments			0.69	1.0		109	21			
215													
			Very dense gray Silty Sand		66					22			
220													
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-09-09 to 8-11-09

LOG OF BORING B-2

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			12" gravel and brick fragments										
			Dark gray Silty Sand with gravel pieces							15			
			Soft gray and tan Fat Clay			0.52	0.50		77	43			
5								0.25		68			
			Very soft to soft dark gray organic Clay					0.10		135	168	126	
			-with pieces of wood, 6' to 8' ▽										
10								0.15		93			
			Very soft gray Sandy Clay with trace of organics					0.10		30			
			Very loose to loose gray Sandy Silt		10					30			
15													
20					4					33			84
			Very soft to soft gray Fat Clay with silt and sand layers					0.10		78			
25													
						0.38		0.15	82	46			
30													
			Loose gray Silty Sand with clay pockets		6					28			
35													
			Very soft to soft gray Fat Clay			0.35		0.15	66	59			
40													
								0.20		69			
45			-with trace of shell fragments, 45' to 50'							41			
					WOH					36			
						0.46		0.15	80	43			
50													

DEPTH OF BORING: 220 Feet

DATE: 8-3-09 to 8-7-09

GROUNDWATER: Measured at 7.5 feet upon completion

LOG OF BORING B-2 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft gray Fat Clay										
55			Medium dense to dense gray poorly graded Sand		49					24			7
60					23					25			
65			-with shell fragments, 63' to 65'		30					27			
70					33					26			10
75			Soft gray Fat Clay			0.22		0.15	73	44			
80			Very loose gray Clayey Sand		3					37			41
85			Loose to medium dense gray Silty Sand -with clay pockets, 83' to 95'		24					24			16
90					22					27			
95			-with shell fragments, 93' to 100'		7					33			
100					6					29			25

DEPTH OF BORING: 220 Feet
DATE: 8-3-09 to 8-7-09

LOG OF BORING B-2 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to medium dense gray Silty Sand										
			Firm to stiff gray Fat Clay					0.45		42			
105													
			-with sand layers, 108' to 115'			1.27	1.0		91	31			
110													
						0.75	1.0		84	42	50	32	
115													
				0.51			1.0		89	34			
120													
						1.18	1.0		82	41			
125													
							1.25			44			
130													
			Very soft gray Silty Clay with shell fragments		WOH					29			
135													
			Firm gray Sandy Clay			0.90	1.5		102	25			
140													
			Medium dense to very dense gray Silty Sand		14					20			
					78					24			22
145													
			Firm gray Sandy Clay			0.56	0.75		98	26			
150													

DEPTH OF BORING: 220 Feet
DATE: 8-3-09 to 8-7-09

LOG OF BORING B-2 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Lean Clay										
					12					26	35	16	90
155													
					42					29			
160													
			Stiff gray Fat Clay with silt seams			1.63	2.0		87	38			
165													
				1.14			2.0		66	61			
170													
			Stiff gray and green Lean Clay			1.05	1.5		97	29			
175													
			Stiff to very stiff gray Fat Clay				2.0			33			
180													
			-with sand layers, 183' to 190'			1.33	2.5		89	33	52	34	
185													
							1.5			38			
190													
						1.39	2.0		86	35			
195													
						3.30	2.0		81	44			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-3-09 to 8-7-09

LOG OF BORING B-2 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay										
205						2.16	2.25		79	43			
210						1.92	2.25		81	42			
			Firm gray Lean Clay										
215						0.80	1.0		99	25			
220			Very dense gray Silty Sand		64					20			
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-3-09 to 8-7-09

LOG OF BORING B-3

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			3.5" asphalt, 8.5" concrete, 4" sand										
			Firm brown Sandy Clay w/trace of organics				1.0			23			
			Stiff gray Fat Clay			1.40	1.5		79	45			
			-with organics, 4' to 6'										
5			Soft gray organic Clay					0.15		80			
						0.39		0.20	45	96			
			Soft dark gray and brown Peat ▼					0.10		131			
					1					117			
10													
			Very loose gray Silty Sand							25			
			Soft gray Fat Clay										
					3					49			
15													
			Very soft to firm gray Lean Clay		8					31			
20													
						0.16		0.20	83	28	69	49	100
25													
					5					33			
30													
			Soft gray Fat Clay with silt seams			0.45		0.20	83	39			
35													
			-with silt and sand layers and shell			0.31		0.20	72	46	100	73	
40			fragments, 39' to 40'			0.14		0.30	69	59			
			Loose gray Silty Sand with trace of shell		8					30			
			fragments										
			Very soft gray Fat Clay with sand layers		WOH					45			
45													
						0.17		0.15	80	54			
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 7 feet after 24 hours

DATE: 8-12-09 to 8-13-09

LOG OF BORING B-3 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft gray Fat Clay										
55			Medium dense to dense gray poorly graded Sand		42					24			10
60			-with shell fragments, 58' to 70'		22					32			
65					13					28			
70					23					27			9
75			Soft gray Lean Clay with trace of shell fragments and sand layers		3					43	48	31	
80						0.14		0.15	79	44			
85			Loose to medium dense gray Silty Sand with clay pockets		10					33			29
90					6					30			
95					15					31			30
100					36					23			

DEPTH OF BORING: 220 Feet
DATE: 8-12-09 to 8-13-09

LOG OF BORING B-3 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to medium dense gray Silty Sand with clay pockets										
105			Soft gray Fat Clay with sand		4					30			74
			Firm to stiff gray Fat Clay with silt seams			0.85	1.0		86	35			
110													
							1.0			42			
115													
						1.99	2.0		80	44			
120													
							1.25			44	93	66	
125													
130			-with sand layers, 128' to 130'			1.37	1.5		84	39			
135			Stiff gray Sandy Clay with shell fragments				1.0			28			
140			Dense gray and brown Silty Sand		44					27			36
145					81					25			
150			Stiff gray and brown Lean Clay			1.12	2.0		105	27			

DEPTH OF BORING: 220 Feet
DATE: 8-12-09 to 8-13-09

LOG OF BORING B-3 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff gray and brown Lean Clay with sand										
155										26			
160					23					25			89
165			Very stiff gray Fat Clay			2.12	1.5		84	40			
170			Stiff gray Lean Clay				1.50			21	37	24	
175						1.30	2.0		99	27			
180			Stiff gray Fat Clay with silt seams -with sand layers, 178' to 180'			1.22	1.5		88	34			
185						1.36	2.0		91	40			
190						2.28	1.75		81	41	74	52	
195			-with sand layers, 193' to 195'			1.98	2.5		88	36			
200						2.49	2.0		81	42			

DEPTH OF BORING: 220 Feet
DATE: 8-12-09 to 8-13-09

LOG OF BORING B-3 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay										
							2.0			44			
205						3.75	2.5		80	44			
							2.0			45			
210						1.94	2.5		85	39			
			Very stiff gray Sandy Clay										
					47					21			57
215													
					41					23			
220													
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-12-09 to 8-13-09

LOG OF BORING B-4

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			3.5" asphalt, 6" sand base Loose dark gray Silty Sand with gravel pieces							12			
			Soft gray and brown Fat Clay -with organics, 4' to 8'			0.33		0.25	57	69			
5			Very soft dark gray and brown organic Clay with peat					0.20		107			
						0.22		0.10	47	84			
10								0.05		198			
15			Very soft gray Fat Clay with silt and sand lenses					0.20		37			
					2					50			
20								0.10	67	47			
			Loose gray Sandy Clay with silt pockets							31			67
25					6					27			
			Very soft gray Fat Clay with silt seams		WOH					51			
30													
						0.14		0.20	58	59			
35													
			-with sand layers, 38' to 40'	0.16				0.15	63	67	84	60	
40													
						0.11		0.05	70	64			
45													
								0.10		91			
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 4.5 after 24 hours

DATE: 7-29-09 to 7-30-09

LOG OF BORING B-4 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft gray Fat Clay										
55			Medium dense to dense gray and brown poorly graded Sand		20					26			5
60					43					23			
65			Medium dense gray and brown Silty Sand with shell fragments		26					34			
70					17					30			16
75			Soft gray Fat Clay with sand layers			0.71		0.15	71	53			
80			Loose to medium dense gray Silty Sand with clay pockets		9					38			
85					18					27			19
90			Very soft gray Fat Clay with sand layers			0.15		0.15	77	52			
95			Medium dense to very dense gray Silty Sand		50					23			
					20					24			14
100			-with clay pockets, 98' to 100'		10					37			

DEPTH OF BORING: 220 Feet
DATE: 7-29-09 to 7-30-09

LOG OF BORING B-4 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand										
			Firm to stiff gray Fat Clay										
			-with sand layers, 105' to 107'		2					44			
105				0.67			1.5		84	41			
								0.45		40			
110													
						1.0	1.25		86	33			
115													
							1.0			46			
120													
						1.51	1.5		77	46	71	49	
125													
							1.5			41			
130													
			Firm gray Lean Clay with sand			0.64		0.30	91	37			
135													
							0.75			24			
140													
			Very dense gray Silty Sand		67					24			17
145													
			Stiff gray Fat Clay										
			-with sand layers, 148' to 150'			1.11	2.0		88	33			
150													

DEPTH OF BORING: 220 Feet
DATE: 7-29-09 to 7-30-09

LOG OF BORING B-4 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
155			Firm gray Fat Clay		3					38			
160			Dense gray Sandy Silt		44					27			62
165			Very soft gray Sandy Clay		1					33			
170			Firm to stiff gray Fat Clay -with trace of organics, 168' to 170'	0.58			1.5		70	45			
175						1.33	1.0		98	25			
180			-with silt and sand seams, 178' to 185'				1.5			32	59	41	
185						0.70	1.0		87	32			
190							2.0			34			
195			-becomes gray and tan, 193' to 195'			2.38	2.0		83	43			
200							1.75			43			

DEPTH OF BORING: 220 Feet
DATE: 7-29-09 to 7-30-09

LOG OF BORING B-4 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay										
205						2.17	1.5		81	41			
210						1.92	2.5 2.25		79	44 42			
			Very stiff gray Sandy Clay			2.31	2.25		83	26			
215													
220			-with trace of shell fragments, 218' to 220'		72					21			68
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-29-09 to 7-30-09

LOG OF BORING B-5

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			4" asphalt										
			Firm gray Sandy Clay with gravel pieces					0.30		26			
			Very soft to soft gray and brown Fat Clay			0.29		0.15	85	26			
			-with sand layers, 2' to 6'										
5			-with trace of gravel, 4' to 6' ▼					0.20		37			
			Very soft dark gray organic Clay			0.21		0.10	48	93			
						0.14		0.15	35	131	143	94	
					2					132			
10													
			Soft gray Sandy Clay		2					39			57
15													
					1					60			
20													
			Soft gray Fat Clay with silt seams			0.47		0.15	88	31			
25													
			Very soft to soft gray Lean Clay with sand					0.15		29	37	18	
30													
						0.23		0.15	100	23			
35													
			Medium dense gray Silty Sand		11					21			
			Soft gray Fat Clay with sand seams			0.64		0.25	60	66			
40													
			Very loose gray Silty Sand		WOH					41			34
45													
			-with shell fragments, 48' to 50'		WOH					35			
50													

DEPTH OF BORING: 220 Feet
DATE: 8-28-09 to 8-30-09

GROUNDWATER: Measured at 5.5 feet after 24 hours

LOG OF BORING B-5 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very loose gray Silty Sand										
55			Medium dense to dense gray poorly graded Sand with clay pockets		33					25			
60					35					28			6
65			-with trace of shell fragments, 63' to 65'		17					32			
70			Medium dense to dense gray Silty Sand with clay pockets		36					25			22
75					13					30			21
80					24					35			
85			-loose, 83' to 85'		9					31			
90					20					32			29
95			-dense, 93' to 95'		37					27			
100					12					39			

DEPTH OF BORING: 220 Feet
DATE: 8-28-09 to 8-30-09

LOG OF BORING B-5 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand with clay pockets										
105			-with shell fragments, 103' to 105'		24					26			19
			Firm to stiff gray Fat Clay			0.86	1.00		90	32			
110			-with sand layers, 108' to 110'										
				0.44			0.75		87	36			
115													
			-with sand layers, 118' to 120'			1.15	1.0		82	39	59	39	
120													
							1.25			44	73	52	
125													
						1.03	1.0		88	32			
130													
							1.25			36			
135													
140			Firm gray Sandy Clay			0.91	1.0		108	22			
			Medium dense to very dense gray Silty Sand		28					24			
145					65					25			20
150			Stiff gray Fat Clay -with sand layers, 148' to 150'			1.61	1.50		91	33			

DEPTH OF BORING: 220 Feet
DATE: 8-28-09 to 8-30-09

LOG OF BORING B-5 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff gray Fat Clay				2.0			32			
155													
			Firm gray and brown Sandy Clay	0.86		0.51		0.50	107	24			
160													
			Stiff gray Fat Clay				1.25		92	31			
165						1.58	1.50		68	46			
170													
			Stiff gray Lean Clay				1.25			24			
175						1.22	1.75		96	29	44	24	
180													
				0.97			1.75		94	28			
185													
			Stiff to very stiff gray Fat Clay			2.03	1.75		82	41			
190													
							2.0			39			
195													
						2.84	2.0		84	36			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-28-09 to 8-30-09

LOG OF BORING B-5 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay										
						1.84	2.25		78	44			
205													
						3.75	2.25		85	38	66	44	
210													
			Medium dense to dense gray Silty Sand		29					21			28
215													
					41					26			
220			Boring termianted at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-28-09 to 8-30-09

