ASSESSMENT OF CLOSURE-BORROW-SITE SOILS
LAKE COUNTY LANDFILL
LAKE COUNTY, FLORIDA
AEA PROJECT No. 202202

Antillian Engineering Associates, Inc.
3309 Bartlett Boulevard
Orlando, Florida 32811
(407) 422-1441

April 18, 2022

S2L, Inc.
531 Versailles Drive, Suite 202
Maitland, Florida 32751

Attention: Bob Mackey, P.E.

Reference: Closure-Borrow-Site Soils Assessment
Lake County Landfill
Lake County, Florida
AEA Project No. 202202

Mr. Mackey:

Antillian Engineering Associates, Inc. has completed a geotechnical assessment of soils from the planned closure-borrow site at the Lake County Landfill in Tavares, Florida. We did the work in general accordance with the scope of services in our proposal dated March 2, 2022.

This report presents the results of our study, and a cursory assessment of the soils we encountered, as it relates to the use of those soils a borrow for the planned landfill closure.

It has been our pleasure to serve S2Li and the Lake County Solid Waste Management District on this project. Please contact our office if you have questions or if you need additional information.

Respectfully submitted,
ANTILLIAN ENGINEERING ASSOCIATES, INC.
Certificate of Authorization 6685

PETER G. SUAH
No 46910
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY
Peter Suah
2022.04.20 18:39:10 -04'00'
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

Peter G. Suah, P.E.
Florida P.E. No. 46910
Principal Engineer/President

Attachments:
Figures
Appendix A: Field Explorations and Laboratory Testing Results
Appendix B: Important Information About This Geotechnical Engineering Report Constraints and Restrictions

202202
Landfill Closure Soil Borrow Site
Lake County Landfill
April 18, 2022

PROJECT DESCRIPTION

The Lake County Solid Waste Management District ("LCSWMD") plans to close a landfill at their central disposal facility in Tavares, Florida. LCSWMD staff assigned the closure design to S2L, Inc. ("S2Li"). S2Li staff requested this limited geotechnical study to assess the general suitability of near-surface soils on a neighboring property for use as landfill-closure soil. The approximate location of this planned "borrow-site" is shown on Figure 1.

AVAILABLE INFORMATION

For general information about the project vicinity, we reviewed United States Geological Survey ("USGS") quadrangle-topographic maps and the United States Department of Agriculture Soil Conservation Service ("SCS") Soil Survey of Lake County. For project-specific information, we reviewed a preliminary exhibit of the planned borrow-site that S2Li staff had provided when they requested this study. We also reviewed historical Google Earth™ aerial imagery.

The USGS topographic map showed the general area where the Lake County Landfill is presently situated as low hills and knolls with irregularly-shaped, low-lying areas between them. Land use was shown as undeveloped or agricultural. We were able to identify State Road 19, County Road 448, County Road 561, and the planned borrow-site on the map, but the landfill was not shown. The shoreline of Lake Harris was mapped about 2,000 feet to the northwest of the present location of the landfill ("the landfill"), and it was fringed with broad areas of marsh and wetlands. Ground surface elevations on the maps ranged from below Elevation 65 feet NGVD (El. 65) along the shoreline of Lake Harris to El. 156 near the top of a knoll about 4,000 feet southwest of the landfill. A localized, low area was shown within the area of the planned borrow site. The bottom of that area was mapped below the El. 75 contour. The water surface on Lake Harris was mapped at El. 63. Portions of the USGS maps we reviewed are reproduced in this report as Figure 1.

The aerial-photo sheet in the SCS Soil Survey that covered the project area showed many of the surface features we had seen on the USGS map, including the nearby roads and Lake Harris. The predominant soil unit mapped in this area was Astatula sand. This soil unit was described in the SCS Soil Survey as "sloping and excessively drained," and the seasonal-high groundwater-level was reported to be more than six feet below the natural ground surface. Tabulated laboratory testing results in the SCS Soil Survey indicated fines contents (fraction by dry weight passing the US Standard No. 200 sieve) in the uppermost seven feet of this soil were between 1 percent and 7 percent. These soils were classified as "SP" (for "poorly graded sand") and "SP-SM" (for "sand with silt") using the Unified Soils Classification System, ASTM D2487.

