REPORT OF PRELIMINARY GEOTECHNICAL EXPLORATION

PROPOSED TWENTY-FOUR-STORY
NORTH BAY VILLAGE COMPLEX
1335 79TH STREET CAUSEWAY
NORTH BAY VILLAGE, FLORIDA

FOR

STANTEC CONSULTING SERVICES
C/O NORTH BAY VILLAGE
PUBLIC WORKS DEPARTMENT
1666 KENNEDY CAUSEWAY, SUITE 300
NORTH BAY VILLAGE, FLORIDA 33141

PREPARED BY

NUTTING ENGINEERS OF FLORIDA, INC.
2051 NW 112TH AVENUE, SUITE 126
MIAMI, FLORIDA 33172

ORDER NO. 1661.68

OCTOBER 2021

Nutting Engineers
of Florida Inc. | Established 1967
Your Project is Our Commitment

Geotechnical & Construction Materials
Engineering, Testing, & Inspection
Environmental Services

Offices throughout the state of Florida

www.nuttingengineers.com info@nuttingengineers.com

October 13, 2021

Stantec Consulting Services
c/o North Bay Village, Public Works Department
Attn: Mr. Delroy Peters
1666 Kennedy Causeway/ Ste. 300
North Bay Village, FL 33141
Phone: 305.756.7171 Email: dpeters@nbvillage.com

Re: Report of Preliminary Geotechnical Exploration
North Bay Village Complex
1335 79th Street Causeway
North Bay Village, FL

NUTTING ENGINEERS OF FLORIDA, INC. has performed a Preliminary Geotechnical Exploration at the above referenced project in accordance with our proposal dated September 27, 2021, and corresponding written authorization to proceed provided by North Bay Village. Included in the report are our preliminary observations, results of our exploration, analysis, and preliminary recommendations for the proposed development.

The purpose of this exploration was to preliminarily evaluate the subsurface soil and groundwater conditions in order to determine the most appropriate foundation system for the proposed construction and provide preliminary design level information to the design Engineers and Architects to formulate design criteria.

We note that this report has been prepared for preliminary planning. This report is not to be utilized for construction or permitting, unless written authorization is provided by Nutting Engineers of Florida, Inc. A supplemental report must be prepared by our office in order to provide construction recommendations for development.

Thank you for providing us the opportunity to be a part of your team for this project. If you have any questions or require further assistance, please contact us at your convenience.

Respectfully submitted,
NUTTING ENGINEERS OF FLORIDA, INC.

Richard Wohlfarth

Richard Wohlfarth, P.E.
Director of Engineering

1310 Neptune Drive • Boynton Beach, Florida 33426 • (561) 736-4900 • Fax (561) 737-9975
Broward (954) 941-8700 • Port St. Lucie (772) 408-1050 • Miami Dade (305) 624-0060

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INTRODUCTION

Project Authorization

NUTTING ENGINEERS OF FLORIDA, INC. has conducted a preliminary geotechnical exploration per your authorization for the proposed North Bay Village Complex in Miami-Dade County, Florida. Our work was completed in general accordance with our proposal dated September 27, 2021 and corresponding written authorization to proceed provided by North Bay Village.

Purpose and Scope

The purpose of this preliminary exploration was to obtain information concerning the subsurface conditions within the potential footprint of the tower in order to determine the most appropriate foundation system for the proposed construction. The site preparation and foundation design recommendations for support of the proposed construction and provide preliminary design level information to the design Engineers and Architects to formulate preliminary design criteria. The scope of services included performing field reconnaissance, review of available subsurface test data, such as the soil survey of Palm Beach County and prior test boring reports performed within the vicinity of the site, conducting field geotechnical explorations, and providing a preliminary engineering report.

We note that this report has been prepared for preliminary planning. This report is not to be utilized for construction or permitting, unless written authorization is provided by Nutting Engineers of Florida, Inc. A supplemental report must be prepared by our office in order to provide construction recommendations for development. In order to provide a supplemental report our office must be provided actual building location information (construction plans) along with the planned structural loads for the new structure.

Project Information

Based on review of the Nova Surveyor's Boundary Survey and discussions with you, plans include the construction of a new 24-story municipal complex to include a fire station on the first level with multi-level parking and municipal office space above to a maximum height of about 240 feet. The footprint and other information is not available at this time as the project is in the early preliminary stages.

Surrounding the building, associated asphalt paved parking lots, driveways, sidewalks, landscaped islands, and other ancillary type structures will be constructed. We understand that there are no below grade floor slabs proposed for this structure.

At the time of this report structural information was not provided to our office. Based on this, utilizing similar project information, our office has estimated approximate structural loads for the building. We note that the loading conditions estimated herein are estimates only and may differ from actual loads. A structural engineer will need to be retained to determine actual loading conditions for the planned construction. Our recommendations provided in this report

are based on our estimates; therefore, they may need to be altered if structural conditions are different from our estimates. Maximum column loads are estimated to be on the order of 2,500 to 3,000 kips. We note that shear and uplift loads on the foundation would need to be determined by the project structural engineer.

