

**GEOTECHNICAL ENGINEERING
SERVICES REPORT**

For the

**PROPOSED PUMP STATION
NORTHEAST CORNER (NEC) OF MELROSE
AVENUE AND OCCIDENT STREET
TAMPA, FLORIDA**

Prepared for

**City of Tampa - Wastewater Department
306 East Jackson Street, 6E
Tampa, Florida 33602**

Prepared by

**Professional Service Industries, Inc.
5801 Benjamin Center Drive
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PSI Project No. 0775-2250 rev 1

April 23, 2015 (Reissued August 28, 2015)

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City of Tampa - Wastewater Department
306 East Jackson Street, 6E
Tampa, Florida 33602

Attn: Cassidy Barrett
Project Engineer

Re: Geotechnical Engineering Services Report
Proposed Pump Station
Northeast Corner (NEC) of Melrose Avenue and Occident Street
Tampa, FL
PSI Project No.: 0775-2250 rev1

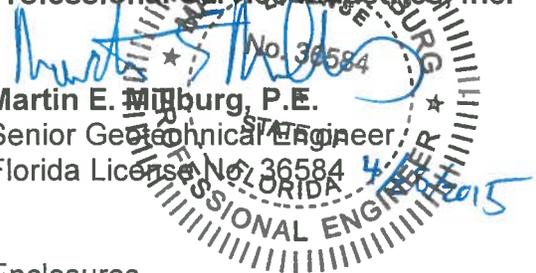
Dear Ms. Barrett:

Professional Service Industries, Inc. (PSI) is pleased to present our geotechnical engineering services report for the referenced lift station project. The results of the study are discussed in the accompanying report. As directed, we have included geotechnical engineering recommendations in our report. We also have added comments regarding allowable bearing pressure and clarified the loading conditions resulting in the estimated settlement.

Should there be any questions, please do not hesitate to contact our office at (813) 886-1075. PSI would be pleased to continue providing construction materials testing (CMT) services throughout the implementation of the project. We look forward to working with you and your organization on this and future projects.

Respectfully submitted,

Professional Service Industries, Inc.


Martin E. Millburg, P.E.
Senior Geotechnical Engineer
Florida License No. 36584


Jeremiah Mosley
Staff Specialist

Enclosures

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1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

Professional Service Industries, Inc. (PSI) has completed a geotechnical exploration for the proposed pump station to be located at the NEC of Melrose Avenue and Occident Street in Tampa, Florida. Our services were authorized by Cassidy Barrett of the City of Tampa Wastewater Department. This study has been performed in accordance with our Geotechnical Engineering Services PSI Proposal No. 775-111669, issued December 11, 2013.

1.2 PROJECT DESCRIPTION

An existing pump station is present at this site. Plans from 1964 for the existing pump station at this site indicate the existing structure is about 25 by 30 feet in plan and extends about 25 feet deep, to about elevation -15'. The existing structure is shown to be supported on 20 ton piles supporting the exterior and interior walls. We think the purpose of the piles would likely be more to resist uplift if the pumping station was empty rather than supporting the weight of the structure. Piles are spaced about 4 feet apart. It is not known if the piles were installed. Current City of Tampa plans show the ground surface is approximately +6' at this site.

The new pump station is a pre-fabricated cylinder concrete structure that extends about 20 feet below the current ground surface. The bottom of the lift station will rest on the bottom of the existing pump station floor slab on grade. The existing pump station is planned to be filled with flowable fill with a unit weight of 110 pounds per cubic foot.

Should any of the above information or assumptions made by PSI be inconsistent with the planned construction, we request that you contact us promptly to allow us to make any necessary modifications to the recommendations in this report.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of our study is to provide geotechnical engineering information required to assist with the planning and design of the proposed development. In order to obtain the required subsurface information, the Scope of Work presented below was planned for this site.

1. PSI contacted "Sunshine One-Call" Service to obtain underground public utility clearance prior to commencing the field work.
2. One (1) Standard Penetration Test (SPT) borings was performed at the proposed site to a depth of 35 feet. Samples were collected and SPT resistances were measured virtually continuously for the top 10 feet and on intervals of 5 feet thereafter. After completion of the soil borings the boreholes were backfilled and grouted, as required.
3. Groundwater levels were carefully measured in each boring. Seasonal High

Groundwater Level (SHGWL) estimates were determined based upon encountered groundwater levels in the borings.