LOG OF BORING B-6

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
		X	6" asphalt, 6" sand base Firm gray Fat Clay with organics		6					77			
			Very soft gray Fat Clay					0.1	54	67			
5			-with trace of organics, 2' to 3' ▼			0.12		0.10	60	71			
			Very soft dark gray organic Clay					0.05		104			
						0.15		0.10	31	164			
			- with peat, 7' to 10'					0.05		228	251	175	
						0.12		0.10	24	229			
10						0.05		0.10	41	144			
			Very soft gray Fat Clay										
15			-with trace of organics, 13' to 15'			0.25		0.10	53	86			
			Loose gray Silty Sand										
20		X	-with trace of shell fragments, 18' to 20'		5					30			
			Very soft to soft gray Fat Clay										
25						0.59		0.25	92	33			
			-with sand layers, 28' to 30'			0.09		0.10	89	29	52	33	
30													
						0.17		0.15	63	62			
35													
								0.15		79			
40													
			Loose to medium dense gray Silty Sand										
		X			6					39			35
45													
		X			26					27			
50													

DEPTH OF BORING: 220 Feet
DATE: 8-11-09 to 8-14-09

GROUNDWATER: Measured at 4 feet after 24 hours

LOG OF BORING B-6 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to medium dense gray Silty Sand with asphalt clay										
			Medium dense gray and brown poorly graded Sand		18					24			
55			-with shell fragments, 53' to 65'										
					23					28			8
60													
					16					28			
65													
			Medium dense gray Silty Sand with some shell fragments		13					42			
70													
					12					39			34
75													
			-loose, 78' to 85'		9					30			
80													
					8					28			
85													
					14					29			31
90													
					11					37			
95													
					24					28			
100													

DEPTH OF BORING: 220 Feet
DATE: 8-11-09 to 8-14-09

LOG OF BORING B-6 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand										
105			Medium dense gray poorly graded Sand		29					24			12
110			Firm to stiff gray Fat Clay with silt seams -with sand layers, 108' to 120'			1.22	1.0		84	38			
115						0.50	0.75		85	37			
120						0.84	1.0		93	31			
125							1.25			49			
130						1.19	1.0		82	42	92	68	
135			-with sand layers, 133' to 140'				1.50			31			
140						1.76	2.0		99	26			
145			Very dense gray poorly graded Sand		68					25			12
150			Firm gray and green Sandy Clay with shell fragments			0.85	1.0		96	24			

DEPTH OF BORING: 220 Feet
DATE: 8-11-09 to 8-14-09

LOG OF BORING B-6 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray and green Sandy Clay with shell fragments				1.75			37			
155													
					27					27			58
160													
			Firm to stiff gray Fat Clay			1.25	1.5		94	29			
165													
						0.67	1.0		88	33			
170													
			-with silt and sand seams, 173' to 180			1.03	1.25		103	28			
175													
							1.25			22			
180													
						0.73	1.0		88	29	76	52	
185													
							1.5			38			
190													
						1.43	1.75		90	32			
195													
							1.25			42			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-11-09 to 8-14-09

LOG OF BORING B-6 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: D&T BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
205			Firm to stiff gray Fat Clay with silt seams			2.0	1.0		83	41			
210						1.88	1.5		80	42			
215			Dense to very dense gray Silty Sand with shell fragments		83					20			39
220					45					20			
225			Boring terminated at 220 feet										
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-11-09 to 8-14-09

LOG OF BORING B-7

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			4" asphalt, 10" sand base Firm gray Fat Clay			0.54	0.75		59	63			
			Soft gray Fat Clay with silt seams					0.20		75			
5			Very soft dark gray organic Clay ▼					0.10		127			
						0.15		0.10	20	277			
10								0.05		170	249	194	
15			Very soft gray Sandy Clay with trace of gravel and wood fragments					0.05		33			
20								0.05		30			
			Medium dense gray Silty Sand with clay pockets		11					28			
25			Very soft to soft gray Fat Clay -with shell fragments, 23' to 30'		WOH					74			
								0.10		54			
30								0.15		48			
						0.29		0.10	64	64	79	55	
35													
40			-with sand layers, 38' to 40'					0.20		75			
45						0.13		0.05	81	46			
50			Very loose gray Silty Sand -with trace of clay and shell fragments, 48' to 50'		1					32			21

DEPTH OF BORING: 220 Feet
DATE: 7-12-09 to 7-14-09

GROUNDWATER: Measured at 5 feet after 24 hours

LOG OF BORING B-7 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
55			Loose to medium dense gray poorly graded Sand		18					31			10
60			-with shell fragments, 58' to 60'		5					47			11
65					19					27			8
70			Firm gray Fat Clay with trace of shell fragments and clay pockets		4					67			
75			Medium dense gray poorly graded Sand with trace of shell fragments and clay pockets		11					30			12
80			Soft gray Fat Clay with sand layers			0.37		0.10	75	52			
85			Very loose to medium dense gray Clayey Sand		WOH					37			47
90					6					35			
95					15					29			38
100			Very dense gray Silty Sand with trace of shell fragments		51					25			14

DEPTH OF BORING: 220 Feet
DATE: 7-12-09 to 7-14-09

LOG OF BORING B-7 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
105			Medium dense gray Silty Sand with clay pockets and trace of shell fragments		22					37			
110			Firm to stiff gray Fat Clay -with sand seams, 108' to 110'		2								
			-with sand layers, 110' to 115'			1.08	1.5		82	40			
115							1.0			43			
120						1.58	1.5		81	40	82	61	
125			-with trace of organics, 123' to 125'	1.01			1.25		82	38			
130						1.49	1.5		81	43			
135			-with silt, sand and shell fragments, 133' to 135'					0.40		38			
140			Stiff gray and blue Lean Clay				2.0			23			
145			Very dense brown Silty Sand		60					27			12
150			Stiff greenish gray Fat Clay w/sand & silt layers -with trace of shell fragments, 148' to 150'			1.5	2.0		88	37			

DEPTH OF BORING: 220 Feet
DATE: 7-12-09 to 7-14-09

LOG OF BORING B-7 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff greenish gray Fat Clay with sand and silt layers				1.75			42			
155													
			-with sand and silt pockets		8					40			
160													
			-becomes dark gray at 163'			2.0	2.0		76	48			
165													
			-becomes firm light brown gray clay at 168'				1.0			25			
170													
			Firm greenish gray Fat Clay with sand			0.62	1.0		95	28	53	33	89
175													
			Firm to stiff greenish gray Fat Clay				2.0			36			
180			-with sand layers, 178' to 185'										
			-sand pockets, 183' to 185'			0.67	0.75		89	32			
185													
				1.13			2.0		84	36			
190													
						1.28	1.5		79	40	88	65	
195													
							2.0			41			
200													

DEPTH OF BORING: 220 Feet
DATE: 7-12-09 to 7-14-09

LOG OF BORING B-7 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
205			Very stiff greenish gray Fat Clay			2.25	2.5		80	41			
210							2.0			40			
215			Dense to very dense gray Silty Sand with some clay pockets		31					22			27
220					51					21			
225			Boring terminated at 220 feet										
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-12-09 to 7-14-09

LOG OF BORING B-8

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			7" concrete, 9" sand base										
			Soft brown Sandy Clay with asphalt pieces and gravel (Fill)					0.15		29			
								0.25		62			
5			Very soft to soft gray Fat Clay -with trace of sand seams, gravel and organics, 2' to 6' ▼			0.15		0.10	48	90			
										45			
10			Very soft dark gray Peat					0.10		172			
15			Very soft gray Fat Clay with silt and sand layers with trace of shell fragments					0.05	77	45			
20			Soft gray Sandy Clay	0.28				0.15	89	27			
25					6					31			
30			Very soft to soft gray Fat Clay -with silt and sand layers, 23' to 35'			0.29		0.10	64	67	69	49	
35								0.20		56			
40						0.44		0.10	57	75			
45			Loose gray Silty Sand with clay pockets and trace of shell fragments		5					35			19
					WOH					39			
50			Loose brown poorly graded Sand							27			

DEPTH OF BORING: 220 Feet
DATE: 7-15-09 to 7-21-09

GROUNDWATER: Measured at 4.5 feet after 24 hours

LOG OF BORING B-8 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to medium dense brown poorly graded Sand with clay pockets and trace of shell fragments		23					23			5
					4					38			
55													
					4					29			
60													
					28					23			8
65													
					13					28			18
70													
			Very soft to soft gray Fat Clay with sand pockets		2					46			
75													
			-with trace of shell fragments, 78' to 85'		WOH					45	67	48	52
80													
					WOH					46			
85													
			Loose gray Silty Sand with some clay pockets		7					36			36
90													
					10					34			37
95													
					8					34			
100													

DEPTH OF BORING: 220 Feet
DATE: 7-15-09 to 7-21-09

LOG OF BORING B-8 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to medium dense gray Silty Sand										
105					10					30			16
110					9					36			42
			Firm to stiff gray Fat Clay with sand layers			1.43	1.5		88	35			
115													
120				0.65			1.0		85	32			
125			-with trace of organics, 123' to 125'			1.27	1.5		83	42	87	61	
130							1.0			43			
135			-with trace of shell fragments, 133' to 135'		10					34			
140			Firm greenish gray Lean Clay with sand			0.80	1.0		102	22	39	21	
145			Dense gray Silty Sand with trace of clay pockets		49					27			14
150			Stiff gray Sandy Clay with trace of shell fragments			1.35	2.5		98	26			

DEPTH OF BORING: 220 Feet
DATE: 7-15-09 to 7-21-09

LOG OF BORING B-8 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff gray Fat Clay										
							1.5			35			
155													
			Very stiff gray Sandy Clay		25					25			71
160													
			Firm to stiff gray Lean to Fat Clay with sand seams		5					32			
165													
						1.57	1.5		103	24			
170													
							1.0			29			
175													
						1.30	2.0		88	30			
180													
			Stiff to very stiff greenish gray Fat Clay				2.50			31			
185													
			-becomes gray with sand layers, 188' to 190'			1.25	2.5		88	30	70	46	
190													
				1.39			2.5		84	38			
195													
						2.90	2.5		83	43			
200													

DEPTH OF BORING: 220 Feet
DATE: 7-15-09 to 7-21-09

LOG OF BORING B-8 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff greenish gray Fat Clay										
205						2.14	2.25		79	43			
210						2.24	2.0		81	40			
215			Stiff gray Sandy Clay			1.17	1.75		107	19			
220			Dense gray Silty Sand with some shell fragments		45					21			
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-15-09 to 7-21-09

LOG OF BORING B-9

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
5			Gray Fat Clay with organics		4					95			
10			Very soft gray Peat -with wood, 8' to 10'			0.10		0.15 0.05	25	211 320			
15			Very soft gray Lean Clay with sand and silt layers			0.16		0.10	57	75	48	30	
20			Loose gray Sandy Silt		5					33			92
25			-with clay pockets, 23' to 25'		9					32			
30			Very soft gray Fat Clay with silt and sand layers -with trace of organics, 28' to 30'					0.10		46			
35						0.21		0.15	67	52			
40			-with sand layers, 38' to 40'					0.25		65			
45			Very loose to loose gray Silty Sand with silt and trace of shell fragments		WOH					39			34
50					7					26			20

DEPTH OF BORING: 220 Feet
DATE: 7-24-09 to 7-26-09

GROUNDWATER: Measured at 5.5 feet after 24 hours

LOG OF BORING B-9 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray poorly graded Sand		25					22			
55					32					23			8
60			Medium dense brown and tan Silty Sand with clay pockets		18					45			
65					13					26			14
70					13					36			
75					10					34			32
80			Soft gray Lean Clay with trace of shell fragments			0.26		0.15	83	38	47	30	
85			Very soft gray Fat Clay with trace of organics	0.08				0.10	68	59			
			Loose to medium dense gray Silty Sand with some clay pockets		12					29			34
90					10					40			
95					9					33			29
100			Medium dense gray poorly graded Sand with trace of shell fragments		33					34			10

DEPTH OF BORING: 220 Feet
DATE: 7-24-09 to 7-26-09

LOG OF BORING B-9 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
105			Medium dense gray poorly graded Sand with trace of shell fragments		31					26			11
110			Firm to stiff gray Fat Clay with sand and trace of shell fragments		2					44			
						1.40		1.0	80	41			
115			-with sand layers, 110' to 115'				1.0			43	78	57	
120						1.36	1.5		81	41			
125							1.25			49			
130			-with silt and sand with trace of shell fragments, 128' to 135'			1.80	1.5		82	42			
135				0.35		0.94	1.0 1.5		88 93	34 32			
140			Firm gray Lean Clay with sand and silt			0.41	1.0		104	25			
145			Firm to stiff bluish gray Fat Clay		9					35			
150			-with sand layers and shell fragments, 148' to 150'			1.30	1.5		91	30			

DEPTH OF BORING: 220 Feet
DATE: 7-24-09 to 7-26-09

LOG OF BORING B-9 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff bluish gray Fat Clay				2.5			37			
155													
			Dense gray Sandy Silt		30					26			68
160													
			Stiff gray Fat Clay			1.67	2.0		85	39			
165													
			-with trace of organic layers, 168' to 170'				1.5			30			
170													
			Firm to stiff greenish gray Lean Clay			2.12	2.0		107	22			
175													
						0.83	1.25		87	30			
180			Stiff greenish gray Fat Clay										
							1.75			30			
185			-with silt and sand layers, 183' to 190'										
						1.17	2.5		86	36			99
190													
							2.0			41			
195													
			-with sand layers, 198' to 200'			1.94	1.75		79	40			
200													

DEPTH OF BORING: 220 Feet
DATE: 7-24-09 to 7-26-09

LOG OF BORING B-9 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
205			Stiff to very stiff tan and green Fat Clay			2.91	2.25		80	41			
210						2.14	2.25		79	43			
215						1.85	1.50		85	25			
220			Medium dense gray Silty Sand		27					26			
225			Boring terminated at 220 feet										
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-24-09 to 7-26-09

LOG OF BORING B-10

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very loose to loose gray Silty Sand with shell fragments and trace of gravel		6					23			
					2					16			5
5			-trace of clay pockets, 6' to 8' ▼		1					30			
										24			
10			Very soft dark gray peat					0.05		300			
15			Very soft gray Lean to Fat Clay with sand and trace of gravel			0.27		0.20	69	54	49	29	
20			Very loose gray Sandy Silt			0.30		0.10	90	29			
					9					28			82
25			-with trace of clay & shell fragments, 23' to 25'		2					27			
30			Very soft gray Fat Clay -with trace of sand layers, 28' to 30'		1					62			
			Very soft gray Sandy Clay					0.10		28			
35						0.18		0.15	81	35			
40			Very soft gray Fat Clay -with sand seams, 38' to 40'					0.15		78			
45			-with sand and silt layers, 43' to 45'			0.18		0.15	83	33			
50			Loose gray Silty Sand with trace of shell fragments		4					28			13