The exhibit that S2Li had provided was an aerial image of the planned borrow-site. The site was heavily wooded, so other surface features were not discernible. The Google Earth™ aerial imagery revealed that the property measured about 650 feet south-to-north by about 1,300 feet west-to-east, and that the trees had been planted sometime between 1983 and 1994.

REGIONAL GEOLOGY

Lake County is in the central Florida peninsular zone of the Atlantic Coastal Plain physiographic province. The topography in Lake County is characterized by low hills and knolls with low areas between that sometimes contain wetlands and marsh. Near-surface materials are predominantly fine quartz sand containing generally small amounts of silt or clay with thin, interbedded layers of silt, clayey silt, silty sand, and clayey sand. Soil stratification within this unit is often difficult, because the composition at any given location is the result of complex, often unique, combinations of depositional and erosional processes. Because soil gradation, condition, and color often change within short horizontal and vertical distances, this unit is called the "Undifferentiated Sediments."

FIELD EXPLORATIONS

AEA staff developed a preliminary boring-location plan using the S2Li exhibit and Google Earth™ aerial imagery as references. Initially, we planned an auger-boring location near each of the four corners of the property. After reviewing the available information in more detail, and discussing access to the property with LCSWMD staff on location, we opted for boring locations at its northwestern, northeastern, and southeastern corners and designated them "AB-1" to "AB-3."

We visited the site to gather general information about the surface conditions, and drill the borings. We were able to drill each boring by hand to ten feet using a bucket auger, in accordance with ASTM D1452. Our field personnel described the soils recovered in the auger bucket, selected representative samples and sealed them in clean, airtight containers; checked the boreholes for groundwater; recorded their observations and measurements on field logs; and backfilled the boreholes to the ground surface with soil. As directed by S2Li staff, we did not stake the boring locations for survey.

LABORATORY TESTING

A geotechnical engineer examined the recovered soil samples in our laboratory, confirmed the descriptions on the field logs, classified the soils using visual-manual methods in accordance with ASTM D2488, and developed a representation of the soil stratigraphy at each boring location. The engineer selected representative specimens for laboratory testing, which consisted of six percent-fines tests, and two permeability tests on remolded samples. We conducted the tests in accordance with applicable ASTM and Florida Standard Test methods. Results are presented in the report text, and on the boring logs and the Summary of Laboratory Test Results sheet in Appendix A.

SURFACE CONDITIONS

The property bordered the northwestern corner of the Lake County Landfill complex. It was fenced, and moderately to heavily wooded. Leaves and pine needles were accumulated on the ground surface. We observed wheel-rut trails inside the perimeter fence along the northern and eastern property boundaries. Despite the heavy vegetation, we were able to discern a low ridge crossing the property from south to north, and a low area between the ridge and the northwestern corner of the property. We could not see much else because of the vegetation.

SUBSURFACE CONDITIONS

The stratigraphy, soil types, and groundwater level described below are based on the results of the auger borings, visual-manual classification of the recovered samples, and a limited number of laboratory tests. We used USCS group-names and group-symbols for soil classification. The descriptions below are general and describe the major material types that we encountered. Detailed subsurface characteristics at the boring locations are shown on the boring logs and the Summary of Laboratory Test Results sheet in Appendix A.

The soils penetrated by our borings were sands that were brown and dark yellowish-brown near the ground surface, and with increasing depth became yellowish brown to brownish yellow, and occasionally strong brown and reddish yellow. Encountered thicknesses were ten feet. We could not confirm the actual thicknesses because we had not completely penetrated these soils when we terminated the boreholes at ten feet.

Percent-fines testing of six samples indicated fines contents between 1 percent and 8 percent. Based on visual-manual examinations and the laboratory-testing results, we classified the samples as “poorly graded sand (SP)” and “sand with silt (SP-SM).”

