

**REPORT OF
GEOTECHNICAL EXPLORATION**

**PROPOSED OFFICE BUILDING
CRYSTAL COVE - NORTH PARCEL
EAST SIDE OF SE FEDERAL HIGHWAY
NORTH OF COUNTY LINE ROAD
HOBE SOUND, FLORIDA**

FOR

**CRYSTAL COVE WATERWAY, LLC
1240 US #1
SUITE 200
NORTH PALM BEACH, FLORIDA 33408**

PREPARED BY

**NUTTING ENGINEERS OF FLORIDA, INC.
615 SW BILTMORE STREET
PORT ST. LUCIE, FLORIDA 34983**

ORDER NO. 342.1

MAY 2014



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

Offices throughout the state of Florida

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Nutting Engineers

of Florida Inc. | Established 1967

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May 13, 2014

Mr. David Ackner, CAO
Crystal Cove Waterway, LLC
1240 US #1, Suite 200
North Palm Beach, Florida 33408
Phone: 561-855-2000 x-2234

Email: davida@urmanagement.com

Subject: Report of Geotechnical Exploration
Proposed Office Building
Crystal Cove - North Parcel
East of SE Federal Highway, North of County Line Road
Hobe Sound, Florida

Dear Mr. Ackner:

Nutting Engineers of Florida, Inc. (NE), has performed a Geotechnical Exploration for the proposed office building at the above referenced site in Hobe Sound, Florida. This exploration was performed in accordance with the written authorization to proceed provided by Crystal Cove Waterway, LLC dated April 30, 2014. This evaluation was performed to develop information regarding subsurface soil conditions at specific test locations which along with proposed construction information provided was used to develop opinions regarding earthwork procedures and foundations for support of the proposed construction. This report presents our findings and recommendations based upon the information examined at the time of this evaluation.

PROJECT INFORMATION

We understand that plans include the development of the vacant property for the construction of one new two-story office building at the site. The building will have the ground floor consist of covered parking, while the second floor will consist of office space. The building will cover a total area of approximately 5,400 square feet and consist of concrete block construction. Along with the building associated asphalt and concrete paved parking lots and driveways will be constructed. We were provided a site plan indicating the planned development.

OFFICES

Palm Beach
Miami-Dade
St. Lucie

Based on existing site conditions, it is estimated that approximately one to three feet of fill may be required to bring the site up to construction grade; however, the final building pad elevation shall be determined by a professional architect, civil engineer, or other qualified party.

NE should be notified in writing by the client of any changes in the proposed construction along with a request to amend our foundation analysis and/or recommendations within this report as appropriate.

GENERAL SUBSURFACE CONDITIONS

Soil Survey Maps

As part of the geotechnical exploration, we have reviewed available Soil Conservation Service (SCS) survey maps for Martin County. These SCS maps provide qualitative information about potential general shallow soil conditions in the project vicinity. This information was derived from approximately 6 ft. deep manual auger borings, aerial photo and surface feature interpretation at some point in the past (mid 1980's to early 1970's). The SCS data may or may not reflect actual current site conditions. A review of the Soil Survey for Martin County revealed that at the time the survey was conducted, the soils at the site were described as Arents-Urban land complex. This complex consists of nearly level, somewhat poorly drained, sandy soils and urban land. The soils formed in thick layers of sandy fill material that were placed over low, wet mineral soils to make the areas suitable for urban use. This complex is in the eastern part of the survey area and takes in golf courses, subdivisions, and condominium developments, roadways, business or industrial areas, reclaimed borrow pits, and other areas filled over but not yet developed.

We note that mapped directly west of SE Federal Highway is Paola-St. Lucie sand. The Paola-St. Lucie series consists of nearly level to sloping, excessively drained, deep, sandy soils in long, narrow dune-like ridges near the Atlantic coast. In general the subsoils are white to yellowish sands that extend to a depth of approximately six feet or more. We note that the soil surveys were typically penetrated to a depth of approximately six feet.

