TSFGeo

March 27, 2023, Rev 1 11/21/23, Rev 2 4/30/24

WGI
2035 Vista Parkway
West Indian River, FL 33411
Attn: Mr. William Evans, P.E., AICP, PD&E Market Leader
email: William.Evans@wginc.com

RE: **Geotechnical Review Report for PD&E**
SR-5 (US-1) at Aviation Blvd
Vero Beach, FL, Indian River County, FPID 441693-1
TSFGeo Project No. 7111-22-131

Dear William:

Tierra South Florida, Inc. (TSFGeo) has completed a geotechnical review of the soils for the subject project. This geotechnical study was performed in general accordance with FDOT procedures. The results of our exploration program and geotechnical recommendations are presented in this report.

If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Sincerely,

TSFGeo

Harmon C. Bennett, P.E.
Principal Engineer
FL Reg. No. 53130

Ramakumar Vedula, P.E.
Principal Engineer
FL Reg No. 54873

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY
Harmon C Bennett
2024.04.30 10:12:08 -04'00'
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.

TIERRA SOUTH FLORIDA, INC
2765 VISTA PARKWAY S-10
WEST PALM BEACH, FL 33411
HARMON COY BENNETT, P.E. No. 53130

Table of Contents

1.0 PROJECT DESCRIPTION

The project is a PD&E Study for SR-5 (US-1) in Vero Beach, Florida. The study includes sections as follows:

- The north-south SR-5 roadway from 21st Street and 41st Street (approximately 2 miles)
- The east-west Aviation Blvd roadway between 27th Avenue and 13th Ave (approximately 1 mile).
- Bridge replacement of SR 5 Bridge over the Main Canal, bridge number 880085/88000-3, 1980.

The purpose of this study was to provide Geotechnical (i.e. soils and groundwater) input to the design team to assist in evaluation of the merits of the potential roadway improvements.

2.0 SCOPE OF SERVICES

The study was performed to obtain information on the existing subsurface conditions at the proposed project site to assist in the PD&E Study. The following services were provided:

1. Reviewed readily available published topographic and soils information. This information was obtained from the "Soil Survey of Indian River County, Florida" published by the United States Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS), and USGS Topographic Maps.
2. Reviewed readily available published Geological Map information for Indian River County.
3. Reviewed readily available Topographic information for the project area.
4. Reviewed readily available Groundwater Table Map information for the project area.
5. Prepared this data report to summarize the review for the project.

These Geotechnical Review Services were performed in general accordance with FDOT Soils and Foundations Handbook guidelines.

3.0 REVIEW OF AVAIABLE SITE INFORMATION

Available information was reviewed and summarized herein for the site, geology of the soils, topographic information, and groundwater information.

3.1 Site Information

The general site area is located in Vero Beach, on the east side of the Vero Beach Airport for SR-5 and along the southern perimeter of the airport for Aviation Drive. SR-5 is generally oriented

north-south along the project corridor and is approximately 1 ½ miles west of the Indian River, which the roadway generally parallels within the project area. A four (4) span bridge exists between 28th street and Aviation Blvd, crossing the Main Canal, bridge number 880085/88000-3. The project is to include replacement of the existing pile supported bridge. The existing four (4) lane bridge is approximately 106 feet in length and has two end bents, and three intermediate bents, a raised sidewalk on the right side, and is supported by 18" piles, 10 piles per end bent and 9 piles per intermediate bent. The piles to the left and right of intermediate bent are battered to the outside of the bridge. At the end bents, every other pile is battered towards the channel, 6 on each end of the bridge.

The bridge design data sheet for the existing bridge is included as an attachment. Based on a review of the attachment the centerline grade elevation is noted to be +14.15 feet. The bottom of the channel is noted to be approximately 30 feet in width, and at an elevation of -4.0. The design high water is noted as elevation +8.2 and normal flow elevation is noted to be +1.58. The bridge low member is noted to be +12.33. All elevations are in feet NGVD 1929.

A parallel bridge for the railroad exists to the west of the existing bridge. The existing separation of the bridges is estimated to be less than 30 feet. Close coordination with the railroad will be required during construction, and during exploration programs.

3.2 Geological Information

The geological information available was reviewed for the general soil information in the Indian River County, Florida, from the USGS. Based on a review of the Geological Map of Indian River County, the soils within the project area are anticipated to be in the following group:

> **Qa - Anastasia Formation** - Variably lithified coquina of shells and sands and unlithified fossiliferous sand.

The Anastasia Formation is described as follows:

> The Atlantic Coastal Ridge is underlain by the Anastasia Formation from St. Johns County southward to Palm Beach County. Excellent exposures occur in Flagler County in Washington Oaks State Park, in Martin County at the House of Refuge on Hutchinson Island and at Blowing Rocks in Palm Beach County. An impressive exposure of Anastasia Formation sediments occurs along Country Club Road in Palm Beach County (Lovejoy, 1992). The Anastasia Formation generally is recognized near the coast but extends inland as much as 20 miles (32 kilometers) in St. Lucie and Martin Counties. The Anastasia Formation, named by Sellards (1912),is composed of interbedded sands and coquinoid limestones. The most recognized facies of the Anastasia sediments is an orangish brown, unindurated to moderately indurated, coquina of whole and fragmented mollusk shells in a matrix of sand often cemented by sparry calcite. Sands occur as light gray to tan and orangish brown, unconsolidated to moderately indurated, unfossiliferous to very fossiliferous beds. The Anastasia Formation forms part of the surficial aquifer system.

3.3 Review of USGS Vero Beach Quadrangle, Indian River County, Florida

Based on a review of the topographic map for the project area, the terrain in the vicinity has little change in elevation. Based on a review of the general elevation data from Google for the pathway along the SR-5 alignment, the roadway elevation is between approximately +14 and +17 feet elevation, sea level, approximately NGVD 1929. Aviation Blvd roadway is approximately +20 ft near the intersection of 27th Ave and SR-5, and +6 east of SR-5 at the intersection with 13th Ave.

3.4 Groundwater Mapping

A historic document for the groundwater within the project corridor was reviewed. The document has estimate data of the groundwater level from the wells from the area. A graphical excerpt from the document is included in the **Appendix**. Based on the review, the water level potential appears to be +5 and +10, sea level (Approximately NGVD 1929). This estimate information is not for design purposes and should only be used as a general reference.

It is anticipated that the east-west main canal will have a significant impact on the groundwater in the vicinity of the project. A review of the historical data for the monitoring station at the bridge was reviewed. A summary of the water level in the canal over the last 13 years is included as **Figure 1**. Reference: USGS Main Canal at Vero Beach, FL USGS 02253000 (Surface Water, Stream)

Statistics for April 30, 2024 based on 13 years of data
Stream water level elevation above NAVD 1988, in ft

low (2022)	25th	median	75th	mean	high (2015)
3.22 ft	4.33 ft	4.49 ft	5.14 ft	4.72 ft	7.22 ft

Figure 1- Historical Water Level Data at the Main Canal

The roadway elevation within the project area appears to be between elevation of +13 and +16, sea level datum. The Seasonal High Groundwater Table (SHGWT) is estimated to be more than 3 feet below the roadway surface within the project corridor. This estimate should be confirmed with field exploration prior to finalizing the design.