Based on surrounding structures it is estimated that final grades will be approximately one to two feet above existing site elevations. We note that final building pad elevations shall be determined by a professional architect, civil engineer, or other qualified party.

SITE DESCRIPTION

Site Location

The site is located in North Bay Village, Miami-Dade County, Florida. The site is bounded by Larry Paskow Way (West Drive) and a multi-story residential building to the north, East Drive to the east, John F. Kennedy Causeway (NE 79th Street) to the south, and a multi-story residential building to the west.

Site Characteristics and Current Conditions

Currently, the site is vacant covered by maintained grass in the previous building area and asphalt pavement to the west. Current ground surface elevations range from about +5 to +7 NGVD based on the Boundary Survey provided to us. Proposed finish floor elevations of the new construction were not known at the time of this report.

A previous multi-story building was demolished and removed from the subject site in approximately 2018. The footprint of the building was about 10,000 square feet. Total property area appears to be approximately one acre based on a Google Earth view.

LIMITED SUBSURFACE EXPLORATION

Field Exploration

The limited exploration of subsurface conditions included the performance of Standard Penetration Test (SPT) borings, and review of the Miami-Dade County Soil Survey Map. Nutting Engineers of Florida, Inc. has performed a total of two Standard Penetration Test (SPT) borings (ASTM D-1586). The test borings were performed to depths of one-hundred feet in areas that were currently accessible with truck mounted drilling equipment. Standard Penetration Tests were performed continuously for 10 feet at each boring with successive sampling at 5-foot intervals thereafter. The number of successive blows (2nd and 3rd blow count) required to drive the sampler into the soil constitutes the test result commonly referred to as the "N" value. The "N" value has been empirically correlated with various soil properties and is considered to be indicative of the relative density of cohesionless soils and the consistency of cohesive soils.

Representative samples collected from the SPT borings were visually reviewed in the laboratory by a geotechnical engineer to confirm the field classifications. The samples were then classified in general accordance with industry standards. We note that the locations of the test borings are estimated using available onsite surface controls and should be considered approximate and their actual locations would need to be verified by a licensed surveyor.

GENERAL SUBSURFACE CONDITIONS

Soil Survey Map Review

As part of the geotechnical exploration, we have reviewed available Natural Resources Conservation Service (NRCS) online soil survey map for Miami-Dade County. The USDA online NRCS mapping provides qualitative information about potential general shallow soil conditions in the project vicinity. This information was derived from approximately 6 ft. deep manual auger borings, aerial photo and surface feature interpretation at some point in the past. The NRCS data may or may not reflect actual current site conditions. A review of the Soil Survey for Miami-Dade County revealed that at the time the survey was conducted, the soils at the site were described as Urban land. This map unit is in areas where shopping centers, parking lots, streets, sidewalks, airports, large buildings, houses, and other structures cover more than 85 percent of the surface. The natural soil cannot be observed. The soils in open areas, mostly lawns, vacant lots, playgrounds, and parks are mainly Udorthents. We note that the maximum depth of the survey is approximately 6 feet.

Test Boring Results

The test borings typically recorded loose to medium dense light brown to brown sand and limestone fragments from the ground surface to a depth of about thirteen feet. Very loose to loose light gray silty sand and limestone was then encountered to a depth of approximately eighteen feet. Below eighteen feet, loose to dense sand and soft to very hard limestone with sand lenses was encountered to a depth of one-hundred feet, the maximum depth explored. Please see the enclosed soil classification sheet in the Appendix of this report for additional important information regarding these descriptions, the field evaluation and other related information.

Rock Formation Note

It is possible that the weathered limestone encountered may extend to greater or lesser depths and be present in areas other than recorded in the test borings. Generally, rock in the South Florida area may include limestone or sandstone which have irregularities and discontinuities including vertical and horizontal solution features, varying surface and bottom elevations, and varying degrees of hardness. The rock features may also contain intervening sand and other material filled lenses. The standard penetration test boring executed in this evaluation was performed in accordance with the normal standard of care in this area. This process may sometimes fail to detect the presence of rock strata by passing through solution features. Solution features can be very common in rock strata in Southeast Florida. Also given the brittle

nature of some rock strata, rocks may readily shatter when hit by the split spoon. Despite this, these strata which may not be depicted in the soil boring logs may present significant resistance to excavation and pile installation.

Groundwater Conditions

The immediate groundwater level was measured at the boring locations at the time of drilling. The groundwater level was encountered at an approximate depth of about five feet below the existing ground surface.

The immediate depth to groundwater measurements presented in this report may not provide a reliable indication of stabilized or a more long term depth to groundwater at this site. Water table elevations can vary dramatically with time through rainfall, droughts, storm events, flood control activities, nearby surface water bodies, tidal activity, pumping and many other factors. For these reasons, this immediate depth to water data should not be relied upon alone for project design considerations.

