1112 Manatee Avenue West
Bradenton, FL 34205
purchasing@mymanatee.org

Solicitation Addendum

Addendum No.:	1
Solicitation No.:	IFBC 21-TA003572AJ
Project No.:	60101870
Solicitation Title:	Paradise Bay Watermain Replacement
Addendum Date:	January 7, 2021
Procurement Contact:	Abigail Jenkins

IFBC 21-TA003572AJ is amended as set forth herein. Responses to questions posed by prospective bidders are provided below. This addendum is hereby incorporated in and made a part of IFBC 21-TA003572AJ.

The deadline to submit all inquiries concerning interpretation, clarification or additional information pertaining to this IFBC was December 30, 2020.

CHANGE TO:

SECTION A, PARAGRAPH A.03, PUBLIC OPENING OF BIDS.
Bids will be opened immediately following the Due Date and Time at the Manatee County Administration Building, Suite 803 in the presence of County officials. Bidders or their representatives may attend the Bid opening virtually by accessing the link below.

Zoom® Webinar Link: https://manateecounty.zoom.us/j/86019609607

Manatee County will make public at the opening the names of the business entities which submitted a Bid and the total bid price submitted. No review or analysis of the Bids will be conducted at the Virtual Bid Opening.

CHANGE TO:

SECTION B, APPENDIX A, MINIMUM QUALIFICATIONS, ITEM NO. 4
. Bidder has provided watermain replacement and repair for at least three (3) projects since December 1, 2015 in which each project included the following components: (i) furnishing and installing water main and appurtenances; (ii) maintenance of traffic; (iii) road

pavement, sidewalk and driveway restoration and repair; (iv) seeding and sodding; and, (v) pressure pipe for reclaimed water and sewer force installed by Jack & Bore.

REPLACE:

SECTION B, APPENDIX K, BID PRICING FORM
Replace Appendix K, Bid Pricing Form with Appendix K, Revised Pricing Form, which is hereby incorporated into the IFBC.

REPLACE:

SECTION C, ATTACHMENT 3, PLAN /DRAWINGS, SHEET NO. 3
Replace Attachment 3, Plan/Drawings, Sheet No. 3 with the revised Attachment 3, Plan/Drawings, Sheet No. 3, which is hereby incorporated into the IFBC.

ADD:

ATTACHMENT 4, PARADISE BAY GEOTECHNICAL REPORT, SECTION C, BID ATTACHMENTS

The attached Attachment 4, Paradise Bay Geotechnical Report, is hereby incorporated into the IFBC.

QUESTIONS AND RESPONSES:

Q1. Please provide a geotechnical report with sub-surface information at the jack and bore location.
R1. See Attachment 4, Paradise Bay Geotechnical Report, included with the Addendum 1.

Q2. Reference Bid Form, Bid Item 1.02, Base and Resurface, are we to base our price for this bid item on the Cortez Road Pavement Repair detail shown on plan sheet 3?
R2. See Appendix K, Revised Bid Pricing Form included with this Addendum 1.

Q3. Reference plan sheet 3, Cortez Road Pavement Repair detail, five (5) inches of Base Group 2, this cannot be correct, look at Base Groups 10 or 11. Please review.
R3. See revised plan sheet 3, showing 11-inch Base and Base Group 11, included with this Addendum 1.

Q4. Reference plan sheet 3, the area of the jacking pit on 7th Street that is south of the F.D.O.T. right-of-way, is this area to receive the same restoration scenario as shown in the Cortez Road Pavement Repair detail?
R4. A new pavement detail has been added to sheet 3 for 7th Street .

Q5. Reference specifications Section 01150, MEASURMENT AND PAYMENT, page 34/163, BID ITEM NO. 9: TAPPING SLEEVES/VALVES, third sentence, "The tapping operation itself up to 12-inches in diameter will be performed by the County.", will there be a charge to the Contractor from the County for making the tap and if so, how much will it cost?

R5. Yes, The Tapping Fee is $550.00, and Testing Fee is $300.00

Q6. Reference specifications Section 'B', Appendix 'A', page 23, par. 4, first sentence, can this requirement be opened up to include pressure pipe lines such as reclaimed water and sewer force mains or even the installation of new water main systems completed for private development.

