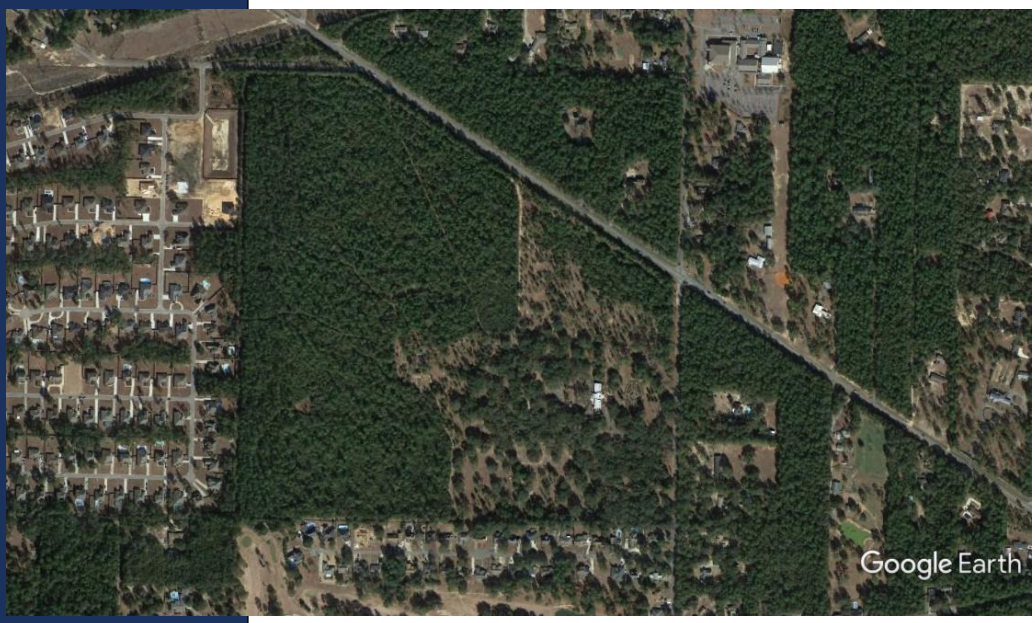
PRELIMINARY GEOTECHNICAL ENGINEERING REPORT



Thames Property

Milton, Santa Rosa County, Florida

PREPARED FOR:

Mr. James R. Thames
67 Whittier Road
Wessesley, Massachusetts 02481

NOVA Project Number: 8218080

July 8, 2018

NOVA

PROFESSIONAL | PRACTICAL | PROVEN

July 8, 2018

Mr. James R. Thames
67 Whittier Road
Wessesley, Massachusetts 02481

Subject: Preliminary Geotechnical Engineering Report
THAMES PROPERTY
Milton, Santa Rosa County, Florida
NOVA Project Number 8218080

Dear Mr. Thames:

NOVA Engineering and Environmental LLC (NOVA) has completed the authorized Preliminary Geotechnical Engineering Report for the potential residential development to be located in Milton, Santa Rosa County, Florida. The work was performed in general accordance with NOVA Proposal Number 016-20185676, dated June 28, 2018. 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 preliminary findings, conclusions, and recommendations.

The primary objective of this preliminary study was to provide a geotechnical exploration of the near surface soils across the site. The authorized preliminary geotechnical engineering services included performing six (6) hand auger borings, each drilled to a depth of about 10 feet below existing grade (BEG), limited soil classification testing, and one (1) re-molded laboratory falling head permeability test.

NOVA understands the proposed development could potentially include 308 residential lots, various amenities, associated entrance drives and parking areas, and a Stormwater Management System desired to consist of one to multiple shallow retention basins to treat and dispose of stormwater runoff associated with the planned site improvements. We assume that finish site grades will not change greater than +/- 2 feet from existing grades along the potential roadway alignments, and that the proposed retention basin(s) will be on the order of 5 feet or less in depth, also relative to existing site grade elevations.