PRELIMINARY ANALYSIS AND RECOMMENDATIONS

The recommendations reported herein are based very limited project information at this time. Once additional design and structural loading information becomes available along with discussions with all interested parties in order to determine the best alternative for support, additional comprehensive geotechnical exploration, and/or analysis may be required. Foundation recommendations may change depending upon final design information provided and the results of the additional field-testing and/or analysis.

Proposed 24-Story Building

Based on the test borings performed, if the proposed structures were constructed over the existing soil profile utilizing a conventional shallow foundation, this would result in excessive settlements. Because of this, alternative foundation methods would need to be employed for the structures.

Preliminary foundation alternatives discussed herein are based on the results of the limited geotechnical exploration, the proposed construction and the available project information. We have considered the following foundation alternatives:

1. Deep Foundations
    - Drilled Shafts
    - Augercast Piles

The actual alternative used for the project will depend upon structural feasibility, costs, and possibly other factors that are not presently known to Nutting Engineers. It is necessary that all interested parties partake in foundation meetings to better understand these alternatives as well as being aware of the varying pros and cons for each.

Deep Foundations Discussions

A wide variety of deep foundation systems have been used to support tall buildings in Southeast Florida. Augercast piles are currently the most common pile type in the South Florida area. Drilled shafts have also been used in South Florida; however, they are not common for structures of this type. The following paragraphs discuss each of these alternatives briefly.

Drilled Shafts

Due to the anticipated high tower column loads, drilled shafts can be considered as a potential high capacity deep foundation support alternative. A drilled shaft is a large diameter foundation (typically three feet or greater), which is constructed by placing fresh concrete in a drilled hole. The drilled shaft is most commonly constructed by employing rotary drilling equipment to drill a cylindrical hole.

The hole may remain open in soils with cohesion or rock, or may be kept open by using drilling slurry and/or temporary casings. A rebar cage is then placed and the excavation is filled with fresh concrete. Drilled shafts have the advantage that they can be designed as a single unit without a pile cap to support highly loaded columns. Disadvantages to drilled shaft foundations include construction procedures that are critical to the quality of the drilled shaft and careful inspection is required. Drilling of the large diameter shafts can be difficult due to pockets of loose sands and porous zones resulting in significant loss of slurry and concrete. Also, the time required to install drilled shafts is typically much greater than augercast piles.

Augercast Piles

Due to its high load carrying capacity, high installation rate, low noise and vibration level, and economic cost, the augercast pile has in recent years dominated the pile foundations selected for high-rise buildings in Southeast Florida.

Augercast piles are cylindrical drilled-in-place piles, generally 14 to 30 inches in diameter and are constructed of a cementious grout. Reinforcement is placed in the core of the pile. The pile is constructed with a special hollow-stem auger. The auger is advanced to the design depth and high strength grout is pumped through the auger while the auger is being extracted from the soil. After the auger is fully extracted, a reinforcing cage is inserted to complete the pile. The augercast pile has the advantage of filling voids in the adjacent soil/rock with grout, providing mechanical interlock with the surrounding foundation material developing higher compressive and uplift capacities than a prestressed concrete pile. Some disadvantages associated with augercast piles are that these piles are susceptible to problems such as necking (small cross section at some locations along its length), and grout contamination by soil or bore hole collapse. These problems can be avoided by maintaining positive pressure and providing a full-length reinforcing bar with centralizers to provide some assurance that the piles have been constructed with a continuous cross section and need to be closely monitored by experienced inspection personnel.

Of the two deep foundation systems discussed above, it is our opinion that the cost, comparative ease/difficulty of construction and technical feasibility will favor the use of the augercast-in-place piles as the appropriate choice of deep foundation for the proposed structures. Presented below are our foundation design recommendations for support of the tower.

Preliminary Augercast Pile Deep Foundation Design

Augercast piles are a technically feasible foundation system will provide the lowest vibration concerns with regards to surrounding buildings. The bearing and tensile capacity of the piles is essentially developed in skin friction, with some limited end-bearing conditions being achieved. The allowable skin friction on the perimeter of the pile should be considered from below the bottom of the pile cap to the tip of the pile. The skin friction value acting on the augercast pile was evaluated using published data, strength parameters determined from our past experience with similar structures and other local projects.

The medium hard to hard limestone formation found in the subsurface profile at approximately fifty to one hundred feet below grade at the building location should provide adequate bearing for the planned construction. Relatively high individual pile capacities on the order of 250 tons could be attained in this stratum with 18-inch diameter augercast pile with pile tips at a depth of about 75 to 80 feet below the existing ground surface.

We recommend that piles be spaced at a minimum of three pile diameters. During piling installation, the possibilities for pile deviations are possible. Based on the soil conditions and our knowledge of piling operations/performance in South Florida, piles that deviate as much as four inches from the intended pile location can still provide the maximum pile load that was designed for the pile.