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 5.5 feet after 24 hours

DATE: 7-9-09 to 7-12-09

LOG OF BORING B-10 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose gray Silty Sand with trace of shell fragments										
55			Medium dense to very dense gray and brown poorly graded Sand		58					19			8
60					14					30			
65					43					24			8
70			Medium dense gray Silty Sand with clay pockets and trace of shell fragments		11					30			16
75			Very soft to firm gray Sandy Fat Clay		9					35			
80					WOH					45	61	43	53
85					2					32			
90			Loose to medium dense gray Silty Sand							46			37
95					14					36			36
100					7					29			

DEPTH OF BORING: 220 Feet
DATE: 7-9-09 to 7-12-09

LOG OF BORING B-10 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose gray Silty Sand										
105			Medium dense gray poorly graded Sand		20					25			10
110			-with trace of clay & shell fragments, 108' to 110'		12					27			
115			Firm to stiff gray and green Fat Clay -with sand layers, 113' to 115'			0.73	1.25		76	46			
120						0.78	1.25		85	34			
125			-with sand layers, 123' to 130'			2.0	2.0		77	43	85	61	
130						0.82	1.0		79	40			
135			-with trace of silt and sand seams and shell fragments, 133' to 135'					0.35		37			
140			Firm green Lean Clay			0.73	1.0		104	26			
145			Dense greenish gray Silty Sand		42					31			17
150			Stiff green Fat Clay with sand layers			2.0	2.0		86	36			

DEPTH OF BORING: 220 Feet
DATE: 7-9-09 to 7-12-09

LOG OF BORING B-10 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff green Fat Clay with sand layers										
							2.0			31			
155													
			Dense brown Silty Sand		33					34			
160													
			Firm to stiff gray Lean to Fat Clay			1.77	2.0		87	33			
165			-with trace of sand layers, 163' to 165'										
							1.50			32			
170													
						0.65	1.0		96	28			
175													
				0.76			1.5		91	33			
180													
						0.95	2.0		90	28			
185													
			Stiff to very stiff greenish gray Fat Clay				3.25			38	87	55	
190													
						2.60	2.5		81	39			
195													
							2.0			44			
200													

DEPTH OF BORING: 220 Feet
DATE: 7-9-09 to 7-12-09

LOG OF BORING B-10 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Staff Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff greenish gray Fat Clay										
205			-with trace of sand layer, 203' to 205'			3.04	3.0		83	39			
							2.25			43			
210													
215						1.83	2.5		82	39			
220			Very dense gray Silty Sand with trace of shell fragments		68					21			
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-9-09 to 7-12-09

LOG OF BORING B-11

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			3.5 asphalt										
			Stiff dark gray Sandy Clay with gravel, shell fragments and brick (Fill)				1.0			24			
								0.25		56			
			Very soft gray Fat Clay with trace of shell fragments and organics			0.19		0.25	58	58			
5								0.10		131			
			Very soft dark brown organic Clay and peat ▼			0.09		0.10	38	139			
								0.05		303			
								0.10	33	132			
10						0.10		0.05	22	247	383	279	
			Very soft gray Fat Clay with silt					0.10		40			
15													
			Loose gray Silty Sand		6					30			20
			Very soft to soft gray Fat Clay		WOH					75			
20													
			-with trace of organics, 23' to 25'			0.14		0.10	58	75	95	69	
25													
								0.15		75			
30													
			Loose gray Silty Sand		6					30			
35													
			Very soft gray Fat Clay			0.30		0.20	62	66			
40													
			Very loose gray Clayey Sand		WOH					36			
45													
					WOH					41			45
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 6.5 feet after 24 hours

DATE: 8-7-09 to 8-9-09

LOG OF BORING B-11 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very loose gray Clayey Sand										
			Medium dense to dense gray and brown poorly graded Sand		38					23			7
55					23					29			
60					19					25			
65			-becomes silty sand at 63'		18					26			13
70			-with shell fragments, 68' to 70'		29					25			
75			Soft gray Fat Clay with sand layers			0.38		0.25	83	42			
80			Very loose gray Silty Sand with trace of shell fragments		2					25			
85					4					27			
90			-medium dense, 88' to 90'		22					29			
95			Very soft gray Fat Clay with sand			0.11		0.20	94	33			
			Medium dense gray Silty Sand		24					27			20
100					16					32			

DEPTH OF BORING: 220 Feet
DATE: 8-7-09 to 8-9-09

LOG OF BORING B-11 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand										
105					11					30			27
			Firm to stiff gray Fat Clay										
110			-with sand layers, 108' to 110'			1.22	1.5		85	42			
							1.0			39			
115													
						1.47	1.5		84	40	66	43	
120													
							1.25			46			
125													
						2.29	2.0		81	41			
130													
			-with sand layers, 133' to 135'	0.38			1.0		92	28			
135						0.93	1.5		83	41			
			Very stiff gray and green Lean Clay				2.25			24			
140													
			Dense gray Silty Sand										
145					39					32			
			Stiff gray Fat Clay with shell fragments										
150						1.99	2.0		92	31			

DEPTH OF BORING: 220 Feet
DATE: 8-7-09 to 8-9-09

LOG OF BORING B-11 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff gray Fat Clay with shell fragments										
			Firm gray and green Lean Clay	0.5			2.5		100	26			
155													
			Dense gray Silty Sand		44					26			
160													
			Stiff gray Fat Clay			1.15			87	37			
165													
			-with trace of organics, 168' to 169'				1.0			45			
170			Stiff dark gray organic Clay				1.5			152			
			Stiff gray and green Lean Clay			1.0	2.5		97	27			
175													
			Firm to stiff gray and green Fat Clay				1.5			31			
180													
						0.82	1.0		94	28	54	34	
185													
				0.88			2.0		92	30			
190													
			-with silt and sand layers, 193' to 195			2.5	2.5		83	38			
195													
						1.82	1.5		83	44			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-7-09 to 8-9-09

LOG OF BORING B-11 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray and green Fat Clay										
205						3.33	1.75		80	42			
210						3.82	2.25		81	40			
215			-with silt and sand layer and shell fragments, 214' to 215'			1.39	2.0 1.5		94	40 36			
220			Very dense gray Silty Sand with shell fragments		77					19			
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-7-09 to 8-9-09

LOG OF BORING B-12

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6" concrete, 6" sand										
			Soft gray & tan Fat Clay with trace of organics			0.33		0.20	65	71			
			Very soft dark gray organic Clay with peat					0.20		105			
5			▼			0.09		0.10	31	143			
								0.05		202			
10					WOH					164			
			Very loose gray Sandy Silt							29			
15													
			Very soft to soft gray Fat Clay with silt seams		3					65			
20													
			-with silt and sand seams, 23' to 25'		2					39			94
25													
						0.24		0.10	61	74	66	45	
30													
					WOH					50			
35													
								0.25		66			
40													
			Very loose to loose Silty Sand										
45			-with shell fragments, 43' to 50'		WOH					37			29
50					4					34			

DEPTH OF BORING: 220 Feet
DATE: 7-26-09 to 7-28-09

GROUNDWATER: Measured at 5 feet after 24 hours

LOG OF BORING B-12 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very loose to loose Silty Sand										
			Medium dense gray and brown poorly graded Sand		34					21			
55													
					19					24			8
60													
			-becomes silty sand at 63'		32					29			
65													
			-with trace of shell fragments, 68' to 70'		25					25			16
70													
			Very loose to medium dense gray Silty Sand		5					39			
75													
					4					36			29
80													
					5					31			
85													
					16					28			24
90													
					25					26			
95													
					17					32			33
100													

DEPTH OF BORING: 220 Feet
DATE: 7-26-09 to 7-28-09

LOG OF BORING B-12 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray and brown Silty Sand										
105			-with clay and shell fragments, 103' to 105'		14					30			
			Firm to stiff gray Fat Clay		5					37			79
110			-with sand and shell fragments, 108' to 110'			1.53	1.0		88	33			
							1.25			34			
115													
					2					38			
120						1.18	1.0		87	32	67	45	
						0.39	1.0		77	45			
125													
						2.29	1.5		77	43			
130													
								0.35		37			
135													
			Firm gray and green Lean Clay			0.81	1.0		104	23			
140													
			Very dense gray Silty Sand		77					24			15
145													
			Stiff gray Fat Clay with shell fragments			1.98	2.0		92	29			
150													

DEPTH OF BORING: 220 Feet
DATE: 7-26-09 to 7-28-09

LOG OF BORING B-12 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff gray Fat Clay with shell fragments										
155			Very soft gray tan Lean Clay with sand					0.20		27			96
160			Firm to very stiff gray Lean Clay with sand		46					30			71
165					4					32			
170			Stiff gray Fat Clay			1.5	1.5		77	45			
							1.25			25			
175			Firm to stiff gray Sandy Clay with silt lenses			1.02	1.5		92	31			
180						2.0				30			
185						1.68	1.5		86	33			
190			Very stiff gray and green Fat Clay			3.0				46			
195						2.2	2.0		82	38			
200						3.3	2.0		82	40			

DEPTH OF BORING: 220 Feet
DATE: 7-26-09 to 7-28-09

LOG OF BORING B-12 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray and green Fat Clay										
205			-with sand layers, 203' to 205'			2.79	2.25		79	44			
210						2.43	2.25		79	40			
215			-with sand and silt seams, 213' to 215'			2.0	2.0		104	32			
220			Very stiff gray Sandy Clay with shell fragments		70					20			55
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-26-09 to 7-28-09

LOG OF BORING B-13

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft brown Sandy Clay					0.10		26			
						0.12		0.20	92	28			
5			Very soft gray Fat Clay					0.05		34			
			-with sand seams, 4' to 5' ▼					0.15		34			
			-with sand layers, 5' to 6'					0.05		114			
			Very soft gray organic Clay										
10			Very soft dark gray Peat							266			
			Very soft Lean to Fat Clay with sand							42			
15			seams		WOH					46			
			-with trace of organics, 18' to 20'		2					60			74
20													
						0.64		0.10	91	36			
25													
								0.15		40	46	26	
30													
			Soft gray Fat Clay			0.35		0.20	60	69			
35													
								0.20		70			
40													
			Medium dense gray poorly graded Sand		30					24			6
			Very soft gray Fat Clay with sand		WOH					42			
45													
			Loose gray Silty Sand with clay pockets		9					29			
50													

DEPTH OF BORING: 220 Feet
DATE: 8-20-09 to 8-22-09

GROUNDWATER: Measured at 5.5 feet after 24 hours

LOG OF BORING B-13 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose gray Silty Sand with clay pockets										
			Medium dense gray poorly graded Sand		29					26			4
55													
					17					33			12
60													
					14					29			
65													
					17					29			6
70													
			Soft gray Fat Clay		4					50			74
75			-with sand layers, 73' to 77'			0.13		0.05	91	38			
			Loose gray Silty Sand with clay pockets							35			12
80										31			
					7					35			43
85													
					18					30			
90													
95			Very soft gray Fat Clay with sand			0.11		0.10	71	51	84	60	
			Medium dense to dense gray Silty Sand		46					22			
					29					27			13
100													

DEPTH OF BORING: 220 Feet
DATE: 8-20-09 to 8-22-09

LOG OF BORING B-13 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
105			Medium dense gray Silty Sand -with clay pockets and shell fragments, 103' to 105'		23					30			
110			Firm to stiff gray Fat Clay			0.88	1.0		83	41			
115							1.25			44			
120						1.24	1.25		84	38	75	54	
125				0.71			1.0		79	45			
130						1.65	1.5		84	40			
135							1.0			44			
140						1.98	2.25		91	31			
145			Very dense brown Silty Sand		57					28			19
150			Stiff gray and green Lean Clay			1.24	1.5		95	29			

DEPTH OF BORING: 220 Feet
DATE: 8-20-09 to 8-22-09

LOG OF BORING B-13 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff gray and green Lean Clay										
155			Stiff gray and green Fat Clay				1.5			58			
160			Dense brown Silty Sand with clay pockets		44					29			
165			Stiff gray Lean Clay			1.65	1.5		96	28			
170			Very stiff Fat Clay			2.24	2.25		67	54	107	71	
175			Firm to stiff gray and green Lean Clay	0.96			1.5		99	26			
180						1.00	2.5		93	28			
185							2.0			33			
190						0.78	1.25		90	31			
195			Stiff to very stiff gray and green Fat Clay				2.0			44			
200						3.03	2.25		82	42			

DEPTH OF BORING: 220 Feet
DATE: 8-20-09 to 8-22-09

LOG OF BORING B-13 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
205			Stiff to very stiff gray and green Fat Clay	1.43		2.70	2.5		80 82	43 41			
210						3.3	2.5		77	44	72	48	
215			Firm gray Sandy Lean Clay with shell fragments			0.62		0.35	110	27			
220			Medium dense gray Silty Sand with shell fragments		17					25			
			Boring termianted at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-20-09 to 8-22-09

LOG OF BORING B-14

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm gray Sandy Clay with gravel and shell fragments							20			
			Soft gray Fat Clay			0.31		0.35	57	71			
			-with organics, 3' to 4'			0.30		0.20		95			
5			Very soft dark gray organic Clay with peat ▼						37	132	151	119	
						0.14		0.10	26	185			
								0.10		138			
			Very soft gray Fat Clay			0.15		0.10	55	50			
10			-with organics, 9' to 10'										
			Very loose gray Sandy Silt with clay pockets		2					40			93
15													
					4					38			
20													
			Very soft to soft gray Fat Clay with sand seams					0.15		76			
25													
						0.21		0.10	64	61			
30													
			Loose gray Silty Sand with clay pockets		7					26			
			Very soft to soft gray Fat Clay with silt seams					0.10		72			
35													
						0.46		0.20	59	70	86	58	
40													
			Very soft gray Lean Clay with shell fragments					0.15		26			
45													
			Loose gray poorly graded Sand with shell fragments		10					26			10
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 4.5 feet after 24 hours