R6. It can be included as long as the reclaimed water/sewer force main was installed by jack and bore.

Q7. Reference specifications Section 'B', Appendix 'A', page 23, par. 4, first sentence, the time constraint to have three (3) watermain and repair projects from December 1, 2017 to the present is too restrictive and needs to be expanded, please review.

R7. The time constraint has been updated to December 1, 2015.

Q8. Reference specifications IFBC, page 45, Builder's Risk Insurance, this job is not a roadway construction project and there will be no addition of a permanent structure or building, or installation of machinery and or equipment, why is this type insurance required? This is a waste of money to the tax payer!

R8. Yes, this insurance is required.

Q9. Reference specifications Section 02325, ROAD AND RAILROAD CROSSINGS, page 102/163, par. 3.01, JACKING SLEEVE, sub-par 'D', first sentence, why is it necessary to "leave all sheeting in place"? Please clarify.

R9. This would apply to sheet pile or lumber used to shore up the site that would be required to leave in place.

Q10. Reference specifications Section 02325, ROAD AND RAILROAD CROSSINGS, page 102-163, par. 3.01, JACKING SLEEVE, sub-par 'D', if steel safety trench boxes or a steel slide rail shoring system is used to shore up the jacking pit, will they have to be left in place?

R10. Trench boxes or steel slide rail shoring systems are not required to be left in place.

NOTE:
Items that are ~~struck through~~ are deleted. Items that are <u>underlined</u> have been added or changed. All other terms and conditions remain as stated in the IFBC.

INSTRUCTIONS:

Receipt of this addendum must be acknowledged as instructed in the solicitation document. Failure to acknowledge receipt of this Addendum may result in the response being deemed non-responsive.

END OF ADDENDUM

AUTHORIZED FOR RELEASE

Jacob Erickson, MBA, CPPO, NIGP-CPP

Digitally signed by Jacob Erickson, MBA, CPPO, NIGP-CPP
Date: 2021.01.07 16:10:15 -05'00'

OPINION OF COST

APPENDIX K, REVISED BID PRICING FORM

IFBC No. 20-TA003572AJ

PARADISE BAY WATERMAIN REPLACEMENT

BID "A" BASED ON A COMPLETION TIME OF 90 CALENDAR DAYS

WATER LINES 10-INCH & UNDER

ITEM NO.	DESCRIPTION	UNITS	QTY.	UNIT PRICE ($)	EXTENDED PRICE ($)
1	Asphalt Pavement Restoration				
1.01	Base & Resurface (Cortez Road)	SY	8		
1.02	Base & Resurface	SY	58		
1.03	Mill & Resurface	SY	307		
2	Curb Replacement	LF	48		
3	Sidewalk Replacement, Concrete	SY	40		
4	Sodding	SY	20		
5	DIP (Pressure Classe 350) Water Mains				
5.1	10" DIP	LF	98		
5.2	6" DIP	LF	28		
6	Steel Casing				
6.1	20"	LF	95		
7	Ductile Iron Fittings, Water				
7.01	10" 90-Degree Bend	EA	3		
7.02	10"x 6" Reducer	EA	1		
7.03	6" 45-Degree Bend	EA	2		
7.04	6" Cap	EA	2		
8	Pipe Joint Restraints				
8.01	10"	EA	10		
8.02	6"	EA	7		
9	Tapping Sleeve/Valves				
9.1	20" x 10" Tapping Sleeve	EA	1		
9.2	10" Tapping Valve	EA	1		
10	Hydrant Assembly	EA	1		
11	Hydrant, Removal	EA	1		
12	In-Place Grouting of Existing Pipe	CY	2		
13	Erosion & Sedifment Control	LS	1		
14	Traffic Control Plan	LS	1		
SubTotal Construction Cost					
15	Mobilization	LS	1.0		
16	Record Drawings	LS	1.0		
Total Base Bid "A" Based on Completion Time of 90 Calendar Days					
17	Contract Contingency	LS	1.0	10%	
Total Bid "A" with Contract Contingency Based on Completion Time of 90 Calendar Days					