3.5 Review of USDA Soil Survey, Indian River County, Florida

Based on a review of the Indian River County Soil Survey, the project corridor includes the following map units:

Map Unit 5 - Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes
Component Myakka - The Myakka component makes up 70 percent of the Map Unit. Slopes are 0 to 2 percent. This component is on flatwoods, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most

restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, October, November. Organic matter content in the surface horizon is about 2 percent.
Component Mayakka, Wet - The Myakka, wet component makes up 15 percent of the Map Unit. Slopes are 0 to 2 percent. This component is on flatwoods, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during July, August, September, October. Organic matter content in the surface horizon is about 2 percent.

Map Unit 8 - Paola sand, 0 to 5 percent slopes - The Paola component makes up 85 percent of the Map Unit. Slopes are 0 to 3 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is very high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

Map Unit 11 - St. Lucie sand, 0 to 8 percent slopes - The St. Lucie component makes up 90 percent of the Map Unit. Slopes are 0 to 8 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is very high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

Map Unit 21 - Pomello sand, 0 to 5 percent slopes - The Pomello component makes up 85 percent of the Map Unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during June, July, August, September, October, November. Organic matter content in the surface horizon is about 1 percent.

Map Unit 22 - Urban land, 0 to 2 percent slopes - The Urban land is a miscellaneous area. No soils information is available for miscellaneous areas.

Map Unit 33 - Astatula sand, 0 to 5 percent slopes - The Astatula component makes up 85 percent of the Map Unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is very high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

Map Unit 23 - Arents, 0 to 5 percent slopes - The Arents component makes up 90 percent of the Map Unit. Slopes are 0 to 5 percent. This component is on fills, rises on marine terraces on coastal plains. The parent material consists of altered marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during June, July, August, September, October, November. Organic matter content in the surface horizon is about 0 percent.

Map Unit 28 - EauGallie-Urban land complex - The EauGallie, hydric component makes up 10 percent of the Map Unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September. Organic matter content in the surface horizon is about 5 percent. Urban land - Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area. No soils information is available for miscellaneous areas.

Map Unit 29 - Immokalee-Urban land complex - The Immokalee, non-hydric component makes up 50 percent of the Map Unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, October, November. Organic matter content in the surface horizon is about 2 percent. Urban land - Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area. No soils information is available for miscellaneous areas. The Immokalee, hydric component makes up 10 percent of the Map Unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent

material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September. Organic matter content in the surface horizon is about 2 percent.

Map Unit 32 - Jonathan sand, 0 to 5 percent slopes - The Jonathan component makes up 85 percent of the Map Unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during June, July, August, September, October. Organic matter content in the surface horizon is about 1 percent. The soil has a maximum sodium adsorption ratio of 1 within 30 inches of the soil surface.

Map Unit 49 - Pompano fine sand, 0 to 2 percent slopes - The Pompano component makes up 80 percent of the Map Unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during July, August, September, October. Organic matter content in the surface horizon is about 2 percent.

Map Unit 100 - Waters of the Atlantic Ocean - The Waters of the Atlantic Ocean is a miscellaneous area. No soils information is available for miscellaneous areas.

Any measurements noted in these sections are for general reference only and typically relative to the existing ground surface.

Sheets for the following items are provided in the **Appendix**.

- Site Vicinity Map
- Site Geology Map
- Site Topographic Map
- Site Water Level Map Information
- Soil Map - Indian River County, Florida

4.0 SOIL CONDITIONS

4.1 Soil Profiles

Soil boring information for signals within the project corridor were obtained for illustration of general soil conditions. Soil Profiles for Report of Core Boring Sheets for the project noted on the graphic are included for general reference, as **Figure 2** – Soil Boring Data.

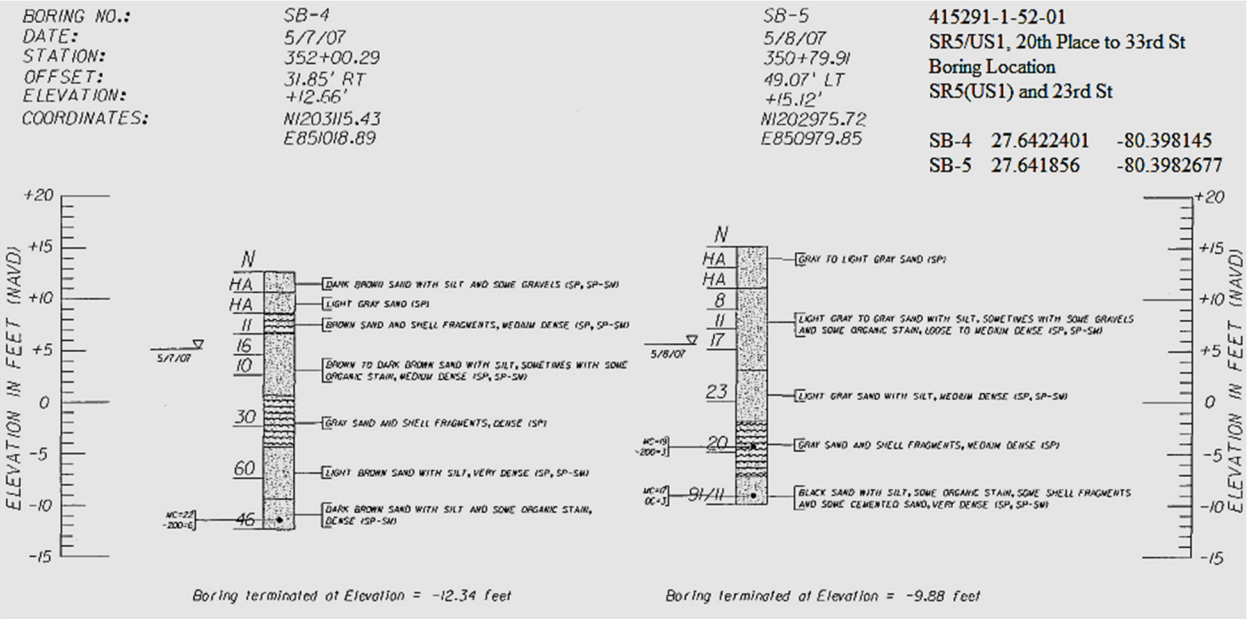


Figure 2 - Soil Boring Data

Plan sheets for hydraulic information and soil borings from the as-built plans for the bridge crossing the Main Canal, bridge number 880085/88000-3 are included in the Appendix of this report for informational purposes.

4.2 Environmental Corrosion Testing

Environmental corrosion classification is based on the FDOT Database of water tests performed at the site, and the fact that the bridge is over a waterway with chlorides level less than 2,000 ppm. Additionally, it does not appear that other bridges with high levels of chlorides in excess of 2,000 ppm are within 2,500 feet of the bridge. The database test results are provided in the Appendix. The classification is noted below.

ENVIRONMENTAL CLASSIFICATION:

	Steel	Concrete
Substructure:	Extremely Aggressive (Resistivity 820)	Moderately Aggressive (Resistivity 820)
Superstructure:	Slightly Aggressive	

Corrosion test results utilized are presented in the **Appendix** as attachment titled **Summary of Corrosion Test Results**.

