NOVA
ENGINEERING AND
ENVIRONMENTAL

REPORT OF
SUBSURFACE EXPLORATION AND
GEOTECHNICAL ENGINEERING EVALUATION

WEST NAVARRE INTERMEDIATE SCHOOL
BUILDING ADDITIONS
Navarre – Santa Rosa County, Florida

Prepared For:

SANTA ROSA COUNTY SCHOOL DISTRICT
C/O PINDER MARTIN ASSOCIATES, INC.
1001 North 12th Avenue
Pensacola, Florida 32501

NOVA Project Number: 7210071

August 31, 2011

NOVA ENGINEERING AND ENVIRONMENTAL

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August 31, 2011

SANTA ROSA COUNTY SCHOOL DISTRICT
c/o Mr. Mike Martin
Pinder-Martin Associates, Inc.
1001 North 12th Avenue
Pensacola, Florida 32501

Subject: Report of Subsurface Exploration and
Geotechnical Engineering Evaluation
CLASSROOM ADDITIONS FOR WEST NAVARRE INTERMEDIATE SCHOOL
Navarre – Santa Rosa County, Florida
NOVA Project Number 7210071

Dear Mr. Martin:

NOVA Engineering and Environmental, LLC (NOVA) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the proposed West Navarre Intermediate Building Additions project located in Navarre – Santa Rosa County, Florida. The work was performed in general accordance with NOVA Proposal Number 08126-G dated August 22, 2011 and in general accordance with industry standards.

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

Richard D. Zion, E.I.
Staff Engineer
Florida Registration No. 1100013724

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

WILLIAM LEE LAWRENCE, JR
LICENSE
No. 60147
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Copies Submitted: via electronic mail service

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APPENDIX

EXECUTIVE SUMMARY

A brief summary of pertinent findings, conclusions and recommendations are presented below. This information should not be utilized in design or construction without reading all of the recommendations presented in the text and Appendix of this report.

GENERAL

- Our field exploration at the subject site included two (2) soil test borings (STBs) drilled within the proposed addition footprints that were each advanced to a depth of approximately 20 feet below the existing ground surface. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

- The subsurface soils encountered during our field exploration consisted primarily of very loose to dense, off-white to dark brown fine-grained sand to silty fine-grained sand with organic materials (USCS classifications of SP, SP-SM, SM, and SM/SC) to the maximum depth explored of roughly 20 feet below existing grade. We note that a very soft sandy peat material (USCS classification of PT) was also encountered in Boring B-1 from about 17 feet below existing grade to the bottom of the 20 foot deep boring.

  Subsurface conditions are described in greater detail on the attached Log of Boring Records.

SITE PREPARATION

- We recommend stripping and grubbing the proposed construction areas to remove all vegetation, root systems, and other deleterious materials, as well as relocating/abandoning as appropriate any subsurface utilities currently traversing the areas. The subgrade soils exposed at the stripped grade elevation should be compacted to 95 percent of the maximum dry density determined by the modified Proctor test (ASTM D-1557), and the excavations should then be backfilled to the desired finished subgrade elevation(s) with structural fill compacted to 95 percent of the maximum dry density determined by the modified Proctor test (ASTM D-1557).

- We recommend densifying (compacting) the in-situ subsoils as specified in this report to a depth of at least 2 feet below the proposed foundation bearing levels. A geotechnical engineer should also carefully evaluate all subgrades prior to foundation and slab-on-grade construction to confirm compliance with this report; evaluate geotechnical sections of the plans and specifications for the overall project; and provide additional recommendations that may be required.

- Compaction of the exposed subgrade soils recommended above should be accomplished either with self-propelled portable compaction equipment (e.g., a jumping jack or mechanical plate tamp), or with a steel drum roller operating in the static mode, due to the close proximity of the existing school structure.

GROUNDWATER CONTROL

- Groundwater was encountered at a depth of approximately 6 feet below existing grade at the boring locations at the time of drilling. Depending on final site grades, seasonal high groundwater levels at areas of the site undergoing construction, and the assumed maximum excavation depths at the site, groundwater could potentially impact the planned near surface construction (most especially for subsurface utility excavations). Dewatering methods may be needed to perform the construction in the dry.