Bidder Name: _____

Authorized Signature: _____

OPINION OF COST

APPENDIX K, REVISED BID PRICING FORM

IFBC No. 20-TA003572AJ

PARADISE BAY WATERMAIN REPLACEMENT

BID "B" BASED ON A COMPLETION TIME OF 120 CALENDAR DAYS

WATER LINES 10-INCH & UNDER

ITEM NO.	DESCRIPTION	UNITS	QTY.	UNIT PRICE ($)	EXTENDED PRICE ($)
1	Asphalt Pavement Restoration				
1.01	Base & Resurface (Cortez Road)	SY	8		
1.02	Base & Resurface	SY	58		
1.03	Mill & Resurface	SY	307		
2	Curb Replacement	LF	48		
3	Sidewalk Replacement, Concrete	SY	40		
4	Sodding	SY	20		
5	DIP (Pressure Classe 350) Water Mains				
5.1	10" DIP	LF	98		
5.2	6" DIP	LF	28		
6	Steel Casing				
6.1	20"	LF	95		
7	Ductile Iron Fittings, Water				
7.01	10" 90-Degree Bend	EA	3		
7.02	10"x 6" Reducer	EA	1		
7.03	6" 45-Degree Bend	EA	2		
7.04	6" Cap	EA	2		
8	Pipe Joint Restraints				
8.01	10"	EA	10		
8.02	6"	EA	7		
9	Tapping Sleeve/Valves				
9.1	20" x 10" Tapping Sleeve	EA	1		
9.2	10" Tapping Valve	EA	1		
10	Hydrant Assembly	EA	1		
11	Hydrant, Removal	EA	1		
12	In-Place Grouting of Existing Pipe	CY	2		
13	Erosion & Sedifment Control	LS	1		
14	Traffic Control Plan	LS	1		
SubTotal Construction Cost					
15	Mobilization	LS	1.0		
16	Record Drawings	LS	1.0		
Total Base Bid "B" Based on Completion Time of 120 Calendar Days					
17	Contract Contingency	LS	1.0	10%	
Total Bid "B" with Contract Contingency Based on Completion Time of 120 Calendar Days					

Bidder Name: _____

Authorized Signature: _____

Geotechnical Engineering Report

Paradise Bay Water Main Replacement
Manatee County, Florida
August 24, 2020
Terracon Project No. HC205055

Prepared for:
Manatee County Public Works
Bradenton, FL

Prepared by:
Terracon Consultants, Inc.
Sarasota, Florida

August 24, 2020

Manatee County Public Works
1022 26th Avenue East
Bradenton, FL 34206

Attn: Mr. Alejandro Gonzalez, P.E.
Project Engineer I

Re: Geotechnical Engineering Report
Paradise Bay Water Main Replacement
Work Assignment No. 27
Manatee County, Florida
Terracon Project No. HC205055

Dear Mr. Gonzalez:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PHC205055 dated July 15, 2020 and authorized on July 30, 2020. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning the planned pipeline construction for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

for

James M. Jackson, P.E.
Department Manager
FL License No. 77733

Douglas S. Dunkelberger, P.E.
Principal
FL License No. 33317

This item has been digitally signed and sealed by James M. Jackson, P.E. on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Paradise Bay Water Main Replacement

Cortez Road W

Manatee County, Florida

Terracon Project No. HC205055

August 24, 2020

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed new water main pipeline to be located at the intersection of Cortez Road and 7th Street in Manatee County, Florida. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Soil parameters for jack-and-bore design
- Site preparation and earthwork

The geotechnical engineering Scope of Services for this project included the advancement of two test borings to a depth of approximately 15 feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at the intersection of Cortez Road and 7th Street in Manatee County, Florida. See **Site Location**
Existing Improvements	A four-lane paved asphalt roadway with a center turn lane, grass shoulders, and concrete sidewalks.
Current Ground Cover	The site is covered with concrete sidewalk, asphalt pavement, and short grasses.

