

GEOTECHNICAL ENGINEERING REPORT



Rish Park – Pavements, Structures & Piles Port Saint Joe, Gulf County, Florida

PREPARED FOR:

CPH Consulting, Inc.

1031 West 23rd Street, 1031-C

Panama City, Florida 32405

NOVA Project Number: 10111-2023120-R1

November 6, 2023



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November 6, 2023

CPH Consulting, Inc.
1031 West 23rd Street, 1031-C
Panama City, Florida 32405

Attention: Mr. Jason Toole, P.E., LEED AP

Subject: **Geotechnical Engineering Report**
Rish Park – Pavements, Structures & Piles
Port Saint Joe, Gulf County, Florida
NOVA Project Number 10111-2023120-R1

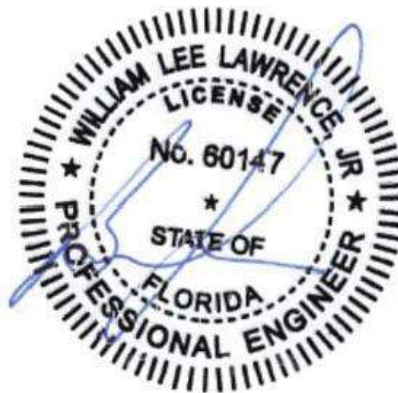
Dear Mr. Toole:

NOVA Engineering and Environmental, LLC (NOVA) has completed the authorized Geotechnical Engineering Report for the Rish Park – Pavements, Structures & Piles proposed in Port Saint Joe, Gulf County, Florida. The work was performed in general accordance with NOVA Proposal Number 10111-2023120-R1, dated August 2, 2023. This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our findings, conclusions, and recommendations.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
NOVA Engineering and Environmental, LLC

Michael R. Keramidas
Staff Engineer



William L. Lawrence, P.E.
Principal Engineer
Florida Registration No. 60147

Copies Submitted: Addressee (electronic)

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	NAME AND LOCATION OF PROJECT	1
1.2	AUTHORIZATION AND SCOPE OF STUDY	1
2.0	PROJECT INFORMATION	3
2.1	PROJECT SITE.....	3
2.2	PROPOSED DEVELOPMENT.....	3
3.0	SUBSURFACE EXPLORATION.....	5
3.1	AREA GEOLOGY	5
3.2	LOCAL EXPERIENCE.....	5
3.3	FIELD EXPLORATION.....	6
3.4	LABORATORY TESTING	7
3.5	SUBSURFACE CONDITIONS	8
4.0	GEOTECHNICAL ASSESSMENT	11
5.0	RECOMMENDATIONS	12
5.1	SITE PREPARATION.....	12
5.2	EXCAVATION	12
5.3	FILL PLACEMENT	14
5.4	FOUNDATIONS.....	15
5.5	SLAB-ON-GRADE.....	17
5.6	DEEP FOUNDATIONS FOR PIER – JETTED TIMBER PILES.....	18
5.7	DEEP FOUNDATIONS FOR BEACHSIDE BATHHOUSE– JETTED TIMBER PILES.....	20
5.8	DEEP FOUNDATIONS FOR STAFF RESIDENCE BUILDING– DRIVEN PCC PILES	22
5.9	PAVEMENT CROSS SECTION DESIGN.....	24
6.0	LIMITATIONS.....	28

APPENDICES

- Appendix A – Figures and Maps
- Appendix B – Subsurface Data
- Appendix C – Laboratory Test Data

1.0 INTRODUCTION

This section provides information relating to our contract, the purpose of our work, and a summary of our understanding of the project,

1.1 NAME AND LOCATION OF PROJECT

The Subject Property (Gulf County Parcel ID 06352-000R) is located at 6733 Cape San Blas Road in Port Saint Joe, Gulf County, Florida. The location of the site is noted on the Site Location Map included in Appendix A.

1.2 AUTHORIZATION AND SCOPE OF STUDY

Our work on this project was as described in our Proposal Number 10111-2023120, authorized by the Client on October 10, 2023.

The primary objectives of this work were to perform a geotechnical exploration within the proposed structure footprints, pavement areas and to assess these findings as they relate to geotechnical aspects of the planned site development. The authorized geotechnical engineering services included a site reconnaissance, soil test borings and sampling, engineering evaluation of the field and laboratory data, and the preparation of this report.

As authorized per the above referenced proposal, this completed geotechnical report includes:

- A description of the site, fieldwork, laboratory testing and general soil conditions encountered, together with a Boring Location Plan and individual Test Boring Records.
- Site preparation considerations that include geotechnical discussions regarding site stripping and subgrade preparation, and engineered fill/backfill placement.
- Recommendations for controlling groundwater and/or run-off during construction, and the potential need for a permanent dewatering system based on the anticipated post construction groundwater levels.
- Flexible (asphalt) pavement section recommendations.
- Deep (driven timber pile) foundation system recommendations, as appropriate.
- Shallow foundation systems recommendations, as appropriate.
- Slab-on-grade construction considerations based on the geotechnical findings, including the need for a sub-slab vapor barrier or a capillary barrier.
- Suitability of on-site soils for re-use as structural fill and backfill. Additionally, the criteria for suitable fill materials will be provided.

- Recommended quality control measures (i.e., sampling, testing, and inspection requirements) for site grading operations.

The assessment of the presence of wetlands, floodplains, or water classified as state waters was beyond the scope of this exploration. Additionally, the assessment of site environmental conditions, including the detection of pollutants in the soil, rock, or groundwater, at the site was also beyond the scope of this geotechnical exploration and evaluation.

2.0 PROJECT INFORMATION

Our understanding of this project is based on discussions with the Client, a site reconnaissance made during boring layout, and our experience with similar projects in and around the Port Saint Joe area.

Site Plans and Documents

We were furnished with the following plans and documents:

- **WILLIAM J RISH PARK OVERALL SITE PLAN**
Jason L. Toole, P.E.
Dated: 6/7/2023

2.1 PROJECT SITE

The Subject Property (Walton County Parcel ID 06352-000R) is located at 6733 Cape San Blas Road in Port Saint Joe, Gulf County, Florida and an existing park. At the time of our field exploration, the vicinity of the Subject Property was observed to be generally developed with existing residential warehouse structures to the north and south with the Gulf of Mexico to the west and Saint Joseph Bay to the east. We note that existing buildings are located adjacent to the subject property.

2.2 PROPOSED DEVELOPMENT

NOVA understands that the project will include the construction of a three-bay shop; three-bay pole barn; fenced maintenance yard; staff residence; bath house; restroom structure; campground roadway alignment and paved RV sites; and pier. The structures are assumed to be supported on a shallow foundation system or a deep foundation system consisting of driven timber piles.

Maximum Loads

Final structural loading details were not available from the Design Team at the time of the issuance of this report. We have therefore assumed that maximum loadings for the proposed structure will not exceed 30 kips per column for isolated interior columns and 3 kips per linear foot for continuous load bearing walls for shallow foundations and maximum loadings will not exceed 3 tons per pile for deep foundations.

Site Grading

Final site grading details were not available from the Design Team at the time of the issuance of this report. We have therefore assumed that finished site grades will not

change greater than +/- 1 foot from existing grades within the proposed structure footprint.

3.0 SUBSURFACE EXPLORATION

3.1 AREA GEOLOGY

According to the United States Geological Survey (USGS), the subject site is located in Gulf County within the Gulf Coastal Plain, separated from the Florida Platform by geologic structures known as the Gulf Trough and Apalachicola Embayment. These structures formed a bathymetric and environmental barrier from the earliest Eocene or earliest Oligocene periods into the Miocene. According to the “Text to Accompany the Geologic Map of Florida” by Scott, 2001, the site is generally underlain by undifferentiated sediments deposited during the Quaternary period. These sediments typically consist of siliciclastics (sand), organics and freshwater carbonates. These soils are highly permeable and form the Sand and Gravel Aquifer of the surficial aquifer system. Surficial soils in the region are primarily siliciclastic sediments deposited in response to the renewed uplift and erosion in the Appalachian highlands to the north and sea-level fluctuations. The extent and type of deposit is influenced by numerous factors, including mineral composition of the parent rock and meteorological events.

NRCS Soil Survey

The Natural Resources Conservation Service (NRCS) “Web Soil” was reviewed to obtain shallow soil and seasonal high groundwater (SHGW) table information. As shown in the table below, many soil-mapping units are located within the project site. Generally, the site primarily lies within the Corolla-Duckston Complex (Map Unit 46) and the Kureb-Corolla Complex (Map Unit 48) units. The NRCS Soil Survey map and data have been included in the Appendix.

Unit no.	Soil Name	Depth (in)	Soil Description	Depth to Seasonal High Groundwater (in)
46	Corolla-Duckston Complex Gently, Undulating, Flooded	0 – 80	Sand	18 – 36
48	Kureb-Corolla Complex, Rolling	> 80	Sand	> 80

3.2 LOCAL EXPERIENCE

NOVA has conducted numerous geotechnical studies for projects in the general site area including within the Gulf County area. The typical subsurface conditions in this area were found to consist of fine-grained sands to silty sands (USCS classifications of SP, SP-SM, and SM). In some instances, sand to silty sand strata with some organics and/or significant organic staining have also been encountered.