5.0 REPORT LIMITATIONS

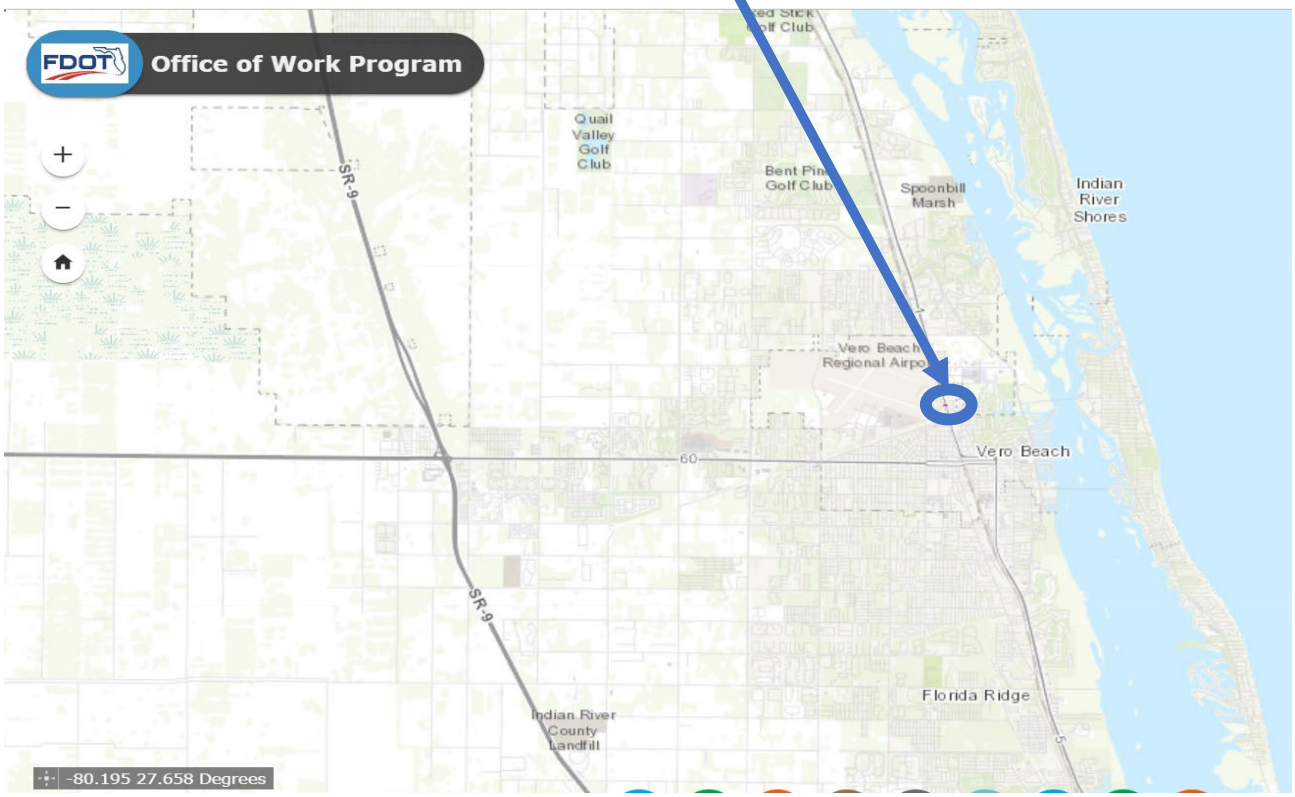
Our Geotechnical engineering review of the site and subsurface conditions with respect to the planned roadway improvements are based upon the followings: (1) site observations, (2) the field historical exploratory test data obtained during the geotechnical review, and (3) our understanding of the project information and anticipated final grades as presented in this report.

Upon the discovery of any site or subsurface conditions during design, which appears to deviate from the data presented within this Geotechnical report, please contact us immediately so that we may visit the site, observe the differing conditions, and evaluate the new information with regards to project recommendations.

APPENDIX

Site Vicinity Map
Site Geology Map
Site Topographic Map
Site Water Level Map Information
Soil Map - Indian River County, Florida
Summary of Corrosion Test Results
As-Built Plan Sheets