Item	Description
Existing Topography	The provided Plan and Profile Sheet 3 for the Paradise Bay WM Replacement by Manatee County Public Works dated June 3, 2020 indicates the ground surface at the center of Cortez Road is at an elevation of about +5.5 feet-NAVD.
Prior Land Use	Review of aerial photographs (ref. Google Earth) indicate the site has been developed with the existing roadway from at least 1994.
Surficial Soil Conditions	Review of the Web Soil Survey indicates the site is mapped with Soil Unit 20, EauGallie fine sand. The typical soil profile consists of sand to a depth of 28 inches, followed by sand coated with organic matter (i.e. hardpan) to a depth of 42 inches, and underlain by sandy clay loam or loamy sand to a depth of 65 inches. Under natural (pre-development) conditions, the seasonal high groundwater level (SHGWL) is reported to be within 10 inches of the ground surface.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	The following information was provided in the *Paradise Bay WM Replacement* plan by Manatee County Public Works and in subsequent e-mails from Mr. Duarte.
Project Description	The project includes the replacement of approximately 85 linear feet (lf) of water main piping. The pipe is to be 10-inch diameter PVC and installed in a 20-inch diameter steel casing. The pipe is to be installed by jack-and-bore with an invert elevation of about -6.5 feet-NAVD (about 12 feet bgs).
Grading/Slopes	Existing site grades are to be maintained.

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Pavement**	Asphalt pavement over lime rock base
2	**Sand**	Poorly graded sand with silt and trace to some shell fragments (SP-SM), medium dense to very dense

Groundwater

Groundwater measurements were collected from hand auger borings positioned in grass areas adjacent to the SPT borings. The groundwater level was measured at a depth of about 3 ½ to 5 ½ feet bgs (+1 to 0 Feet-NAVD) 24 hours after completion of drilling.

As presented herein, the SHGWL is the highest sustained groundwater elevation during a typical (normal or average rainfall amount) wet season and not the peak groundwater elevation immediately following a major storm event. Therefore, the SHGWL referred to in this report is an average, high value and not necessarily a peak (upper bound) value. The SHGWL generally occurs at the end of the wet season, which the Southwest Florida Water Management District (SWFWMD) identifies as the period from mid-May through September.

The best and most accurate method of determining the SHGWL is to obtain real-time site-specific groundwater data through the entire hydro period (dry and wet seasons) during a year with normal rainfall. However, due to the project's design schedule, this was not feasible. Therefore, our SHGWL estimate for the planned pipeline area is based on the stabilized measurements made on August 13, 2020 and an adjustment factor based on the published groundwater data.

The groundwater levels in the surficial aquifer well ROMP TR 7-2, which is located approximately 7.5 miles southeast of the site, were also considered. The historical groundwater measurements reported for the well shows that the groundwater levels peak in the month of August. Additionally, the real-time data for the well suggests that the groundwater levels in August 2020 were about equal to the average position for this time of year.

The well data discussed above suggests that the groundwater measurements made in mid-August 2020 for this study are about equal to the normal (average rainfall) year SHGWL. Based on this information, we estimate the SHGWL to be at an elevation of about +1 feet-NAVD with an accuracy of ½-foot +/-..

GEOTECHNICAL OVERVIEW

In general, the borings found 8 to 9 inches of pavement (3 to 4 inches of asphalt over 5 inches of limerock base) underlain by medium dense to very dense poorly graded fine sand with silt and

trace to some shell fragments from the surface to the maximum borehole termination depth of 15 feet bgs. Based on the planned maximum drilling depth of about 12 feet, typical jack-and-bore construction procedures should be sufficient for the installation of the new water main piping.

Our recommended soil parameter and shear moduli values are provided in the **Lateral Earth Pressures** section.

The **Trench Backfill Recommendations** section addresses recommendations for backfilling trenches associated with the planned construction.

The **General Comments** section provides an understanding of the report limitations.

LATERAL EARTH PRESSURES

Design Parameters

The soil parameters shown in the table below, based on an empirical correlation (ref: Florida Department of Transportation Soils and Foundations Handbook, 2020) with SPT blow counts (N-Values), should be assumed for the planning of any below grade operations in the vicinity of the SPT borings.

GeoModel Layer	USCS Classification	SPT N-Values	Total Weight (pcf)	Submerged Weight (pcf)	Friction Angle (phi)	Cohesion (psf)	Coefficients		
							Active (Ka)	Passive (Kp)	At-Rest (K_0)
2	SP-SM	HA[1]	105	43	30	0	0.333	3.00	0.500
2	SP-SM	18 to 20	110	48	33	0	0.295	3.39	0.455
2	SP-SM	23 to 29	115	53	35	0	0.271	3.69	0.426
2	SP-SM	32 to 41	120	58	38	0	0.238	4.20	0.384
2	SP-SM	50+	125	63	38	0	0.238	4.20	0.384

1. The upper four feet of each boring was hand augered to check for possible underground utility conflicts. For this zone, “loose” soil conditions were assumed.