3.3 FIELD EXPLORATION

Our field exploration was conducted on October 17, 2023, and included performing:

- Five 25-foot SPT borings (designated B-1 and B-5 in the attached Appendix)
- Two 50-foot SPT borings (B-6 and B-7)
- Nine 5-foot auger borings in pavement/parking areas

The boring locations were established in the field by NOVA personnel using a handheld GPS device and by estimating distances and angles from site landmarks. Prior to initiating field testing, underground utilities were marked by the state utility locate service (811, or Sunshine One-Call). Any required underground utility related adjustments of the test locations were then made at the time of the field exploration. The approximate test locations are shown in the Boring Location Plan provided in Appendix B. If increased accuracy is desired by the Client, test locations and elevations may be surveyed.

The Test Boring Records in Appendix B show the Standard Penetration Test (SPT) resistances, or “N-values”, for the structure borings and present the soil conditions encountered in all of the borings. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the split-barrel samples, laboratory test data, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual.

The groundwater levels reported on the Test Boring Records represent measurements made at the completion of each test boring, following a suitable stabilization period. The test borings were subsequently backfilled with soil cuttings from the drilling process for safety concerns.

SPT Borings

The structure borings were performed using the guidelines of ASTM Designation D-1586, "Penetration Test and Split-Barrel Sampling of Soils". A mud rotary drilling process was used to advance the borings once groundwater was encountered. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-tube sampler. The sampler was first seated six inches and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance". Representative portions of the soil samples, obtained from the sampler, were placed in sealed containers and transported to our laboratory for further evaluation and laboratory testing.

Hand Auger Borings

The auger borings were performed using a hand operated soil sampler. Soil samples were obtained from the auger bucket approximately at each stratum break.

Test Boring Records in Appendix B present the soil conditions encountered in the borings. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the recovered samples, laboratory test data, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual.

3.4 LABORATORY TESTING

Following completion of the field work, soil and rock samples obtained in the field were returned to our office for classification and laboratory testing assignment. These tests included the following:

- Manual/Visual Soil Classification
- Moisture Content
- Fines Content
- Organic Content

The purpose of the testing program was to classify the subsurface materials relative to the Unified Classification System and to determine their physical characteristics including strength, and compressibility.

Moisture Content

The moisture content is the ratio expressed as a percentage of the weight of water in a given mass of soil to the weight of the solid particles. This testing was conducted in general accordance with ASTM Designation D-2216. Twenty four moisture content tests were performed in this study.

Fines Content

The percentage of fines passing through the No. 200 sieve is generally considered to represent the amount of silt and clay of the tested soil sample. The sieve analysis testing was conducted in general accordance with ASTM Designations D-6913 and D-1140. Twenty four fines content tests were performed in this study.

Organic Content

The organic content is the ratio expressed as a percentage of the weight of organic material in a given mass of soil to the weight of the solid particles. This testing was conducted in general accordance with ASTM D-2974. Thirteen organic content tests were performed in this study.

Detailed descriptions of the tests conducted are presented in Appendix C. The soil samples will be discarded 30 days following the submittal of this report, unless you request otherwise.

3.5 SUBSURFACE CONDITIONS

The following paragraphs provide generalized descriptions of the subsurface profiles and soil conditions encountered by the borings conducted during this exploration.

Surface Materials

Surface materials across the subject site generally consisted of sand, smaller scrub vegetation and related surficial organics.

Fill

Based on the boring results and our observations of the property at the time of our field exploration, previously installed fill materials do not appear to be present on this property.

Native Soils

The soil borings generally encountered very loose to very dense fine-grained sand (USCS classification of SP) from the existing ground surface to the maximum depth explored of about 50 feet BEG. We note in auger borings P-1 and P-3 there are stratum of fine-grained silty sand (SM) and fine-grained slightly silty sand (SP-SM) from 0 feet BEG to 1 foot BEG in each boring. We also note in boring B-7 there is a stratum of clay from 33 feet BEG to 35 feet BEG. Trace to few organics were also encountered throughout the borings.

Standard Penetration Test (SPT) resistance values (“N”- values) varied from 2 to 96 blows per foot (bpf) and were found to be variable with respect to depth. SPT values typically ranged from 4 to 33 bpf in the upper 10 feet of the soil horizon, and 2 to 96 bpf at greater depths.

Groundwater Conditions

Groundwater in the Gulf County, Florida area typically occurs as an unconfined aquifer condition. Consequently, the groundwater table is expected to be a subdued replica of the original surface topography. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix can affect groundwater conditions.

A stabilized groundwater table was encountered in the test borings at depths ranging between about 0.1 feet to 7 feet BEG at the time of our final field exploration, which occurred during a period of relatively normal seasonal rainfall and within a pattern of frequent (daily) rain events. Based on a review of topographic maps and our visual site observations, we anticipate the groundwater flow at the site to be towards the east (i.e., towards Saint Joseph Bay).

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff, and other site-specific factors. Groundwater levels in the Gulf County area are typically lowest in the late fall to winter and highest in the early spring to mid-summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times. Based on comparisons of current annual monthly rainfall data to historical rainfall data extending back 50+ years in time, we estimate that the normal permanent seasonal high groundwater (SHGW) table for this site will occur within about 1-foot above the groundwater levels measured at each boring location at the time of our exploration, during the wet season. This data generally correlates to the values provided by the USGS Natural Resources Conservation Service (NRCS). The table below shows the following information for each soil test boring: soil type per NRCS, the encountered groundwater table and the estimated seasonal high groundwater level.

Test Boring	Soil Type*	Encountered Groundwater Depth (BEG)**	Estimated Seasonal High Groundwater Depth (BEG)**
B-1	Slightly Silty Sand	7 feet	6 feet
B-2	Slightly Silty Sand	5½ feet	4½ feet
B-3	Slightly Silty Sand	5½ feet	4½ feet
B-4	Slightly Silty Sand	5 feet	4 feet
B-5	Slightly Silty Sand	5 feet	4 feet
B-6	Slightly Silty Sand	0.1 feet	0 feet
B-7	Slightly Silty Sand	0.1 feet	0 feet
P-1	Slightly Silty Sand	GNE	GNE
P-2	Slightly Silty Sand	GNE	GNE
P-3	Slightly Silty Sand	GNE	GNE
P-4	Slightly Silty Sand	GNE	GNE
P-5	Slightly Silty Sand	GNE	GNE
P-6	Slightly Silty Sand	3 feet	2 feet
P-7	Slightly Silty Sand	5 feet	4 feet
P-8	Slightly Silty Sand	5 feet	4 feet
P-9	Slightly Silty Sand	GNE	GNE

* Based on the NRCS Soil Survey provided Appendix A

** Below Existing Grade

4.0 GEOTECHNICAL ASSESSMENT

The following assessment is based on our understanding of the proposed construction, our site observations, our evaluation and interpretation of the field data obtained during this exploration, our experience with similar subsurface conditions, and generally accepted geotechnical engineering principles and practices.

Based on boring data and analysis, the encountered subsurface conditions appear to be favorable supporting the proposed structures. On-site near surface soils that are categorized as fine-grained sand, fine-grained slightly silty sand, and fine-grained silty sand (SP, SM and SP-SM based on the Unified Soil Classification System, or USCS) are likely considered suitable for reuse as structural fill or backfill (if required).

Subsurface conditions in unexplored locations can and will vary from those encountered at the boring locations considered and discussed herein. If such variations are noted during construction, or if project development plans are changed, we request the opportunity to review the changes and amend our recommendations, if necessary.

The following sections present our recommendations for site preparation and grading, and for the design of the proposed shallow and deep foundation systems.

5.0 RECOMMENDATIONS

5.1 SITE PREPARATION

Prior to proceeding with construction, all topsoil and vegetation, trees and associated root systems, and any other deleterious non-soil materials found to be present should be stripped from the proposed building footprint. Clean topsoil may be stockpiled and subsequently re-used in landscaped areas. Debris-laden materials should be excavated, transported, and disposed of off-site in accordance with appropriate solid waste rules and regulations. Any existing utility locations should be reviewed to assess their impact on the proposed construction and relocated/grouted in-place as appropriate.

The soils exposed at the stripped grade elevation should be compacted via non-vibratory methods (due to the presence of existing structures on adjacent properties) to a minimum soil density of at least 100 percent of the maximum dry density as determined by the Modified Proctor test method (ASTM D-1557).

NOVA should observe the compaction of the subgrade to locate soft, weak, or excessively wet fill or existing soils present at the time of construction. Any unstable materials observed during the evaluation and compaction operations should be undercut and replaced with structural fill or stabilized in-place by scarifying and re-densifying. Actual remedial recommendations can best be determined by the geotechnical engineer in the field at the time of construction.