Piles that deviate further than this need to be reviewed by our office and the project structural engineer on a case by case basis to determine the reduction potential, if any. During installation of the piles, a minimum spacing of six pile diameters is required to cast a pile within a period of 12 hours. Therefore, if an 18-inch pile is cast, then the next closest pile that can be cast under 12 hours must be at least nine feet away from the recently cast pile.

We also note that pile loading capacities may be temporarily increased to allow for sudden wind loading conditions up to 25 percent greater than the design pile capacity. It is recommended that during load testing of the pile, performance of a pile overload may provide additional temporary loading capabilities for structural design purposes.

Pile Length Note: It is our experience that the piles will be installed at grades of at least +5 NAVD (five feet above average water table elevation). This is due to the fact that attempting to dewater while performing pile installation can potentially degrade the grout being placed, while grout fines may clog the dewatering pipes. Because of this the depth recommendations presented below assume that the area will be fully dry to allow for pile installation at a minimum elevation of +5 NAVD. If this is not feasible and site elevations are higher, then it

is the responsibility of the piling contractor to include the additional depth of steel and drilling required to meet the minimum tip depths.

The following table presents the results of our pile capacity analysis. Also included in the table are the minimum grout strengths required by the Florida Building Code, (FBC).

PILE CAPACITY TABLE*

Pile Diameter (inches)	*Depth Below Existing Grade (ft)*	*All. Compr. Capacity (tons)*	*All. Tension Capacity (tons)*	*Minimum Grout Strength (psi)(0.3 f '$_c$)*
18	*75 to 80*	*250*	*125*	*7,000*

*Additional Pile analysis and alternative pile analysis can be provided once full project information becomes available and will be included as part of the supplemental report.

The actual tip elevation may vary (possibly shallower or deeper) depending on the drilling conditions encountered during installation of these piles. Note that some very hard drilling was encountered in the test borings starting at about 50 feet. Minimum reinforcement for the piles should consist of at least one full length #7 reinforcing steel bar utilizing centralizers in each augercast pile. Additional pile reinforcement must be designed by the Structural Engineer to resist all anticipated axial, uplift, bending, and shear stresses.

Lateral Pile Analysis Discussion

When a structural engineer has been retained, and lateral pile information is needed, then a lateral pile analysis can be performed by our office. Once our office has received the project specific structural information, we can determine the lateral pile capacities based on a fixed or free head condition along with allowable deflection, the point of fixity, and provide necessary graphs of shear force and moments of the pile, as well as determine spring constants if needed for the project. We note that direct discussion with our office and the project structural engineer will be needed in order to perform these operations.

Settlement Evaluation

We estimate that the structure will settle on the order of one inch for pile loads on the order 250 tons or less. Differential settlements should be approximately one-half of the total settlement. Tension uplifts are anticipated to be on the order of approximately one inch for the design tension capacity of 125 tons.

We anticipate that the majority of the settlements will occur during construction activities. The rate of settlements is expected to occur gradually and uniformly as successive floors are added to the structure. We predict that as the tower height reaches the final level stories, the rate of settlement will decrease and the foundation settlement will continue to gradually stabilize as the building tops out.

Test Pile Program

The Florida Building Code (FBC) requires that any piles designed for greater than 40 tons should be load tested in order to verify the pile capacity. Therefore, a full-scale pile load test will be required for this project as described in the FBC. The code also states that the maximum load on the pile shall not exceed 0.3 percent of the 28-day strength of the grout multiplied by the pile area.

The pile load test should be performed in accordance with the Florida Building Code in conjunction with ASTM D-1143. In order to verify the design tensile strength of the pile, a pull test should be performed in accordance with ASTM D-3689. The load tests should be inspected and monitored, and the load test results should be evaluated by a representative of this office.

Test Pile Installation

A set of technical specifications for test pile installation and load tests and for the production pile installation will be required. These specifications should be prepared by our firm to assure proper representation of our recommendations in the construction documents.

At least one compression test pile and one tension test pile should be installed per the structural engineers piling capacity specifications. Based on the drilling conditions observed in the field, the test pile will be installed in areas specified by the geotechnical engineer. The compression pile should be load tested in compression to at least twice the design-bearing load.

The tension pile should be load tested in tension to at least twice the design uplift load. Strain gauges should be installed at different depths of the compression test pile to measure the test load distribution along the pile. This may allow for shorter piles; therefore, cost savings.

Once the pile load tests are completed, final pile installation criteria will be provided. It is important that the installation of the piles for the load test program and production piles be installed under the full-time observation of the Nutting project geotechnical engineer. Field observations and prompt engineering decisions must be made to determine the required embedment of the rock socket and pile tip elevation should soft rock be encountered.

CLOSING

This concludes our limited scope of services at this time regarding the proposed construction. When actual building construction plans become more formalized and a design team has been properly assembled, our office must be notified in order to provide detailed analysis based on the new information.