Estimated shear modulus values based on depth are also provided in the following table.

Boring No.	Depth (feet)	USCS	Relative Density	Average Shear Modulus, G (psf)		
				Range		Average
B-1	0 to 4	SP-SM	Not measured[1]	100,000	100,000	100,000
	4 to 8	SP-SM	Medium dense	272,000	332,000	302,000
	8 to 15	SP-SM	Dense	334,000	417,000	375,500
B-2	0 to 4	SP-SM	Not measured[1]	100,000	100,000	100,000
	4 to 6	SP-SM	Very dense	541,000	541,000	541,000
	6 to 15	SP-SM	Medium dense	222,000	322,000	262,000

1. The upper four feet of each boring was hand augered to check for possible underground utility conflicts. For this zone, "loose" soil conditions were assumed.

In estimating shear modulus values, an empirical formula (Coduto, 2001) was used to relate the elastic modulus to both N-value and soil type. For the granular soils, we assumed drained conditions and assigned Poisson's ratios of 0.1 for loose soils, 0.2 for medium dense soils and 0.3 for dense to very dense soils (Rowe, 2000).

TRENCH BACKFILL RECOMMENDATIONS

- Any open trench (excavation) areas should be accomplished in the dry (i.e. not in saturated or submerged conditions). Dewatering to a depth of 2 feet below the bottom of all excavations should be performed prior to placement of backfill materials.
- Should the excavation bottom become unstable due to persistent moisture or hydrostatic pressure, the bottom should be "over-excavated" a minimum of 12 inches (deep) and replaced with clean gravel (FDOT No. 57 Stone) that is wrapped in a filter fabric.
- Backfill below the existing water level at the time of construction should consist of relatively clean sands or gravels, with a maximum of 15% passing the U.S. No. 200 sieve and no particle size larger than 1 inch in any dimension. Backfill above the existing water level at the time of construction should consist of sands or gravels with particle sizes of less than 1 inch in any dimension, no more than 35 percent fines, and of low plasticity (i.e. Liquid Limit less than 40 and Plasticity Index less than 10). The fill should be placed in the dry in lifts that do not exceed 12 inches in vertical measure. Each lift should be compacted to at least 95% of the Modified Proctor maximum dry density (ASTM D-1557). Backfill in pavement areas should be compacted to at least 98% density (ASTM D-1557).
- The GeoModel Layer 2 soils should generally meet the backfill gradation requirements of a maximum of 15% passing the U.S. No. 200 sieve.
- As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. Temporary excavations will probably be required during pipe installation operations. The utility contractor, by contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope, or

bench the sides of the excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards.

Temporary Dewatering

Dewatering will be needed to facilitate earthwork and underground construction operations for this project. The necessity for dewatering will be dependent on the depth of excavation below existing grade and the groundwater levels at the time of construction. Actual dewatering "means and methods" should be left up to a contractor experienced in installation and operation of dewatering systems. The contractor should provide a dewatering plan for review and approval by the engineer prior to the installation of the dewatering systems.

Also, the dewatering plan should consider the potential impact of lowered groundwater (i.e. increased vertical stress on subsoils which could trigger settlement) on nearby, existing construction.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