5.2 EXCAVATION

Excavations greater than five feet deep (such as for deeper foundations and underground utilities) should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29CFR Part 1926), excavation safety standards. It should be noted that the Contractor is solely responsible for site safety. This information is provided only as a service and under no circumstances should NOVA be assumed to be responsible for construction site safety. Each excavation should be observed and classified by an OSHA-competent person. All excavations below the groundwater level are classified as OSHA Class C soils for excavation purposes.

After stripping and trench excavation, a NOVA geotechnical engineer should carefully evaluate the exposed soils. We recommend undercutting the proposed pipe trench areas approximately ½ foot below the proposed pipe bearing elevations and installing structural backfill for use as pipe bedding materials. Sewer pipe installation should be constructed in general compliance with ASTM D2321, standard practice for underground installation of pipe for sewers and other gravity flow applications.

Groundwater Control

A stabilized groundwater table was encountered in the test borings at depths ranging between about 0.1 feet to 7 feet BEG during our field exploration, which occurred during a period of relatively normal seasonal rainfall. The relatively shallow groundwater table present beneath some portions of the overall property may require temporary dewatering efforts during utility construction and both temporary and permanent dewatering measures may be required should deeper cuts for the proposed construction be performed.

As previously noted, groundwater levels are subject to seasonal, climatic, and other variations and may be different at other times and locations. The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

Temporary Dewatering: Design of a temporary dewatering system is usually the responsibility of the contractor. However, based on our experience with similar conditions, we anticipate that a well point dewatering system could potentially be necessary to properly control groundwater if deeper excavations are required.

Since well point system construction is partially dependent on the technique and experience of the contractor, we believe the system should only be installed by a contractor with a minimum of 5 years of experience in dewatering system design and installation. Design flexibility should be allowed for the specialty contractor to choose the most appropriate dewatering system, including the well depths and spacing.

At the time of construction, groundwater must be lowered and continuously maintained at a minimum depth of 3 feet below the desired working elevation to permit subgrade preparation and foundation excavation and construction. The dewatering system should be installed and operational prior to excavation beneath the water table. The dewatering system should also remain in continuous operation until the foundation concrete installation is complete.

Although dewatered, the subgrade will remain saturated and susceptible to damage caused by construction traffic. Undercutting, stabilization, and replacement of unstable soils should be assumed to be necessary.

As previously noted, groundwater levels are subject to seasonal, climatic, tidal and other variations and may be different at other times and locations. The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

5.3 FILL PLACEMENT

Fill Suitability

Fill materials should be relatively clean sands with less than 12 percent fines (material passing the No. 200 sieve), and free of non-soil materials and rock fragments larger than 3 inches in diameter. Based on visual examination and limited laboratory soil testing results, the existing surficial soils encountered during this exploration typically consisted of fine-grained sand, fine-grained slightly silty sand, and fine-grained silty sand (SP, SM and SP-SM) that should be suitable for re-use as fill or backfill material, depending on the fines content, organic content and moisture content of the materials excavated from these zones.

We recommend that stockpiles of all materials planned for re-use be sealed as they are excavated to prevent (to the greatest extent practical) the intrusion of moisture into the core of the soil stockpile(s) during significant rain events prior to their potential re-use as fill and/or backfill soils.

Prior to construction, bulk samples of all proposed fill materials (both native and import) should be laboratory tested to confirm their suitability. Organic and/or debris-laden material is not suitable for re-use as structural fill. Topsoil, mulch, and similar organic materials can be wasted in architectural areas. Debris-laden materials should be excavated, transported, and disposed of off-site in accordance with appropriate solid waste rules and regulations.

Soil Compaction

Fill should be placed in thin, horizontal loose lifts (maximum 8-inch) and compacted to a minimum soil density of at least 98 percent of the Modified Proctor maximum dry density (ASTM D-1557). In confined areas, such as utility trenches, portable compaction equipment and thinner fill lifts (3 to 4 inches) may be necessary.

Fill materials used in structural areas should have a target maximum dry density of at least 95 pounds per cubic foot (pcf). If lighter weight fill materials are used, the NOVA geotechnical engineer should be consulted to assess the impact on design recommendations.

Soil moisture content should be maintained within 3 percent of the optimum moisture content. We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. Moisture control may be difficult during rainy weather. Soils excavated from below the groundwater table will likely require significant efforts to achieve acceptable moisture contents prior to re-use as fill.

One test per 2,500 square feet of building footprint should be performed at the stripped grade elevation and in each lift of fill, with test locations well distributed throughout the fill mass. When filling in small areas, at least one test per day per area should be performed. One test in each column footing and one test per 50 linear feet of continuous strip foundations are also recommended.

The site should be graded during construction to maintain positive drainage away from the proposed structure footprint, to prevent ponding of stormwater on the site during and shortly following significant rain events. The construction areas should be sealed and crowned with a smooth roller to minimize ponding water from storm events at the end of each day of work.

5.4 FOUNDATIONS

General

We understand that the proposed structures will be supported on either conventional shallow foundation systems (three-bay shop; three-bay pole barn; restroom structure) or deep foundation systems (pier, beachside bathhouse, and staff residence building). Final structural loadings were not available from the design team at the time of the issuance of this report; we have therefore assumed that maximum isolated interior column and continuous load bearing wall loads will not exceed 30 kips per column and 3 kips per linear foot, respectively, for the proposed structure. We have assumed maximum loadings for the deep foundation system will not exceed 8 tons per pile.

If any of the above stated design assumptions are found to be incorrect or are revised, NOVA should be contacted immediately so that additional analyses can be performed to determine if the recommendations presented herein will need to be modified.

Shallow Foundations

Design: After the recommended site and subgrade preparation and fill placement has been completed, it is our opinion that a conventional shallow foundation systems can be used to support the three-bay shop; three-bay pole barn; and, restroom structure.

Foundations bearing on densified existing soils and/or compacted structural fill, as recommended in this report, may be designed employing a maximum allowable soil bearing pressure of **2,000 pounds per square foot (psf)**.

We recommend a value of 0.35 can be employed as the coefficient of friction (sliding resistance) between foundations and the underlying residual or fill soils. Footings should be a minimum of 24 inches in width for ease of construction and to reduce the possibility of localized shear failures. Isolated exterior and interior footing bottoms

should be established at least 18 inches below finished surrounding exterior grades. When utilizing a post-tensioned monolithic slab-on-grade design, exterior and interior footing bottoms should be established a minimum of 12 inches below adjacent finished grades.

Settlement: Settlements for a spread foundation bearing on structural fill were assessed using SPT values to estimate elastic modulus, based on published correlations and previous NOVA experience. We note that the settlements presented are based on the SPT boring results. Conditions may be better or worse in other areas; however, we believe the estimated settlements are reasonably conservative.

Based on the provided structural loadings, the soil bearing capacity provided above, the presumed foundation elevations as discussed above, we expect residual primary total settlement beneath individual foundations to be on the order of 1-inch.

The amount of differential settlement is difficult to predict because the subsurface and foundation loading conditions can vary considerably across the site. However, we anticipate residual differential settlement between adjacent foundations will be less than ½-inch. The final deflected shape of the structure will be dependent on actual foundation locations and loading.

Foundation support conditions are highly erratic and may vary dramatically in short horizontal distances. It is anticipated that the geotechnical engineer may recommend a different bearing capacity upon examination of the actual foundation subgrade at numerous locations.

To reduce the differential settlement if lower consistency materials are encountered, a lower bearing capacity should be used. We anticipate that timely communication between the geotechnical engineer and the structural engineer, as well as other design and construction team members, will be required.

Construction: Foundation excavations should be evaluated by the NOVA geotechnical engineer prior to reinforcing steel placement to observe foundation subgrade preparation and confirm bearing pressure capacity. Foundation excavations should be level and free of debris, ponded water, mud, and loose, frozen, or water-softened soils. Concrete should be placed as soon as is practical after the foundation is excavated and the subgrade evaluated. Foundation concrete should not be placed on frozen or saturated soil.

If a foundation excavation remains open overnight, or if rain or snow is imminent, a 3 to 4-inch thick "mud mat" of lean concrete should be placed in the bottom of the excavation to protect the bearing soils until reinforcing steel and concrete can be placed.

5.5 SLAB-ON-GRADE

General

The conditions exposed at subgrade levels will vary across the site and may include structural fill or densified in-situ soils. The slab-on-grade may be adequately supported on these subgrade conditions subject to the recommendations in this report. The slab-on-grade should be jointed around columns and along walls to reduce cracking due to differential movement. An underdrain system is not necessary beneath the slab, provided that the slab is installed at least 2 feet above the post development high groundwater level. An impermeable vapor barrier is recommended beneath finished spaces to reduce dampness.

Once grading is completed, the subgrade can be exposed to adverse construction activities and weather conditions during the period of sub-slab utility installation. The subgrade should be well drained to prevent the accumulation of water. If the exposed subgrade becomes unstable, excessively wet or exhibits excessive rutting or pumping, the geotechnical engineer should be consulted.

Subgrade Modulus

A coefficient of subgrade reaction (k) of 125 pci (psi per inch) may be used for conventional slab design where slabs bear upon subgrades prepared in accordance with previous recommendations.