FOUNDATION RECOMMENDATIONS

- After the recommended site/subgrade preparation and fill placement, we recommend that the proposed structure additions be supported on conventional shallow foundation systems bearing upon naturally occurring soils and/or compacted structural fill. Foundations may be designed for a maximum bearing pressure of **2,000 pounds per square foot (psf).** We note that the building addition foundations should be structurally isolated from the existing structure foundations to reduce the potential for structural damage caused by differential settlements between the two structures. Flexible connections for subsurface utility tie-ins should also be utilized for this project.

INTRODUCTION

PROJECT INFORMATION

Our understanding of the proposed development is based on recent conversations and email exchanges with Mr. Mike Martin of Pinder-Martin Associates; review of supporting conceptual drawings provided by Pinder-Martin Associates; review of aerial photography of the site via internet-based GIS software; a site reconnaissance performed on August 25th and our recent experience providing similar geotechnical services in this locale.

NOVA understands the project will consist of the construction of single-story, steel-, concrete- and masonry-framed classroom additions that are planned to extend from the northern end of the existing primary school structure at two locations. Foundation support for the proposed building additions is anticipated to be conventional isolated shallow spread and continuous strip perimeter footings. We assume bearing loads are on the order of 75 kips for concentrated column loads and 5 kips per foot for wall loads. We assume finish site grades will not change greater than +/- 3 feet from existing grades. If these assumptions are not accurate please advise us so that we may adjust our conclusions and recommendations as appropriate.

Please note; this exploration is limited to the structural foundation support aspects of the proposed building additions to the aforementioned existing school; hence, additional information regarding overall site development is not relevant.

SCOPE OF WORK

Santa Rosa County School District engaged NOVA to provide geotechnical engineering consulting services for the proposed West Navarre Intermediate School – Building Additions project. This report briefly discusses our understanding of the project, describes our exploratory procedures and presents our findings, conclusions, and recommendations.

The primary objective of this study was to provide a geotechnical exploration of the near surface soils within the areas of the proposed construction 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, two (2) soil test borings (STBs) and sampling, engineering evaluation of the field data, and the preparation of this report. The boring locations are shown on the attached Boring Location Plan. Our services were performed in general accordance with industry standards.

The assessment of site environmental conditions, including the presence of wetlands or detection of pollutants in the soil, rock or groundwater, laboratory testing of samples, or a site-specific seismic study was beyond the scope of this geotechnical study. If requested, NOVA can provide these services.

SITE DESCRIPTION

GENERAL

The subject project site is located at the existing West Navarre Intermediate School campus at 1970 Cotton Bay Lane in Navarre – Santa Rosa County, Florida. We note that the proposed addition areas are currently partially developed and vegetated with short grasses. The site topography is relatively level in the area of the proposed construction. Surrounding areas are developed residential areas with an undeveloped wooded area to the north.

GEOLOGY / HYDROLOGY

Site and Area Geology

The site is located in 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.

Groundwater

Groundwater in the Gulf Coastal Plain typically occurs as an unconfined aquifer condition. 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. The groundwater table is expected to be a subdued replica of the original surface topography. Based on a review of topographic maps and our visual site observations, we anticipate the groundwater flow at the site to be towards the north east.

FIELD & LABORATORY PROCEDURES

FIELD EXPLORATION

Boring locations were established in the field by NOVA personnel using the provided site plan, and estimating distances and angles from site landmarks. Consequently, referenced boring locations are approximate. If the client desires increased accuracy, NOVA recommends that the boring locations and elevations be surveyed.

Our field exploration at the subject site included two (2) soil test borings (STBs) performed within the proposed building addition footprints and were each advanced to a depth of approximately 20 feet below the existing ground surface. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

The Log of Boring Records in the Appendix present the soil conditions encountered, and show the standard penetration test (SPT) resistances or "N" values, which provide an indication of the relative densities of the materials encountered. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the samples, 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. Also, subsurface conditions intermediate of each boring location may vary.

The groundwater levels reported on the Log of Boring Records represent measurements made at the completion of the borings. The borings were backfilled with soil cuttings at the completion of the field exploration for safety concerns. The approximate location of each boring is depicted on the Boring Location Plan in the Appendix. Please refer to the Log of Boring Records included in the Appendix for subsurface conditions at the specific boring location.

LABORATORY TESTING

Split-barrel samples were returned to our testing laboratory, where they were classified using visual/manual methods in accordance with the Unified Soil Classification System (USCS) and ASTM designations. The descriptions presented in the boring logs should be considered approximate.