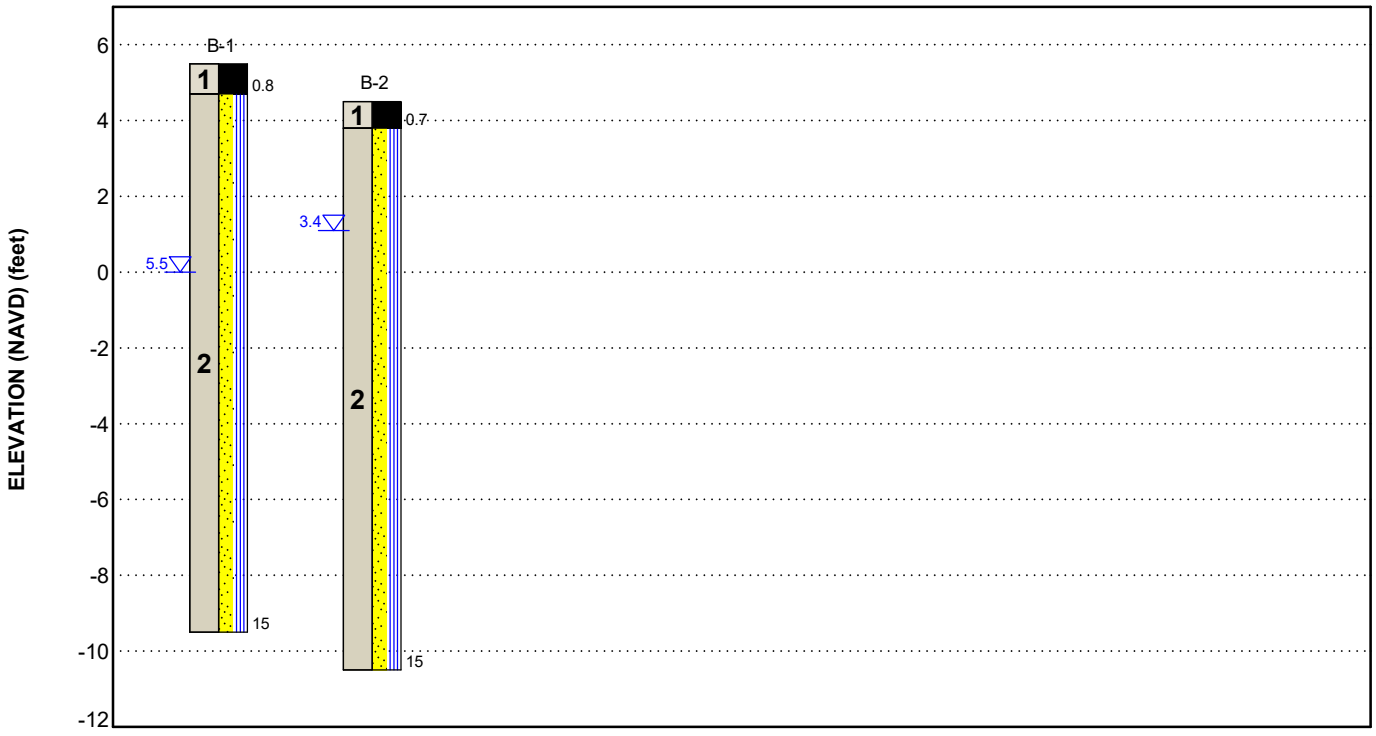
Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

FIGURES

Contents:

GEOMODEL

Paradise Bay WM Replacement ■ Bradenton, FL
Terracon Project No. HC205055



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	**Pavement**	Asphalt over lime rock base
2	**Sand**	Poorly graded sand with silt and trace to some shell fragments (SP-SM), medium dense to very dense

LEGEND

Asphalt

Poorly-graded Sand with Silt

▽ First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet)[1]	Location
2	15	One at each end of the planned jack-and-bore

1. Below ground surface

Boring Layout and Elevations: Manatee County Public Works personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet). Ground surface elevations were estimated from the profile survey on the *Plan and Profile Sheet 3* provided by Manatee County Public Works.

Permitting: A Florida Department of Transportation (FDOT) Right-of-Way Use permit was obtained prior to mobilization of our drilling equipment.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using mud rotary procedures. Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound rope and cathead operated safety hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration or the middle 12 inches of a 24-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A split-barrel sampling spoon was used for sampling. We observed and recorded groundwater levels during drilling, as well as digging hand augers adjacent to the boring locations for 24-hour observation. The borings were backfilled with cement grout and capped with cold-patch asphalt at their completion, and the augers were backfilled with bentonite chips after delayed groundwater level readings.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D1140-17 Standard Test Method for Amount of Material in Soils Finer than No. 200 (75-µm) Sieve

Our laboratory testing program also includes examination of soil samples by an engineer. Based on observation and test data, the engineer classified the soil samples in accordance with the Unified Soil Classification System (ASTM D2487)