Please note that this magnitude of k is intended to reflect the elastic response of soil beneath a typical floor slab under light loads with a small load contact area often measured in square inches, such as loads from forklifts, automobile/truck traffic or lightly loaded storage racks. The recommended coefficient of subgrade reaction (k) of 125 pci is not applicable for heavy slab loads caused by bulk storage or tall storage racks, or for mat foundation design.

Several design methods are applicable for conventional slab design. We have assumed that the slab designer will utilize the methods discussed in the American Concrete Institute (ACI) Committee 360 report, *“Guide to Design of Slabs-on-Ground, (ACI 360R-10).*

5.6 Deep Foundations for Pier – Jetted Timber Piles

Allowable compressive and uplift (tension) capacities for 8-inch tip diameter (cylindrical) timber piles are presented in Table 1 on the following page. The pile embedment depth recommended below should be established relative to the current approximate grade elevation at each pile location along the proposed pier alignment, with pile lengths above grade being determined by the desired top-of-pier elevations.

If higher pile capacities are desired than those provided in Table 1, larger diameter and/or longer piles may be considered. We are available to evaluate additional options, if requested.

TABLE 1 – DRIVEN TIMBER PILE CAPACITIES			
Pile Type	Depth of Embedment, below existing grade	Allowable Compressive Capacity (Tons)	Allowable Uplift Capacity (Tons)
8-inch Φ tip – 8.5-inch Φ butt* Round	15 feet**	5	1.5

* Butt diameter is at existing grade and not indicative of total pile length.

** Assumed to be jetted to within 3 feet of the tip elevation then driven to the required bearing depth.

Installation Considerations: The pile-driving hammer should be sized to avoid overstressing the pile during driving. A drop hammer with a rated energy of 1,000 to 1,500 foot-pounds should be considered initially. NOVA should be allowed to evaluate the hammer pile system submitted by the contractor. Piles should be driven to capacity or refusal using the ENR, Hiley, Janbu, Davison, or other driving formula approved by NOVA.

A minimum pile spacing of 3 diameters should be maintained. If a closer spacing is required, or if pile caps contain more than 5 piles, capacity reduction due to group effects should be considered. Also, the design engineer should evaluate the potential for buckling of the piles under the maximum scour condition.

Installation of driven piles, including probe and test piles should be monitored on a full-time basis. Detailed records should be maintained by the geotechnical engineer who will confirm pile size, location, installed lengths, driving resistance, tip elevation and other relevant installation information.

The engineer monitoring the installation of the production piles should be aware that the inter-layering of sandy soils and organic materials is common in the coastal areas. Our experience on projects in the surrounding area indicates that subsurface conditions can

be highly erratic. If a pile(s) encounters refusal at a depth which appears to be inconsistent with the borings, probe piles or other nearby production piles, it may be necessary to replace the pile or reduce its capacity.

Pile Load Test: The installation criteria of timber piles are typically verified by performing a load test in general accordance with ASTM standard D-1143. The load test should be carried out to at least twice the design load. Preferably, the test pile should be loaded to failure to more accurately determine ultimate working capacities and recommended working loads. The structural engineer should specify the failure criteria for the load test.

Quality Control: An engineer or engineer's aide familiar with the installation of driven piles into subsurface soil conditions similar to those at this site and acting under the direction and supervision of the geotechnical engineer should witness the installation of the remaining production piles. His duties should include, but not be limited to, the following:

1. Keep an accurate record of pile installation and driving procedures.
2. Verify that all piles are installed to the proper driving resistance and to a depth indicative of the piles bearing in the desired bearing formation.
3. Confirm the pile driving equipment is operating properly.
4. Inspect the piles prior to installation for defects and confirm that the piles are not damaged during installation.

5.7 Deep Foundations for Beachside Bathhouse– Jetted Timber Piles

Allowable pile (compression and uplift) capacities for 8-inch, 10-inch, and 12-inch round timber piles were evaluated for this project. The estimated allowable axial compression and uplift capacities and corresponding embedment depths are provided in Table 1 below.

Table 1 – Jetted Timber Piles Deep Foundation Recommendations			
Pile Size - Type	Embedment Depth (ft)*	Allowable Capacities** (Tons)	
		Compression***	Uplift****
8" Round, Timber	20	6	4 ½
10" Round, Timber	20	8 ½	6
12" Round, Timber	20	10 ½	7
8" Round, Timber	25	8	6
10" Round, Timber	25	10 ½	7 ½
12" Round, Timber	25	13 ½	9
8" Round, Timber	30	10	7 ½
10" Round, Timber	30	13	9 ½
12" Round, Timber	30	16 ½	11 ½

* Referenced from existing site grade elevations.

** Based on the SPT boring B-5 results, and assumes piles are jetted to 5 feet of the final tip elevation then driven 5 feet to the final depth.

*** Based on the Estimated Davisson Capacity and Factor of Safety of 3 for end-bearing capacity.

**** Based on the Ultimate Side Friction and Factor of Safety 2.

Installation Considerations: The pile-driving hammer should be sized to avoid overstressing the pile during driving. A drop hammer with a rated energy of 8,000 to 10,000 foot-pounds should be considered initially. NOVA should be allowed to evaluate the hammer pile system submitted by the contractor. A minimum pile spacing of 3 diameters and/or 3 widths should be maintained. If a closer spacing is required, or if pile caps contain more than 5 piles, capacity reduction due to group effects should be considered. Installation of driven piles, including probe and test piles should be monitored on a full-time basis. Detailed records should be maintained by the geotechnical engineer who will confirm pile size, location, installed lengths, driving resistance, tip elevation and other relevant installation information.

The engineer monitoring the installation of the production piles should be aware that the inter-layering of sandy soils and organic materials is common in the coastal areas. Our experience on projects in the surrounding area indicates that subsurface conditions can be highly erratic. If a pile(s) encounters refusal at a depth which appears to be

inconsistent with the borings, probe piles or other nearby production piles, it may be necessary to replace the pile or reduce its capacity.

The installation of driven piles could adversely affect adjacent structures. Therefore, we recommend performing pre/post inspection surveys, settlement monitoring, and vibration monitoring on any structure within a minimum distance of 100 feet of pile driving or equal to 0.5 times the square root of the impact hammer energy, in foot pounds. These structures should be monitored during all pile driving activities. Construction operations should be immediately stopped if the maximum peak particle velocity (PPV) is reached, movement of the structure is detected, or damage of the existing structures is observed.

Pile Load Test: We recommend a dynamic load testing program using PDA, including the driving of several test piles (i.e., approximately 5% of total number of production piles) in production pile locations spaced across the site to provide an indication of the potential variability in driving conditions and to confirm that the required axial capacity can be achieved in these variable conditions with the contractor's pile driving equipment. The purpose of the test pile program is to provide the contractor recommended production pile driving criteria required across the site developed based on the results and subsequent analyses of test pile program.

Our experience with the PDA indicates that a significant cost savings (over static load testing of piles) may be realized if the PDA is properly utilized to monitor the installation as to pile driving stresses, capacities, and integrity.

Pile driving inspection is recommended for all production piles based on driving criteria developed based on the results of test pile program. Continuous driving and installation records should be maintained for each test and production pile for the geotechnical engineer's review.

Quality Control: An engineer or engineer's aide familiar with the installation of driven piles into subsurface soil conditions similar to those at this site and acting under the direction and supervision of the geotechnical engineer should witness the installation of the remaining production piles. His duties should include, but not be limited to, the following:

1. Verify that the pile or leads are either plumb or at correct batter prior to installation.
2. Keep an accurate record of pile installation and driving procedures.
3. Verify that all piles are installed to the proper driving resistance and to a depth indicative of the piles bearing in the desired bearing formation.
4. Confirm the pile driving equipment is operating properly.
5. Inspect the piles prior to installation for defects and confirm that the piles are not damaged during installation.

5.8 Deep Foundations for Staff Residence Building– Driven PCC Piles

Allowable pile (compression and uplift) capacities for 8-inch, 10-inch, and 12-inch round pcc piles were evaluated for this project. The estimated allowable axial compression and uplift capacities and corresponding embedment depths are provided in Table 1 below.

Table 1 – Driven PCC Piles Deep Foundation Recommendations			
Pile Size - Type	Embedment Depth (ft)*	Allowable Capacities** (Tons)	
		Compression***	Uplift****
8" Round, Timber	20	9 ½	8
10" Round, Timber	20	12 ½	10
12" Round, Timber	20	15 ½	12
8" Round, Timber	25	13	11 ½
10" Round, Timber	25	17	14
12" Round, Timber	25	21 ½	17
8" Round, Timber	30	17	15
10" Round, Timber	30	22	18 ½
12" Round, Timber	30	27 ½	22

* Referenced from existing site grade elevations.