DATE: 8-26-09 to 8-28-09

LOG OF BORING B-14 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
55			Medium dense to dense gray poorly graded Sand with shell fragments		30					24			6
60					42					22			
65					14					29			11
70					12					28			
75			Medium dense gray Silty Sand		13					33			31
80					12					33			36
85					19					32			
90					16					30			24
95					21					24			
100					23					29			

DEPTH OF BORING: 220 Feet
DATE: 8-26-09 to 8-28-09

LOG OF BORING B-14 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand										
					24					25			13
105													
			-with shell fragments, 108' too 110'		15					26			
110													
			Firm to stiff gray Fat Clay			0.80	0.75		84	39			
115													
							1.00			41			
120													
						1.80	1.75		76	46			
125													
							1.25			41			
130													
			-with sand layers, 133' to 135'			0.67	1.0		94	26	51	33	
135													
							1.25			33			
140													
			Very stiff gray Sandy Clay		33					29			
145													
			Stiff gray Fat Clay with sand layers			1.68	1.5		87	34			
150													

DEPTH OF BORING: 220 Feet
DATE: 8-26-09 to 8-28-09

LOG OF BORING B-14 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay with sand layers										
						1.24	1.75		84	42			
155													
							1.5			29			
160													
						1.55	1.50		92	32			
165													
						1.80	2.00		76	47	80	53	
170													
							2.25			40			
175													
			-firm, 178' to 190'			0.98	1.0		93	31			
180													
			-with sand layers, 183' to 185'				1.0			28			
185													
						0.53	1.0		89	30			
190													
							2.0			40			
195													
						2.61	2.00		82	39			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-26-09 to 8-28-09

LOG OF BORING B-14 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: OUTPATIENT BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
205			Very stiff gray Fat Clay with sand layers			3.16	2.25		96	40	74	52	
210						2.04	2.00		81	43			
215						2.23	2.00		79	41			
220			Dense gray Silty Sand		40					28			33
225			Boring terminated at 220 feet										
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-26-09 to 8-28-09

LOG OF BORING B-15

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			4" asphalt, 6" sand							8			
			Brown and gray Silty Sand with gravel and limestone fragments					0.25		78			
5			Soft gray Fat Clay -with gravel pieces and organics, 2' to 4' ▼										
			Very soft to soft dark gray Peat			0.14		0.05	30	300			
10						0.25		0.15	17	289	407	256	
			Very soft gray Fat Clay with trace of silt seams					0.10	64	61			
15													
20								0.15		35			
			Firm gray Sandy Clay			1.19	1.0		103	25			
25													
			Very soft to soft gray Fat Clay	0.14				0.10	65	64			
30													
35						0.33		0.10	68	60			
40		X			WOH					66			
			Soft gray Sandy Clay			0.29		0.10	80	43			
			Very soft gray Fat Clay	0.09				0.15	72	57			
45													
			Very soft gray and brown Sandy Clay with trace of organics										
50								0.05	90	32			

DEPTH OF BORING: 220 Feet
DATE: 7-7-09 to 7-9-09

GROUNDWATER: Measured at 5 feet after 24 hours

psi
Geotechnical Consulting Services
Jefferson, Louisiana

LOG OF BORING B-15 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to medium dense brown poorly graded Sand		28					23			7
					32					23			
55													
					6					26			9
60													
					26					33			
65													
					39					30			10
70													
			Soft gray Sandy Clay		2					44			50
75													
								0.15		48			
80													
			Very soft to soft gray Fat Clay										
			-with sand and silt seams, 83' to 85'			0.39		0.20	84	40			
85													
			-with sand, 88' to 95'					0.10		50	59	40	
90													
						0.16		0.10	80	45			
95													
								0.15		58			
100													

DEPTH OF BORING: 220 Feet
DATE: 7-7-09 to 7-9-09

LOG OF BORING B-15 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Soft gray Fat Clay										
105			-with sand layers, 103' to 115'			0.29		0.30	80	44			
110				0.08				0.30	92	24			
			Firm to stiff gray and brown Fat Clay			1.03	1.5		79	45			
115													
120							1.0			41			
125						1.21	1.5		74	48	81	50	
130				0.55			1.0		79	44			
135			-with silt and sand layers, trace of shell fragments, 133' to 135'		3					29			
140						1.91	2.0		94	31			
145			Medium dense gray Silty Sand with trace of clay		33					28			36
150			Very stiff gray and tan Fat Clay with sand layers				2.50			35			

DEPTH OF BORING: 220 Feet
DATE: 7-7-09 to 7-9-09

LOG OF BORING B-15 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray and tan Fat Clay with sand layers										
155			Soft gray Lean Clay	0.24				0.15	99	25			
160			Loose to dense brown Silty Sand with clay pockets		41					26			43
165					9					32			
170			Stiff dark gray Fat Clay			1.91	2.0		69	52			
175			Firm to stiff tan and green Lean Clay				2.0			25			
180				0.83			1.5		92	31	46	25	
185						0.86	1.75		88	37			
190			Firm to very stiff gray Fat Clay -with silt and sand layers, 188' to 190'			1.83	2.0		92	33			
195				0.95			1.25		81	37			
200						2.55	3.0		83	38			

DEPTH OF BORING: 220 Feet
DATE: 7-7-09 to 7-9-09

LOG OF BORING B-15 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray Fat Clay										
205						3.60	3.0		81	43	82	54	
210							2.25			43			
215						2.50	3.0		88	36			
220			Very dense gray Silty Sand with trace of shell fragments		66					23			27
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-7-09 to 7-9-09

LOG OF BORING B-16

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			3.5" asphalt, 6" sand base							8			
			Loose dark gray Silty Sand with gravel pieces										
			Very soft to soft gray Fat Clay with trace of organics and sand seams			0.25		0.20	45	95			
5			Very soft dark gray organic Clay ▼					0.10		151			
								0.05		197			
10								0.10		182			
			Very soft gray Fat Clay with sand layers and trace of organics					0.05		60			
15													
			Very loose gray Sandy Silt							29			
20													
			Very soft gray Lean Clay					0.15		41	42	22	100
25													
			Very soft gray Fat Clay										
			-with sand and silt layers, 28' to 30'					0.10		49			
30													
						0.11		0.20	72	49			
35													
				0.18				0.15	76	37			
40													
			Loose gray Silty Sand		5					25			12
			Very soft to soft gray Sandy Clay		WOH					36			
45													
			-with shell fragments, 48' to 50'			0.23		0.10	87	35			
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 5.5 feet during drilling

DATE: 6-30-09

psi *Geotechnical Consulting Services*
Jefferson, Louisiana

LOG OF BORING B-16 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft gray Sandy Clay										
55			Medium dense to dense gray and brown poorly graded Sand		18					28			5
60					37					25			
65					34					27			
70					23					26			8
75			Soft to firm gray Sandy Fat Clay		4					40			
80					3					45			63
85			Soft gray Lean to Fat Clay with trace of sand layers and shell fragments			0.43		0.20	72	46			
90				0.15				0.15	88	36			
95						0.25		0.10	79	42			
100			Loose gray Silty Sand							28			16

DEPTH OF BORING: 220 Feet
DATE: 6-30-09

LOG OF BORING B-16 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft gray Fat Clay with sand layers										
						0.20		0.10	90	31			
105													
								0.05		56			
110													
			Medium dense gray Silty Sand with clay pockets		16					31			
115													
			Firm to stiff gray Fat Clay -with silt and sand seams, 118' to 123'	0.44			1.5		87	33			
120													
						1.29	2.0		74	45			
125													
							1.25			47	87	64	
130													
			-with sand layers and trace shell fragments, 133' to 135'			0.57	1.0		81	43			
135													
							1.25			26			
140													
					15					33			90
145													
			-with sand and silt seams, 148' to 155'		18					30			
150													

DEPTH OF BORING: 220 Feet
DATE: 6-30-09

LOG OF BORING B-16 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
155			Stiff gray Fat Clay			1.25	2.0		82	38			
160			Loose brown and gray Silty Sand							27			42
165			Firm to stiff gray Fat Clay -with sand seams, 163' to 165'		6					32			91
170						2.16	2.5		77	42	79	52	
175							1.25			28			
180			-with silt and sand layers, 178' to 180'			0.94	1.25		85	31			
185				0.96			1.0		83	42			
190						1.38	1.5		83	36			
195							2.75			37			
200						2.36	3.0		79	42			

DEPTH OF BORING: 220 Feet
DATE: 6-30-09

LOG OF BORING B-16 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: TRANSITIONAL LIVING BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay										
							1.75			43			
205													
						1.06	1.5		77	42			
210													
								0.35		43			
215													
			Very dense gray Silty Sand		50					20			39
220													
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 6-30-09

LOG OF BORING B-17

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Patient Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5" asphalt, 12" sand base		4					35			
			Firm gray Fat Clay with trace of organics and shell fragments			0.12		0.15	28	181			
5			Very soft dark brown organic Clay ▼					0.10		353			
			Very soft dark gray Fat Clay			0.11		0.10	74	35			
10			-with traces of organics, 6' to 10'	0.06				0.10	78	37			
15								0.05	76	42			
20			Firm gray Sandy Clay		8					34			
25			Very soft gray Fat Clay with sand and silt layers			0.24		0.25	88	32			
30								0.15		66			
35						0.25		0.15	60	70			
40			Dense brown poorly graded Sand		36					21			5
45			Soft gray Fat Clay with sand seams and trace of shell fragments		4					35			
50			Loose gray Silty Sand with trace of clay pockets		7					27			

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 5.5 feet after 24 hours

DATE: 7-13-09 to 7-15-09

LOG OF BORING B-17 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Patient Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose gray Silty Sand with trace of clay pockets										
55			Medium dense to dense brown poorly graded Sand		25					22			4
60					42					22			
65			Medium dense gray and brown Silty Sand		15					30			
70			-with clay pockets, 63' to 75'		19					27			12
75			-with trace of shell fragments		21					34			24
80			Soft gray and blue Fat Clay with sand seams			0.21		0.15	81	38			
85			Loose to dense gray Silty Sand -with clay pockets, 83' to 85'		8					31			28
90					33					30			
95			-with clay pockets, 93' to 95'		16					29			
100			-with trace of shell fragments, 98' to 100'		21					30			27

DEPTH OF BORING: 220 Feet
DATE: 7-13-09 to 7-15-09

LOG OF BORING B-17 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Patient Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand										
105			-with clay pockets, 103' to 105'		18					27			22
			Medium dense gray poorly graded Sand		15					22			11
110													
115			Firm to stiff gray Fat Clay -with sand layers, 113' to 115'			0.72	1.5		85	33			
120				0.57			1.0		77	41			
125						1.30	1.5		80	43			
130			-with trace of sand seams, 128' to 130'					0.40		37			
135			-with sand and silt layers, 123' to 140'			1.58	2.0		85	35	66	46	
140							1.50			37			
145			Very stiff greenish gray Sandy Clay		32					31			
150			Firm gray and green Fat Clay -with sand layers, 148' to 150'			0.88	1.0		87	38			

DEPTH OF BORING: 220 Feet
DATE: 7-13-09 to 7-15-09

LOG OF BORING B-17 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Patient Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray and green Fat Clay										
							2.50			36			
155													
			-with sand layers, 158' to 160'			0.93	1.25		89	33			
160													
							1.50			38			
165													
						1.24	1.5		68	46			
170													
				0.87			1.5		93	31			
175													
			Firm green and tan Sandy Clay			0.94	1.0		94	29			
180													
			Stiff green and tan Fat Clay				2.0			32			
185			-with sand layers, 183' to 190'										
						0.40	1.0		86	30	52	34	
190													
							1.75			42			
195													
			-with sand layers, 198' to 200'			1.48	1.5		81	40			
200													

DEPTH OF BORING: 220 Feet
DATE: 7-13-09 to 7-15-09

LOG OF BORING B-17 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: Patient Garage | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff green and tan Fat Clay										
							2.0			42			
205													
						1.77	2.0		80	39			
210													
			-with trace of shell fragments, 213' to 215'	0.66			2.0		77	44			
215													
			Very dense gray Silty Sand with shell fragments		75					19			30
220													
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-13-09 to 7-15-09

LOG OF BORING B-18

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: PATIENT GARAGE | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			4.5" asphalt, 3.5" stabilized base										
			Soft to firm gray Fat Clay with trace of organics, sand seams			0.60	0.50		80	38			
			-wood pieces, 2' to 4'					0.25		83			
5			Very soft dark gray Organic Clay with peat ▼					0.10	39	106			
								0.10		202			
						0.18		0.10	16	324	397	255	
10													
			Very soft gray Fat Clay with trace of organics					0.05		84			
15													
			Very soft gray Lean Clay with silt seams and trace of organics			0.14		0.15	85	31			
20													
			Loose gray Sandy Silt		10					29			
					4					30			64
25													
			Very soft gray Fat Clay with silt and sand layers and trace of organics					0.10		80			
30													
								0.1		46			
35													
			Very dense gray and brown poorly graded Sand		50					21			
40													
			Very soft gray Sandy Clay with silt		WOH					37			
45			-with shell fragments, 43' to 45'										
						0.13		0.05	113	24	39	23	
50													

DEPTH OF BORING: 220 Feet
DATE: 7-22-09 to 7-24-09

GROUNDWATER: Measured at 6 feet during drilling

LOG OF BORING B-18 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: PATIENT GARAGE | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense to dense gray and brown poorly graded Sand		36					23			5
					27					21			
55													
			-with trace of clay and organics, 58' to 60'		8					31			15
60			-loose, 58' to 60'										
					22					25			8
65													
					20					26			11
70			-with shell fragments, 68' to 75'										
			Medium dense gray Silty Sand		15					33			
75													
			-with clay pockets, 78' to 95'		6					38			45
80			-loose, 78' to 85'										
					10					30			
85													
					11					41			42
90													
			-loose, 93' to 95'		5					35			43
95													
			Very dense gray poorly graded Sand with shell fragments		59					24			8
100													