Additional laboratory testing on remolded samples yielded soil permeability of 37 feet per day (“ft/day”) and more than 40 ft/day. The boreholes did not encountered groundwater. Details of the subsurface conditions encountered at each borehole location are discussed in the text, and shown on the auger-boring logs and the Summary of Laboratory test Results sheet, in Appendix A.

[END OF SECTION]

GENERAL COMMENTS ON RECOMMENDATIONS

The following discussions are based on our review of the available information, the results of our field explorations and laboratory testing, our limited knowledge of the planned closure design, and our experience with similar projects and subsurface conditions. We prepared this report for S2Li and LCSWMD for this project only. *It should not be used for other purposes, even at the same exploration locations, without consulting us.* The assessments in this report should not be used to countermand or override the project specifications during construction.

Soils are natural materials, so variations in composition and other characteristics are normal, and should be expected. Because of those natural variations, and the limited number of subsurface explorations that we conducted, soils or materials other than those that we encountered (including potentially unfavorable or unsuitable materials) may exist on this property, even though it was fenced, and they should be anticipated. If the subsurface conditions encountered during excavation differ significantly from those encountered during this study, they should be reported to us promptly for our observation and possible comment.

GENERAL ASSESSMENT OF SUBSURFACE CONDITIONS

As discussed in the SUBSURFACE CONDITIONS section of this report, the uppermost soils at this site were sands at least ten feet deep. We classified them as SP and SP-SM.

Permeability of the remolded samples exceeded 35 ft/day. However, those results should be used with due consideration of the fact that permeability is not an intrinsic soil property. In undisturbed soils, it varies with soil composition, stratification and condition. Permeability can also vary when soils are excavated, transported, possibly mixed, spread, and compacted during earthwork activity.

USE OF ENCOUNTERED SOILS FOR LANDFILL CLOSURE

Soils for use as landfill closure should not have fines contents higher than 10 percent, unless allowed by specifications previously approved by LCSWMD. They should be free from debris, rubbish, topsoil, mud, muck, peat, stumps, roots, vegetable matter, or other unsuitable materials. These soils should be permeable enough to enable collection of landfill gases. They also should have acceptable interface-friction resistance against geosynthetic materials that will be used in the closure. Testing to confirm friction should be conducted as needed for the design.

The SP and SP-SM soils that we encountered are desirable for earthwork in central Florida because they drain freely, and can be worked effectively across a broad moisture-content range. Satisfactory compaction can be achieved using a wide variety of vibratory-compaction equipment. Some instability or "pumping" should be expected if these soils are being compacted at moisture contents near saturation. These soils should be covered promptly after they have been placed and accepted, to protect them against drying and excessive blowing by wind and to avoid possible erosion by water.