** Based on the SPT boring B-2 results.

*** Based on the Estimated Davisson Capacity and Factor of Safety of 3 for end-bearing capacity.

**** Based on the Ultimate Side Friction and Factor of Safety 2.

Installation Considerations: The pile-driving hammer should be sized to avoid overstressing the pile during driving. A drop hammer with a rated energy of 8,000 to 10,000 foot-pounds should be considered initially. NOVA should be allowed to evaluate the hammer pile system submitted by the contractor. A minimum pile spacing of 3 diameters and/or 3 widths should be maintained. If a closer spacing is required, or if pile caps contain more than 5 piles, capacity reduction due to group effects should be considered. Installation of driven piles, including probe and test piles should be monitored on a full-time basis. Detailed records should be maintained by the geotechnical engineer who will confirm pile size, location, installed lengths, driving resistance, tip elevation and other relevant installation information.

The engineer monitoring the installation of the production piles should be aware that the inter-layering of sandy soils and organic materials is common in the coastal areas. Our experience on projects in the surrounding area indicates that subsurface conditions can be highly erratic. If a pile(s) encounters refusal at a depth which appears to be inconsistent with the borings, probe piles or other nearby production piles, it may be necessary to replace the pile or reduce its capacity.

The installation of driven piles could adversely affect adjacent structures. Therefore, we recommend performing pre/post inspection surveys, settlement monitoring, and vibration monitoring on any structure within a minimum distance of 100 feet of pile driving or equal to 0.5 times the square root of the impact hammer energy, in foot pounds. These structures should be monitored during all pile driving activities. Construction operations should be immediately stopped if the maximum peak particle velocity (PPV) is reached, movement of the structure is detected, or damage of the existing structures is observed.

Pile Load Test: We recommend a dynamic load testing program using PDA, including the driving of several test piles (i.e., approximately 5% of total number of production piles) in production pile locations spaced across the site to provide an indication of the potential variability in driving conditions and to confirm that the required axial capacity can be achieved in these variable conditions with the contractor's pile driving equipment. The purpose of the test pile program is to provide the contractor recommended production pile driving criteria required across the site developed based on the results and subsequent analyses of test pile program.

Our experience with the PDA indicates that a significant cost savings (over static load testing of piles) may be realized if the PDA is properly utilized to monitor the installation as to pile driving stresses, capacities, and integrity.

Pile driving inspection is recommended for all production piles based on driving criteria developed based on the results of test pile program. Continuous driving and installation records should be maintained for each test and production pile for the geotechnical engineer's review.

Quality Control: An engineer or engineer's aide familiar with the installation of driven piles into subsurface soil conditions similar to those at this site and acting under the direction and supervision of the geotechnical engineer should witness the installation of the remaining production piles. His duties should include, but not be limited to, the following:

1. Verify that the pile or leads are either plumb or at correct batter prior to installation.
2. Keep an accurate record of pile installation and driving procedures.
3. Verify that all piles are installed to the proper driving resistance and to a depth indicative of the piles bearing in the desired bearing formation.
4. Confirm the pile driving equipment is operating properly.
5. Inspect the piles prior to installation for defects and confirm that the piles are not damaged during installation.

5.9 PAVEMENT CROSS SECTION DESIGN – Campground Roadway Alignment, Paved RV Sites & Parking Lot

General

A recommended flexible (asphalt) pavement section has been developed for this project based on our understanding of the existing subsurface conditions, review of applicable FDOT specifications, and the assumed loading conditions of 50,000 Equivalent Single-Axle Loads (ESALS) for heavy duty pavement areas and 25,000 Equivalent Single-Axle Loads (ESALS) for standard (light) duty pavement areas, with a 20-year design life. The terminal serviceability index and reliability for these pavement sections were assumed to be 2.0 and 85%, respectively. Traffic exceeding the stated criteria will require a heavier pavement section.

Flexible Pavements

We recommend a minimum compaction of at least 98 percent of the maximum dry density be specified for the base and Stabilized Subgrade courses as determined by the Modified Proctor test method (ASTM D-1557). A minimum separation of at least 24 inches between the bottom of an FDOT approved Crushed Limerock Base or GAB course and the seasonal high groundwater table should be maintained.

All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and FDOT requirements. A NOVA technician should observe placement and perform density testing of the stabilized subgrade and base course materials as well as asphalt. We recommend using the parameters shown for a flexible pavement section presented on the next page in Table 3 (Standard Duty) and in Table 4 (Heavy Duty) for the flexible pavement section designs for this project.

Table 3 – Recommended Standard Duty Flexible Pavement Section	
Asphaltic Concrete Structural Course (SuperPave SP-9.5 or SP-12.5)	1½ inch
FDOT Approved Crushed Limerock, Crushed Concrete, or Graded Aggregate Base (GAB) Material (minimum LBR of 100)	6 inches
Stabilized Subgrade Course (minimum LBR of 40)	12 inches
Table 4 – Recommended Heavy Duty Flexible Pavement Section (Primary Entrance, and areas where static wheel turning is required)	
Asphaltic Concrete Structural Course (such as a 9.5 or 12.5 mm SuperPave approved FDOT mix)	2½ inches
FDOT Approved Crushed Limerock, Crushed Concrete, or Graded Aggregate Base (GAB) Material (minimum LBR of 100)	8 inches
Stabilized Subgrade Course (minimum LBR of 40)	12 inches

Based on visual classification of the near-surface materials encountered in the pavement area test borings (P-1 through P-9), it appears that the native slightly silty sand, silty sand, and relatively clean sand (SP, SM, and SP-SM) soils may or may not meet the minimum LBR requirement of 40 for the Stabilized Subgrade Course (SSC), and therefore stabilization of the native subgrade soils could potentially be necessary (based on our experience, LBR values for the materials encountered typically range between about 30 and 45). An imported material having a minimum LBR value of 40 should be specified for the final (12-inch) lift of fill for pavement areas being installed over fill.

All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and Florida Department of Transportation. A NOVA technician should observe placement and perform density testing of the SSC, base course material and asphalt.

Rigid Pavements

We understand that a rigid (concrete) pavement section may also be employed for the proposed pavement areas planned as part of this development. Recommended heavy duty and light duty pavement sections have been developed for this project based on our understanding of the existing subsurface conditions, review of applicable FDOT specifications, and the assumed pavement design parameters stated previously. Our recommendations for slab thickness for standard duty and heavy-duty concrete pavements are also based on the subgrade soils being densified to a minimum soil density of at least 98 percent of the Modified Proctor test method (ASTM D-1557), and employment of a design modulus of subgrade reaction (k) equal to 150 pounds per cubic inch.

We recommend using the designs in Table 5 below for Standard Duty and Heavy-Duty concrete (rigid) pavement sections.

Table 5 - Recommended Rigid Pavement Sections		
STANDARD DUTY PAVEMENT SECTION		
Minimum Pavement Thickness	Maximum Control Joint Spacing	Recommended Saw-Cut Depth
5½ Inches	10 feet x 10 feet	1 ³ / ₈ Inches
HEAVY DUTY PAVEMENT SECTION		
Minimum Pavement Thickness	Maximum Control Joint Spacing	Recommended Saw-Cut Depth
8 Inches	12 feet x 12 feet	2 Inches

All concrete materials and placement should conform to applicable FDOT specifications. We recommend that a non-woven geotextile (about 3 feet wide) be placed beneath the construction joints to prevent upward "pumping" movement of soil fines through the joints.

The recommend using concrete with a minimum compressive strength of 4,000 psi and a minimum 28-day flexural strength (modulus of rupture) of at least 600 pounds per square inch, based on 3rd point loading of concrete beam test samples. All sections should be reinforced with #3 (3/8-in. diameter) rebar every 18-in OC. Layout of the sawcut control joints should form square panels, and the depth of sawcut joint should

be $\frac{1}{4}$ of the concrete slab thickness. The joints should be sawed within six hours of concrete placement or as soon as the concrete has developed sufficient strength to support workers and equipment.

We also recommend allowing NOVA to review and comment on the final concrete pavement design, including section and joint details (type of joints, joint spacing, etc.), prior to the start of construction. For further details on concrete pavement construction, please reference “Building Quality Concrete Parking Areas”, published by the Portland Cement Association.