Subsurface Exploration

NUTTING ENGINEERS OF FLORIDA, INC. performed four Standard Penetration Test (SPT) borings (ASTM D-1586) to depths of twenty feet below land surface in the area of the office building. The locations of the test borings are indicated on the individual test boring reports presented in the Appendix of this report. The boring locations were identified in the field using approximate methods; namely, a measuring wheel and available surface controls. As such the soil boring locations should be considered to be approximate.

We note that due to the potential for underground utilities, the upper four feet of the soil profile was manually cleared. Because of this the relative density (N-value) of the upper four feet was not obtained at those test boring locations.

Test Boring Results

In general, the soil boring locations evaluated recorded a surface layer of loose to medium dense tan to gray sand in the upper six feet underlain by medium dense to loose brown sand to a depth of twenty feet, the maximum depth explored. We note that within test boring B-1 traces of concrete construction debris was encountered at depths of five to six feet below the existing ground surface. Please see the enclosed soil classification sheet in the Appendix of this report for additional important information regarding these descriptions, the field evaluation and other related information.

Note: Substantially different subsurface conditions may exist at other areas of the site. Buried debris may or may not be identified or adequately delineated by soil borings. Test pit excavation can provide more insight into such conditions and rock lithology if present. Such conditions may be revealed during site development activities (e.g. proof rolling, utility & foundation excavation activities) or other related activities. Should additional assurance be desired by the client, further subsurface investigation could be performed.

Groundwater Information

The immediate groundwater level was measured at the boring locations at the time of drilling. The groundwater level was encountered at a depth of approximately four to four and a half feet below the existing ground surface at the time of drilling.

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

ANALYSIS AND RECOMMENDATIONS

The borings performed for this project suggests that the soil in the upper six feet of the soil profile is in a loose state. Because of this in order to prepare the site for the proposed construction an undercut and compaction program will need to be implemented. Because the ground floor will consist of covered parking, the undercut and compaction will need to be performed within the proposed individual foundations for the building.

Once the site is successfully prepared in accordance with the recommendations presented in this report, the site may be developed with the proposed office building using a shallow foundation system designed for an allowable soil bearing pressure of 2,500 pounds per square foot. Once plans are finalized for the proposed construction, a copy should be provided to Nutting Engineers for review to determine whether additional details or changes to our recommendations are warranted. All work should be completed in accordance with applicable building codes, other regulations as appropriate, and good standard local practice.

We recommend a minimum width of 24 inches for continuous footings and 36 inches for individual footings, even though the soil bearing pressure may not be fully developed in all cases. We recommend that the bottom of footings be at least 18 inches below the lowest adjacent finished grade.

It is our opinion that the first level parking floor slab system may be constructed as a slab on grade. We recommend that a vapor barrier be placed between the soil and concrete. We also recommend that the reinforcing steel mesh be placed at the approximate center of the slab for tensile support.

Settlement Analysis

We performed a settlement evaluation based upon a hypothetical improved soil profile following completion of the undercut and compaction operations using a moderately sized vibratory compactor for the construction. This method should improve the soils to provide an allowable bearing capacity of 2,500 pounds per square foot. It was estimated that upon proper completion, long-term total settlements should be on the order of less than approximately one inch. Differential settlements should be approximately one-half of the total settlement. Distortions that occur along wall footings should not be more than 1 in 500. Most of this settlement should occur upon the application of the dead load during construction.

Site Preparation

The surficial organic soils, any surficial debris (prior construction debris), and any unsuitable soils as determined by the Geotechnical Engineer will need to be completely removed within the construction area and to a lateral distance of at least 5 feet beyond the footprint limits and potentially further based upon depth. A Nutting Engineer's representative should be present to observe that the stripping operations are performed as we have discussed herein.