GENERAL

Our client for this geotechnical evaluation was:

Stantec Consulting Services
c/o North Bay Village, Public Works Department
Attn: Mr. Delroy Peters
1666 Kennedy Causeway/ Ste. 300
North Bay Village, FL 33141

The contents of this report are for the exclusive use of the client, the client's design & construction team and governmental authorities for this specific project exclusively. Information conveyed in this report shall not be used or relied upon by other parties or for other projects without the expressed written consent of Nutting Engineers of Florida, Inc. This report discusses geotechnical considerations for this site based upon observed conditions and our understanding of proposed construction for foundation support. Environmental issues including (but not limited to), soil and/or groundwater contamination are beyond our scope of service for this project. As such, this report should not be used or relied upon for evaluation of environmental issues.

Nutting Engineers of Florida, Inc. (NE), recommends that we be contracted to provide input to the design team and owner during the foundation and earthwork design process. If NE is not engaged to perform these services as detailed herein, the Client agrees that NE shall bear no liability for the interpretation, implementation of our report, its recommendations and/or inspection and testing services as described in this report if implemented by others.

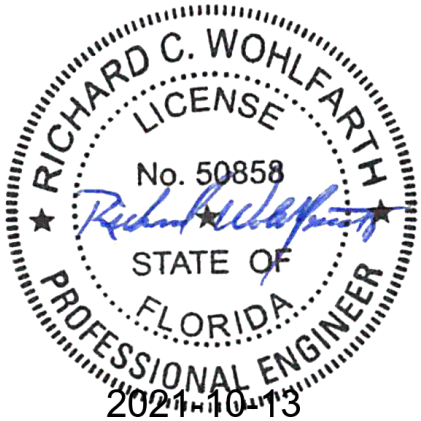
The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in accordance with general accepted professional practice in the field of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

We appreciate the opportunity to provide these services for you. If we can be of any further assistance, or if you need additional information, please feel free to contact us.

Respectfully submitted,
NUTTING ENGINEERS OF FLORIDA, INC.

This item has been digitally signed and sealed by Richard C. Wohlfarth on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



2021-10-13

Richard C. Wohlfarth, P.E. #50858
Director of Engineering

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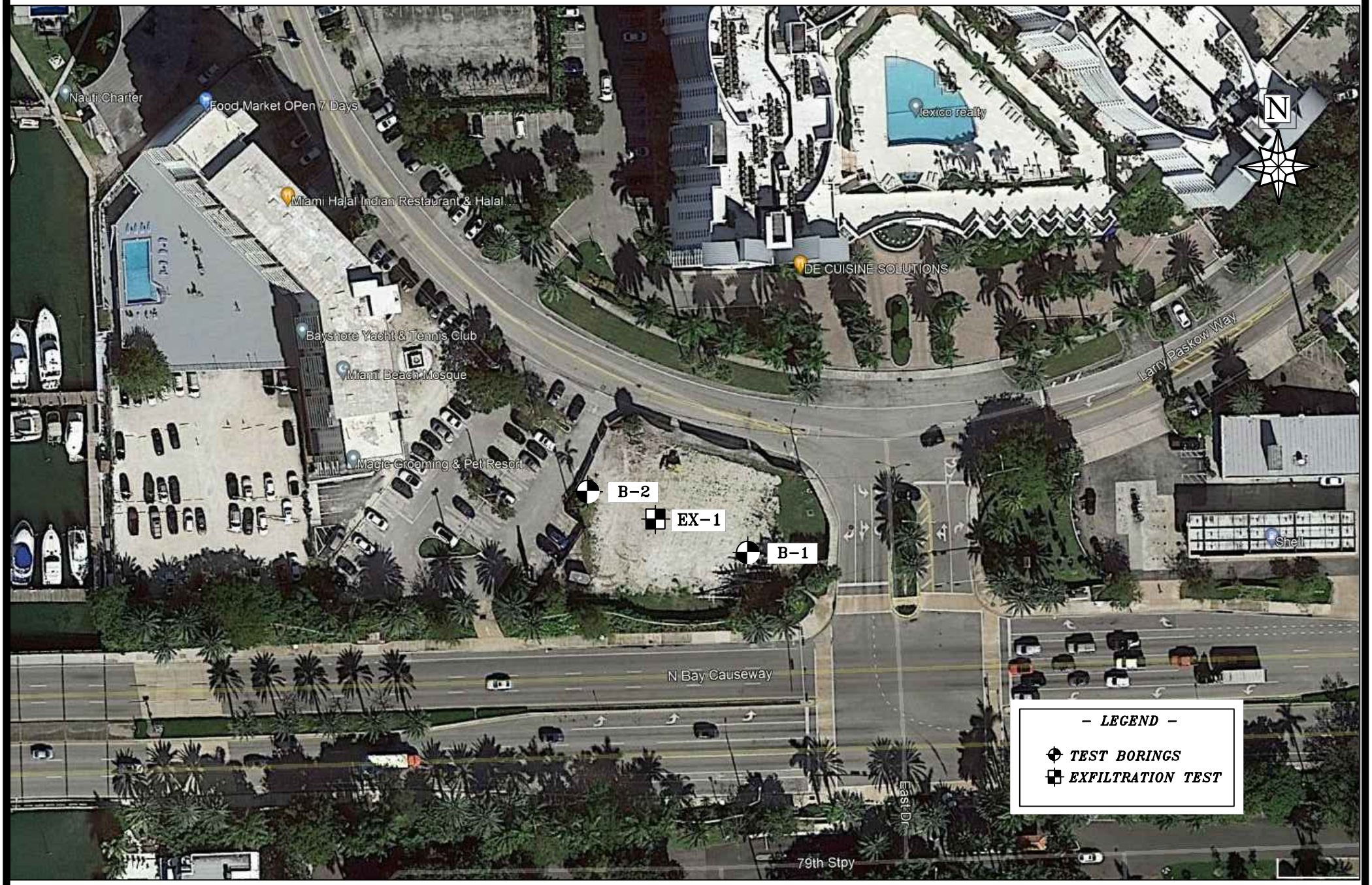
APPENDICES