6.0 LIMITATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at significantly later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for NOVA to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

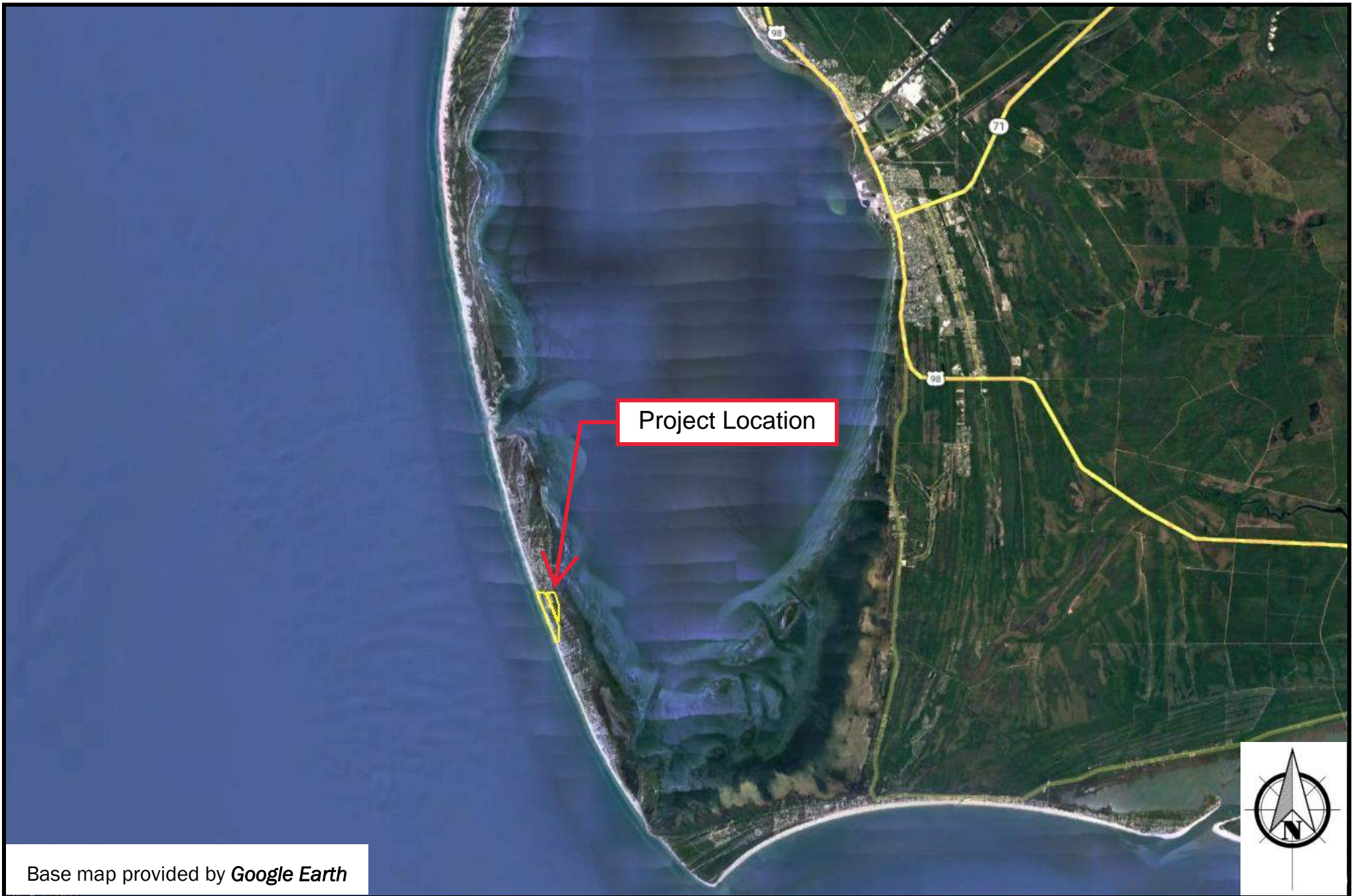
Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between test locations will differ from those encountered at specific test locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

This report is intended for the sole use of **CPH Consulting, Inc.** for the above noted project. The scope of work performed during this study may not satisfy other user's requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Florida. This warranty is in lieu of all other statements or warranties, either expressed or implied.

APPENDIX A

Figures and Maps



Base map provided by *Google Earth*

Scale: Not To Scale
Date Drawn: October 31, 2023
Drawn By: M. Keramidas
Checked By: W. Lawrence

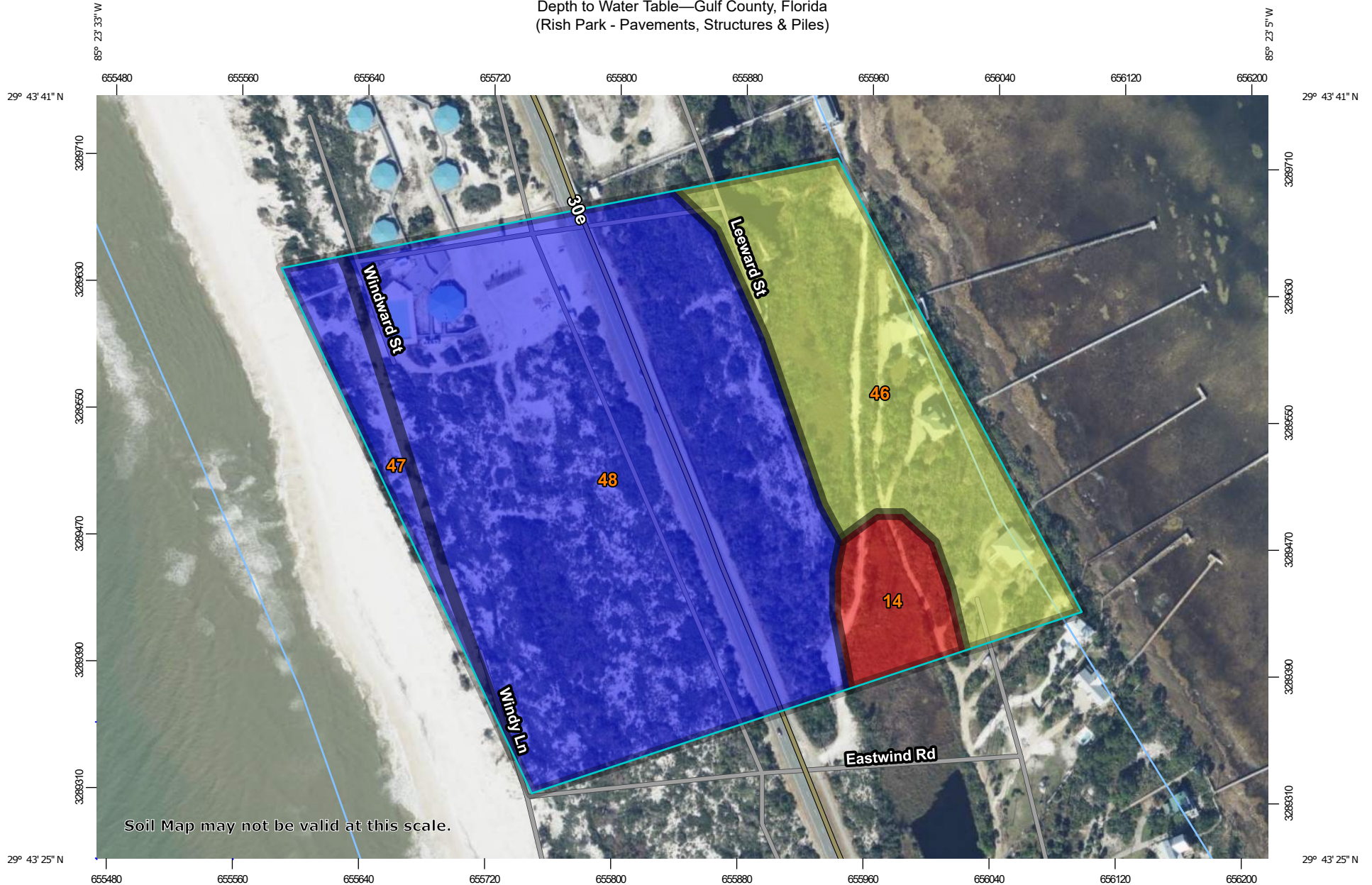


17612 Ashley Drive
Panama City Beach, Florida 32413
850.249.6682 ♦ 850.249.6683

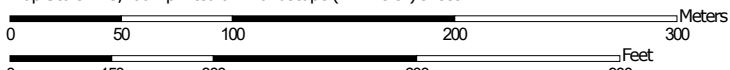
PROJECT LOCATION MAP

Rish Park – Pavements, Structures & Piles
Port Saint Joe, Gulf County, Florida
NOVA Project Number 10111-2023120-R1

Depth to Water Table—Gulf County, Florida
(Rish Park - Pavements, Structures & Piles)































Map Scale: 1:3,400 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84



MAP LEGEND

Area of Interest (AOI)	 Not rated or not available
Area of Interest (AOI)	
Soils	Water Features
Soil Rating Polygons	 Streams and Canals
 0 - 25	Transportation
 25 - 50	 Rails
 50 - 100	 Interstate Highways
 100 - 150	 US Routes
 150 - 200	 Major Roads
 > 200	 Local Roads
 Not rated or not available	Background
	 Aerial Photography
Soil Rating Lines	
 0 - 25	
 25 - 50	
 50 - 100	
 100 - 150	
 150 - 200	
 > 200	
 Not rated or not available	
Soil Rating Points	
 0 - 25	
 25 - 50	
 50 - 100	
 100 - 150	
 150 - 200	
 > 200	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Gulf County, Florida
Survey Area Data: Version 20, Aug 24, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 2, 2020—Dec 8, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
14	Duckston-Duckston depressional complex, frequently flooded	8	1.6	5.3%
46	Corolla-Duckston complex, gently undulating, flooded	59	7.4	24.4%
47	Newhan-Corolla complex, 2 to 30 percent slopes	>200	1.5	4.8%
48	Kureb-Corolla complex, rolling	>200	19.9	65.4%
Totals for Area of Interest			30.4	100.0%