DEPTH OF BORING: 220 Feet
DATE: 7-22-09 to 7-24-09

LOG OF BORING B-18 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: PATIENT GARAGE | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very dense gray poorly graded Sand with shell fragments										
105			Loose to medium dense gray Clayeyy Sand		15					39			37
110					27					29			
115					6					32			46
120			Firm to stiff gray Fat Clay -with sand layers, 118' to 120'			0.87	1.25		89	33			
125				0.79			1.0		83	42	72	54	
130						1.04	1.5		81	41			
135							1.25			47			
140			Firm to very stiff blue green Lean Clay		16					27			92
145						0.65	1.0		99	31			
150					14					31			

DEPTH OF BORING: 220 Feet
DATE: 7-22-09 to 7-24-09

LOG OF BORING B-18 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: PATIENT GARAGE | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to very stiff gray Fat Clay with sand layers			0.76	3.0		100	31			
						2.06	2.5		80	43	85	63	
155													
							2.0			37			
160													
					19					37			
165													
						2.42	2.0		86	36			
170													
			Stiff gray blue Lean Clay	1.55			1.75		104	21			
175													
					12					34			
180													
						0.86	1.25		90	30			
185													
			Stiff to very stiff gray Fat Clay with silt and sand seams				1.5			32			
190													
			-becomes tan at 193'			1.68			81	43			
195													
				1.14			2.5		82	37			
200						3.24	2.0		82	38			

DEPTH OF BORING: 220 Feet
DATE: 7-22-09 to 7-24-09

LOG OF BORING B-18 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: PATIENT GARAGE | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray Fat Clay with silt and sand seams										
205						2.06	1.75		83	42	89	64	
210						3.25	2.0		81	44			
215						2.23	2.0		78	42			
220			Loose gray Silty Sand with trace of shell fragments		9					28			28
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-22-09 to 7-24-09

LOG OF BORING B-19

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm dark gray Sandy Clay with trace of							18			
			organics and gravel				0.5			49			
			Firm gray Fat Clay				0.75			49			
							1.0			57			
5			Very soft dark gray Organic Clay to peat										
			▽					0.05		163			
								0.05		290	216	155	
10								0.10		324			
15			Very soft gray Fat Clay with trace of organics					0.15	66	61			
20			Soft gray Sandy Clay		3					37			70
25			Very soft gray Fat Clay		WOH					64			
30								0.10		60			
			Medium dense gray Silty Sand with pockets of clay		13					28			41
35			Very soft gray Fat Clay		WOH					58			
40			Very dense gray poorly graded Sand		54					21			
45			Very loose gray Silty Sand with clay and trace of shell fragments		WOH					35			29
50			Very soft gray Fat Clay			0.13		0.15	71	56			

DEPTH OF BORING: 220 Feet | GROUNDWATER: Encountered at 6.5 feet during drilling

DATE: 8-18-09 to 8-20-09

LOG OF BORING B-19 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very soft gray Fat Clay										
55			Medium dense to dense gray and brown poorly graded Sand		21					24			3
60					41					22			
65					42					23			
70					35					25			7
75					30					27			
80			Very soft to soft gray Sandy Fat Clay		4					39			
85					2	0.49		0.35	79	50 45	60	40	65
90			Soft gray Fat Clay					0.20		38			
95			Medium dense to loose gray Silty Sand with clay pockets and shell fragments		15					31			29
100					9					37			

DEPTH OF BORING: 220 Feet
DATE: 8-18-09 to 8-20-09

LOG OF BORING B-19 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY — LOCATION: CENTRAL ENERGY PLANT — PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand with clay and trace of shell fragments										
105			-with clay pockets, 103' to 110'		14					33			44
					29					36			
110													
			-with trace of shell fragments		40					24			13
115			-dense, 113' to 115'										
			-with clay pockets and shell fragments, 118' to 120'		23					34			
120													
			Stiff gray Fat Clay			1.63	1.5		80	43			
125													
							1.25			44	81	52	
130													
						1.65	1.5		86	35			
135													
			Firm to stiff gray Lean Clay	0.55			1.0		95	30			
140						1.28	1.5		93	29	42	23	
							1.25			28			
145													
			Dense gray Silty Sand with clay pockets		33					30			45
150													

DEPTH OF BORING: 220 Feet
DATE: 8-18-09 to 8-20-09

LOG OF BORING B-19 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Dense gray Silty Sand with clay pockets										
155			Stiff to very stiff gray and green Fat Clay -with sand, 153' to 168'			1.30			93	29			
							2.50			39			
160													
					16					32			81
165													
						1.69	1.5		88	36			
170													
175			Firm to stiff gray and green Lean Clay	1.10			2.0		108	22			
						0.72	1.0		97	25			
180													
185			Stiff to very stiff gray Fat Clay				2.50			35	85	60	
						1.56	2.5		86	33			
190													
							2.25			35			
195													
				0.98		2.0	2.0		81	38			
200							2.0		81	40			

DEPTH OF BORING: 220 Feet
DATE: 8-18-09 to 8-20-09

LOG OF BORING B-19 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay										
						2.20	2.0 2.0		80	41 39			
205													
						2.24	2.0 2.25		78	43 41	87	59	
210													
						2.55	2.5 2.50		80	41 42			
215													
220			Dense gray Silty Sand with shell fragments		47					21			
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-18-09 to 8-20-09

LOG OF BORING B-20

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose brown Silty Sand							20			
			Soft gray Sandy Fat Clay with wood pieces		3					61			58
5			Very soft dark gray and brown Peat ▼		WOH					330			
								0.05		265			
								0.05		182			
10					WOH					279			
			Very soft gray Fat Clay							50			100
15													
			Very loose to loose gray Silty Sand with trace of clay pockets		4					37			
20					9					32			
			Very soft gray Fat Clay with silt seams			0.25		0.20	75	51			
25													
								0.15		61	75	53	
30													
35						0.42		0.20	64	67			
			Dense gray Clayey Sand with shell fragments		47					20			34
40													
			Very soft to soft gray Fat Clay with trace of shell fragments		WOH					35			
45						0.35		0.25	79	43			
			Loose gray poorly graded Sand		6					29			9
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 4.5 feet after 24 hours

DATE: 8-24-09 to 8-26-09

LOG OF BORING B-20 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose to dense gray Silty Sand										
55					4					29			16
60					43					25			
			Medium dense gray poorly graded Sand										
65					19					24			9
70					19					28			
			Very soft gray Fat Clay										
75						0.11		0.15	65	56			
			Very loose gray Clayey Sand										
80					3					34			49
85			-with shell fragments, 83' to 85'		9					33			
			Medium dense to very dense gray Silty Sand										
90					16					33			
95					16					31			26
100					52					24			

DEPTH OF BORING: 220 Feet
DATE: 8-24-09 to 8-26-09

LOG OF BORING B-20 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY — LOCATION: CENTRAL ENERGY PLANT — PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense to very dense gray Silty Sand										
105			-with clay pockets, 103' to 105'		26					30			
					61					22			
110													
115			-with shell fragments, 113' to 115'		19					27			25
			Stiff gray Fat Clay with silt seams and sand layers			1.63	1.00		84	36			
120													
							1.25			43			
125													
						1.65	1.25		81	41	73	52	
130													
							1.50			36			
135													
140			Firm to very stiff gray and green Lean Clay			0.84	1.25		104	21			
					16					29			
145													
					13					34			
150													

DEPTH OF BORING: 220 Feet
DATE: 8-24-09 to 8-26-09

LOG OF BORING B-20 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Lean Clay with sand layers										
						1.07	1.25		104	24			
155													
								0.30		25			
160													
			Firm to very stiff gray Fat Clay										
						0.53	1.00		90	33			
165													
							1.50			40			
170													
						2.66	2.00		96	28	71	51	
175													
							2.0			31			
180													
			-with sand layers, 183' to 185'			1.13	1.75		93	28			
185													
							2.50			36			
190													
						1.69	1.50		87	35			
195													
						2.51	2.25		81	39			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-24-09 to 8-26-09

LOG OF BORING B-20 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray Fat Clay										
205						2.81	1.75		80	43	72	50	
210						2.18	2.00		80	42			
215						2.05	2.00		78	41			
220			Dense gray Silty Sand with trace of shell fragments		43					25			34
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-24-09 to 8-26-09

LOG OF BORING B-21

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			8" asphalt Soft gray Fat Clay			0.46		0.25	60	72			
			Very soft to soft dark brown organic Clay with peat ▼			0.47		0.20 0.15 0.10	48	100 97 197			
5								0.10	31	160			
								0.10		156	378	228	
						0.08		0.05	17	317			
10										176			
			Very soft gray Fat Clay with silt seams			0.09		0.10	74	49			
15													
			Soft to firm gray Sandy Clay		2					36			67
20													
					7					26			
25													
			Soft gray Fat Clay			0.39		0.15	76	49			
30													
			Loose gray Silty Sand with clay pockets		5					35			
			Soft gray Fat Clay			0.36		0.20	69	52			
35													
			Very dense gray poorly graded Sand		67					21			6
40													
			Very loose gray Silty Sand with some shell fragments		1					29			
45													
			Soft gray Lean Clay with trace of shell fragments			0.27		0.15	97	27			
50													

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 4.5 feet after 24 hours

DATE: 8-22-09 to 8-24-09

LOG OF BORING B-21 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense to dense gray poorly graded Sand		22					27			4
					11					28			
55													
					34					24			
60													
					37					26			7
65													
					28					30			
70													
			Medium dense gray Silty Sand with some clay pockets		15					30			24
75													
80			Soft gray Fat Clay with sand layers			0.38		0.25	82	42			
			Soft gray Sandy Clay		3					36			55
85													
			Medium dense gray Silty Sand with some clay pockets		10					30			45
90													
					17					35			
95													
					14					32			35
100													

DEPTH OF BORING: 220 Feet
DATE: 8-22-09 to 8-24-09

LOG OF BORING B-21 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense to very dense gray Silty Sand										
105					52					28			19
110					17					28			
115					20					31			31
120			Stiff gray Fat Clay -with sand layers, 118' to 120'			1.04	1.75		84	42			
125							1.5			43			
130						1.48	1.25		81	45	81	52	
135			-with trace of shell fragments, 133' to 135'				1.5			38			
140			Stiff to firm gray and green Lean Clay -with shell fragments, 138' to 140'		17					22			
145						0.68	1.0		101	25			
150			Dense gray Silty Sand with clay pockets		33					32			

DEPTH OF BORING: 220 Feet
DATE: 8-22-09 to 8-24-09

LOG OF BORING B-21 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Dense gray Silty Sand with clay pockets										
			Firm to stiff gray Fat Clay			0.91	1.25		97	28			
155			-with sand layers, 153' to 155'										
							1.5			44			
160													
			Firm gray Sandy Clay		17					32			
165													
			Stiff gray Fat Clay			2.75	1.5		92	31			
170													
			Firm to stiff gray Lean to Fat Clay with trace of organics				1.75			22	41	25	
175													
						0.55	1.0		100	27			
180													
					13					35			
185													
			-with trace of shell fragments, 188' to 190'			0.92	0.75		98	23	66	42	
190													
			Very stiff gray and tan Fat Clay				2.5			38			
195													
						2.53	2.0			39			
200													

DEPTH OF BORING: 220 Feet
DATE: 8-22-09 to 8-24-09

LOG OF BORING B-21 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: CENTRAL ENERGY PLANT | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very stiff gray and tan Fat Clay										
						2.00	2.25		80	41			
205													
						2.43	2.0		83	41			
210													
						3.63	2.0		82	40	78	54	
215													
			Dense gray Silty Sand		44					23			45
220													
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 8-22-09 to 8-24-09

LOG OF BORING B-22

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: RESEARCH BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
		X	7" asphalt, 7" sand and gravel base Very loose brown Fat Clay with organics		3					59			
			Very soft dark gray Organic Clay ▼			0.16		0.20	36	131			
5			Very soft dark gray Peat					0.05		325			
						0.11		0.15	17	318			
10								0.05		239			
15			Very soft to soft gray Fat Clay					0.15	76	42			
		X			2					42			
20													
25				0.03				0.20	66	53	72	48	
						0.16		0.05	82	28			
30													
35								0.15		63			
		X	Medium dense gray poorly graded Sand		30					24			7
40													
45		X	-loose with clay layers and shell fragments, 43' to 45'		2					31			
50		X			14					25			

DEPTH OF BORING: 220 Feet | GROUNDWATER: Measured at 4 feet during drilling

DATE: 7-6-09 to 7-9-09

LOG OF BORING B-22 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: RESEARCH BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense light brown and gray poorly graded Sand										
55					24					25			4
60			-very loose, 58' to 60'		3					31			
65					25					24			6
70			-with trace of clay pockets, 68' to 75'		17					25			
75			Medium dense gray Silty Sand		18					29			28
80			Loose gray Clayey Sand with trace of shell fragments		4					36			44
85			Firm gray Fat Clay with trace of sand layers			0.76	1.0		68	53			
90			-with sand and silt layers, 88' to 95'					0.45		65			
95						0.43	1.0		79	40			
100			Loose gray Silty Sand with clay pockets		7					30			

DEPTH OF BORING: 220 Feet
DATE: 7-6-09 to 7-9-09

LOG OF BORING B-22 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: RESEARCH BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Loose gray Silty Sand with clay pockets										
			Very soft gray Sandy Clay			0.20		0.05	96	26			
105													
			Medium dense gray Silty Sand with clay pockets		18					29			24
110													
			-with trace of shell fragments		11					33			
115													
					11					35			45
120													
			Firm to very stiff gray Fat Clay			2.34	2.0		76	45			
125													
							1.25			44	81	58	
130													
			-with sand and silt layers, 133' to 135'			1.07	1.0		87	36			
135													
				0.60			2.5		92	30			
140													
						1.72	2.0		94	29			
145													
							2.25			25			
150													