4. Samples were returned to our Tampa, Florida office where they were subjected to laboratory testing, if required, and classified by a geotechnical engineer. A soil profile was prepared for each borehole indicating lithological materials encountered and any additional pertinent information.

At the conclusion of our field and laboratory work, the data was analyzed by one of our experienced geotechnical engineers and a report was prepared. The report includes the following:

- A discussion of subsurface conditions encountered including pertinent soil properties.
- Geotechnical recommendations for the foundations at the proposed site.
- Identification of groundwater levels and an estimation of seasonal high groundwater level at the boring location.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 SITE LOCATION AND DESCRIPTION

The proposed pump station is located at the NEC of Melrose Avenue and Occident Street in Tampa, Florida. The site is currently located in an existing residential area and is surrounded by short grass. Medium dense to dense trees can be found on site. The project site is located within Section 29, of Township 29 South, Range 18 East. Site elevation is approximately +5 to +10 feet based on the "National Geodetic Vertical Datum (NGVD) of 1929."

2.2 FIELD INVESTIGATION

One (1) Standard Penetration Test (SPT) borings was performed in the proposed pump area to a depth of 35 feet deep. During the SPT boring, samples were collected nearly continuously for the upper 10 feet then at intervals of 5 feet thereafter. After completion of the soil boring, the borehole location was backfilled and grouted, as required.

2.3 SUBSURFACE CONDITIONS

The soils in the upper 8 feet of the soil boring encountered fine to slightly silty fine sands (Unified Classification SP/SP-SM). Underlying the surficial sandy soils, clayey sand (SC) and clay (CL) were encountered at depths ranging from about 8 to 17 feet. Calcareous clay (CL) and clayey limestone were encountered at a depth from approximately 17 feet to the terminal depth of 35 feet. The calcareous clay (CL) found from about 17 to 22 feet above the limestone may be part of the limestone formation. The SPT resistances (N-values) in the sandy soils ranged from 8 to 15 blows per foot, indicating soils of loose to

medium density. The SPT resistances in the clay soils ranged from 6 to 36 blows per foot, indicating soils of firm to hard consistency. The limestone stratum experienced SPT resistances ranging from 3 to greater than 50 blows per foot.

The soil profiles presented on **Sheet 1** of the **Appendix** include soil descriptions, stratifications and penetration resistances. 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. Water level information obtained during field operations is also shown on these soil profiles.

2.4 GROUNDWATER INFORMATION

The groundwater table was encountered at a depth of 6 feet below the ground surface. It should be noted that groundwater levels tend to fluctuate during periods of prolonged drought and extended rainfall and may be affected by manmade influences. In addition, a seasonal effect will also occur in which higher groundwater levels are normally recorded in rainy seasons. In this regard, and based on the USDA soil review, the seasonal high groundwater table (SHGT) is estimated to be about 4 feet below the ground surface.

2.5 LABORATORY TEST RESULTS

Select soil samples were transferred to the laboratory for soil classification and engineering properties testing. Laboratory test results are provided on the soil profiles found on **Sheet 1** and are also included on separate lab report sheets in the **Appendix**.

3.0 RECOMMENDATIONS

3.1 GENERAL

A summary of the approximate soil pressures at this site is presented below:

Current Effective Stress Within Soil @ -14' Elev.	1,500 psf
Current Pressure at Base of Existing Lift Station	1,600 psf
Additional Pressure Due to New Lift Station	500 psf
Additional Pressure Due to Filling Existing Lift Station with Flowable Fill	600 psf

For the case where the new lift station is installed inside the existing pump station structure, we estimate the maximum settlement of the existing pump station will be approximately ½ an inch from the additional loading from the new pump station and

flowable fill (approximately 10 feet at 110 pcf). If piles are present and effectively support the existing structure, maximum settlement on the order of ¼ of an inch or less is anticipated. We anticipate this degree of settlement is within tolerable limits for this structure. The designer will need to evaluate the estimated settlement values to determine if they are compatible with the project design.

As requested, we also evaluated the approximate allowable bearing pressure of the soils at about 20 feet below grade using standard geotechnical engineering bearing capacity equations for cohesive soils. Using these equations and providing a Factor of Safety of 3 to control settlement, we estimate the total allowable bearing pressure of approximately 12,000 psf. This allowable bearing pressure would likely result in settlement significantly higher than the settlement estimate provided above.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 GENERAL

It is recommended that PSI be retained to provide observation and testing of any construction activities involved in the foundation, earthwork and related activities of this project. This will promote project continuity and will reduce the potential for misinterpretation of our recommendations

4.2 EXCAVATION AND EMBANKMENT SLOPE CONSIDERATIONS

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 excavations or footing excavations, whether they utility trenches, basement excavations 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.