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Gulf County, Florida

46—Corolla-Duckston complex, gently undulating, flooded

Map Unit Setting

National map unit symbol: 1lfj1

Elevation: 0 to 20 feet

Mean annual precipitation: 59 to 67 inches

Mean annual air temperature: 64 to 72 degrees F

Frost-free period: 265 to 295 days

Farmland classification: Not prime farmland

Map Unit Composition

Corolla and similar soils: 50 percent

Duckston and similar soils: 40 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Corolla

Setting

Landform: Rises on dunes on marine terraces on coastal plains

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: sand

CAb - 4 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: Rare

Frequency of ponding: None

Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 20.0

Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A/D

Ecological site: F152AY200FL - Central Coastal Adjacent Ridges and Rises

Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G152AA131FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G152AA131FL)

Hydric soil rating: No

Description of Duckston

Setting

Landform: Flats on marine terraces, depressions on marine terraces, swales on marine terraces

Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Parent material: Sandy marine deposits

Typical profile

A - 0 to 2 inches: sand

Cg - 2 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 20.0

Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: F152AY215FL - Central Coastal Adjacent Flooded Interdunal Flats

Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G152AA145FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G152AA145FL)

Hydric soil rating: Yes

Minor Components

Kureb

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, dunes on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F152AY205FL - Central Coastal Adjacent Dune
Other vegetative classification: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G152AA113FL)
Hydric soil rating: No

Bayvi

Percent of map unit: 5 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F152AY220FL - Central Coastal Adjacent Tidal Zones
Other vegetative classification: Forage suitability group not assigned (G152AA999FL)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Gulf County, Florida
Survey Area Data: Version 20, Aug 24, 2023

Gulf County, Florida

48—Kureb-Corolla complex, rolling

Map Unit Setting

National map unit symbol: 1lfjn
Elevation: 0 to 30 feet
Mean annual precipitation: 59 to 67 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 265 to 295 days
Farmland classification: Not prime farmland

Map Unit Composition

Kureb and similar soils: 65 percent
Corolla and similar soils: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kureb

Setting

Landform: Ridges on marine terraces, dunes on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian deposits or sandy fluvial or marine deposits

Typical profile

A - 0 to 2 inches: fine sand
E/B - 2 to 35 inches: fine sand
C - 35 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Ecological site: F152AY205FL - Central Coastal Adjacent Dune
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G152AA113FL)
Other vegetative classification: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G152AA113FL)
Hydric soil rating: No

Description of Corolla

Setting

Landform: Rises on dunes on marine terraces on coastal plains
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
CAb - 4 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A/D
Ecological site: F152AY200FL - Central Coastal Adjacent Ridges and Rises
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G152AA131FL)
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G152AA131FL)
Hydric soil rating: No

Minor Components

Duckston

Percent of map unit: 3 percent
Landform: Flats on marine terraces, depressions on marine terraces, swales on marine terraces
Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F152AY215FL - Central Coastal Adjacent Flooded
Interdunal Flats
Other vegetative classification: Sandy soils on stream terraces,
flood plains, or in depressions (G152AA145FL)
Hydric soil rating: Yes

Duckston, depressional




Percent of map unit: 2 percent
Landform: Flats on marine terraces, depressions on marine
terraces, swales on marine terraces
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F152AY215FL - Central Coastal Adjacent Flooded
Interdunal Flats
Other vegetative classification: Sandy soils on stream terraces,
flood plains, or in depressions (G152AA145FL)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Gulf County, Florida
Survey Area Data: Version 20, Aug 24, 2023



LEGEND

-  25' SPT Boring Locations (B-1 through B-5)
-  20' SPT Boring Locations (B-6 and B-7)
-  5' Auger Boring Locations (P-1 through P-9)

Base map provided by Google Earth

Scale: Not To Scale

Date Drawn: November 3, 2023

Drawn By: M. Keramidas

Checked By: W. Lawrence



17612 Ashley Drive
Panama City Beach, Florida 32413
850.249.NOVA(6682) ♦ 850.249.6683

BORING LOCATION PLAN

Rish Park – Pavements, Structures & Piles






Port Saint Joe, Gulf County, Florida

NOVA Project Number 10111-2023120-R1

APPENDIX B

Subsurface Data

SYMBOLS AND ABBREVIATIONS

<u>SYMBOL</u>	<u>DESCRIPTION</u>
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW Well-graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GP Poorly graded gravels and gravel-sand mixtures, little or no fines
			GM Silty gravels and gravel-sand-silt mixtures
		SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve
	SANDS with 12% or more passing No. 200 sieve		SW** Well-graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SP** Poorly graded sands and gravelly sands, little or no fines
SANDS with 12% or more passing No. 200 sieve	SM** Silty sands, sand-silt mixtures		
	SANDS with 12% or more passing No. 200 sieve	SC** Clayey sands, sand-clay mixtures	
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*		SILTS AND CLAYS Liquid limit 50% or less	ML Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
	CL Inorganic clays of low to medium plasticity, gravelly clays, sandy 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 diamicaceous fine sands or silts, elastic silts	
		CH Inorganic clays or clays of high plasticity, fat clays	
		OH Organic clays of medium to high plasticity	
PT Peat, muck and other highly organic soils			

*Based on the material passing the 3-inch (75 mm) sieve

** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY

(Sands and Gravels)

Very loose – Less than 4 Blow/Foot
 Loose – 4 to 10 Blows/Foot
 Medium Dense – 11 to 30 Blows/Foot
 Dense – 31 to 50 Blows/Foot
 Very Dense – More than 50 Blows/Foot

CONSISTENCY

(Sils and Clays)

Very Soft – Less than 2 Blows/Foot
 Soft – 2 to 4 Blows/Foot
 Medium Stiff – 5 to 8 Blows/Foot
 Stiff – 9 to 15 Blows/Foot
 Very Stiff – 16 to 30 Blows/Foot
 Hard – More than 30 Blows/Foot

RELATIVE HARDNESS

(Limestone)

Soft – 100 Blows for more than 2 Inches
 Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample

Trace – 5% or less
 With Silt or With Clay – 6% to 11%
 Silty or Clayey – 12% to 30%
 Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample

Trace – Less than 3%
 Few – 3% to 4%
 Some – 5% to 8%
 Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample

Trace – 5% or less
 Few – 6% to 12%
 Some – 13% to 30%
 Many – 31% to 50%



TEST BORING RECORD B-1

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 7 feet EST. SHGW DEPTH: 6 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) 		
0		Loose to very dense grey and brown to dark brown to grey fine-grained SAND with trace organics (SP)							
4									
10									
13									
11									
14									
15									
69									
73									

Note: Boring Terminated at 25 feet

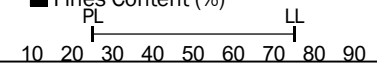


TEST BORING RECORD B-2

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 5.5 feet EST. SHGW DEPTH: 4.5 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0		Loose to very dense grey and brown fine-grained SAND (SP)		 4.5 feet (EST. SHGW DEPTH)			
						4	●
						8	●
5						11	●
						11	●
						11	●
10							
						46	■
						46	▲
						46	●
15							
		51	●				
20							
		44	●				
25							



Note: Boring Terminated at 25 feet



TEST BORING RECORD B-3

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 5.5 feet EST. SHGW DEPTH: 4.5 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0		Loose to very dense grey and brown to dark brown to grey and brown fine-grained SAND with few organics (SP)		▽ ▽			
5							
8							
10							
12							
13							
27							
46							
96							

Note: Boring Terminated at 25 feet

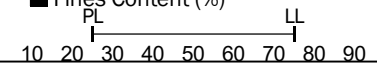


TEST BORING RECORD B-4

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 5 feet EST. SHGW DEPTH: 4 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) 	
0		Loose to very dense grey and brown to dark brown to grey fine-grained SAND (SP)						
						8	●	
						13	●	
5						14	●	
						14	●	
						16	●	
						26	■	▲
						65	●	
						85	●	
25						Boring Terminated at 25 feet		