DEPTH OF BORING: 220 Feet
DATE: 7-6-09 to 7-9-09

LOG OF BORING B-22 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

TYPE OF BORING: WET ROTARY | LOCATION: RESEARCH BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay										
			Firm to stiff gray Lean Clay										
155						0.79	1.0		103	24			
			-with trace of shell fragments, 158' to 160'					0.25		25			
160													
						0.64	1.5		93	29			
165													
						0.72	1.0		92	29	33	13	
170													
						1.48	1.75		100	24			
175													
			-with trace of organics, 178' to 180'				1.75			27			
180													
			Stiff to very stiff gray and tan Fat Clay			1.69	2.0		94	29			
185													
							1.75			40			
190													
			-with sand layers, 193' to 195'			1.16	2.0		88	31			
195													
			-with silt and sand seams, 198' to 200'				2.5		86	32			
200													

DEPTH OF BORING: 220 Feet
DATE: 7-6-09 to 7-9-09

LOG OF BORING B-22 (continued)

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

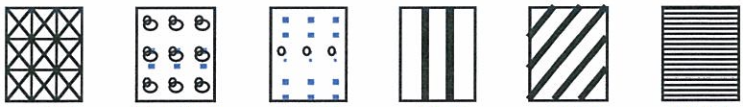
TYPE OF BORING: WET ROTARY | LOCATION: RESEARCH BUILDING | PSI PROJECT NO.: 267-95001

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	TRIAXIAL UU SHEAR STRENGTH, tsf	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay										
						0.62	1.0		78	42			
205													
							1.50			41			
210													
						2.31	2.5		78	41			
215													
			Very dense gray Silty Sand with shell fragments		71					20			
220													
			Boring terminated at 220 feet										
225													
230													
235													
240													
245													
250													

DEPTH OF BORING: 220 Feet
DATE: 7-6-09 to 7-9-09

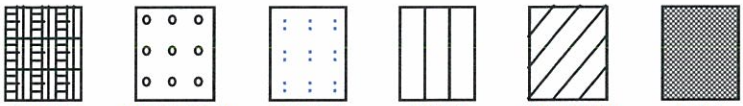
KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE



SAMPLER TYPE

MODIFIERS



UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

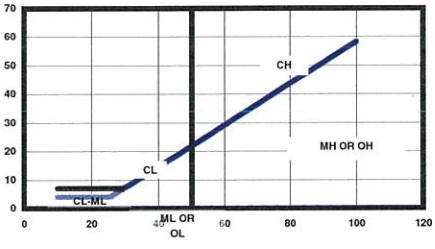
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		W/ APPRECIA BLE FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN 50% PASSING NO. 4 SIEVE	CLEAN SANDS LITTLE FINES	SW	WELL GRADED SAND, GRAVELY SAND (LITTLE FINES)
			SP	POORLY GRADED SANDS, GRAVELY SAND (L.FINES)
		SANDS WITH APPREA. FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS,SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS,ROCK FLOUR SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI
			CL	INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY FAT CLAYS
			OH	ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT
HIGHLY ORGANIC SOIL			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
UNCLASSIFIED FILL MATERIALS				ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH IN TONS/FT^2
VERY SOFT	0. TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



ABBREVIATIONS

HP - HAND PENETROMETER
TV - TORVANE
MV - MINIATURE VANE
UC - UNCONFINED COMPRESSION TEST
UU - UNCONSOLIDATED UNDRAINED TRAIXIAL
CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

DELAYED GROUNDWATER LVL

LEVEL GROUNDWATER ENCOUNTERED

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

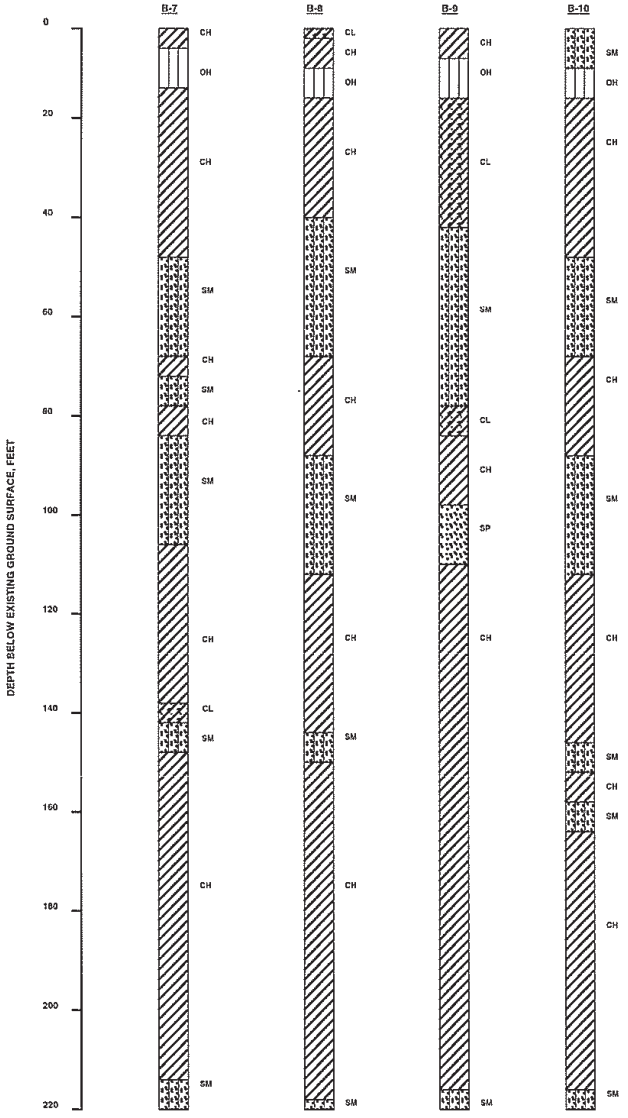
6"	3"	3/4"	4	10	40	200

BOUL-DERS	COBBLES	GRAVEL		SAND			SILT OR CLAY	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

152	76.2	19.1	4.76	2.0	0.42	0.074	0.002

GRAIN SIZE IN MM

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
SP - POORLY GRADED SAND	
OH	

STAFF GARAGE

(BORINGS B-7, B-8, B-9, B-10)

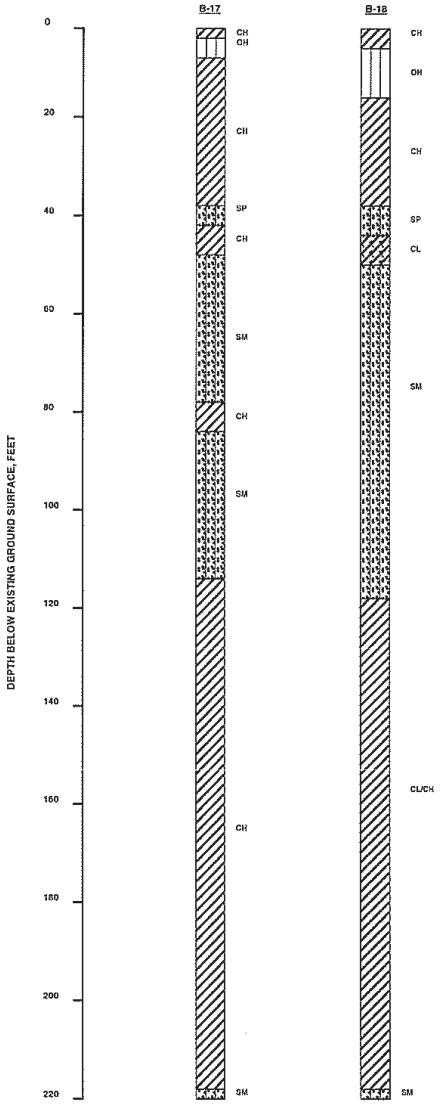
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95001

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
SP - POORLY GRADED SAND	
OH - ORGANIC CLAY	

PATIENT GARAGE

(BORINGS B-17, B-18)

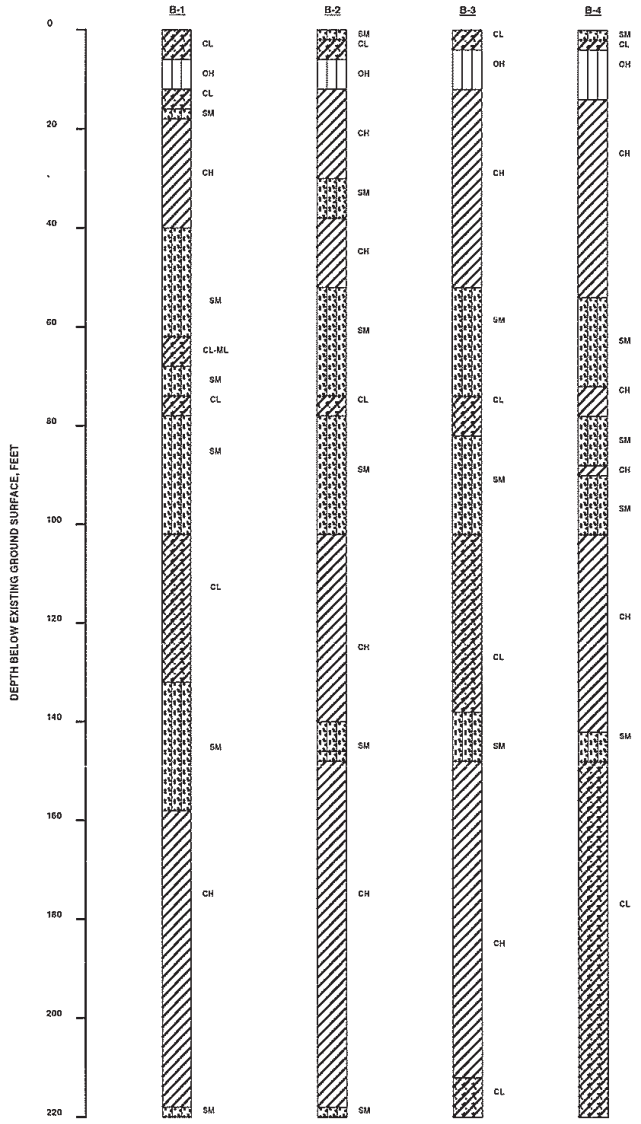
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

psi Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95001

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
OH - ORGANIC CLAY	

DIAGNOSTIC AND TREATMENT (D& T) - NORTH

(BORINGS B-1, B-2, B-3, B-4)

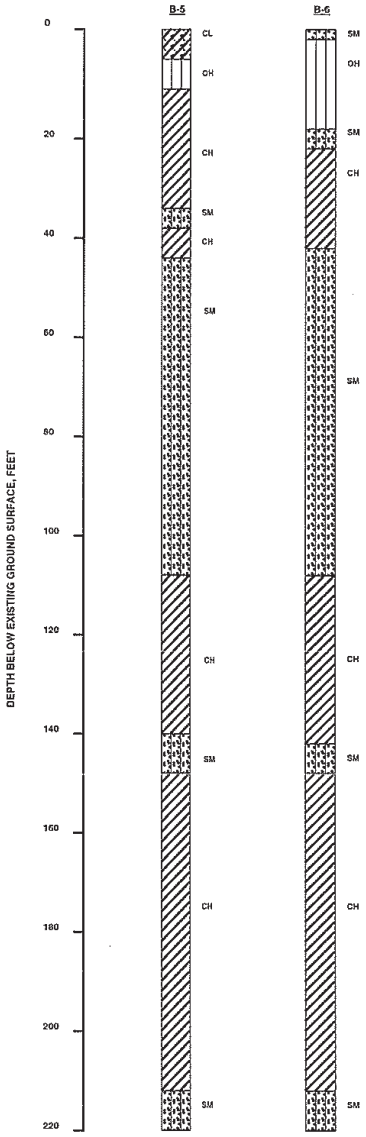
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95001

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
OH - ORGANIC CLAY	

DIAGNOSTIC AND TREATMENT (D&T) - SOUTH

(BORINGS B-5, B-6)

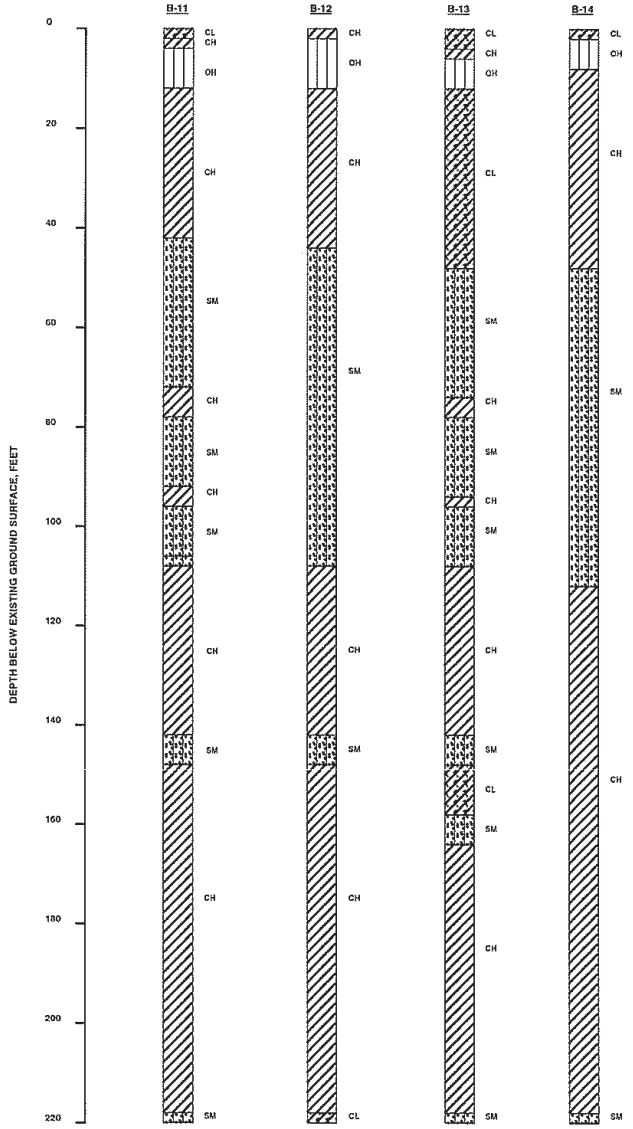
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-55001