Site Location and Description

The subject property is located southwest of the intersection of Willard Norris Road and Tanglewood Drive in Milton, Santa Rosa County, Florida. According to the Santa Rosa County Property Appraiser Geographic Information System (GIS) Database, the Subject 130-acre Property is identified as Parcel ID 30-2N-28-0000-00204-0000. A Site Location Map is included in Appendix A.

At the time of our preliminary field exploration, the eastern portion of the property was developed with several single-story structures and vegetated with isolated mature oak trees, light undergrowth, and short grasses. The western portion of the property consisted of undeveloped woodlands vegetated primarily with sapling to mature pine trees and moderately dense underbrush, with several jeep trails traversing the property. The site is bordered by Willard Norris Road and Shamrock Street to the North, Tanglewood Drive to the east, and single-family residences to the south and west.

Subsurface Conditions

Our field exploration at the subject site included performing six (6) hand auger borings across the subject property. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

Beneath a thin stratum of topsoil, the test borings generally encountered fine-grained sands with silt (USCS classification of SP-SM) to depths of about 4 feet to 6 feet below existing grade (BEG) underlain by fine-grained silty sands (SM) to the maximum depth explored of roughly 10 feet BEG. The Test Boring Records and a summary of laboratory soil testing results are provided in the attached Appendix.

A stabilized groundwater table was not encountered in the 10-foot deep test borings at the time of our preliminary field exploration, which occurred during a period of relatively normal seasonal rainfall and shortly following several significant rain events. 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 remain at a depth greater than 10 feet BEG.

We note that groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors. Groundwater levels in the Milton 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.

Preliminary Site Discussion

Based on the results of our field exploration, the subsurface conditions encountered beneath this property appear to be adaptable for supporting the proposed roadway pavement sections. Conventional pavement sections should be appropriate with the employment of "typical" site preparation operations.

A further, more extensive, geotechnical exploration should be performed along the proposed roadway alignments, after a Site Plan has been finalized for this project.

Preliminary SMS Design Considerations

NOVA understands that one to multiple conventional shallow dry retention basins could potentially be employed for this development for the treatment and disposal of stormwater runoff associated with the planned improvements to the property. Based upon the results of the test borings, the subsurface conditions encountered appear to be only marginally adaptable for employing the desired SMS, primarily due to the presence of relatively low permeability silty sands present across the site at depths beginning at roughly 4 feet to 6 feet BEG.

NOVA has provided preliminary geotechnical SMS design parameters below in Table 1 for your consideration. We note that these design parameters are subject to confirmation of the soil and groundwater conditions with auger borings performed within the actual SMS footprint(s) once a Site Plan has been finalized for this project. Furthermore, we recommend that a soil exploration be conducted to investigate the possibility of installing a sand chimney feature beneath the basin, as sand chimneys are typically employed in northern Pace to Milton region.

Table 1 – PRELIMINARY SMS Soil Design Parameters	
Corresponding Soil Boring Test Locations	A-1 through A-6
Approximate Depth to Confining Layer, feet BEG	4 feet
Measured Vertical Hydraulic Conductivity (Kv)	2 feet/day
Calculated Horizontal Hydraulic Conductivity (Kh)	3 feet/day
Estimated Infiltration Rate (DRI)	½ to 1 inch/hour
Estimated Fillable Porosity of Soil	25%
Estimated Depth to Normal Permanent SHGW table, feet BEG	Below 10 feet

Conclusion

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

Jesse A. James E.I.
Assistant Branch Manager
Florida Certificate No. 1100019359

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

Copies Submitted: via electronic mail service

APPENDIX A
Figures and Maps

Scale: Not To Scale **Date Drawn:** July 6, 2018 **Drawn By:** J. James **Checked By:** W. Lawrence	NOVA 140-A Lurton Street Pensacola, Florida 32505 850.607.7782 ♦ 850.249.6683	**PROJECT LOCATION MAP** **Thames Property** Milton, Santa Rosa County, Florida *NOVA Project Number 8218080*

Soil Map—Santa Rosa County, Florida
(8218080 Thames Property)

Map Scale: 1:6,370 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

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: Santa Rosa County, Florida
Survey Area Data: Version 14, Oct 6, 2017