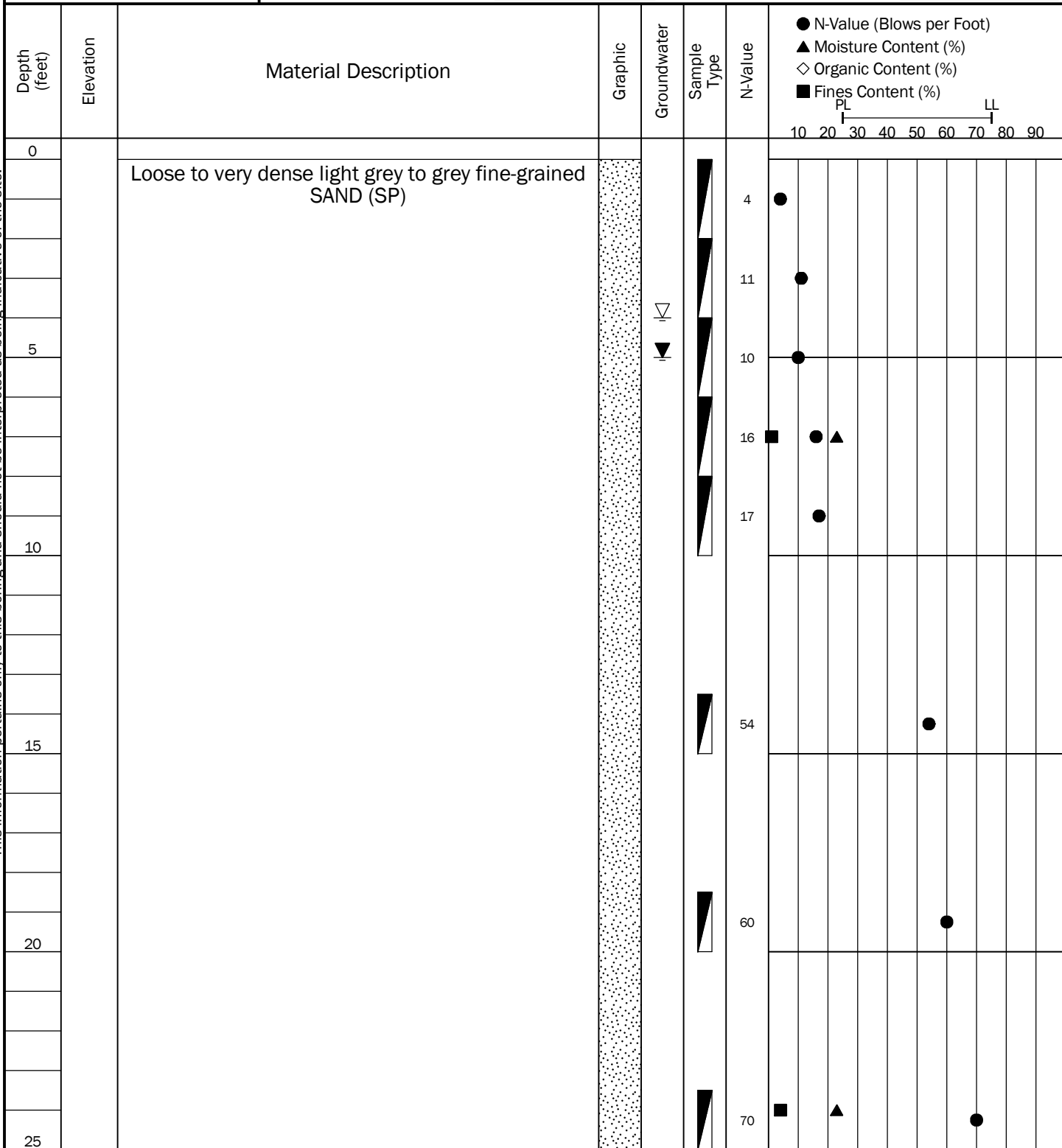
Note: Boring Terminated at 25 feet



TEST BORING RECORD B-5

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 5 feet EST. SHGW DEPTH: 4 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.



Note: Boring Terminated at 25 feet

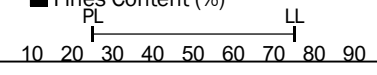


TEST BORING RECORD B-6

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 0.1 feet EST. SHGW DEPTH: 0 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0		Very loose to very dense brown and grey to dark grey to grey fine-grained SAND with trace organics (SP)					
4							
12							
21							
20							
22							
71							
52							
26							
27							
2							
5							
64							
30							



Note: Boring Terminated at 50 feet



TEST BORING RECORD B-7

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Mud Rotary HAMMER: Manual
 INITIAL GW DEPTH: 0.4 feet EST. SHGW DEPTH: 0 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	Soil Properties			
							● N-Value (Blows per Foot)	▲ Moisture Content (%)	◇ Organic Content (%)	■ Fines Content (%)
0		Loose to very dense grey fine-grained SAND (SP)				4				
5						12				
10						13				
15						25				
20						33				
25						59				
30						40				
35						37				
40						32				
45						2				
50						5				
						28				
						31				
		2								
		5								
		28								
		31								

Note: Boring Terminated at 50 feet



TEST BORING RECORD P-1

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Hand Auger HAMMER: Manual
 INITIAL GW DEPTH: ▼ GNE feet EST. SHGW DEPTH: ▽ GNE feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0		Light grey brown fine-grained silty SAND (SM)					
		Light grey brown fine-grained SAND (SP)					
5		Boring Terminated at 5 feet					

Note: Boring Terminated at 5 feet



TEST BORING RECORD P-3

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
 PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
 PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
 LOCATION: See Boring Location Plan ELEVATION: Existing Grade
 DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
 DRILLING METHOD: Hand Auger HAMMER: Manual
 INITIAL GW DEPTH: ▼ GNE feet EST. SHGW DEPTH: ▽ GNE feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0		Light brown fine-grained slightly silty SAND with rocks (SP-SM)					
		Light brown to grey fine-grained SAND (SP)					
5		Boring Terminated at 5 feet					

Note: Boring Terminated at 5 feet



TEST BORING RECORD P-6

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
DRILLING METHOD: Hand Auger HAMMER: Manual
INITIAL GW DEPTH: 3 feet EST. SHGW DEPTH: 2 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) PL LL 10 20 30 40 50 60 70 80 90													
0		Light grey brown fine-grained SAND (SP)																		
5		Boring Terminated at 5 feet																		

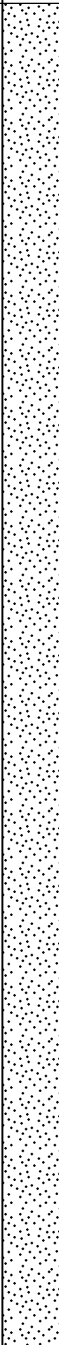



Note: Boring Terminated at 5 feet



TEST BORING RECORD P-8

PROJECT NAME: Rish Park - Pavements, Structures & Piles DATE: 10/17/2023
PROJECT NO.: 2023120-R1 CLIENT: CPH Consulting, Inc.
PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLED BY: L. Griffin LOGGED BY: M. Keramidas
DRILLING METHOD: Hand Auger HAMMER: Manual
INITIAL GW DEPTH: 5 feet EST. SHGW DEPTH: 4 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) PL LL 10 20 30 40 50 60 70 80 90													
0		Light grey brown fine-grained SAND (SP)																		
5																				

Note: Boring Terminated at 5 feet



TEST BORING RECORD P-9

PROJECT NAME: Rish Park - Pavements, Structures & Piles **DATE:** 10/17/2023
PROJECT NO.: 2023120-R1 **CLIENT:** CPH Consulting, Inc.
PROJECT LOCATION: Port Saint Joe, Gulf County, Florida
LOCATION: See Boring Location Plan **ELEVATION:** Existing Grade
DRILLED BY: L. Griffin **LOGGED BY:** M. Keramidas
DRILLING METHOD: Hand Auger **HAMMER:** Manual
INITIAL GW DEPTH: ▼ GNE feet **EST. SHGW DEPTH:** ▽ GNE feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	<ul style="list-style-type: none"> ● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0		Light grey brown to light brown fine-grained SAND (SP)					
5		Boring Terminated at 5 feet					

Note: Boring Terminated at 5 feet

APPENDIX C

Laboratory Data

SUMMARY OF CLASSIFICATION & INDEX TESTING

Rish Park – Pavements, Structures & Piles
 Port Saint Joe, Gulf County, Florida
 NOVA Project Number 10111-2023120-R1

Boring Number	Sample Depth (ft)	Natural Moisture (%)	Percent (%) Passing Sieve #200	Percent Organic (%)	USCS Soil Classification
B-1	2 - 4	3	1	0	SP
B-1	13 ½ - 15	25	1	2	SP
B-2	0 - 2	3	0	N/A	SP
B-2	13 ½ - 15	24	4	N/A	SP
B-3	4 - 6	12	1	N/A	SP
B-3	13 ½ - 15	26	1	3	SP
B-4	0 - 2	3	1	0	SP
B-4	13 ½ - 15	28	2	0	SP
B-5	6 - 8	23	1	N/A	SP
B-5	23 ½ - 25	23	4	N/A	SP
B-6	0 - 2	27	1	1	SP
B-6	2 - 4	24	1	N/A	SP
B-7	4 - 6	50	2	1	SP
B-7	8 - 10	17	1	N/A	SP
B-7	33 ½ - 35	39	91	N/A	CL
P-1	0 - 1	14	17	0	SM
P-2	1 - 2	4	0	N/A	SP
P-3	0 - 1	6	7	2	SP-SM
P-4	1 - 2	5	2	0	SP
P-5	0 - 1	8	5	2	SP
P-6	5 - 6	20	0	0	SP
P-7	0 - 1	4	0	N/A	SP
P-8	5 - 6	21	0	N/A	SP
P-9	2 - 3	6	0	0	SP

APPENDIX D

Support Documents

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 your GBC-Member geotechnical engineer for more information.



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