APPROXIMATE SITE LOCATION



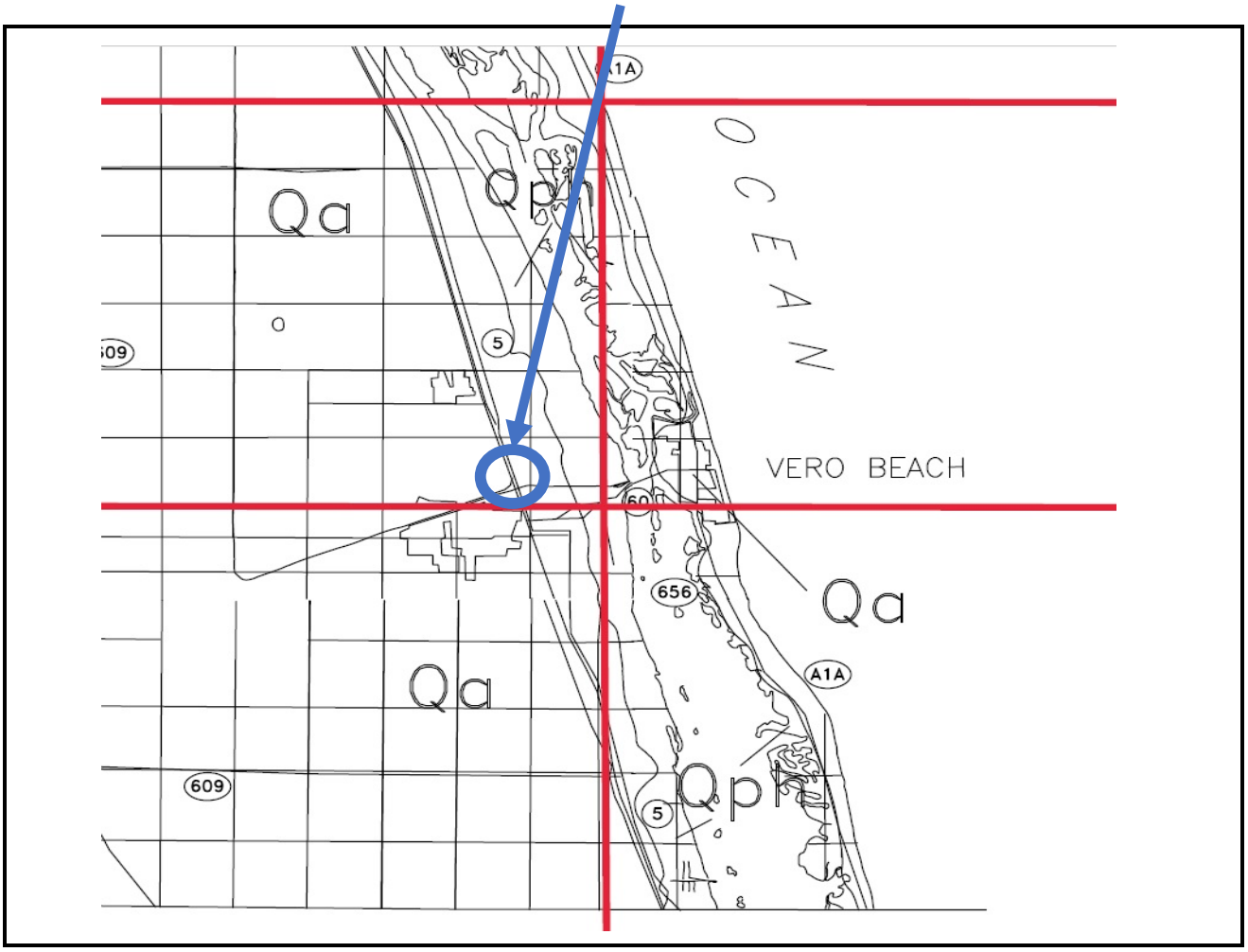
SITE VICINITY MAP

COUNTY: INDIAN RIVER

REFERENCE: FDOT Work Program Mapping

Geotechnical Review Report Project Development & Environment (PD&E) Study SR 5/US-1 at Aviation Boulevard Financial Management Number: 441693-1-22-02 ETDM Number: 14475, Indian River County, Florida		
Drawn by: J.O.	Scale: N.T.S.	Project No: 7111-22-131

APPROXIMATE SITE LOCATION



SITE GEOLOGICAL MAP

COUNTY: **INDIAN RIVER**

REFERENCE: **FLORIDA GEOLOGICAL SURVEY (PART OF MAP AND LEGEND INCLUDED HERE)**

EXPLANATION

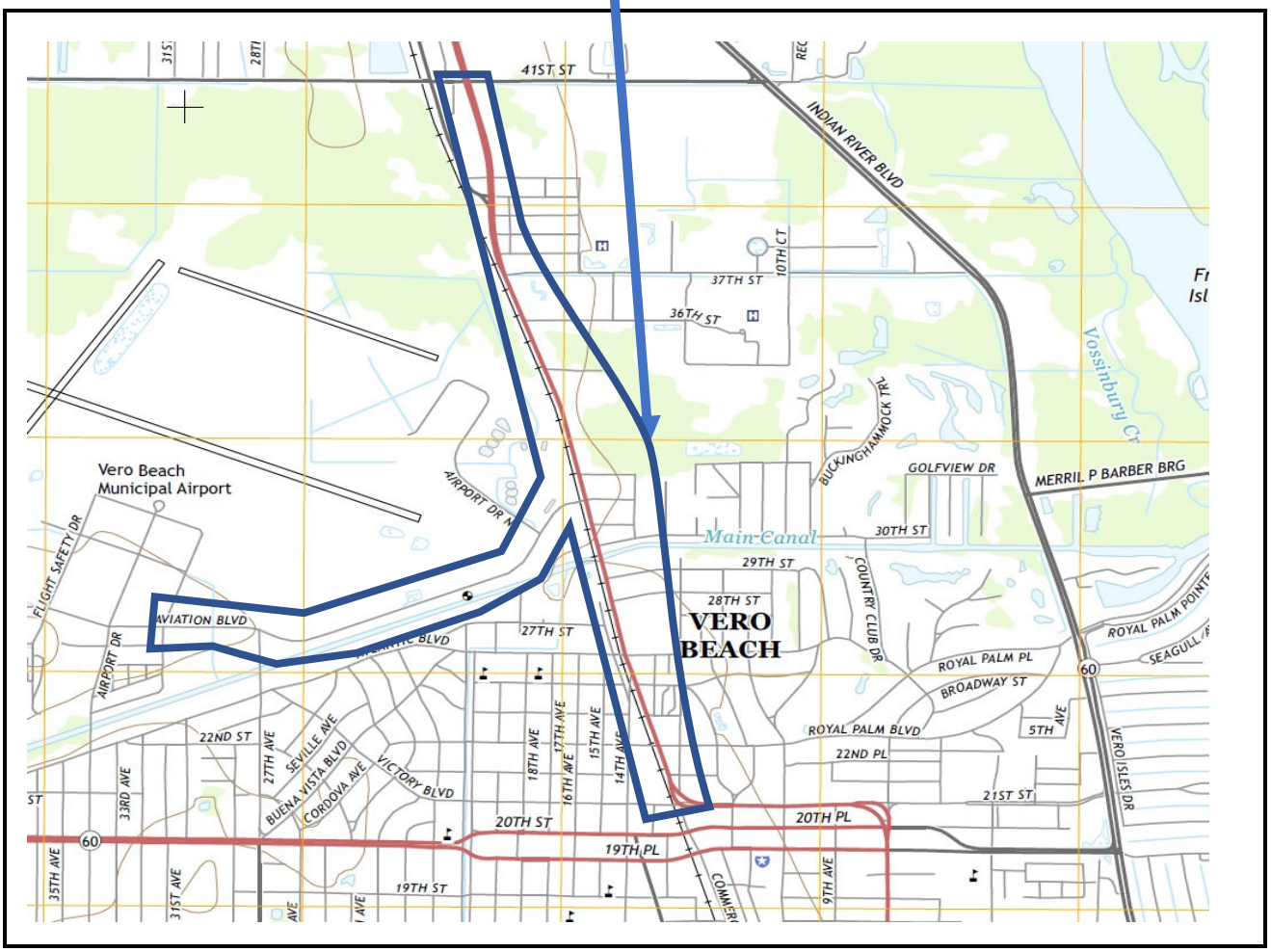
QUATERNARY

Qa— Anastasia Fm.. Variably lithified coquina of shells and sands and unlithified fossiliferous sand.

Geotechnical Review Report Project Development & Environment (PD&E) Study
SR 5/US-1 at Aviation Boulevard
Financial Management Number: 441693-1-22-02
ETDM Number: 14475, Indian River County, Florida

Drawn by:	Scale:	Project No:
J.O.	N.T.S.	7111-22-131

APPROXIMATE SITE LOCATION



SITE TOPOGRAPHICAL MAP

COUNTY: **INDIAN RIVER**

REFERENCE: **TOPOGRAPHIC MAP, VERO BEACH, FLORIDA (PART OF MAP INCLUDED HEREIN)**

T32S
R39E
S35

Geotechnical Review Report Project Development & Environment (PD&E) Study SR 5/US-1 at Aviation Boulevard Financial Management Number: 441693-1-22-02 ETDM Number: 14475, Indian River County, Florida		
Drawn by: J.O.	Scale: N.T.S.	Project No: 7111-22-131