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
OH - ORGANIC CLAY	

OUTPATIENT BUILDING

(BORINGS B-11, B-12, B-13, B-14)

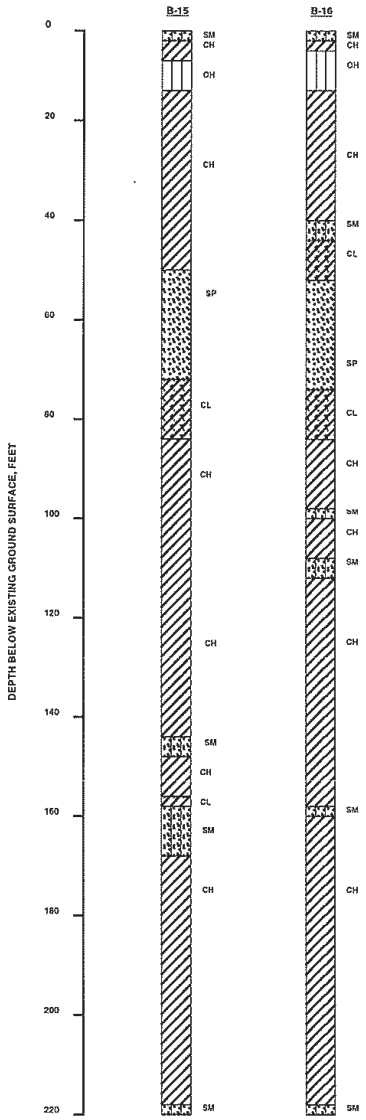
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95091

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
SP - POORLY GRADED SAND	
OH - ORGANIC CLAY	

TRANSITIONAL LIVING

(BORINGS B-15, B-16)

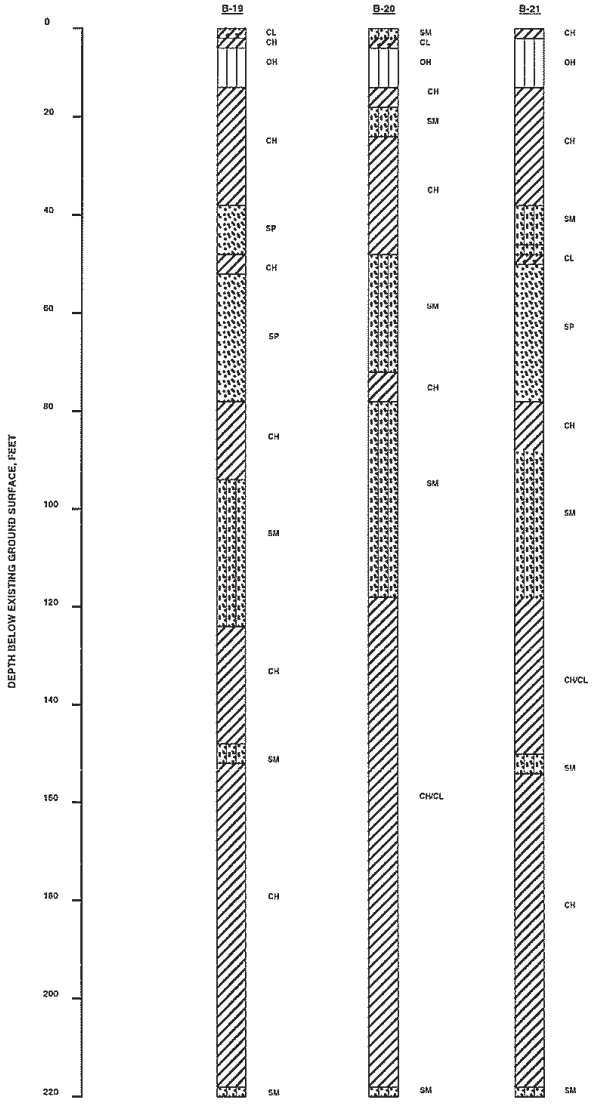
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95001

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
SP - POORLY GRADED SAND	
OH - ORGANIC CLAY	

CENTRAL ENERGY PLANT

(BORINGS B-19, B-20, B-21)

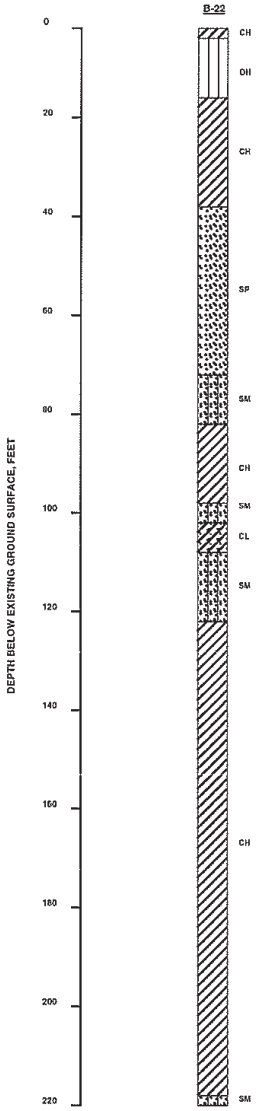
SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95091

GENERALIZED SOIL PROFILE



NOTE: STRATUM BOUNDARIES ARE SHOWN TO BE CONTINUOUS FOR DESIGN PURPOSES, ACTUAL FIELD STRATIFICATIONS COULD BE DISCONTINUOUS

SOIL TYPE	SYMBOL
CH - FAT CLAY	
CL - LEAN CLAY	
SM - SILTY SAND	
SP - POORLY GRADED SAND	
OH	

RESEARCH (DIXIE) BUILDING

(BORINGS B-22)

SOIL PROFILE

PROPOSED VA HOSPITAL
CANAL STREET AND SOUTH GALVEZ STREET
NEW ORLEANS, LOUISIANA

Professional Service Industries, Inc.
724 Central Avenue
Jefferson, Louisiana

DRAWN BY:	SCALE:	PSI REPORT NO.
SND	NOT TO SCALE	267-95001

psi Information To Build On
Engineering • Consulting • Testing

November 30, 2009

NBBJ
1555 Lake Shore Drive
Columbus, Ohio 43204

Attention: Ms. Peggy Reed
Senior Associate

Re: Geotechnical Engineering Report
Proposed VA Hospital – Phase I
Canal Street and South Galvez Street
New Orleans, Louisiana
PSI Project No.: 267-95001

Dear Ms. Reed:

Professional Service Industries, Inc. (PSI) completed a preliminary geotechnical exploration for the proposed VA Hospital at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana. The results of our preliminary investigation were presented in PSI Report No.: 267-95001 dated October 16, 2009. This letter presents additional site preparation recommendations based on our correspondence with Mr. Jeff Slane with NBBJ, Mr. Wayne Peterson and Mr. Chris Jenkins of Schrenk and Peterson Consulting Engineers, Inc.

The property is bounded by Canal Street, South Galvez Street, Tulane Avenue, and South Rocheblave Street in New Orleans, Louisiana. Based on the latest grading plan provided to us, it is understood that about three (3) to five (5) feet of fill will be needed in the different building areas to achieve floor slabs design elevation. Up to three (3) feet of fill is anticipated in some of the parking lot, driveway, and sidewalk areas.

Based on the results of our preliminary field exploration and laboratory test results, the near surface soils present at this site to a depth of about 50 feet are soft and poor in bearing quality and highly compressible in nature. This soft soil will experience excessive amount of settlement under the weight of the fill required to raise the site elevation. Based on our analyses, maximum long term areal settlement in the center of the loaded area was estimated to be on the order of 25 and 16 inches due to placement of five (5) and three (3) feet of fill, respectively. These consolidation settlements could take place over a period of 25 years.

These consolidation settlements, which are estimated to take place over a period of 25 years, could be problematic in the parking areas particularly at the interface with pile supported structures. Therefore, depending on the land acquisition and project construction schedules, consideration may be given to a surcharge program to induce some of the areal subsidences and reduce post construction settlements.

RFI 041

In our analyses, we evaluated a surcharge load consisting of five (5) feet of fill placed on top of the fill required to achieve the design grades. Using the recommended surcharge, it will take about 16 months and 4.5 years for about 50% and 90% of the settlement to occur, respectively. However, installation of closely spaced vertical wick drains in conjunction with the surcharge program could induce about 90% of the total settlement in about three (3) to four (4) months. The remaining 2.5 inches of settlement will occur over the life of the different structures.

As requested, PSI has evaluated the different areas within the project limits and our recommendations are presented below:

1. Main Entrance at South Galvez Street: Existing ground surface elevation in this area ranges between -1.47 to +1.31. Based on finished floor elevation, it is understood that about three (3) feet of fill will be needed to achieve design grades. It is our recommendation that the reflection pool and driveways and other structures near the main entrance be pile supported. Furthermore, we recommend pre-loading the main entrance area in conjunction with installation of wick drains.

2. Emergency Department Access Area: Existing ground surface elevation in this area ranges between -1.80 feet and +0.27 feet. It is understood that a driveway ramp will be constructed up to the emergency level, which we recommend be supported on a pile foundation system. Furthermore, the parking lot adjacent to the emergency access area should be pre-loaded in conjunction with wick drains.

3. Transitional Living and Rehab area: It is understood that four shotgun residences will be constructed on the west side of the Transitional Living building. We recommend this area to be pre-loaded before constructing the houses. Furthermore, we recommend that the houses be supported on large treated timber piles as recommended in our original geotechnical report. The existing ground surface elevation ranged between -2.7 feet and -3.6 feet. Considering a finished floor elevation of +1.33 feet, up to five (5) feet of fill will be needed to achieve the floor slab design elevation.

   The south side of the Transitional Living building is occupied by several live oak trees which will remain in place and limit the addition of fill. Therefore, we recommend using geofoam under the building and extending of about 20 feet inside the building edge to reduce fill induced stresses and minimize settlement of the surrounding areas at the building interface.

4. Concourse area: The area between Transitional Living, Staff Garage, Outpatient, and Patient Parking Garage buildings should be pre-loaded to reduce post-construction settlement. Furthermore, we recommend that the Concourse structure connecting the different buildings be supported on a pile foundation system.

We appreciate the opportunity to be of continued service to you and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please do not hesitate to call.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Malay Ghose Hajra, Ph.D., P.E.
Regional Engineer

Tony Y. Maroun, P.E.
Vice President

MGH/TYM/CH:gsm

cc: Mr. Chris Humphreys, P.E. -- PSI, Inc.
Mr. Wayne Peterson, P.E. – Schrenk & Peterson Consulting Engineers, Inc.

Information To Build On
Engineering • Consulting • Testing

June 9, 2010

NBBJ
1555 Lake Shore Drive
Columbus, Ohio 43204
Attention: Mr. Jeff Slane, AIA

Re: Geotechnical Engineering Report
Proposed VA Hospital – Phase I
Canal Street and South Galvez Street
New Orleans, Louisiana
PSI Project No. 0267100
Addendum #1R

Dear Mr. Slane:

Professional Service Industries, Inc. (PSI) completed a preliminary geotechnical exploration for the proposed VA Hospital at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana. The results of our preliminary investigation were presented in PSI Report No. 267-95001 dated October 16, 2009. PSI also submitted an addendum letter on May 21, 2010 which included additional site preparation recommendations related to the project. This letter presents discussion and PSI's response to a letter by Desman Associates dated May 20, 2010 and addressed to Mr. Jeff Slane with NBBJ.

According to the New Orleans Amendments to the International Building Code (2000 Edition), Section 1812.5.1.2, the minimum pile spacing for all piles shall be either three (3) feet, or three (3) pile diameters (widths), or as determined by the following expression:

$SPAC = 0.05 (L_1) + 0.025 (L_2) + 0.0125 (L_3)$
where, SPAC = center-to-center spacing of piles, ft.
L_1 = Pile penetration up to 100 ft.
L_2 = Pile penetration from 101 to 200 ft.
L_3 = Pile penetration beyond 201 ft.

This formula for calculating pile spacing will result in 6'-3" center-to-center distance for a 150 foot long, two piece, square pre-cast concrete pile with an allowable compression capacity of 150 tons, which is being considered for the two garages to be constructed for this project. The New Orleans Building Code (Section 1812.5.3.1) also recommends investigating group pile capacity for a pile cluster using the following expression:

$$Q_a = \frac{(PLC)}{FS_F} + \left[\frac{2.6q_u(1+0.2\ w/b)}{FS_B} \right]$$

where, Q_a=Allowable load-carrying capacity of pile group, lb.

- P = Perimeter distance of pile group, ft.
- L = Length of pile, ft.
- C = Average (weighted) cohesion or shear strength of material between the surface and the depth of the pile tip, psf
- q_u = Average unconfined compressive strength of material in the zone below pile tips, psf.
- w = Width of base of pile group, ft.
- b = Length of base of pile group, ft.
- A = Base area of Pile Group, sq. ft.
- FS_F= Factor of safety for the group friction area = 2
- FS_B= Factor of safety for the group base area = 3

In our preliminary geotechnical exploration report, it was recommended that group capacities of pile clusters will have to be checked after the actual pile spacing and pile cap configuration is determined by the Structural Engineer in accordance with the City of New Orleans Amendments to the IBC 2000.

According to the letter by Desman Associates, a 5'-2" center-to-center pile spacing resulted in an efficiency factor of 1.0 or greater. We understand that this was based on the method of calculating efficiency of a pile group developed by J.E. Bowles. Desmon Associates also referenced an approach developed by Terzaghi and Peck of calculating group efficiency, which appears to be similar to the methodology indicated in the City of New Orleans Amendments to IBC 2000. PSI performed group pile analysis using 5'-2" pile spacing for several typical pile caps using soil boring data obtained at the patient and staff garages and the method in the New Orleans Amendments to the IBC 2000 code. For small pile clusters (up to 9 piles), no reduction in capacity due to group effect was required. However, for large pile groups (10 piles or more), the 5'-2" spacing would result in a capacity reduction due to group effects, necessitating a larger center-to-center pile spacing.