FIGURES

Boring Location Plan



NUTTING ENGINEERS OF FLORIDA, INC. ESTABLISHED 1967	NORTH BAY VILLAGE COMPLEX 1335 79TH STREET CAUSEWAY, NORTH BAY VILLAGE, FLORIDA	APPROXIMATE TEST LOCATIONS	NOT TO SCALE	FIGURE 1

TEST BORING RECORDS

EXFILTRATION TEST RESULTS

Nutting Engineers of Florida

BORING NUMBER B-1

PROJECT NUMBER 1661.68

CLIENT Stantec **PROJECT NAME** North Bay Village Complex

PROJECT LOCATION 1335 79th Street Causeway, North Bay Village, FL

DATE STARTED 10/9/21 COMPLETED 10/9/21 SURFACE ELEVATION REFERENCE Same as road crown

DRILLING METHOD Standard Penetration Boring GROUND WATER LEVELS:

LOGGED BY JR Precision CHECKED BY C. Hernandez ▽ AT TIME OF DRILLING 5.1 ft

APPROXIMATE LOCATION OF BORING **As located on site plan**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value
0		Brown fine SAND and LIMESTONE FRAGMENTS	SS 1	4-3-5-5	8
			SS 2	5-6-6-7	12
		▽ Lt. brown fine SAND and LIMESTONE	SS 3	5-6-7-10	13
			SS 4	9-7-6-8	13
10			SS 5	8-10-12-13	22
		Lt. gray SILTY SAND and LIMESTONE	SS 6	1-2-2-4	4
20		Lt. gray fine SAND and LIMESTONE	SS 7	3-6-6-7	12
			SS 8	6-7-8-10	15
30			SS 9	7-9-6-7	15
			SS 10	7-9-6-10	15
40			SS 11	7-8-10-7	18
			SS 12	4-4-3-2	7
50			SS 13	4-4-5-50/1"	100+ >>
			SS 14	50/4"	100+ >>
60			SS 15	10-50/1"	100+ >>

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

(Continued Next Page)

Nutting Engineers of Florida

BORING NUMBER B-1

PROJECT NUMBER 1661.68

CLIENT Stantec **PROJECT NAME** North Bay Village Complex

PROJECT LOCATION 1335 79th Street Causeway, North Bay Village, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
60		Lt. gray fine SAND and LIMESTONE *(continued)*				
			SS 16	7-50/3"	100+	>>
			SS 17	50/2"	100+	>>
70						
			SS 18	18-24-50/1"	**100+**	>>
			SS 19	12-50/2"	100+	>>
80						
			SS 20	17-24-50/2"	**100+**	>>
			SS 21	50/2"	100+	>>
90						
			SS 22	17-14-23-30	**37**	▲
			SS 23	18-22-50/4"	**100+**	>>
100		Bottom of hole at 100.0 feet.				

TEST NUTTING BOREHOLE 2-1661.68 STANTEC - NORTH BAY VILLAGE COMPLEX.GPJ GINT US.GDT 10/12/21

Nutting Engineers of Florida

BORING NUMBER B-2

PROJECT NUMBER 1661.68

CLIENT Stantec **PROJECT NAME** North Bay Village Complex

PROJECT LOCATION 1335 79th Street Causeway, North Bay Village, FL

DATE STARTED 10/7/21 COMPLETED 10/7/21 SURFACE ELEVATION REFERENCE Same as road crown

DRILLING METHOD Standard Penetration Boring GROUND WATER LEVELS:

LOGGED BY JR Precision CHECKED BY C. Hernandez ▽ AT TIME OF DRILLING 5.4 ft

APPROXIMATE LOCATION OF BORING **As located on site plan**

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0		Brown fine SAND and LIMESTONE FRAGMENTS	SS 1	8-9-8-7	17	
			SS 2	6-5-6-7	11	
		▽ Lt. brown fine SAND and LIMESTONE	SS 3	7-5-4-4	9	
			SS 4	4-3-3-4	6	
10			SS 5	4-5-5-3	10	
		Gray SILTY SAND and lt. brown LIMESTONE	SS 6	1-1-4-10	5	
20		Lt. gray fine SAND and LIMESTONE	SS 7	10-8-7-7	15	
			SS 8	5-6-6-7	12	
30			SS 9	4-6-7-5	13	
			SS 10	5-6-5-5	11	
40			SS 11	2-3-3-4	6	
			SS 12	5-6-7-9	13	
50			SS 13	50/4"	100+	>>
			SS 14	20-50/2"	100+	>>
60			SS 15	6-10-13-12	23	

(Continued Next Page)

Nutting Engineers of Florida

BORING NUMBER B-2

PROJECT NUMBER 1661.68

CLIENT Stantec **PROJECT NAME** North Bay Village Complex

PROJECT LOCATION 1335 79th Street Causeway, North Bay Village, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
60		Lt. gray fine SAND and LIMESTONE *(continued)*				
			SS 16	12-14-5-10	19	▲
			SS 17	7-8-50/1"	100+	>>▲
70						
			SS 18	4-4-5-6	9	▲
			SS 19	7-12-50/4"	100+	>>▲
80						
			SS 20	12-10-50/1"	100+	>>▲
			SS 21	50/1"	100+	>>▲
90						
			SS 22	14-9-14-13	23	▲
			SS 23	7-8-10-20	18	▲
100		Bottom of hole at 100.0 feet.				

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Offices throughout the state of Florida

www.nuttingengineers.com info@nuttingengineers.com

Report of Exfiltration Test

Client:	Stantec	Order No	1661.68
Project:	North Bay Village Complex	Report No	1
Location:	1335 79th Street Causeway, North Bay Village, FL	Date:	10/9/21

Test: Usual Open Hole Exfiltration Test

Surface Elevation: Approx. same as road crown Water table from ground surface: 5.04'

Casing Diameter: 6"

Tube Depth: 15'

Sample Location: Approx. as located on site plan

Material:
- 0'- 2' Lt. brown fine SAND and LIMESTONE FRAGMENTS
- 2'- 15' Lt. brown fine SAND and LIMESTONE

One Minute Increme	Pump Rate in Gal/Min
1	37
2	37
3	37
4	37
5	37
6	37
7	37
8	37
9	37
10	37

$K = 9.17 \times 10^{-4}$ cfs/ft^{2}ft.head

SOILS CLASSIFICATION CRITERIA

LIMITATIONS OF LIABILITY

LIMITATIONS OF LIABLILITY

WARRANTY

We warranty that the services performed by Nutting Engineers of Florida, Inc. are conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession in our area currently practicing under similar conditions at the time our services were performed. ***No other warranties, expressed or implied, are made***. While the services of Nutting Engineers of Florida, Inc. are a valuable and integral part of the design and construction teams, we do not warrant, guarantee or insure the quality, completeness, or satisfactory performance of designs, construction plans, specifications we have not prepared, nor the ultimate performance of building site materials or assembly/construction.

SUBSURFACE EXPLORATION

Subsurface exploration is normally accomplished by test borings; test pits are sometimes employed. The method of determining the boring location and the surface elevation at the boring is noted in the report. This information is represented in the soil boring logs and/or a drawing. The location and elevation of the borings should be considered accurate only to the degree inherent with the method used and may be approximate.

The soil boring log includes sampling information, description of the materials recovered, approximate depths of boundaries between soil and rock strata as encountered and immediate depth to water data. The log represents conditions recorded specifically at the location where and when the boring was made. Site conditions may vary through time as will subsurface conditions. The boundaries between different soil strata as encountered are indicated at specific depths; however, these depths are in fact approximate and dependent upon the frequency of sampling, nature and consistency of the respective strata. Substantial variation between soil borings may commonly exist in subsurface conditions. Water level readings are made at the time and under conditions stated on the boring logs. Water levels change with time, precipitation, canal level, local well drawdown and other factors. Water level data provided on soil boring logs shall not be relied upon for groundwater based design or construction considerations.

LABORATORY AND FIELD TESTS

Tests are performed in *general* accordance with specific ASTM Standards unless otherwise indicated. All criteria included in a given ASTM Standard are not always required and performed. Each test boring report indicates the measurements and data developed at each specific test location.

ANALYSIS AND RECOMMENDATIONS

The geotechnical report is prepared primarily to aid in the design of site work and structural foundations. Although the information in the report is expected to be sufficient for these purposes, it shall not be utilized to determine the cost of construction nor to stand alone as a construction specification. Contractors shall verify subsurface conditions as may be appropriate prior to undertaking subsurface work.

Report recommendations are based primarily on data from test borings made at the locations shown on the test boring reports. Soil variations commonly exist between boring locations. Such variations may not become evident until construction. Test pits sometimes provide valuable supplemental information that derived from soil borings. If variations are then noted, the geotechnical engineer shall be contacted in writing immediately so that field conditions can be examined and recommendations revised if necessary.