APPROXIMATE SITE LOCATION

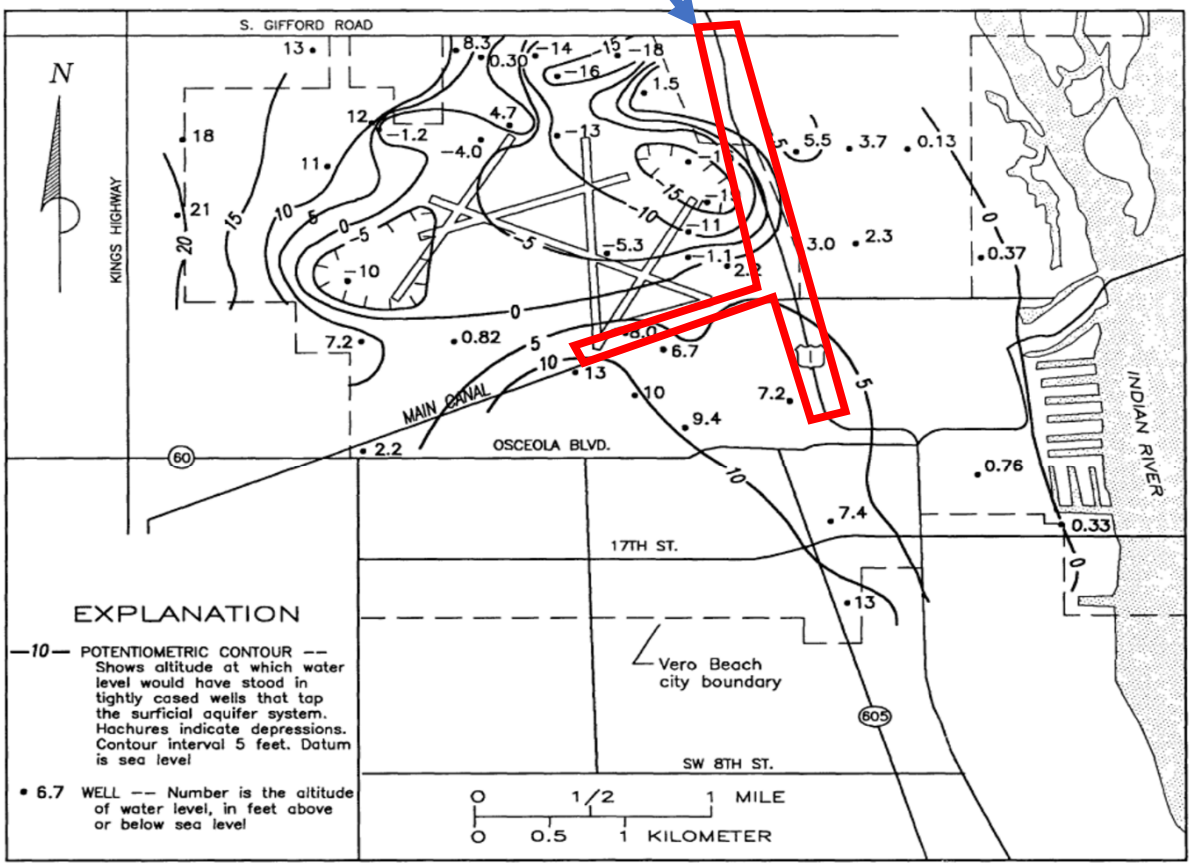


Figure 26.--Potentiometric surface of the surficial aquifer system in the Vero Beach well field, May 1984.

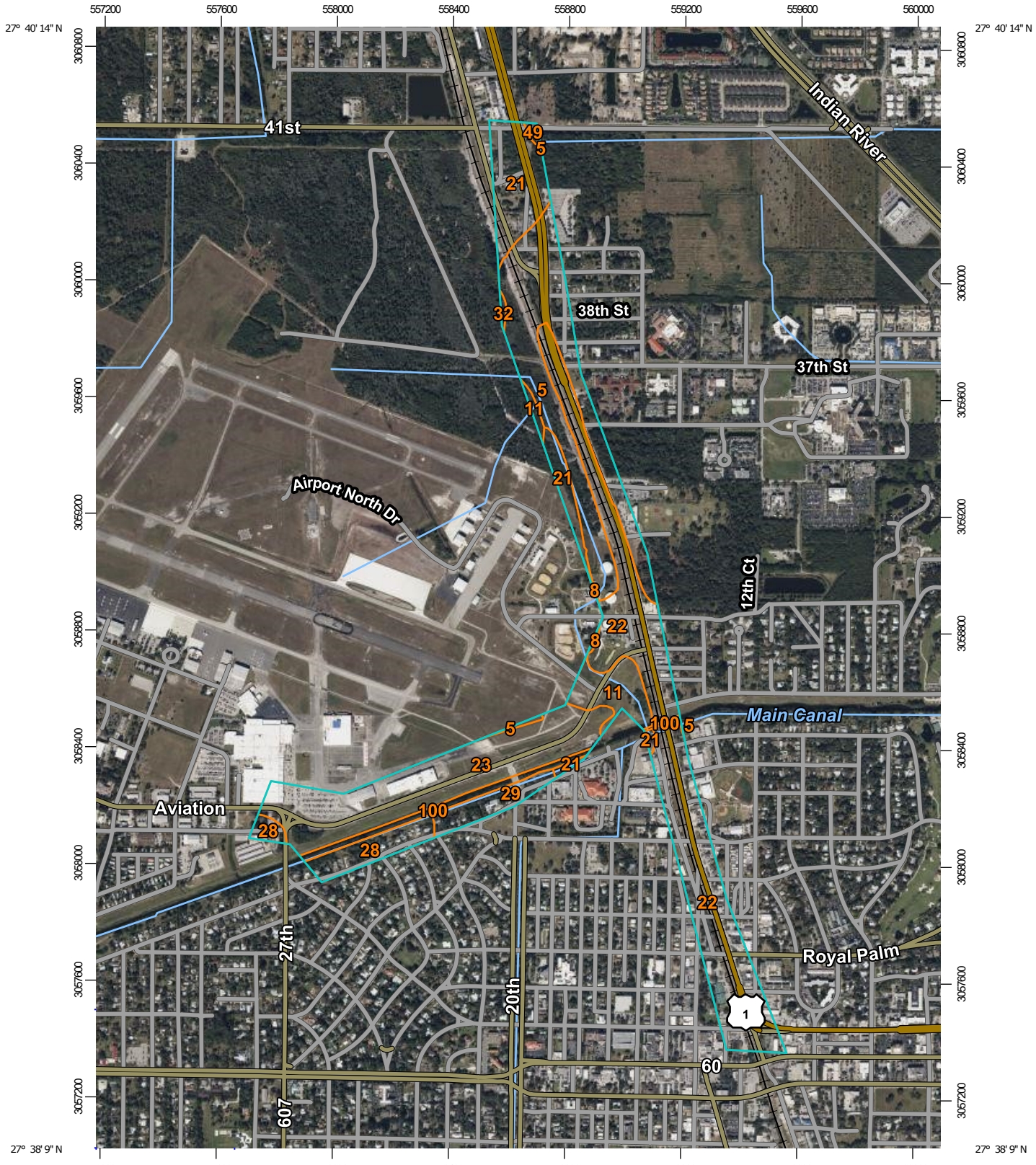
SITE WATER LEVEL MAP INFORMATION

COUNTY: **INDIAN RIVER**

REFERENCE: **Geohyrology of Indian River County, Florida**
By G.R. Schiner and C.P. Laughlin, U.S. Geological Survey and D.J. Toth, St. Johns River Water Management District, U.S. Geological Survey - Water-Resources Investigations Report 88-4073, 1988

Geotechnical Review Report Project Development & Environment (PD&E) Study SR 5/US-1 at Aviation Boulevard Financial Management Number: 441693-1-22-02 ETDM Number: 14475, Indian River County, Florida		
Drawn by: J.O.	Scale: N.T.S.	Project No: 7111-22-131

Soil Map—Indian River County, Florida
(441693-1 SR 5 at Aviation Blvd PD&E in Vero Beach)



Map Scale: 1:18,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N 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 1:20,000.