Upon approval by the geotechnical engineer, the building foundations should then be undercut to a depth two feet below the proposed bottom of foundation elevation. The suitable undercut soils approved by Nutting Engineers may be stockpiled and used as backfill. The undercut surface should then be thoroughly soaked with water and compacted with at least 20 overlapping passes of a vibratory compactor having a minimum dynamic force of 5 tons operated no faster than at a

slow walking pace. The roller coverage's should be equally divided into two perpendicular directions. The coverage's should be equally divided into two perpendicular directions. **The compaction operations must be observed by a representative of Nutting Engineers.**

In addition, the surface should also be compacted until a density equivalent to at least 98 percent of the modified Proctor maximum dry density (ASTM D-1557) is achieved to a depth of at least 12 inches below the compacted surface.

Any structural fill needed to bring the foundations and or floor slab areas back to construction grade may then be placed in lifts not exceeding twelve inches in loose thickness. Each lift should be thoroughly compacted until densities equivalent to at least 98 percent of the Modified Proctor maximum dry density are uniformly obtained. The floor slab area should also be compacted in the same manner.

Fill should consist of granular soil, with less than 10% passing the No. 200 sieve, free of rubble, organics (5% or less) clay, debris and other unsuitable material. The fill should have ASTM designation (D-2487) of GP, GW, SP, or SW, with a maximum particle size of no more than 3 inches or as otherwise approved by Nutting Engineers.

Pavements - Beyond Building Footprint

Pavement areas should be compacted to a minimum of 98 percent of the modified Proctor maximum dry density to a depth of at least 12 inches below the subgrade level. We recommend that stabilized subgrade having a minimum Limerock Bearing Ratio (LBR) of 40 be placed to a depth of approximately one foot below the base course. The base course will range from approximately 6 to 8 inches, and should have a minimum LBR of 100. Based on the soil borings performed, material will need to be imported to the site in order to prepare the base and sub-base course. The project civil engineer should also be consulted for details concerning the pavement design.

GENERAL INFORMATION

Our client for this geotechnical evaluation was:

Mr. David Ackner, CAO
Crystal Cove Waterway, LLC
1240 US #1, Suite 200
North Palm Beach, Florida 33408

The contents of this report are for the exclusive use of the client and the client's design team for this specific project exclusively. Information conveyed in this report shall not be shall not be reproduced, except in full, used, or relied upon by other parties or for other projects without the

expressed written consent of Nutting Engineers of Florida, Inc. This report discusses geotechnical considerations for this site based upon observed conditions and our understanding of proposed construction for foundation support. Environmental issues including (but not limited to), soil and/or groundwater contamination are beyond our scope of service for this project. As such, this report should not be used or relied upon for evaluation of environmental issues.

Prior to initiating compaction operations, we recommend that representative samples of the structural fill material to be used and acceptable in-place soils be collected and tested to determine their compaction and classification characteristics. The maximum dry density, optimum moisture content, gradation and plasticity characteristics should be determined. These tests are needed for compaction quality control of the structural fill and existing soils, and to determine if the fill material is acceptable.

If conditions are encountered which are not consistent with the findings presented in this report, or if proposed construction is altered or moved from the location investigated, this office shall be notified immediately so that the condition or change can be evaluated and appropriate action taken.

The vibratory compaction equipment may cause vibrations that could be felt by persons within nearby buildings and could potentially induce structural settlements. Additionally, preexisting settlements may exist within these structures that could be construed to have been caused or worsened by the proposed vibratory compaction after the fact. Pre- and post conditions surveys of these structures along with the vibration monitoring during vibratory compaction could be performed to better evaluate this concern. The contractor should exercise due care during the performance of the vibratory compaction work with due consideration of potential impacts on existing structures. If potential vibrations and impacts are not considered tolerable, then alternate foundation modification techniques should be considered.

Nutting Engineers of Florida, Inc. shall bear no liability for the implementation of recommended inspection and testing services as described in this report if implemented by others. Nutting has no ability to verify the completeness, accuracy or proper technique of such procedures if performed by others.

Excavations of five feet or more in depth should be sloped or shored in accordance with OSHA and State of Florida requirements.