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

SITE LOCATION

Paradise Bay Water Main Replacement ■ Manatee County, Florida
August 24, 2020 ■ Terracon Project No. HC205055

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Paradise Bay Water Main Replacement ■ Manatee County, Florida
August 24, 2020 ■ Terracon Project No. HC205055

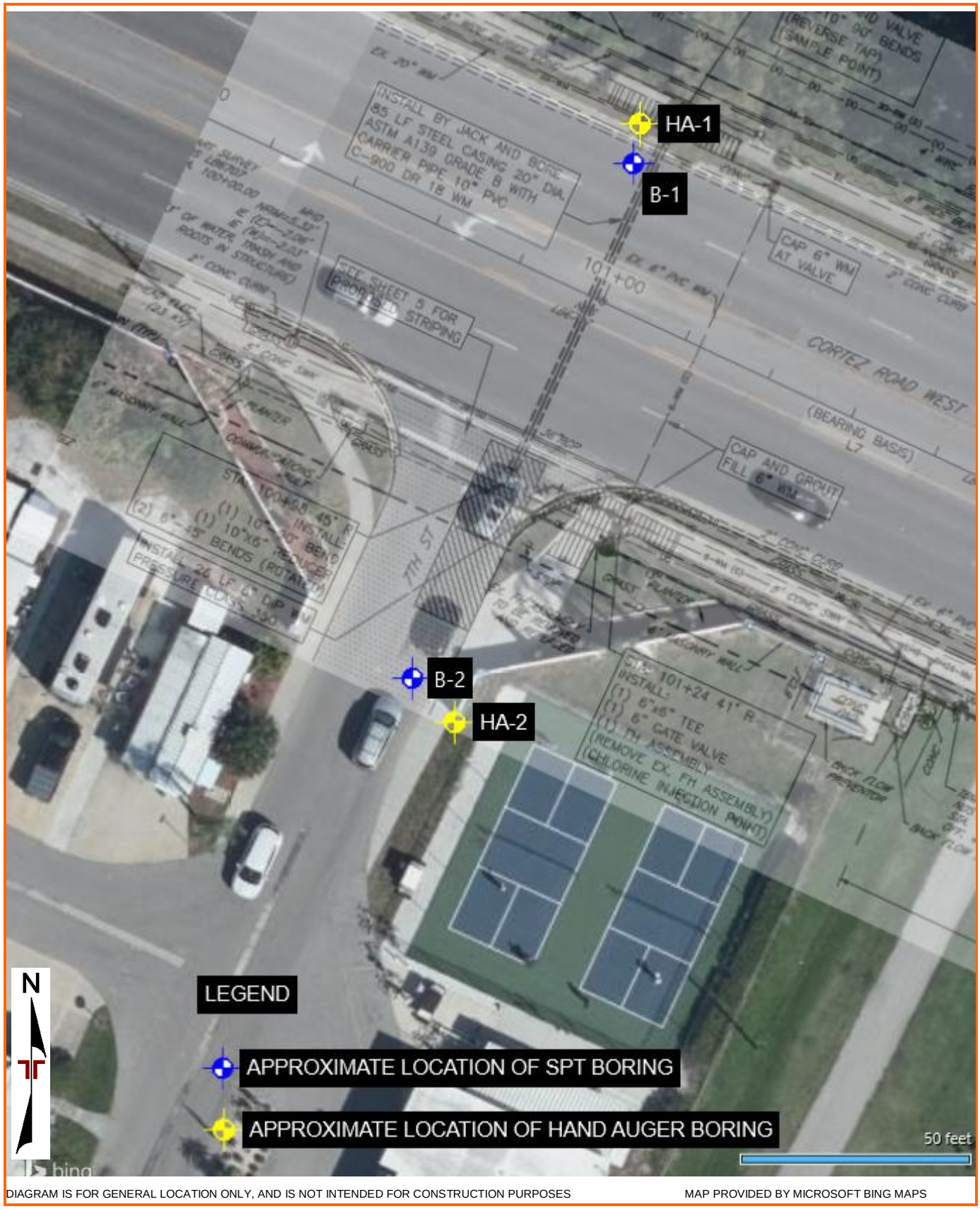


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 and B-2)