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: Indian River County, Florida
Survey Area Data: Version 21, Sep 1, 2022

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

Date(s) aerial images were photographed: Jan 18, 2022—Jan 30, 2022

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
5	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	49.6	21.4%
8	Paola sand, 0 to 5 percent slopes	0.4	0.2%
11	St. Lucie sand, 0 to 8 percent slopes	11.4	4.9%
21	Pomello sand, 0 to 5 percent slopes	22.7	9.8%
22	Urban land, 0 to 2 percent slopes	72.7	31.4%
23	Arents, 0 to 5 percent slopes	48.9	21.1%
28	EauGallie-Urban land complex	11.3	4.9%
29	Immokalee-Urban land complex	7.7	3.3%
32	Jonathan sand, 0 to 5 percent slopes	0.4	0.2%
49	Pompano fine sand, 0 to 2 percent slopes	0.6	0.3%
100	Waters of the Atlantic Ocean	6.2	2.7%
Totals for Area of Interest		**232.0**	**100.0%**

TIERRA SOUTH FLORIDA

SUMMARY OF CORROSION TEST RESULTS

Geotechnical Review Report for PD&E
SR-5 (US-1) at Aviation Blvd
Vero Beach, FL, Indian River County, FPID 441693-1
TSFGeo Project No. 7111-22-131

Water Sample	Date	pH (FM 5-550)	Resistivity (ohm-cm) (FM 5-551)	Chlorides (ppm) (FM 5-552)	Sulfates (ppm) (FM 5-553)	Environmental Classification* (Soil)	
						Steel	Concrete
Main Canal US-1 (SR-5) NB (880003)	3/25/1981	7.6	820	852	152	Extremely Aggressive	Moderately Aggressive
North Relief Canal US-1 (SR-5) NB (880029)	10/29/1979	7.6	680	960	16	Extremely Aggressive	Moderately Aggressive
South Relief Canal US-1 (SR-5) (880089)	3/25/1981	7.6	1200	923	21	Moderately Aggressive	Moderately Aggressive
RELIEF CANAL CR-613 (58TH AVE.) (884065)	11/2/1979	7.7	1000	17963	1	Extremely Aggressive	Extremely Aggressive

* As per FDOT Structures Design Guidelines, Table 1.3.2-1, Updated January, 2023
**** Any reading represented as "0.0" is below the detection limit of 4.8 ppm**

Data attained from FDOT Statewide Environmental Data

Structures Design Guidelines
1 - General Requirements

Topic No. 625-020-018
January 2023

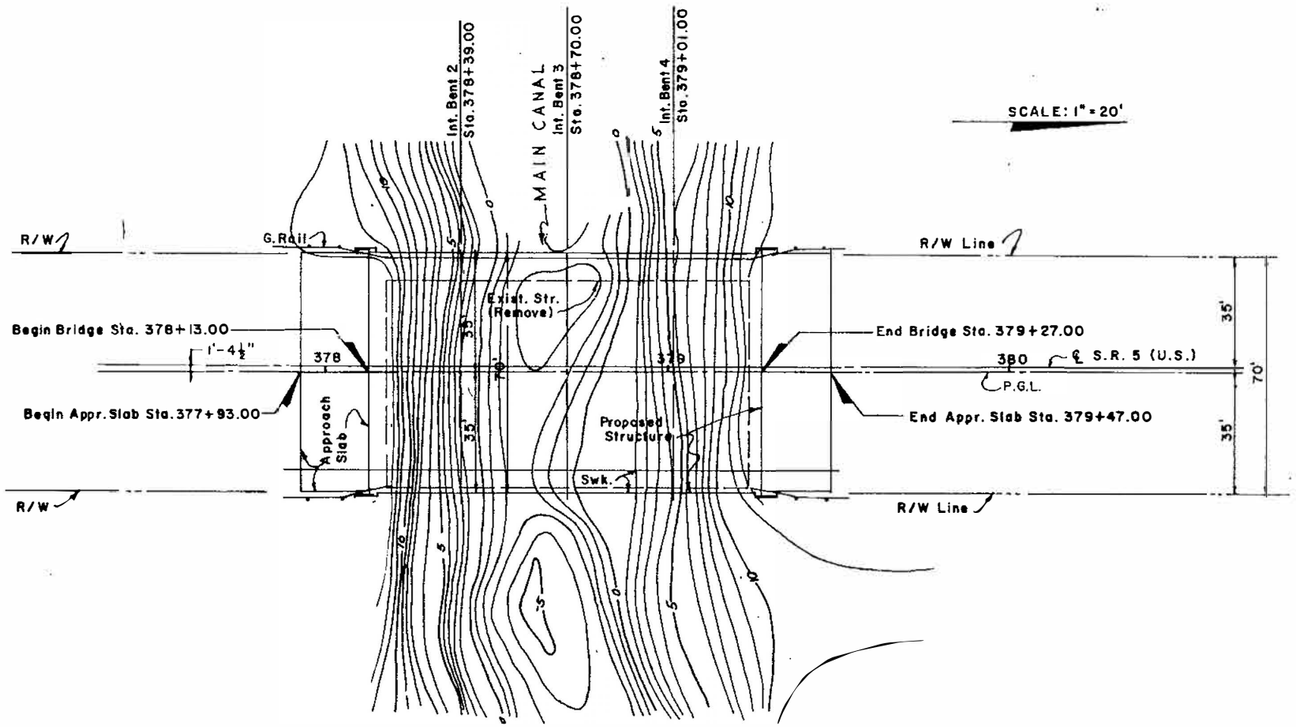
Table 1.3.2-1 Criteria for Substructure Environmental Classifications

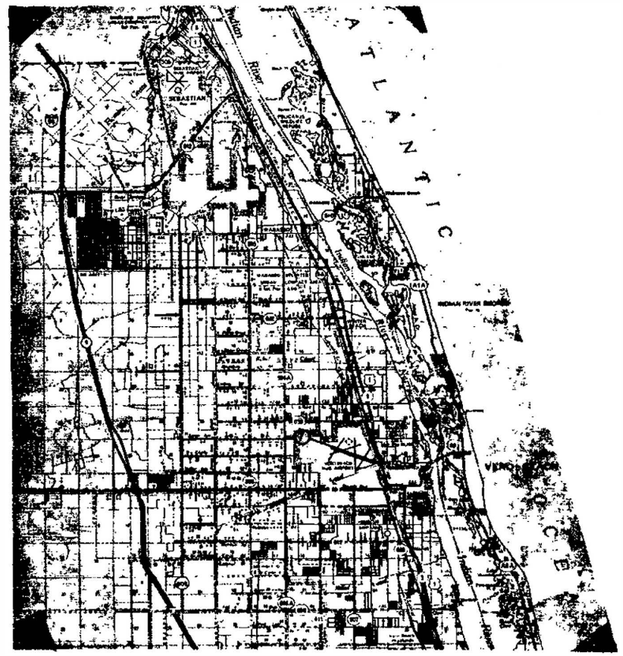
Classification	Environmental Condition	Units	Steel		Concrete	
			Water	Soil	Water	Soil
Extremely Aggressive (If any of these conditions exist)	pH		< 6.0		< 5.0	
	Cl	ppm	> 2,000		> 2,000	
	SO_4	ppm	N.A.		> 1,500	> 2,000
	Resistivity	Ohm-cm	< 1,000		< 500	
Slightly Aggressive (If all of these conditions exist)	pH		> 7.0		> 6.0	
	Cl	ppm	< 500		< 500	
	SO_4	ppm	N.A.		< 150	< 1,000
	Resistivity	Ohm-cm	> 5,000		> 3,000	
Moderately Aggressive	This classification must be used at all sites not meeting requirements for either slightly aggressive or extremely aggressive environments.					

pH = acidity ($-\log_{10}H^+$; potential of Hydrogen), Cl = chloride content, SO_4 = Sulfate content.