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

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

Sincerely,
NUTTING ENGINEERS OF FLORIDA, INC.

Matthew Allen for

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

[Signature] 5/2/14
Christopher E. Gworek, P.E. #69947
Senior Engineer

Appendix: Boring Location Plan
 Test Boring Results
 Limitations of Liability
 Soil Classification Criteria

REP CRYSTAL COVE NORTH PARCEL OFFICE HOBE SOUND CEG



Crystal Cove - North Parcel

- LEGEND -



APPROX. TEST LOCATION

GEOTECHNICAL EXPLORATION

— Not to Scale —

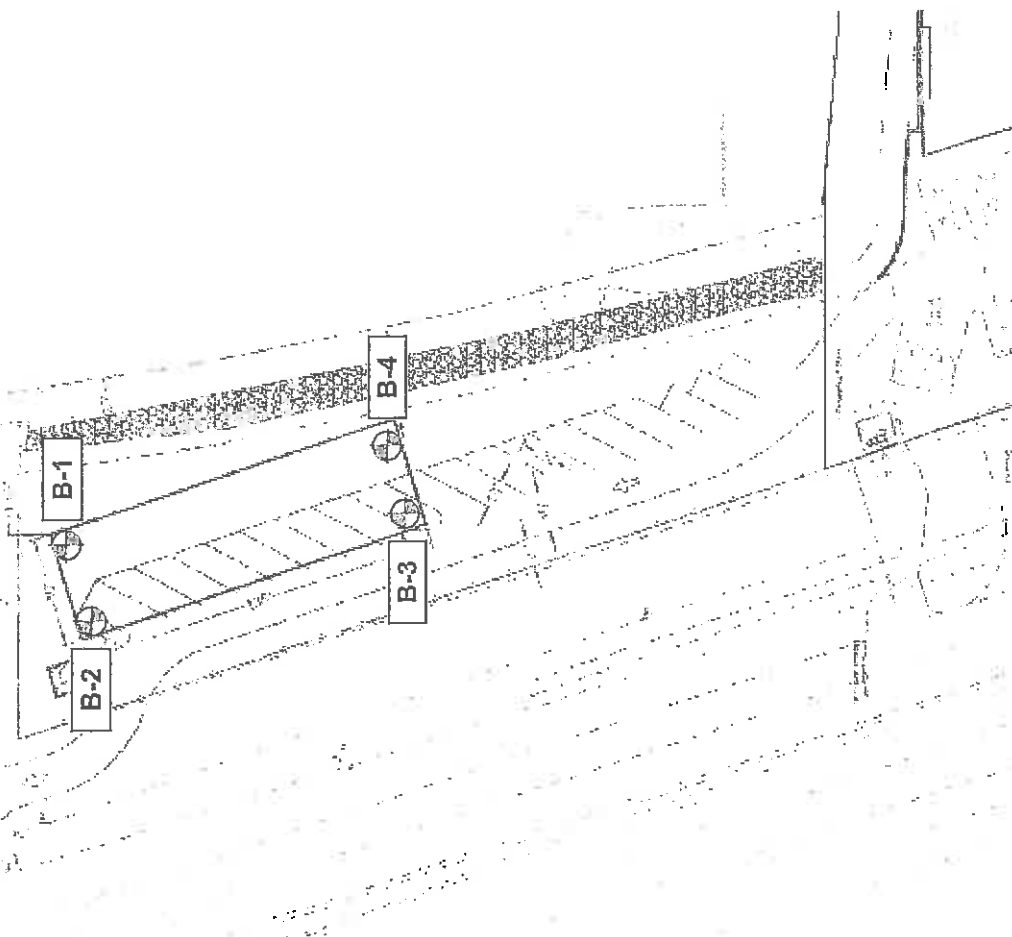
FIG. 1

APPROXIMATE
TEST LOCATION
PLAN

Crystal Cove Waterway, LLC
Crystal Cove—North Building
N. of County Line Road & E. of US Hwy. 1
Hobe Sound, Florida

PROJECT NO. 342.1

**NUTTING
ENGINEERS**
— OF FLORIDA, INC. —
ESTABLISHED 1937





1310 Neptune Drive
Boynton Beach, FL, 33426
Telephone: 561-736-4900
Fax: 561-737-9975

BORING NUMBER B-1 South Bldg.