Further laboratory testing was beyond the scope of this exploration.

SUBSURFACE CONDITIONS

SOIL CONDITIONS

The following paragraphs provide generalized descriptions of the subsurface profiles and soil conditions encountered by the borings conducted during this study. The Log of Boring Records in the Appendix should be reviewed to provide detailed descriptions of the conditions encountered at each boring location. Conditions may vary at other locations and times.

The subsurface soils encountered during our field exploration consisted primarily of very loose to dense, off-white to dark brown fine-grained sand to silty fine-grained sand with organic materials (USCS classifications of SP, SP-SM, SM, and SM/SC) to the maximum depth explored of roughly 20 feet below existing grade. We note that a very soft sandy peat material (USCS classification of PT) was also encountered in Boring B-1 from about 17 feet below existing grade to the bottom of the 20 foot deep boring.

Subsurface conditions are described in greater detail on the attached Log of Boring Records.

GROUNDWATER CONDITIONS

Groundwater was encountered in the test borings at a depth of approximately 6 feet below existing grade at the time of our subsurface exploration. Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors. Groundwater levels in the Santa Rosa County area are typically lowest in the late spring and the late fall and highest in the mid-summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on our understanding of the proposed construction, our site observations, our interpretation of the field data obtained during this exploration, our experience with similar projects, and generally accepted geotechnical engineering principles and practices.

Subsurface conditions in unexplored locations or at other times may vary from those encountered at specific boring locations. 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 deemed necessary.

As previously noted, boring locations were established by estimating distances and angles from site landmarks. If the client desires increased accuracy, we recommend that the boring locations and elevations be surveyed.

SITE GRADING

Site Preparation

Prior to proceeding with construction, all vegetation, root systems, and other deleterious non-soil materials should be stripped and grubbed from the proposed construction areas. NOVA suggests any existing utility locations should be reviewed to assess their impact on the proposed construction, and should be relocated, removed, or abandoned in place as appropriate.

After clearing and stripping, a NOVA geotechnical engineer should carefully evaluate the exposed soils. The existing soils should be compacted and densified to approximately 2 feet below the planned foundation bearing using multiple passes with a static (non-vibratory) surface roller. The soils should be compacted to at least 95 percent of the maximum dry density 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.

Fill Placement

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. Fill materials with fines contents between 12 and 25 percent can also be utilized with specific approval from the project geotechnical engineer, but strict moisture control will be required for these materials during placement and compaction operations.

Based on visual examination, the existing soils encountered during this exploration appear suitable for reuse as structural fill. Fill materials that contain organic debris are not suitable for reuse as structural fill. Prior to construction, bulk samples of the proposed fill materials should be laboratory tested to confirm their suitability.

Fill should be placed in thin, horizontal loose lifts (maximum 12-inch) and compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557). Fill materials used in structural areas should have a target maximum dry density of 95 pcf or greater. 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. Soils excavated from below the water table will likely require significant efforts to adjust the moisture contents prior to reuse as fill.

A NOVA soils technician, who can assess suitability of materials used, and uniformity and appropriateness of compaction efforts, should observe all filling and subgrade preparation. Field tests, using thin-wall tube, nuclear or sand cone testing methods (ASTM D 2937, D2922, or D1556 respectively) should also be performed. One test per 2,000 square feet and each lift of fill are recommended, with test locations well distributed throughout the fill mass. When filling in small areas, at least one test per day per area should be required. One test at conventional spread foundations and one test per 75 linear feet at continuous strip foundations are also recommended.

GROUNDWATER CONTROL

Groundwater was encountered in the test borings at a depth of approximately 6 feet below existing grade at the time of our field exploration. As previously noted, groundwater levels are subject to seasonal, climatic, and other variations and may be different at other times and locations. This geotechnical study was performed during a period of below normal rainfall. Depending on final site grades, seasonal high groundwater levels at areas of the site undergoing construction, and the assumed maximum excavation depths at the site, groundwater could potentially impact the planned near surface construction (most especially for subsurface utility excavations). Dewatering methods may be needed to perform the construction in the dry.