2. Superstructure: Any superstructure located within 2,500-feet of any coal burning industrial facility, pulpwood plant, fertilizer plant, or any other similar industry classify as Moderately Aggressive. All others classify as Slightly Aggressive.

FED. ROAD DIV. No.	STATE	PROJECT No.	FISCAL YEAR	SHEET No.
3	FLA.	88010- 3510		B-3



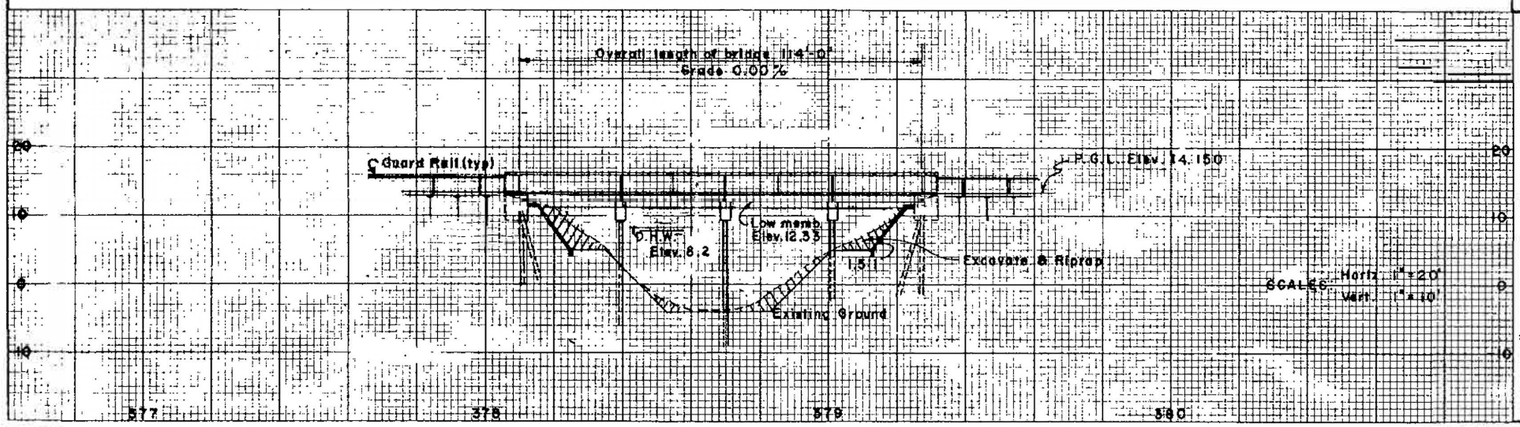


DRAINAGE AREA & LOCATION

EXISTING STRUCTURES

(REFERENCE)	(1)	(2)	(3)	(4)	(5)
FOUNDATION	Conc. Piles				
OVERALL LENGTH	105' 6"				
SPAN LENGTH	5@15' 2@15'3"				
TYPE CONSTRUCTION	Conc.				
SIDEWALKS					
ROADWAY WIDTH	54'				
ELEV LOW MEMBER	12.33				

As Built Plan Sheets
SR 5 Bridge over the Main Canal
Bridge number 880085/88000-3, 1980.
Page 1 of 2



DESIGN DATA

STRUCTURE RECOMMENDATIONS
1. LOADING HS-20-44
2. BRIDGE ROADWAY WIDTH 62 FT. 1"
3. SIDEWALKS 5'-0" Rt.

DRAINAGE RECOMMENDATIONS
1. BEGIN BRIDGE STATION 378+13.00 — END BRIDGE STATION 379+27.00
2. CENTERLINE GRADE ELEVATION 14.15
3. BRIDGE SKEW ANGLE NONE
4. CHANNEL BOTTOM, WIDTH 30'± — ELEVATION -4.0 — SIDE SLOPES 2:1 approx.
   CENTERLINE CHANNEL BOTTOM, STATION 378+70
   LIMITS OF CHANNEL EXCAVATION RT. R/W — LT. R/W
5. CLEARANCE: NAVIGATION: HORIZ. N.A. — DRIFT: HORIZ. 15' Min.
   VERT. N.A. ABOVE EL. N.A. — VERT. 3.0 ABOVE EL. 8.2
6. DRAINAGE AREA 25 Sq. Miles *
7. WATER STAGE DATA: MAX. STAGE OF RECORD — DESIGN H.W. — NORMAL FLOW ELEV.
   ELEVATION 7.5-8 — 8.2 — 1.58
   DATE OF OCCURRENCE unknown
   RECURRENCE INTERVAL " — 50 Years
8. DESIGN DISCHARGE 2264 CFS — SOURCE Indian River Farms Drainage District & Corps of Engineers Ft. Drum Study.
   RECURRENCE INTERVAL 50 YEARS
9. DESIGN VELOCITY 3.8 FPS