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

Date(s) aerial images were photographed: Jan 31, 2015—Feb 13, 2015

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
21	Lakeland sand, 0 to 5 percent slopes	9.5	6.9%
44	Troup loamy sand, 0 to 5 percent slopes	127.7	93.1%
Totals for Area of Interest		**137.2**	**100.0%**

APPENDIX B
Subsurface Data

LEGEND

Ax = 10-foot Auger Boring

Scale: Not To Scale	NOVA	**BORING LOCATION PLAN**
Date Drawn: July 6, 2018	140-A Lurton Street Pensacola, Florida 32505 850.607.7782 ♦ 850.249.6683	**Thames Property** Milton, Santa Rosa County, Florida *NOVA Project Number 8218080*
Drawn By: J. James		
Checked By: W. Lawrence		

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 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
(Silts 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%

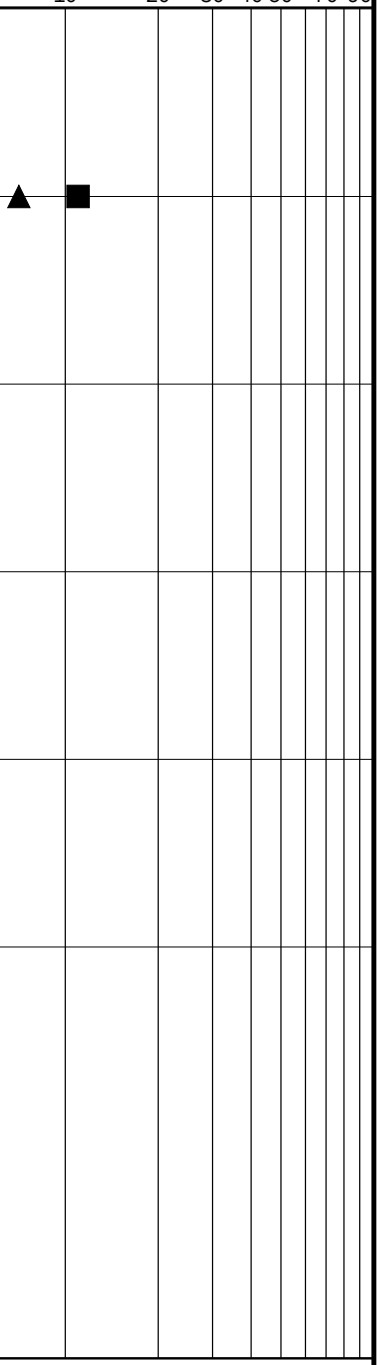
NOVA

TEST BORING RECORD A-1

PROJECT: Thames Property | PROJECT NO.: 8218080
CLIENT: Mr. James R. Thames
PROJECT LOCATION: Milton, Santa Rosa County, Florida
LOCATION: Per Boring Location Plan | ELEVATION: Existing Grade
DRILLER: S. Filippo | LOGGED BY: J. James
DRILLING METHOD: Hand Auger Boring | DATE: July 3, 2018
DEPTH TO - WATER> INITIAL: GNE | AFTER 24 HOURS: | CAVING>

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value
0		TOPSOIL (Less than 1-inch)				
		Brown fine-grained SAND with Silt (SP-SM)				
2						
		Light brown fine-grained SAND with Silt (SP-SM)				
4						
6						
		Orange/brown fine-grained Silty SAND (SM)				
8						
10						
		Boring Terminated at 10 ft.				
12						
14						

■ %<#200
● BLOW COUNT
▲ NATURAL MOISTURE
PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT
10 20 30 40 50 70 90



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

NOVA

TEST BORING RECORD A-2

PROJECT: Thames Property | PROJECT NO.: 8218080
CLIENT: Mr. James R. Thames
PROJECT LOCATION: Milton, Santa Rosa County, Florida
LOCATION: Per Boring Location Plan | ELEVATION: Existing Grade
DRILLER: S. Filippo | LOGGED BY: J. James
DRILLING METHOD: Hand Auger Boring | DATE: July 3, 2018
DEPTH TO - WATER> INITIAL: GNE | AFTER 24 HOURS: | CAVING>