PSI performed additional group analyses using the City of New Orleans Building Code formula for several typical pile caps (4 piles to 15 piles per cap) using subsurface soil information from the patient and staff parking garages and various pile center-to-center spacings. Based on our analyses, it was found that no reduction in group capacity will be required for pile groups with center-to-center spacing of at least 6'-0".

The City of New Orleans Amendments to the IBC 2000 code appear to address group requirements as well as constructability issues such as piles that may wander during installation as well as pile heave and drivability. The New Orleans Amendments were likely added due to the regular use of relatively long piles to reduce the possibility of piles interfering with or intersecting each other during installation. Additionally, with larger displacement pile groups, the significant volume of pile in the ground will tend to densify sands, compress cohesive soils, contribute to possible heaving of piles, as well as contribute to difficulty in pile driving which could lead to early refusal or possible overstressing of concrete. Greater pile spacing reduces this potential. Therefore, we recommend using the City of New Orleans Code requirements which will result in center-to-center pile spacing of 6'-3" for a 150 foot long pile and will satisfy group efficiency requirements as well as reduce potential constructability issues.

We appreciate the opportunity to be of continued service to you and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this letter, or if we may be of further service, please do not hesitate to call.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Malay Ghose Hajra, Ph.D., P.E.
Regional Engineer

Chris Humphreys, P.E.
Executive Vice President

MGH/CH:mgh

Information To Build On
Engineering • Consulting • Testing

May 21, 2010

NBBJ
1555 Lake Shore Drive
Columbus, Ohio 43204
Attention: Mr. Jeff Slane, AIA

Re: Geotechnical Engineering Report
Proposed VA Hospital – Phase I
Canal Street and South Galvez Street
New Orleans, Louisiana
PSI Project No. 0267100
Addendum #2R

Dear Mr. Slane:

Professional Service Industries, Inc. (PSI) completed a preliminary geotechnical exploration for the proposed VA Hospital at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana. The results of our preliminary investigation were presented in PSI Report No. 267-95001 dated October 16, 2009. This letter presents additional site preparation recommendations based on our recent meeting with Mr. Chris Jenkins, P.E. of Schrenk & Peterson Consulting Engineers, Inc. on May 20, 2010.

The property is bounded by Canal Street, South Galvez Street, Tulane Avenue and South Rocheblave Street in New Orleans, Louisiana. Based on the latest grading plan provided to us, it is understood that about three (3) to five (5) feet of fill will be needed in the different building areas to achieve floor slabs design elevation. Up to three (3) feet of fill is anticipated in some of the parking lot, driveway, and sidewalk areas.

Based on the results of our preliminary field exploration and laboratory test results, the near surface soils present at this site to a depth of about 50 feet are soft and poor in bearing quality and highly compressible in nature. This soft soil will experience excessive amount of settlement under the weight of the fill required to raise the site elevation. Based on our analyses, maximum long term settlement at the center of the loaded areas was estimated to be on the order of 25 and 16 inches due to placement of five (5) and three (3) feet of fill, respectively. These consolidation settlements could take place over a period of 25 years. As requested by Mr. Chris Jenkins, P.E. of Schrenk & Peterson Consulting Engineers, Inc., PSI has estimated total settlement for different fill heights as indicated in the following table:

Area to be Filled	Amount of Fill (ft)	Estimated Total Consolidation Settlement (inches)	Settlement remaining after 1 year from fill placement (inches)	Settlement remaining after 2 years from fill placement (inches)
200 feet by 100 feet	1	6 ½	5.6	5.2
	2	11 ½	9.8	9.2
300 feet by 60 feet	1	6	5.1	4.8
	2	11	9.4	8.8
	3	16	13.6	12.8
	5	25	21.3	20.0
600 feet by 50 feet	1	6	5.1	4.8
	2	11	9.4	8.8
	3	16	13.6	12.8
	5	24	21.3	20.0

These consolidation settlements, which are estimated to take place over a period of 25 years, could be problematic in the parking areas particularly at the interface with the pile supported structures. Therefore, based on our discussions with Mr. Chris Jenkins, P.E., consideration is being given to a surcharge program to induce some of the subsidence and reduce post construction settlements. In our analyses, we evaluated a surcharge load consisting of five (5) feet of fill placed on top of the fill required to achieve the design grades. Using the recommended surcharge, it will take about 16 months and 4.5 years for about 50% and 90% of the settlement to occur, respectively. However, installation of closely spaced vertical wick drains in conjunction with the surcharge program could induce about 90% of the total settlement in about three (3) to four (4) months. The remaining 2.5 inches of settlement will occur over the life of the different structures. However, it is recommended that all utility lines in the building areas should be hung from the slabs. Hangers and connections used should conform to the applicable Building Code. Flexible connections must be provided at the interface of pile supported and non-pile supported areas to accommodate at least six (6) inches of settlement provided the surcharge with wick drains is implemented. The depth and spacing of the wick drains to achieve the above degree of settlement should be designed by the wick drain installation contractor.

During the surcharge with wick drain program, settlement should be monitored using Settlement monuments which generally consists of 2' x 2' x ½" steel plates with 2 inch diameter or larger riser pipes that can be increased in length as the fill thickness increases. It is recommended that about 30 settlement plates be placed in a grid pattern across the site on the subgrade spaced about 200 feet apart. The top of the flushed coupled rod should extend approximately 24 inches above the finished compacted fill grade. After the site is stripped and proofrolled, prior to placement of any fill on the site, the elevation of the top of the rod should be surveyed using a bench mark located at a sufficient distance from the pad as not to be influenced by the fill placement. After the initial base line survey of the settlement plates is complete, the first lift of fill can be placed. The fill and surcharge material should meet the fill material requirements recommended in the Geotechnical report.

It is recommended that fill placement should be monitored by the geotechnical engineer or his representative. Initial readings should be established immediately after the settlement plates are placed. Subsequent surveys of the settlement plates should be secured once a week during and after fill placement and should continue for a period of up to three (3) to four (4) months or until the anticipated settlement has dissipated, whichever occurs first. It is recommended that the Construction Manager hire an independent Registered Surveyor to survey the elevation of the settlement plates on a weekly basis, as recommended above. The weekly settlement surveys should be submitted to the Design Engineer and Geotechnical Engineer in a timely manner. Based on our discussions, we recommend the following general guidelines related to the surcharge program:

1. It is recommended that the entire site, with the exception of the areas described below, be surcharged to induce uniform settlement under the building and pavement areas. This will also reduce the possibility of differential settlement of ground supported utility lines that cross under multiple buildings. The surcharge area should include areas at the interface of the buildings and non-pile supported pavement and structures as well as fill areas where new utility lines are planned.

2. If the surcharge is placed in multiple phases at different locations within the site, it is recommended the new surcharge fill should be overlapped into the adjacent area previously surcharged, by a distance of at least five (5) feet.

3. In areas within the site where significant amount of fill is needed but surcharge can not be performed in the surrounding areas, a geofoam may be used to reduce fill induced stresses and minimize settlement of the surrounding areas.

4. It is recommended that all piles for this project be installed after the completion of the surcharge program and removal of the surcharge fill.

5. It is recommended that the toe of the sloped surcharge fill be placed at least 25 feet from the edge of the property lines to reduce the effects of the surcharge on the existing structures and utility lines under the roads.

6. It is recommended that the toe of the sloped surcharge fill be placed at least 25 feet from the edge of the Pan Am building footprint to reduce the effects of the surcharge on the existing structure, provided the Pam Am building is closely monitored for movement and signs of distress throughout the surcharge period. If any adverse effects are noted during the surcharge period, the surcharge fill near the Pan Am building should be removed immediately to a distance of at least 40 feet from the edge of the building. We recommend that several monuments/rulers are placed on the Pan Am building close to the surcharge area as well as installation of at least one inclinometer with Sondex rings to a depth of 100 feet to monitor horizontal and vertical displacement of the soil near the Pan Am building during the surcharge period. It is recommended that the Geotechnical Engineer or his representative monitor the monuments and inclinometers daily for movement.

7. It is recommended that the toe of the sloped surcharge fill be placed at least outside the drip line or canopy of the existing oak trees to reduce any adverse effect of the surcharge on the trees. Based on our discussions with Mr. Jim Culpepper with Greener Trees LA, LLC, it is recommended that no fill be placed on any exposed tree roots and a combination of swale and silt fence should be utilized to reduce the migration of any sand fill towards the canopy area of the trees.

8. It is recommended that the toe of the sloped surcharge fill be placed at least 25 feet from the Sewage and Water Board property line. The toe of the sloped surcharge fill should also be placed at least 25 from existing sewer lines present adjacent to the building to reduce the effects of surcharge on the existing structure.

9. The wick drains should be placed within the surcharged areas only. The outside edge of the wick drains should be near the point where the fill surface elevation is 0 feet. That is the wicks will extend beyond the edge of each building but not all the way to the toe of the fill slope which is generally at or below elevation -1 foot.

10. Site preparation for the surcharge program should include, but not be limited to the demolition and removal of the existing buildings, foundation elements, and pavements. Furthermore, any topsoil, organics, vegetation, and any other deleterious materials should be stripped and removed from the areas to be surcharged. Disturbed soil should be graded and the subgrade should be proofrolled prior to fill placement to achieve a generally stable ground support. Structural fill necessary to bring existing grade to finished grade should be placed in maximum lifts of eight (8) inches of loose material and should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM Designation D-698 (Standard Proctor). The surcharge fill placed above the site fill may be placed in maximum lift thickness of 12 inches and should be compacted to at least 90 percent of the material's maximum dry density as determined by ASTM D-698 (Standard Proctor). Locally available "pumped" river sand, having less than 10 percent passing the No. 200 sieve may be used as both the permanent fill and the surcharge fill.

11. Site preparation recommendations and other construction considerations presented in our original Geotechnical Engineering Report dated October 16, 2009 should be followed by the contractor during the surcharge program.

We appreciate the opportunity to be of continued service to you and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this letter, or if we may be of further service, please do not hesitate to call.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Malay Ghose Hajra, Ph.D., P.E.
Regional Engineer

Chris Humphreys, P.E.
Executive Vice President

MGH/CH:mgh

Information To Build On
Engineering • Consulting • Testing

January 12, 2011

NBBJ
1555 Lake Shore Drive
Columbus, Ohio 43204
Attention: Mr. Jeff Slane, AIA

Re: Geotechnical Engineering Report
Proposed VA Hospital – Phase I
Canal Street and South Galvez Street
New Orleans, Louisiana
PSI Project No. 0267100
Addendum #3

Dear Mr. Slane:

Professional Service Industries, Inc. (PSI) completed a preliminary geotechnical exploration for the proposed VA Hospital at the intersection of Canal Street and South Galvez Street in New Orleans, Louisiana. The results of our preliminary investigation were presented in PSI Report No. 267-95001 dated October 16, 2009. PSI also submitted addendum letters on May 21, 2010 and June 9, 2010 which included additional foundation design and site preparation recommendations related to the project. As requested by you, PSI presents this letter to comment on the soil-cement stabilization option proposed by Clark/McCarthy for the referenced project.

Based on information provided to us by Clark/McCarthy, the construction manager for this project, it is understood that consideration is being given to modifying the near surface in-situ soil by cement-soil stabilization method. Current plans calls for raising the existing site grade (varying between -1 feet and -4 feet) to an elevation of +1.33 feet. The subsurface soil will then be cement stabilized to a depth of seven (7) to nine (9) feet starting at elevation +1.33 feet. According to Clark/McCarthy, the primary purpose of the cement-soil stabilization is to strengthen the subsurface soil to obtain a minimum undrained shear strength of 30 psi. According to Clark/McCarthy, this will minimize the use of forms during construction of pile caps and other below-grade structures. Furthermore, the cement-stabilized soil is expected to provide a stable ground for movement of heavy construction equipment without extensive use of crane mats, etc. PSI acknowledges the above advantages to the project due to cement-stabilization of the near surface soils.

The large majority of the soil/cement will be within the building limits where most of the soil/cement mixture will be excavated for pile caps, etc. Although PSI did not account for the material properties of the upper eight (8) to nine (9) feet of cement stabilized soil in our original geotechnical analysis, it is our opinion that stabilizing the soil will not negatively impact the recommended pile capacities and settlement estimates.

It should be noted that the permeability of the cement mixed soil will typically be less than natural soil by about one (1) order of magnitude. Hence, percolation of rain water outside the buildings will be less through the cement mixed soils. Therefore, positive drainage gradients away from the structures should be provided to handle excess rainwater run-off. Additional drainage systems may be required in tree plantings and planting beds to handle excess surface water.

In lawn areas, it is our recommendation that preparation of cement treated soils to promote healthy grass and tree growth should be provided by horticulturalists and arborists with expertise in this field. Soil/cement mixtures have been used in the New Orleans area to stabilize and improve the strength of the bearing soils in applications that also require a healthy grass surface. The top few inches of soil cement may require scarification or pulverization (tilling) and possible application of fertilizers to promote the growth of grass, plants and trees. The chemical properties of Cement mixed soils in these areas should be determined by laboratory tests and evaluated by experienced horticulturalists and arborists. It may also be necessary to excavate the near surface cement mixed soil in the root zone of grass and landscaping areas and replacing them with top soil suitable for proper plant growth.

Soil/cement stabilization procedures and quality control mechanisms related to this project should be designed and monitored by a qualified professional engineer knowledgeable in this field to ensure proper implementation of the methods in practice. It is our recommendation that qualified and experienced contractor with at least 10 years of experience in soil-cement stabilization perform the task and that the work be performed under direct supervision of a Licensed Professional Engineer.

We appreciate the opportunity to be of continued service to you and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this letter, or if we may be of further service, please do not hesitate to call.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Malay Ghose Majra, Ph.D., P.E.
Regional Engineer

for Chris Humphreys, P.E.
Executive Vice President

MGH/CH:mgh