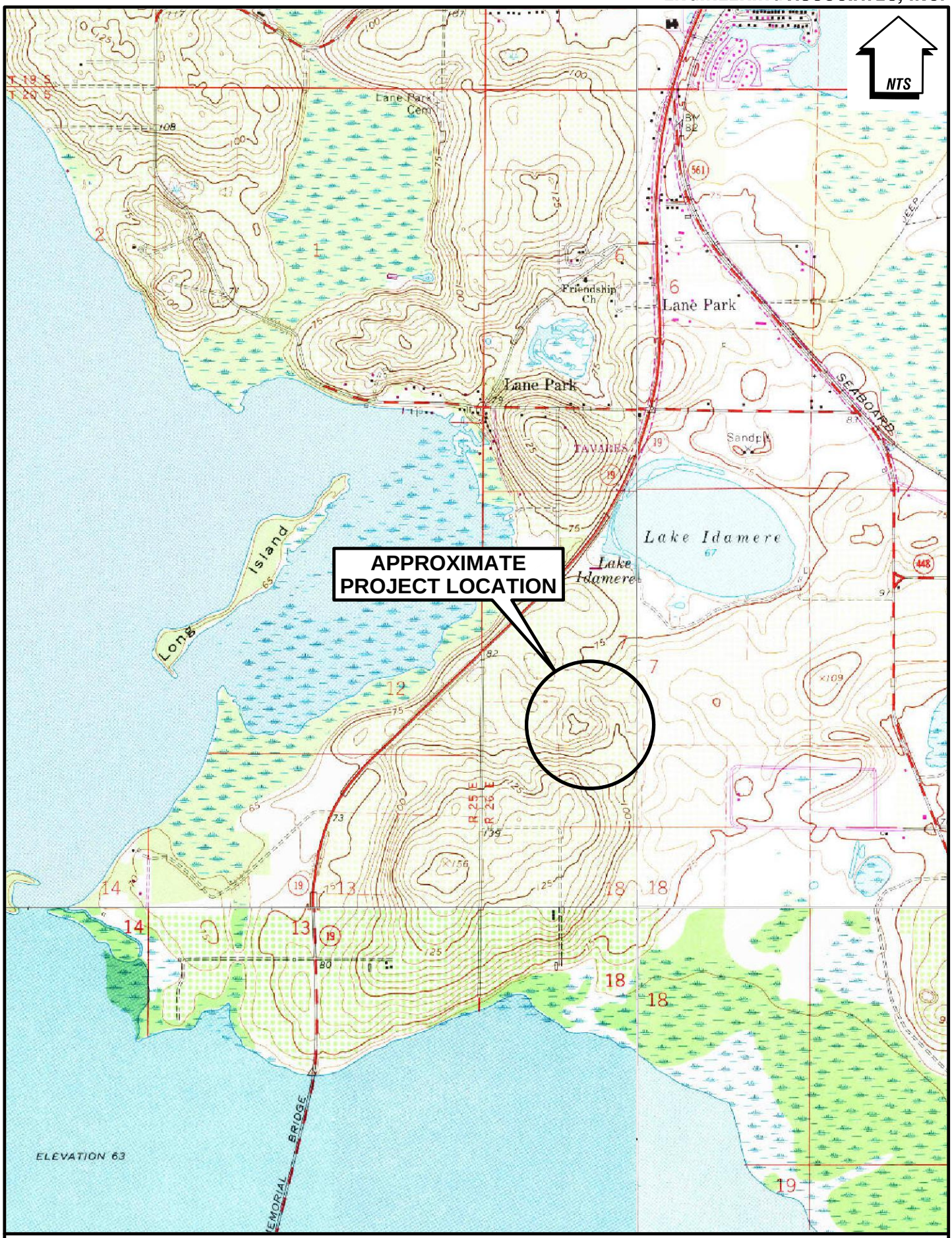
LIMITATIONS

This report presents an evaluation of the subsurface conditions on the basis of accepted geotechnical-engineering procedures for site characterization. We did not examine or test the recovered soil samples in any way for chemical composition or environmental hazards.

The investigation was confined to the zone of soil which is likely to be affected by the proposed construction, and did not address the potential of surface expression of deep geologic activity such as sinkholes. This type of evaluation requires a more extensive range of services than those performed for this study.