PAGE 1 OF 1

PROJECT NUMBER 342.1

CLIENT Crystal Cove Waterway, LLC

PROJECT NAME Crystal Cove - South Building

PROJECT LOCATION N. of County Line Road and E. of US Highway 1, Hobe Sound, Florida

DATE STARTED 5/7/14

COMPLETED 5/7/14

SURFACE ELEVATION REFERENCE ~3' below Road Crown

DRILLING METHOD Standard Penetration Boring

GROUND WATER LEVELS:

LOGGED BY R. Drowatzky

CHECKED BY C. Gworek

▽ AT TIME OF DRILLING 4.0 ft

APPROXIMATE LOCATION OF BORING As located on site plan

TEST NUTTING BOREHOLE 1-342.1 CRYSTAL COVE WATERWAY - CRYSTAL COVE HOBE SOUND.GPJ GINT US.GDT 5/12/14

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	Δ SPT N VALUE Δ			
						10	20	30	40
						PL	MC	LL	
						20	40	60	80
						□ FINES CONTENT (%) □			
						20	40	60	80
0		Gray fine SAND	AU 1						
		Lt. brown fine SAND							
		Brown fine SAND	AU 2						
5	▽								
		Brown fine SAND, trace construction debris and shell	SS 3	6-8-14-17	22			Δ	
		Brown fine SAND	SS 4	10-15-15-15	30				Δ
10			SS 5	4-4-4-6	8	Δ			
			SS 6	4-4-4-5	8	Δ			
15			SS 7	7-8-8-8	16		Δ		
20			SS 8	4-3-3-3	6	Δ			
		Bottom of hole at 20.0 feet.							



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BORING NUMBER B-2 South Bldg.

PAGE 1 OF 1

PROJECT NUMBER 342.1

CLIENT Crystal Cove Waterway, LLC

PROJECT NAME Crystal Cove - South Building

PROJECT LOCATION N. of County Line Road and E. of US Highway 1, Hobe Sound, Florida

DATE STARTED 5/7/14

COMPLETED 5/7/14

SURFACE ELEVATION REFERENCE ~3' below Road Crown

DRILLING METHOD Standard Penetration Boring

GROUND WATER LEVELS:

LOGGED BY R. Drowatzky

CHECKED BY C. Gworek

▽ AT TIME OF DRILLING 4.0 ft.

APPROXIMATE LOCATION OF BORING As located on site plan

TEST NUTTING BOREHOLE 1-342.1 CRYSTAL COVE WATERWAY - CRYSTAL COVE HOBE SOUND.GPJ GINT US.GDT 5/12/14

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	△ SPT N VALUE △			
						10	20	30	40
						PL	MC	LL	
						20	40	60	80
						□ FINES CONTENT (%) □			
						20	40	60	80
0		Gray fine SAND							
		Lt. brown fine SAND	AU 1						
		Brown fine SAND	AU 2						
5	▽								
		Brown fine SAND, slight trace shell and root	SS 3	5-6-8-11	14		△		
		Brown fine SAND	SS 4	9-10-10-12	20			△	
10			SS 5	5-4-5-4	9		△		
			SS 6	4-5-4-5	9		△		
15			SS 7	6-8-8-9	16			△	
20			SS 8	3-4-5-6	9		△		
		Bottom of hole at 20.0 feet.							



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BORING NUMBER B-4 South Bldg.