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

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.

5.0 REPORT LIMITATIONS

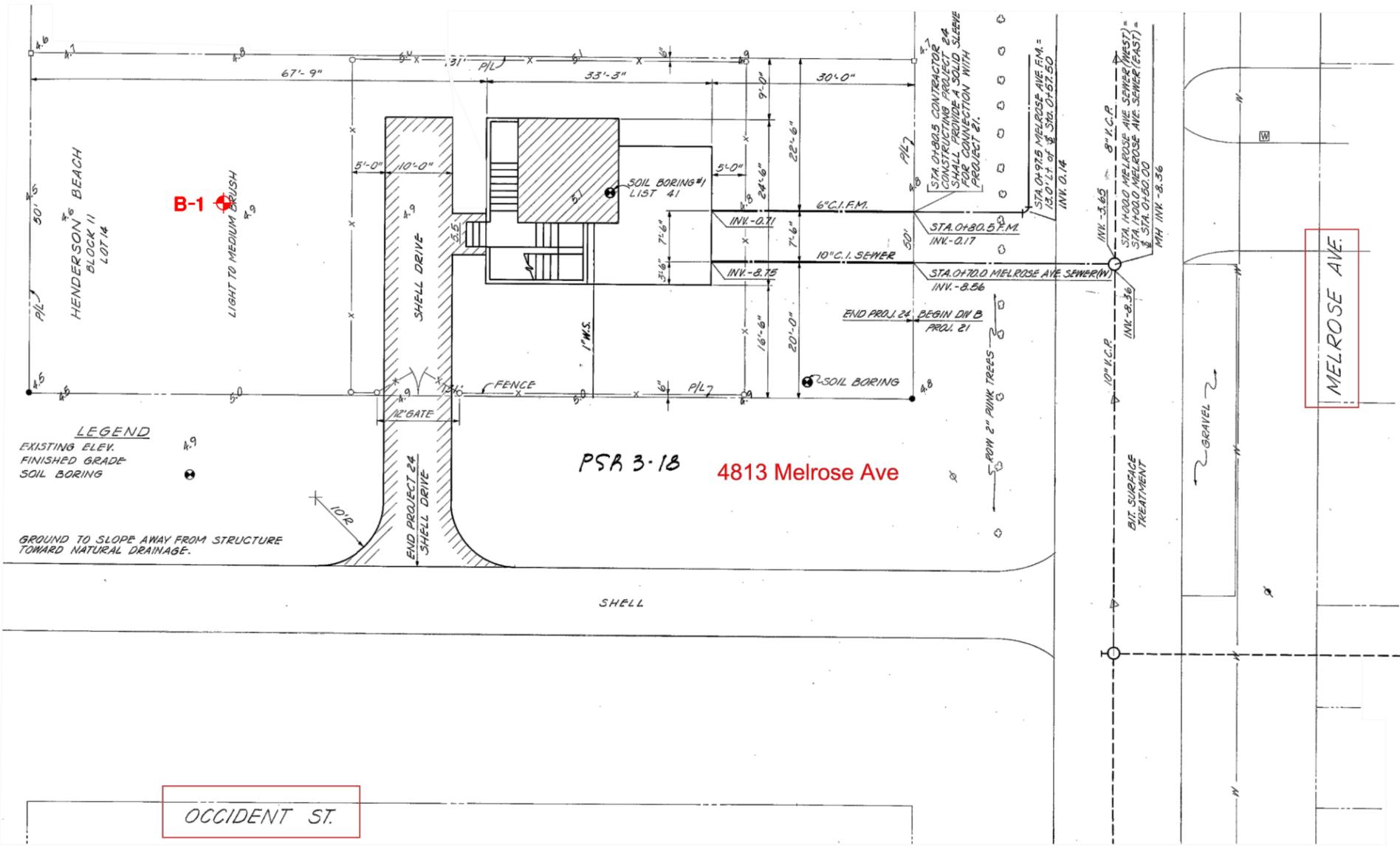
The Geotechnical Engineer warrants that the findings contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

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

Florida is underlain by a soluble limestone formation, which can dissolve and result in surface subsidence and the formation of sinkholes. A more comprehensive assessment of the recycle center site for the potential for sinkhole development typically includes Ground Penetrating Radar (GPR) studies and the extension of deeper soil borings into the underlying limestone formation. Such an assessment is beyond the scope of this proposed study, but can be performed at significant additional cost, if desired.