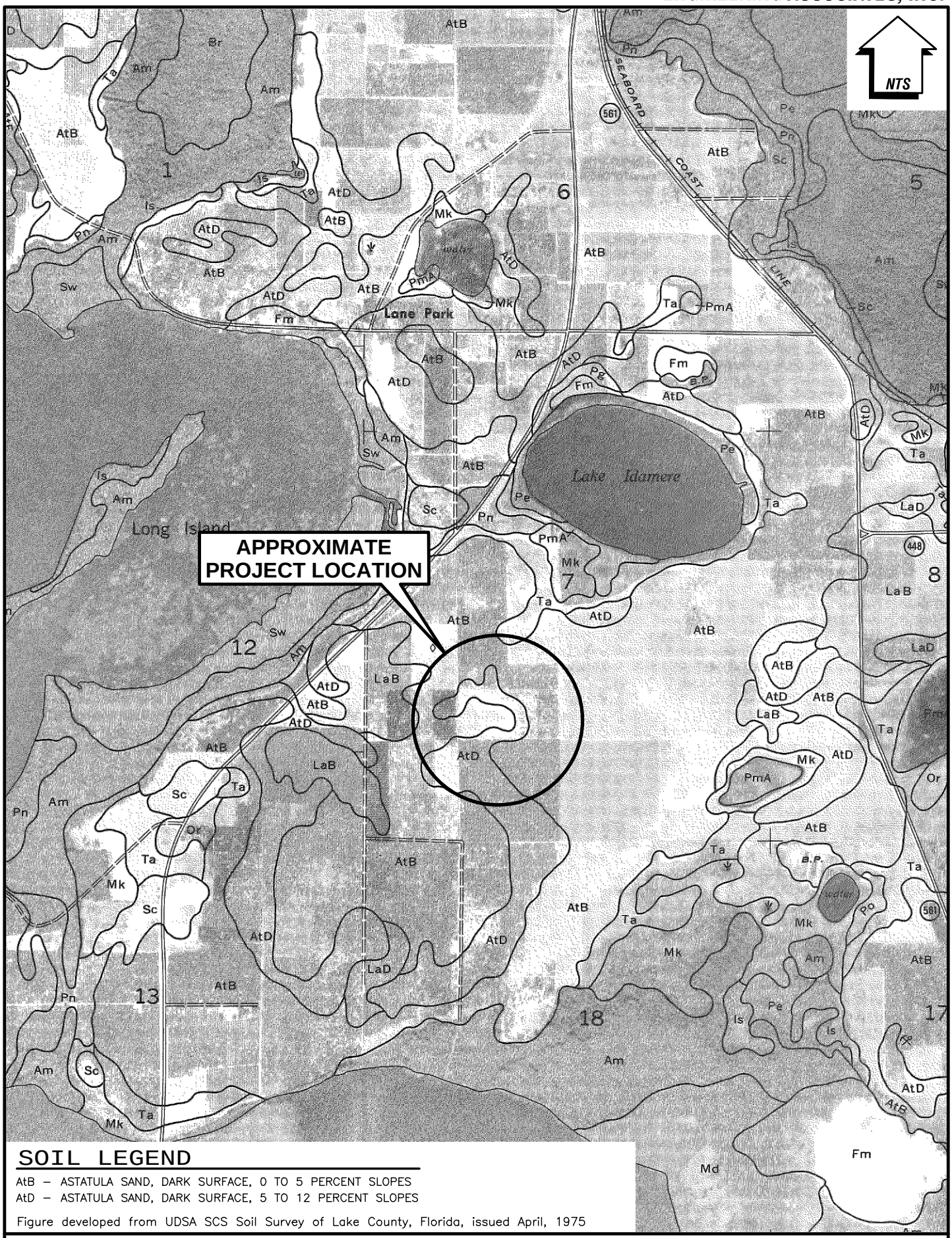
Because of the natural limitations inherent in working below the ground surface, a geotechnical engineer cannot predict and address all possible problems. During construction, geotechnical issues not addressed in this report may arise. We included in Appendix D the bulletin "Important Information About This Geotechnical-Engineering Report" by the Geoprofessional Business Association to help explain the nature of geotechnical issues. We show additional information in Appendix E to discuss the basic limitations of a typical geotechnical-engineering report.