FOUNDATION RECOMMENDATIONS

NOVA understands the project will consist of the construction of single-story, steel-, concrete- and masonry-framed classroom additions that are planned to extend from the northern end of the existing primary school structure at two locations. Foundation support for the proposed building additions is anticipated to be conventional isolated shallow spread and continuous strip perimeter footings. We assume bearing loads are on the order of 75 kips for concentrated column loads and 5 kips per foot for wall loads. We assume finish site grades will not change greater than +/- 3 feet from existing grades. If these assumptions are not accurate please advise us so that we may adjust our conclusions and recommendations as appropriate.

After the recommended site and subgrade preparation and fill placement, we recommend conventional shallow foundation systems consisting of isolated spread and continuous strip perimeter footings and/or turn-down slab-on-grade construction be used to support the proposed structure additions. Foundations bearing on densified existing soils and/or compacted structural fill, as recommended in this report, may be designed for a maximum allowable bearing pressure of **2,000 pounds per square foot (psf).**

We note that the building addition foundations should be structurally isolated from the existing structure foundations to reduce the potential for structural damage caused by differential settlements between the two structures. Flexible connections for subsurface utility tie-ins should also be utilized for this project.

We recommend minimum footing widths of 24 inches for ease of construction and to reduce the possibility of localized shear failures. Exterior footing bottoms should be at least 18 inches below exterior grades.

Settlements for spread foundations bearing on the aforementioned improved materials have been assessed using SPT values to estimate elastic modulus, published correlations and previous NOVA experience. Based on the assumed loading and strict adherence to the soil improvement recommendations stated in this report, we estimate total post-construction settlements will be less than 1 inch, with less than ½ the total settlement being differential between adjoining foundations.

Foundation excavations should be level and free of debris, ponded water, mud, loose, or water-softened soils. All foundation excavations should be evaluated by the geotechnical engineer prior to reinforcing steel placement to observe foundation subgrade preparation and assess bearing pressure capacity. Due to variable site subsurface and construction conditions, some adjustments in isolated foundation bearing pressures, depth of foundations or undercutting and replacement with controlled structural fill may be necessary. 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 saturated soil. If a foundation excavation remains open overnight, or if precipitation is imminent, a 3 to 4 inch thick "mud mat" of lean concrete should be placed in the bottom of the footing to protect the bearing soils until reinforcing steel and concrete can be placed.

SLABS-ON-GRADE

The conditions exposed at subgrade levels will vary across the site and may include structural fill or densified in-situ soils. Slabs-on-grade may be adequately supported on these subgrade conditions subject to the recommendations in this report. Slabs-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 slabs, provided that the slab is at least 2 feet above the high groundwater level. An impermeable vapor barrier is recommended beneath finished spaces to reduce dampness.