PAGE 1 OF 1

PROJECT NUMBER 342.1

CLIENT Crystal Cove Waterway, LLC

PROJECT NAME Crystal Cove - South Building

PROJECT LOCATION N. of County Line Road and E. of US Highway 1, Hobe Sound, Florida

DATE STARTED 5/7/14

COMPLETED 5/7/14

SURFACE ELEVATION REFERENCE ~3' below Road Crown

DRILLING METHOD Standard Penetration Boring

GROUND WATER LEVELS:

LOGGED BY R. Drowatzky

CHECKED BY C. Gworek

☒ AT TIME OF DRILLING 4.5 ft.

APPROXIMATE LOCATION OF BORING As located on site plan

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	△ SPT N VALUE △			
						10	20	30	40
						PL	MC	LL	
						20	40	60	80
						<input type="checkbox"/> FINES CONTENT (%) <input type="checkbox"/>			
						20	40	60	80
0		Tan fine SAND	AU 1						
			AU 2						
5		▽ Gray fine SAND, trace root	SS 3	4-6-8-9	14		△		
		Brown fine SAND	SS 4	8-11-10-10	21			△	
			SS 5	6-6-7-8	13		△		
10			SS 6	5-5-4-6	9		△		
15			SS 7	8-8-8-8	16		△		
20			SS 8	4-5-6-6	11		△		
		Bottom of hole at 20.0 feet.							

Disclaimer Nutting Engineers of Florida, Inc. accepts no liability for the consequences of the independent interpretation of drilling logs by others.

LIMITATIONS OF LIABILITY

WARRANTY

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

SUBSURFACE EXPLORATION

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

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

LABORATORY AND FIELD TESTS

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

ANALYSIS AND RECOMMENDATIONS

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

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

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

CONSTRUCTION OBSERVATION

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

SOIL AND ROCK CLASSIFICATION CRITERIA

SAND/SILT

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

CLAY/SILTY CLAY

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

ROCK

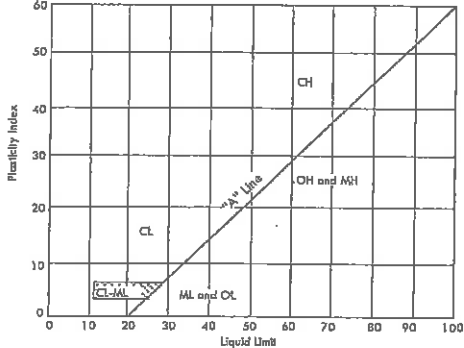
N-VALUE (bpf)	RELATIVE HARDNESS	ROCK CHARACTERISTICS
$N \geq 100$	Hard to v. hard	Local rock formations vary in hardness from soft to very hard within short vertical and horizontal distances and often contain vertical solution holes of 3 to 36 inch diameter to varying depths and horizontal solution features.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

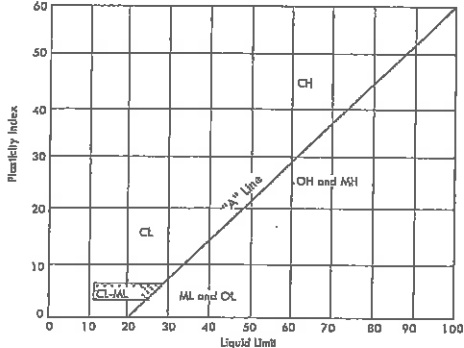
PARTICLE SIZE

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

DESCRIPTION MODIFIERS

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

Major Divisions		Group Symbols	Typical names	Laboratory classification criteria	
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_z = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW	
		GW*	d u Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	
			GC	Clayey gravels, gravel-sand-clay mixtures	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_z = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
		SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW	
		SM*	d u Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	
			SC	Clayey sands, sand-clay mixtures	Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual system.
	Fine-grained soils (More than half of material is smaller than No. 200 sieve size)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		
			CL		
			OL		
		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
	Silty and clays (Liquid limit less than 50)	CH	Inorganic clays of high plasticity, fat clays		
		OH	Organic clays of medium to high plasticity, organic silts		
	Highly organic soils	PT	Peat and other highly organic soils		



Plasticity Chart