REMARKS: Construct Berm at El. 5.0

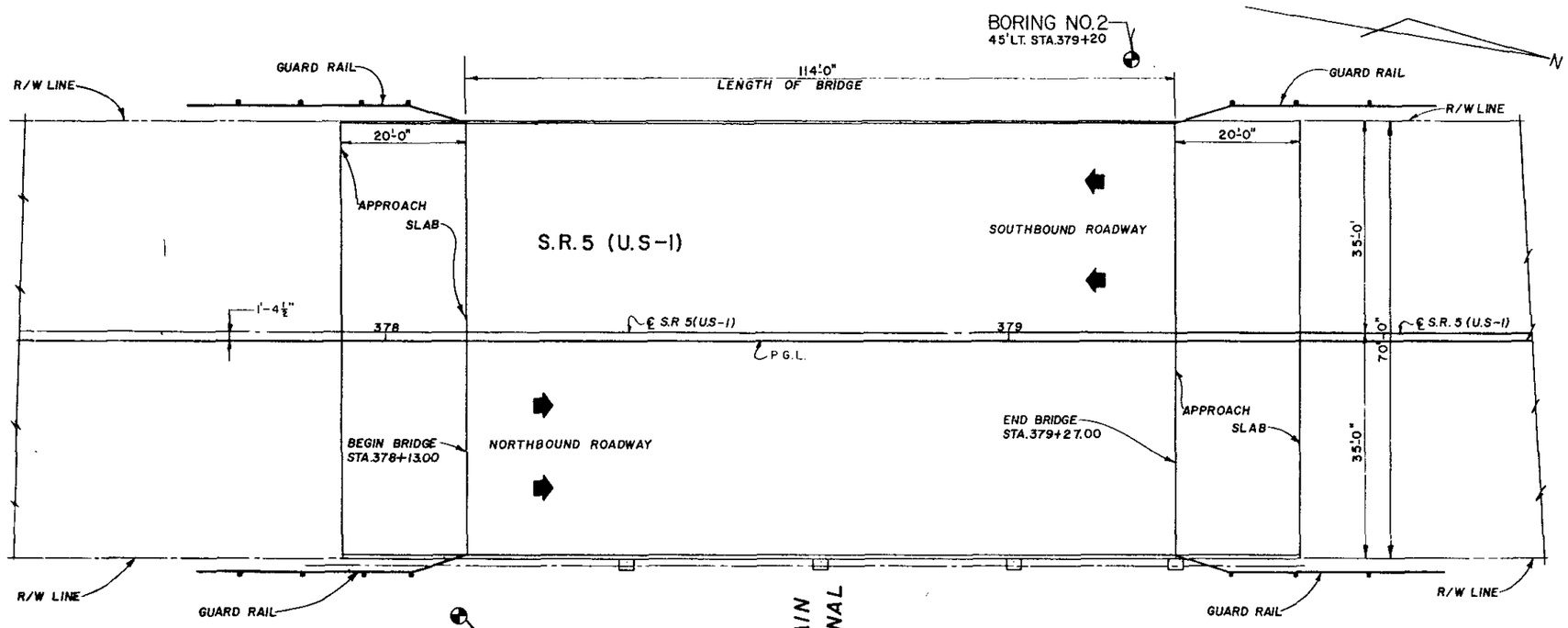
* U.S.G.S. report indicates drainage area is indeterminate. D.A. determined by I.R.F.D.D. (Approx.)
There is a saltwater intrusion barrier 4650 ft. east of bridge Elev. 12± m.s.l.

BASIC FLOOD (100YR) DATA:
Q100 = 2504 CFS
EHW: +8.6' MSL

RECOMMENDED DISTRICT DR. ENGR. [signature]
APPROVED ENGINEER OF DRAINAGE [signature] 3/10/82

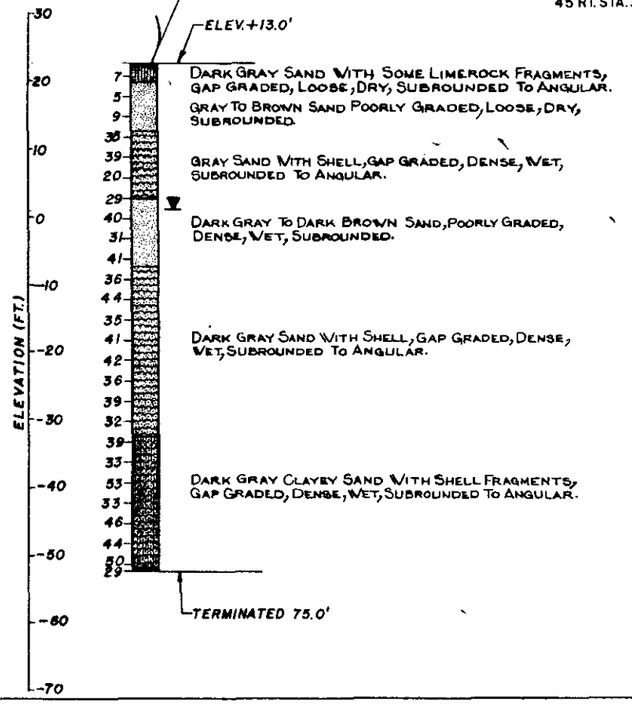
BRIDGE DESIGN DATA SHEET DRAWING NO. 3-C-11 DATE 12-82 DD IB

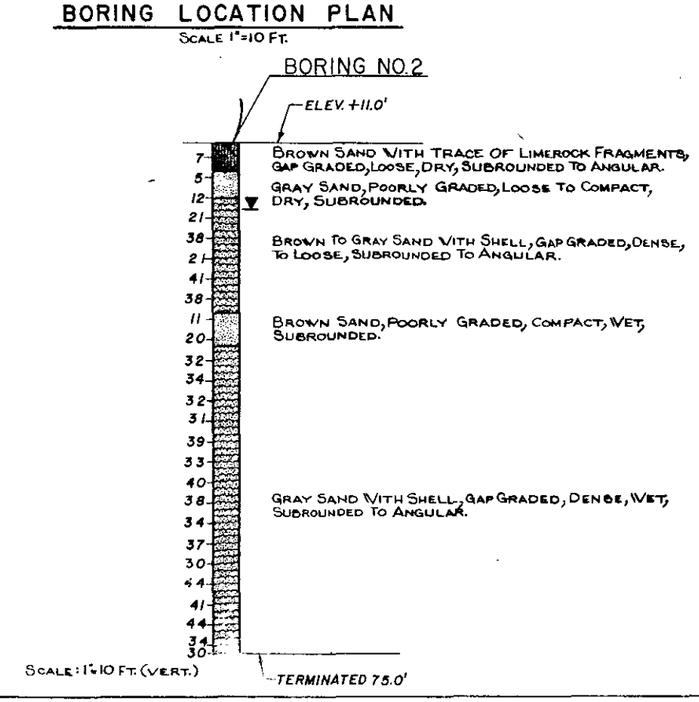
STATE	PROJECT No.	FISCAL YEAR	SHEET No.
FLA.	88010-3510		84



BORING LOCATION PLAN

SCALE 1"=10 FT.





NOTES

DUE TO CORE BORING LOCATIONS AND PROCEDURES, STRATA MAY DIFFER WITH SOIL PROFILE.

DEPTHS GIVEN IN DISTANCE BELOW EXISTING GROUND.

NUMBERS TO LEFT OF BORING INDICATE BLOWS ON SPOON FOR 12" PENETRATION.

SPOON: INSIDE DIAMETER $1\frac{3}{8}$"
OUTSIDE DIAMETER 2"

HAMMER: WEIGHT 140#
DROP 30"

LEGEND

- WATER LEVEL
- FINE SILICA SAND WITH LIMEROCK FRAGMENTS
- FINE SILICA SAND
- FINE SILICA SAND WITH SHELL
- CLAYEY SAND WITH SHELL FRAGMENTS

As Built Plan Sheets
SR 5 Bridge over the Main Canal
Bridge number 880085/88000-3, 1980.
Page 2 of 2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
REPORT OF CORE BORINGS FOR STRUCTURE

SR5 (U.S.1) OVER MAIN CANAL (BRIDGE NO.3)

PROJ. NO. 99004-3511
BRIDGE NO. 88000 3
COUNTY: INDIAN RIVER

BORING DATE: 1/9 – 1/11/78
BORINGS BY: HAIRE & CONWAY
SUBMITTED BY: FLORIDA TESTING & ENGINEERING

APPROVED	DRAWING NO.	INDEX NO.
	4 of 11	12521