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value
0		TOPSOIL (Approx. 3-inches)				
		Light brown fine-grained SAND with Silt (SP-SM)				
2						
4						
6		Orange/brown fine-grained Silty SAND (SM)				
8		Orange/brown fine-grained Silty SAND with seams of clayey sand and trace iron rock (SM)				
10		Boring Terminated at 10 ft.				
12						
14						

■ %<#200
● BLOW COUNT
▲ NATURAL MOISTURE
PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT
10 20 30 40 50 70 90

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

NOVA

TEST BORING RECORD A-3

PROJECT: Thames Property | PROJECT NO.: 8218080
CLIENT: Mr. James R. Thames
PROJECT LOCATION: Milton, Santa Rosa County, Florida
LOCATION: Per Boring Location Plan | ELEVATION: Existing Grade
DRILLER: S. Filippo | LOGGED BY: J. James
DRILLING METHOD: Hand Auger Boring | DATE: July 3, 2018
DEPTH TO - WATER> INITIAL: ▽ GNE AFTER 24 HOURS: ▼ _____ CAVING> _____

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value
0		TOPSOIL (Approx. 2-inches)				
		Light brown fine-grained SAND with Silt (SP-SM)				
2						
4						
6		Red/orange fine-grained Silty SAND (SM)				
8						
10		Boring Terminated at 10 ft.				
12						
14						

■ %<#200
● BLOW COUNT
▲ NATURAL MOISTURE
PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT
10 20 30 40 50 70 90

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

NOVA

TEST BORING RECORD A-4

PROJECT: Thames Property | PROJECT NO.: 8218080
CLIENT: Mr. James R. Thames
PROJECT LOCATION: Milton, Santa Rosa County, Florida
LOCATION: Per Boring Location Plan | ELEVATION: Existing Grade
DRILLER: S. Filippo | LOGGED BY: J. James
DRILLING METHOD: Hand Auger Boring | DATE: July 3, 2018
DEPTH TO - WATER> INITIAL: GNE | AFTER 24 HOURS: | CAVING>

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value
0		Light brown fine-grained SAND with Silt (SP-SM)				
6		Brown/orange fine-grained Silty SAND (SM)				
10		Boring Terminated at 10 ft.				

%<#200
BLOW COUNT
NATURAL MOISTURE
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 70 90

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

NOVA

TEST BORING RECORD A-5

PROJECT: Thames Property | PROJECT NO.: 8218080
CLIENT: Mr. James R. Thames
PROJECT LOCATION: Milton, Santa Rosa County, Florida
LOCATION: Per Boring Location Plan | ELEVATION: Existing Grade
DRILLER: S. Filippo | LOGGED BY: J. James
DRILLING METHOD: Hand Auger Boring | DATE: July 3, 2018
DEPTH TO - WATER> INITIAL: GNE | AFTER 24 HOURS: | CAVING>

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value
0		TOPSOIL (Approx. 2-inches)				
		Light brown fine-grained SAND with Silt (SP-SM)				
2						
4		Brown/orange fine-grained Silty SAND (SM)				
6						
8						
10		Boring Terminated at 10 ft.				
12						
14						

■ %<#200
● BLOW COUNT
▲ NATURAL MOISTURE
PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT
10 20 30 40 50 70 90

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

NOVA

TEST BORING RECORD A-6

PROJECT: Thames Property | PROJECT NO.: 8218080
CLIENT: Mr. James R. Thames
PROJECT LOCATION: Milton, Santa Rosa County, Florida
LOCATION: Per Boring Location Plan | ELEVATION: Existing Grade
DRILLER: S. Filippo | LOGGED BY: J. James
DRILLING METHOD: Hand Auger Boring | DATE: July 3, 2018
DEPTH TO - WATER> INITIAL: GNE | AFTER 24 HOURS: | CAVING>

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value
0						
		Brown fine-grained SAND with Silt (SP-SM)				
2						
		Light brown fine-grained SAND with Silt (SP-SM)				
4						
		Brown/orange fine-grained Silty SAND (SM)				
6						
8						
10						
		Boring Terminated at 10 ft.				
12						
14						