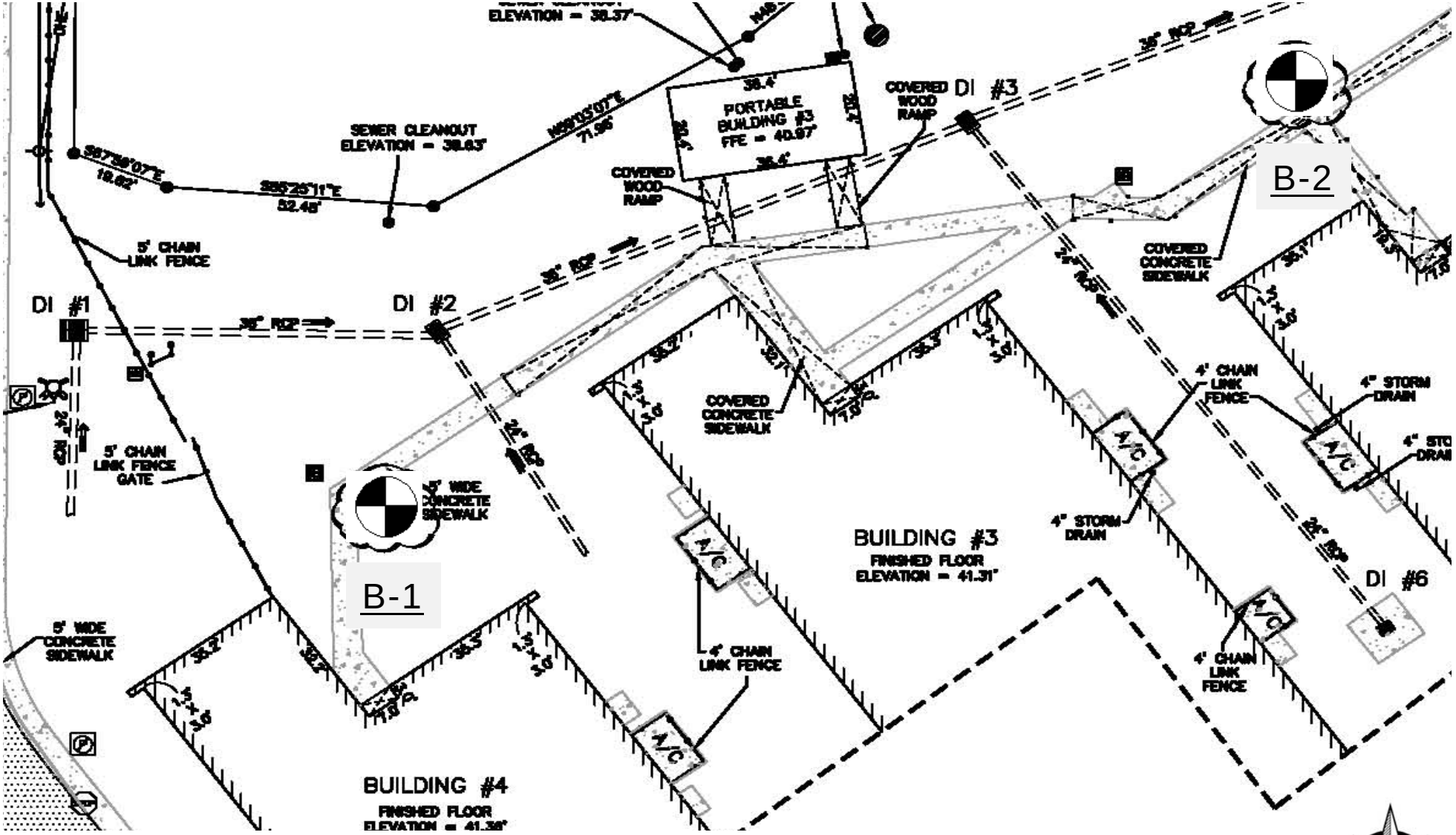
Once grading is completed, the subgrade can be exposed to adverse construction activities and weather conditions during the period of sub-slab utility installation. The subgrade should be well drained to prevent the accumulation of water. If the exposed subgrade becomes unstable, excessively wet or exhibits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

CONSTRUCTION OBSERVATIONS

Shallow Foundations

Foundation excavations should be level and free of debris, ponded water, mud, and loose, frozen or water-softened soils. All foundation excavations should be evaluated by the geotechnical engineer prior to reinforcing steel placement to observe foundation subgrade preparation and assess bearing pressure capacity. Due to variable site subsurface and construction conditions, some adjustments in isolated foundation bearing pressures, depth of foundations or undercutting and replacement with controlled structural fill may be necessary.

APPENDIX



LEGEND

Soil Test Boring (B-1) Proposed Structural Location

Base map provided by ***Pinder Martin & Associates.***

Scale: NTS	NOVA ENGINEERING AND ENVIRONMENTAL	**Boring Location Plan**
Date Drawn: August 30, 2011	17749 Ashley Drive, Suite B Panama City Beach, Florida 32413 850.249.NOVA(6682) ♦ 850.249.6683	**West Navarre Intermediate School**
Drawn By: R. Zion		Navarre – Santa Rosa County, Florida
Checked By: W. Lawrence		*NOVA Project Number7211071*

Soil Map—Santa Rosa County, Florida
(West Navarre Intermediate School)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:3,000 if printed on A size (8.5" × 11") sheet.

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 accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

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

Soil Survey Area: Santa Rosa County, Florida
Survey Area Data: Version 8, Feb 1, 2010

Date(s) aerial images were photographed: 9/16/2007

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.