The geotechnical report states our understanding as to the location, dimensions and structural features proposed for the site. ***Any significant changes of the site improvements or site conditions must be communicated in writing to the geotechnical engineer immediately*** so that the geotechnical analysis, conclusions, and recommendations can be reviewed and appropriately adjusted as necessary.

CONSTRUCTION OBSERVATION

Construction observation and testing is an important element of geotechnical services. The geotechnical engineer's field representative (G.E.F.R.) is the "owner's representative" observing the work of the contractor, performing tests and reporting data from such tests and observations. ***The geotechnical engineer's field representative does not direct the contractor's construction means, methods, operations or personnel.*** The G.E.F.R. does not interfere with the relationship between the owner and the contractor and, except as an observer, does not become a substitute owner on site. The G.E.F.R. is responsible for his/her safety, but has no responsibility for the safety of other personnel at the site. The G.E.F.R. is an important member of a team whose responsibility is to observe and test the work being done and report to the owner whether that work is being carried out in general conformance with the plans and specifications. The enclosed report may be relied upon solely by the named client.

SOIL AND ROCK CLASSIFICATION CRITERIA

SAND/SILT

N-VALUE (bpf)	RELATIVE DENSITY
0 – 4	Very Loose
5 – 10	Loose
11 – 29	Medium
30 – 49	Dense
>50	Very dense
100	Refusal

CLAY/SILTY CLAY

N-VALUE (bpf)	UNCONFINED COMP. STRENGTH (tsf)	CONSISTENCY
<2	<0.25	v. Soft
2 – 4	0.25 – 0.50	Soft
5 – 8	0.50 – 1.00	Medium
9 – 15	1.00 – 2.00	Stiff
16 – 30	2.00 – 4.00	v. Stiff
>30	>4.00	Hard

ROCK

N-VALUE (bpf)	RELATIVE HARDNESS	ROCK CHARACTERISTICS
N≥ 100	Hard to v. hard	Local rock formations vary in hardness from soft to very hard within short vertical and horizontal distances and often contain vertical solution holes of 3 to 36 inch diameter to varying depths and horizontal solution features. Rock may be brittle to split spoon impact, but more resistant to excavation.
25≤ N ≤ 100	Medium hard to hard	
5≤ N ≤ 25	Soft to medium hard	

PARTICLE SIZE

Boulder	>12 in.
Cobble	3 to 12 in.
Gravel	4.76 mm to 3 in.
Sand	0.074 mm to 4.76 mm
Silt	0.005 mm to 0.074 mm
Clay	<0.005 mm

DESCRIPTION MODIFIERS

0 – 5%	Slight trace
6 – 10%	Trace
11 – 20%	Little
21 – 35%	Some
>35%	And

Major Divisions			Group Symbols	Typical names	Laboratory classification criteria
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gavels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than five percent……GW, GP, SW, SP More than 12 percent……GM, GC, SM, SC 5 to 12 percent……*Borderline* cases requiring dual systems**
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	
		Gravels with fines (Appreciable amount of fines)	GW* d	Silty gravels, gravel-sand-silt mixtures	
			u		
			GC	Clayey gravels, gravel-sand-clay mixtures	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
			SP	Poorly graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM* d	Silty sands, sand-silt mixtures	
			u		
			SC	Clayey sands, sand-clay mixtures	
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve size)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy, clays, silty clays, lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	Inorganic clays or high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly organic soils		PT	Peat and other highly organic soils	

$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_z = \frac{(D_{30})^2}{D_{10} x D_{60}}$ *between* 1 and 3

Not meeting all gradation requirements for GW

Atterberg limits below "A" line or P.I. less than 4

Atterberg limits above "A" line with P.I. greater than 7

Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols.

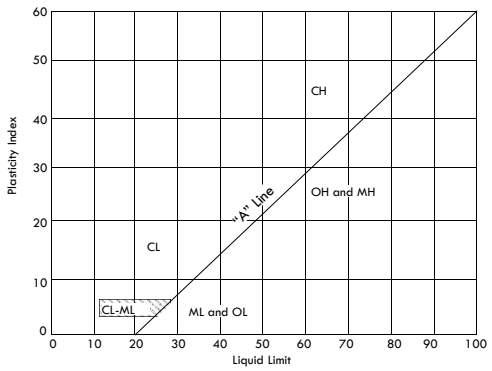
$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_z = \frac{(D_{30})^2}{D_{10} x D_{60}}$ *between* 1 and 3

Not meeting all gradation requirements for SW

Atterberg limits below "A" line or P.I. less than 4

Atterberg limits above "A" line with P.I. more than 7

Limits plotting in hatched zone with P.I. between 4 and 7 are *borderline* cases requiring use of dual system.



Plasticity Chart

Nutting Engineers of Florida Inc. | Established 1967
Your Project is Our Commitment