%<#200
BLOW COUNT
NATURAL MOISTURE
PLASTIC LIMIT — LIQUID LIMIT
10 20 30 40 50 70 90

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

APPENDIX C
Laboratory Data

SUMMARY OF CLASSIFICATION & INDEX TESTING

Thames Property
Milton, Santa Rosa County, Florida
NOVA Project Number 8218080

SUMMARY OF CLASSIFICATION AND INDEX TESTING						
Boring No.	Sample Depth (ft. BEG)	Natural Moisture (%)	Percent Fines (- #200)	Hydraulic Conductivity		USCS Soil Classification
				K_{vs} (ft/day)	Unit Weight of Sample (pcf)	
A-1	2-7	5	11	---	---	SP-SM
A-3	0-5	6	10	2	---	SP-SM
A-3	5-10	12	27	---	---	SM
A-6	5-10	7	14	---	---	SM

REMOLDED LABORATORY PERMEABILITY TEST DATA SHEET

PROJECT: Thames Property NOVA PROJECT #: 8218080

DATE: 7/5/2018 ASSIGNED BY: JAJ TESTED BY: SS

Sample LOCATION / BORING NO.	A-3
Sample NUMBER / DEPTH	0-5 ft.

PERMEABILITY TESTING SUMMARY			
PERMEABILITY (K_V)	→	2	ft/day
Corresponding K_h	→	3	ft/day
DRY DENSITY	→	109	lbs/ft^3
MOISTURE CONTENT	→	6	%
-200 FINES CONTENT	→	10	%

FALLING HEAD PERMEABILITY (ASTM D 5084)

No. of LAYERS:	3	Wt. of MOLD (lbs):	4.52
BLOWS/LAYER:	15	Wt. of MOLD/SOIL (lbs):	8.38

HEIGHT (FT)	TRIAL #1 (SEC)	TRIAL #2 (SEC)	PERMEABILITY
7	0.0		8.13E-04
6	17.1		8.08E-04
5	38.8		8.18E-04
4	67.2		8.31E-04
3	101.1		8.06E-04
2	152.8		
1	238.9		
	8.2E-04		cm/sec

MOISTURE CONTENT (ASTM D 2216)

Pan NUMBER	M
Wt. of WET SOIL & PAN (g)	236.9
Wt. of DRY SOIL & PAN (g)	227.2
Wt. of PAN (g)	66.0
Wt. of Water (g)	9.7
Wt. of Dry Soil (g)	161.2
MOISTURE CONTENT (%)	6.0

-200 SIEVE WASH (ASTM D 1140)

Pan NUMBER	M
Wt. of DRY SOIL & PAN (g)	227.2
Wt. of WASH SOIL & PAN (g)	210.4
Wt. of PAN (g)	66.0
Wt. of Original Dry Sample (g)	161.2
Wt. of -200 Material (g)	16.8
Wt. of Washed Dry Sample (g)	144.4
-200 FINES CONTENT (%)	10.4

NUMBER OF INCHES MOLD WAS SHORT? 0.000 INCHES (ZERO INCHES IS DEFAULT)

PERMEABILITY CONSTANT USED WAS → 0.23 (Includes 3/8"ID tubing)

NOVA

APPENDIX D
Qualifications of Recommendations

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 observations and testing services.

This report is intended for the sole use of **Mr. James R. Thames** only. The scope of work performed during this study was developed for purposes specifically intended by of **Mr. James R. Thames** 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.

Important Information about This

Geotechnical-Engineering Report

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

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

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

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

Read the Full Report

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

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

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

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

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

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

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

Subsurface Conditions Can Change

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

Most Geotechnical Findings Are Professional Opinions

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

A Report's Recommendations Are Not Final

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

A Geotechnical-Engineering Report Is Subject to Misinterpretation

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

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

Do Not Redraw the Engineer's Logs

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

Give Constructors a Complete Report and Guidance

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

Read Responsibility Provisions Closely

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

Environmental Concerns Are Not Covered

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

Obtain Professional Assistance To Deal with Mold

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

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

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

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