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 the City of Tampa Wastewater Department and their consultants, for the specific application to the proposed Pump Station at the NEC of Melrose Avenue and Occident Street in Tampa, Florida.

APPENDIX



LEGEND
 EXISTING ELEV. \square
 FINISHED GRADE \square
 SOIL BORING \bullet

GROUND TO SLOPE AWAY FROM STRUCTURE TOWARD NATURAL DRAINAGE.

NOTE: Based upon site plan provided to PSI by City of Tampa

BORING LOCATION PLAN

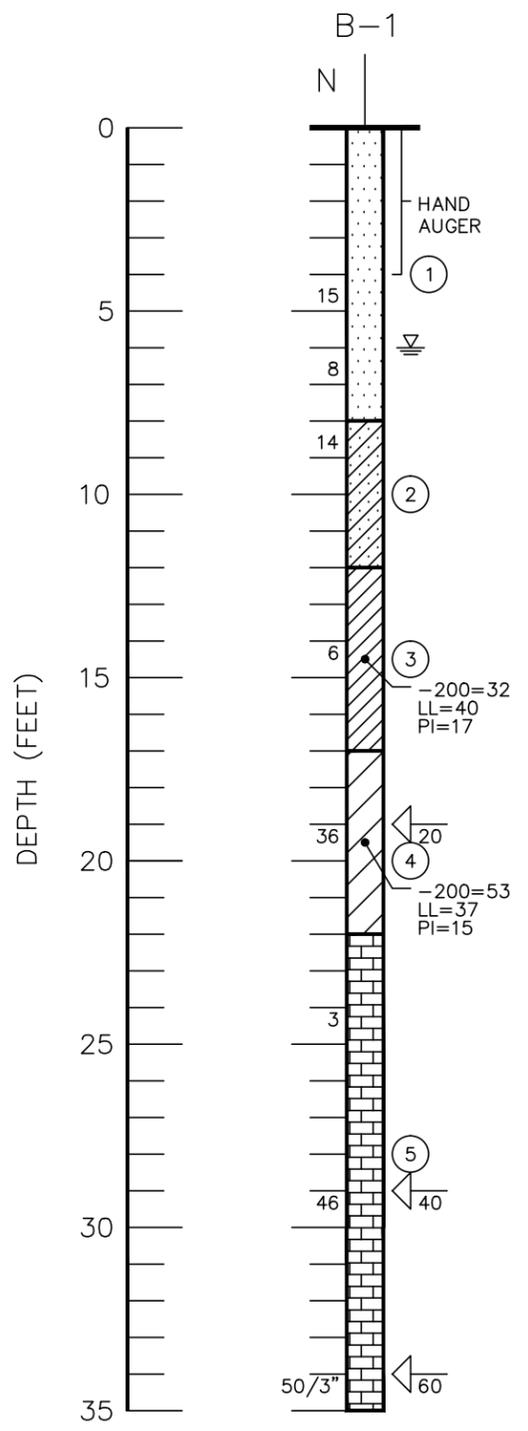


LEGEND

- ① Gray/brown SAND to slightly silty fine SAND (SP/SP-SM)
- ② Light brown clayey SAND (SC)
- ③ Light brown/green CLAY (CL)
- ④ White calcareous CLAY (CL)
- ⑤ Tan/white clayey LIMESTONE

- Unified Soil Classification System (ASTM D 2487) group symbol as determined by visual review
- ∇ Groundwater level, April 2015
- N SPT N-value in blows/foot
- 50/6" Fifty blows for six inches

- \leftarrow Loss of circulation (%)
- 200 Fines passing No. 200 sieve (%)
- LL Liquid Limit (%)
- PI Plasticity Index (%)
- \star Approximate SPT boring location



SOIL PROFILE



DRAWN	DJG
CHECKED	MEM
APPROVED	MEM
SCALE	NOTED

GEOTECHNICAL SERVICES
CITY OF TAMPA
 TAMPA, FLORIDA

PSI Information
 To Build On
 Engineering • Consulting • Testing

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