FIGURES



SITE LOCATION MAP

202202	LAKE COUNTY LANDFILL CLOSURE BORROW SITE	FIG. 1



SOIL LEGEND

AtB – ASTATULA SAND, DARK SURFACE, 0 TO 5 PERCENT SLOPES
AtD – ASTATULA SAND, DARK SURFACE, 5 TO 12 PERCENT SLOPES

Figure developed from UDSA SCS Soil Survey of Lake County, Florida, issued April, 1975

USDA SCS SOIL SURVEY MAP

202202	LAKE COUNTY LANDFILL CLOSURE BORROW SITE	FIG. 2

APPENDIX A

Antillian Engineering Associates, Inc.
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LOG OF BORING AB-1

PROJECT NUMBER 202202
PROJECT NAME Lake Co Landfill Closure Borrow Site
CLIENT S2Li
PROJECT LOCATION
DATE STARTED 3/31/22 **COMPLETED** 3/31/22
GROUND ELEVATION **HOLE SIZE** inches
DRILLING CONTRACTOR
GROUNDWATER DEPTH:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY PS **CHECKED BY** PS
AT END OF DRILLING ---
NOTES 300 ft East of NE corner of property
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Dark brown SAND, a few leaves and pine needles (SP)	HA									
		- dark yellowish-brown										2
		- yellowish brown										
		- brownish yellow										
5												
10		Groundwater not encountered.										4

Bottom of borehole at 10.0 feet.

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LOG OF BORING AB-2

PROJECT NUMBER 202202
PROJECT NAME Lake Co Landfill Closure Borrow Site
CLIENT S2Li
PROJECT LOCATION
DATE STARTED 3/31/22 **COMPLETED** 3/31/22
GROUND ELEVATION **HOLE SIZE** inches
DRILLING CONTRACTOR
GROUNDWATER DEPTH:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY PS **CHECKED BY** PS
AT END OF DRILLING ---
NOTES 100 ft South of NE corner of property
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown SAND, a few leaves and pine needles (SP)	HA									
		- dark yellowish-brown										
		- yellowish brown										
		- a few tree roots										
		- no roots										3
5												
		Strong brown SAND with silt (SP-SM)										6
		Strong brown to reddish yellow SAND (SP)										
10		Groundwater not encountered.										3

Bottom of borehole at 10.0 feet.

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LOG OF BORING AB-3

PROJECT NUMBER 202202
PROJECT NAME Lake Co Landfill Closure Borrow Site
CLIENT S2Li
PROJECT LOCATION
DATE STARTED 3/31/22 **COMPLETED** 3/31/22
GROUND ELEVATION **HOLE SIZE** inches
DRILLING CONTRACTOR
GROUNDWATER DEPTH:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY PS **CHECKED BY** PS
AT END OF DRILLING ---
NOTES 100 ft North of SE corner of property
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown SAND, a few leaves (SP)	HA									
		- brown to pale brown										
		- yellowish brown										3
5												
		- strong brown										
10		- reddish yellow, groundwater not encountered										

Bottom of borehole at 10.0 feet.

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SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 202202 **PROJECT NAME** Lake Co Landfill Closure Borrow Site

CLIENT S2Li **PROJECT LOCATION**

Borehole Depth	Sample Description	#4	#10	#40	#60	#100	Fines #200	Water Content (%)	LL	PI	Organic Content	k (ft/day)	Stratum No.	AASHTO	USCS
AB-1 1.0	Dark yellowish-brown sand						2.4								SP
AB-1 9.5	Brownish yellow sand						3.8								SP
AB-2 4.0	Yellowish brown sand						2.7								SP
AB-2 7.0	Strong brown sand with silt						5.6								SP-SM
AB-2 9.5	Strong brown sand						3.2								SP
AB-3 2.5	Yellowish brown sand						3.0								SP

APPENDIX B

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

ANTILLIAN ENGINEERING ASSOCIATES, INC.
CONSTRAINTS AND RESTRICTIONS

WARRANTY

Antillian Engineering Associates, Inc. has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Antillian Engineering Associates, Inc., as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Antillian Engineering Associates, Inc. of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Antillian Engineering Associates, Inc. to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Antillian Engineering Associates, Inc. is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Antillian Engineering Associates, Inc..

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Antillian Engineering Associates, Inc..

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Antillian Engineering Associates, Inc. cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Antillian Engineering Associates, Inc. to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Antillian Engineering Associates, Inc. to locate any such buried objects. Antillian Engineering Associates, Inc. cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of investigation. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.