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: Paradise Bay WM Replacement

CLIENT: Manatee County Government
Bradenton, FL

SITE: Cortez Road West
Bradenton, FL

LOCATION See Exploration Plan

Latitude: 27.4638° Longitude: -82.6694°

Surface Elev.: 5.5 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
1		0.8	4.5						
			PAVEMENT, 4" asphalt over 5" limerock base						
2			**POORLY GRADED SAND WITH SILT (SP-SM)**, fine grained, brown to dark gray, medium dense to dense	5	▽		10-14-15-18 N=29	21.9	11
							7-12-11-5 N=23		
			- with trace shell fragments	10			9-14-18-16 N=32	22.7	6
		15.0	-9.5	15			12-18-23 N=41		
			Boring Terminated at 15 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud rotary. Hand auger upper 4 feet
Continuous sampling from 4 to 10 feet
Samples at 5 foot intervals thereafter

Abandonment Method:
Boring backfilled with Cement Grout
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:
Begin mud rotary at 8 feet
Groundwater levels measured in adjacent hand auger boring
Ground surface elevation was estimated from the Plan and Profile Sheet 3 dated June 3, 2020 and reference feet-NAVD.

WATER LEVEL OBSERVATIONS

▽ *At 5.5' after 24 hours*

Terracon
8260 Vico Ct, Unit B
Sarasota, FL

Boring Started: 08-12-2020 | Boring Completed: 08-12-2020

Drill Rig: BR 2500 | Driller: S.D.

Project No.: HC205055

BORING LOG NO. B-2

PROJECT: Paradise Bay WM Replacement

CLIENT: Manatee County Government
Bradenton, FL

SITE: Cortez Road West
Bradenton, FL

LOCATION See Exploration Plan

Latitude: 27.4635° Longitude: -82.6696°

Surface Elev.: 4.5 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
1		0.7	4						
		PAVEMENT, 3" asphalt over 5" limerock base							
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, with shell fragments, fine grained, light brown to gray, medium dense to very dense			▽			17.1	8
				5			7-33-26-8 N=59		
							9-9-9-15 N=18		
							14-10-10-12 N=20		
				10					
							13-14-14 N=28	24.8	7
		15.0	-10.5	15					
		Boring Terminated at 15 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud rotary. Hand auger upper 4 feet
Continuous sampling from 4 to 10 feet
Samples at 5 foot intervals thereafter

Abandonment Method:
Boring backfilled with Cement Grout
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:
Begin mud rotary at 4 feet
Groundwater levels measured in adjacent hand auger boring
Ground surface elevation was estimated from the Plan and Profile Sheet 3 dated June 3, 2020 and reference feet-NAVD.

WATER LEVEL OBSERVATIONS

▽ *At 3.4' after 24 hours*

Terracon
8260 Vico Ct, Unit B
Sarasota, FL

Boring Started: 08-12-2020 | Boring Completed: 08-12-2020

Drill Rig: BR 2500 | Driller: S.D.

Project No.: HC205055

SUPPORTING INFORMATION

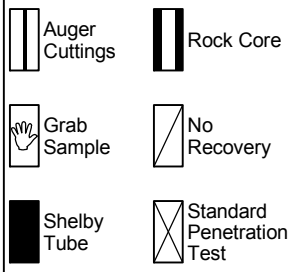
Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(DCP)	Dynamic Cone Penetrometer
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (psf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 500	0 - 1
Loose	4 - 9	Soft	500 to 1,000	2 - 4
Medium Dense	10 - 29	Medium Stiff	1,000 to 2,000	4 - 8
Dense	30 - 50	Stiff	2,000 to 4,000	8 - 15
Very Dense	> 50	Very Stiff	4,000 to 8,000	15 - 30
		Hard	> 8,000	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Terracon

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ³ 4 and 1 £ Cc £ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ³ 6 and 1 £ Cc £ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above “A”		CL	Lean clay [K, L, M]
			PI < 4 or plots below “A” line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line		CH	Fat clay [K, L, M]
			PI plots below “A” line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ³ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ³ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ³ 30% plus No. 200 predominantly sand, add “sandy” to group name.

[M] If soil contains ³ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] PI ³ 4 and plots on or above “A” line.

[O] PI < 4 or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.