Map Unit Legend

Santa Rosa County, Florida (FL113)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
24	Leon sand, 0 to 2 percent slopes	7.5	17.1%
33	Ortega sand, 0 to 5 percent slopes	12.4	28.4%
34	Pactolus loamy sand, 0 to 5 percent slopes	9.6	22.0%
35	Pickney loamy sand	0.8	1.8%
40	Rutlege loamy sand	13.5	30.7%
Totals for Area of Interest		**43.8**	**100.0%**

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KEY TO BORING LOGS

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
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
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			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
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SIOLS 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
(Silts and Clays)
Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Firm – 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%

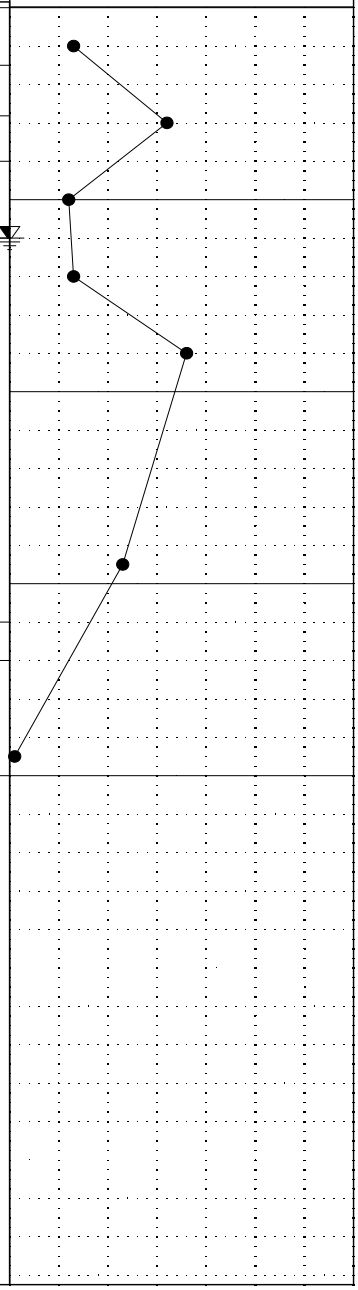
Project: West Navarre Intermediate School Building Additions
Project Location: Navarre, Santa Rosa County, Florida
Project Number: 7211071

LOG OF BORING
B-1
Page 1 of 1

Date(s) Drilled: **August 29, 2011**	Drill Bit Size/Type: **2-inch Soil Bit**	Logged by: **W. Lawrence**
Drilled By: **B. Kinsella**	Sampling Method: **Split Spoon**	Checked by: **R. Zion**
Drill Rig Type: **KINCO (Trailor Mounted)**	Total Depth of Boring: **20 Feet**	Approximate Surface Elevation: **Existing Grade**
Drilling Method: **SPTB**	Boring Backfill: **Soil Cuttings**	Vertical Datum: **Existing Site Grade**
Hammer Data: Weight **140 lbs.** Drop **30 in.**	Groundwater Level: **6 Feet**	Location: **Per Boring Location Plan**

Depth, feet	Sample Type	Sample Number	Sampling Resistance Blows/foot (N-value)	Consistency/ Relative Density	USCS-AASHTO	Material Description
0		1	13	MEDIUM DENSE	SP-SM	Brown/gray fine-grained SAND with silt, with roots and traces of gravel
		2	32	DENSE	SM/SC	Red/orange fine-grained slightly clayey silty SAND (old pavement base material)
					SP	Tan fine-grained SAND
5		3	12	MEDIUM DENSE	SP	Off-white fine-grained SAND
		4	13	MEDIUM DENSE	SP	
		5	36	DENSE		
10						
		6	23	MEDIUM DENSE		
15					SP	Gray/brown fine-grained SAND with slight organic stain
					PT	Dark brown/black sandy PEAT with natural wood fibers
		7	1	VERY SOFT		
20						Boring Terminated at 20 Feet
25						
30						

TEST RESULTS
N-VALUE ●
PLASTICITY INDEX ⊢⊣ LIQUID LIMIT
NATURAL MOISTURE % ■
% <200 ▲
ORGANIC % ◇
10 20 30 40 50 60



REMARKS AND OTHER TESTS:

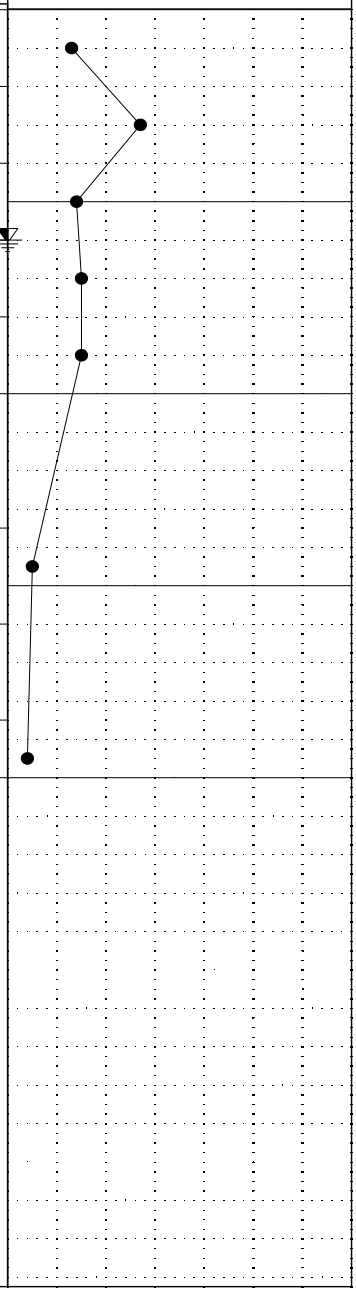
NOVA ENGINEERING AND ENVIRONMENTAL

Project: West Navarre Intermediate School Building Additions
Project Location: Navarre, Santa Rosa County, Florida
Project Number: 7211071

LOG OF BORING
B-2

Date(s) Drilled: **August 29, 2011**	Drill Bit Size/Type: **2-inch Soil Bit**	Logged by: **W. Lawrence**
Drilled By: **B. Kinsella**	Sampling Method: **Split Spoon**	Checked by: **R. Zion**
Drill Rig Type: **KINCO (Trailor Mounted)**	Total Depth of Boring: **20 Feet**	Approximate Surface Elevation: **Existing Grade**
Drilling Method: **SPTB**	Boring Backfill: **Soil Cuttings**	Vertical Datum: **Existing Site Grade**
Hammer Data: Weight **140 lbs.** Drop **30 in.**	Groundwater Level: **6 Feet**	Location: **Per Boring Location Plan**

Depth, feet	Sample Type	Sample Number	Sampling Resistance Blows/foot (N-value)	Consistency/ Relative Density	USCS-AASHTO	Material Description
0		1	13	MEDIUM DENSE	SP-SM	Brown fine-grained SAND with silt, with seams of tan fine-grained SAND
		2	27	MEDIUM DENSE	SM	Dark brown/dark gray fine-grained SAND with heavy organic stain (cemented hardpan)
5		3	14	MEDIUM DENSE	SP	Gray/brown fine-grained SAND
		4	15	MEDIUM DENSE	SP	Off-white fine-grained SAND
		5	15	MEDIUM DENSE	SP	Light brown fine-grained SAND
10					SP	Off-white fine-grained SAND
		6	5	LOOSE	SP-SM	Dark brown/gray fine-grained SAND with silt, with organic stain
15					SM	Dark brown fine-grained silty SAND with heavy organic stain and natural wood fibers
		7	4	LOOSE	SP-SM	Dark brown fine-grained SAND with silt, with heavy organic stain
20						Boring Terminated at 20 Feet
25						
30						



REMARKS AND OTHER TESTS:

NOVA ENGINEERING AND ENVIRONMENTAL

Important Information About Your

Geotechnical Engineering Report

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

The following information is provided to help you manage your risks.

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 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 your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you* – should apply the 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 at all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project–Specific Factors

Geotechnical engineers consider a number of 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,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- 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 study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man–made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the 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 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 construction recommendations included in your report. *Those 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 recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject To Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower 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. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

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Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors 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 specific types on information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors 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 contractors do not 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 such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations", many of the 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.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental 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 geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else*.

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques than can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE–member geotechnical engineer for more information.

ASFE

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QUALIFICATIONS OF RECOMMENDATIONS

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 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 previous experience. If additional information becomes available which might impact our geotechnical opinions, it will be necessary for NOVA to review the information, re-assess 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 borings may differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process has 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.

The professional opinions presented in this report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to confirm that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observation and testing services.

This report is intended for the sole use of **Santa Rosa County School District and Pinder Martin Associates, Inc**, only. The scope of work performed during this study was developed for purposes specifically intended by **Santa Rosa County School District and Pinder Martin Associates, Inc,** only, and may not satisfy other users' 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.