

PREPARED FOR



SPECIFIC PURPOSE SURVEY
SURVEYOR'S REPORT
VERTICAL DATUM UPGRADE PROJECT

WO #4600002187-WO10R2
SAP PO# 9500006634

W WGI™



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OVERVIEW OF PROJECT

Purpose of Project:

Procure all materials to construct and install 43 staff gauges calibrated to the North American Vertical Datum of 1988 (NAVD88) at various sites identified by the Vertical Datum Project Manager. Establish a NAVD88 Reference Elevation on the inside deck of existing Telemetry Stations and stamp site specific data onto a brass tag, using a steel stamp die set. The brass tags were delivered to SFWMD and would be installed by SFWMD Field Personnel during site inspections.

Accuracy:

Staff gauges have been set (adjusted) to the nearest two hundredth (.02') of a foot, and reference elevations established to the nearest hundredth (.01') of a foot. Elevations have been transferred from provided bench mark using a digital level, steel tape, and redundant measurements.

Bench Marks:

A bench mark was provided by SFWMD at each location, unless otherwise noted, and used to establish the reference elevation and calibrate each staff gauge.

Survey Equipment Used:

Topcon DL-502 (Digital Level)
Fiberglass Digital Level Rods
Conventional Level Rod

Vertical Datum Factor:

The reference elevations and staff gauges, in this report, have been correctly calibrated to the North American Vertical Datum of 1988. The datum conversion to the National Geodetic Vertical Datum of 1929 (NGVD 29), as shown herein and engraved on each gauge, were provided by the SFWMD VDUP Project Manager.

Completion Date:

Staff Gauge installation, calibration, and the establishment of telemetry station reference elevation was completed on April 15, 2016.

Construction:

Each Staff Gauge is attached to a 4" O.D. galvanized steel pipe with stainless steel hardware. The pipes were driven to a depth to achieve required stability, to a minimum of 10', unless otherwise noted. Sections of pipes were driven by jack hammer, and attached with a galvanized threaded coupling.

Details of Staff Gauges

Staff Gauge Detail Summary Chart:

Gauges completed:

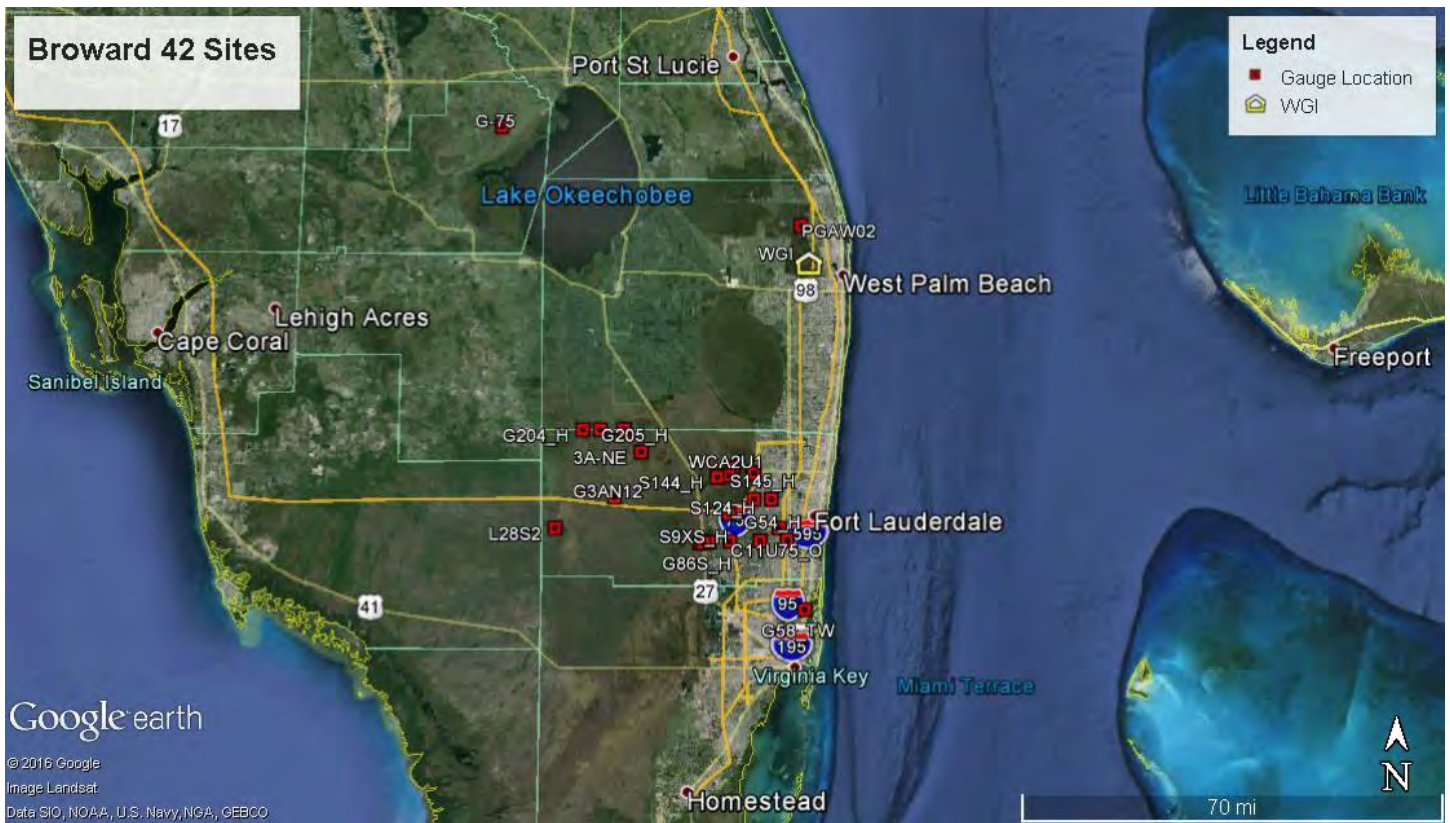
Staff Gauge Site	Latitude	Longitude	Benchmark Used	Benchmark Elevation NAVD88	Well Head Reference BM Elevation	Conversion Elevation to NGVD29
2B-T1	26° 07' 46.309"	80° 21' 58.179"	H695	8.42	13.00	1.54
C11U75	26° 03' 47.437"	80° 21' 48.717"	C11U75	7.748	10.56	1.56
G75_HW	27° 05' 30.176"	81° 00' 23.067"	FCE4544	25.84	27.79	1.28
G86S_HW	26° 03' 34.236"	80° 26' 05.026"	G86S	4.36	7.14	1.50
G204_HW	26° 19' 57.113"	80° 45' 53.221"	B50	13.11	20.11	1.44
G204_TW	26° 19' 55.93"	80° 45' 54.007"	B50	13.11	20.48	1.44
G205_HW	26° 19' 59.074"	80° 43' 00.333"	B53	12.53	20.50	1.45
G205_TW	26° 19' 57.793"	80° 43' 01.145"	B53	12.53	19.94	1.45
G206_HW	26° 20' 00.85"	80° 39' 08.923"	B57	12.28	18.48	1.45
G206_TW	26° 19' 59.684"	80° 39' 09.594"	B57	12.28	18.42	1.45
S38_HW	26° 13' 46.184"	80° 17' 55.974"	B43	17.506	18.62	1.54
S38_TW	26° 13' 46.182"	80° 17' 53.67"	B43	17.506	14.43	1.54
S38A_HW	26° 13' 48.933"	80° 17' 53.555"	B43	17.506	14.92	1.54
S38C_TW	26° 13' 42.088"	80° 17' 53.723"	B43	17.506	14.21	1.54
S144_HW	26° 13' 06.392"	80° 23' 51.664"	W464	15.92	17.79	1.50
S144_TW	26° 13' 05.251"	80° 23' 51.709"	W464	15.92	16.86	1.50
S145_HW	26° 13' 19.253"	26° 13' 19.253"	Y464	16.14	18.31	1.52
S145_TW	26° 13' 18.06"	80° 21' 56.696"	Y464	16.14	16.35	1.52
G54_HW	26° 05' 41.898"	80° 13' 49.898"	10.462	8.93	11.93	1.60
G54_TW	26° 05' 41.099"	80° 13' 45.249"	10.462	8.93	11.94	1.60
G58_TW	25° 53' 58.786"	80° 09' 43.676"	G58	7.456		1.56
G86N_HW	26° 03' 42.555"	80° 26' 04.957"	G86N	13.34	9.45	1.50
S9_HW	26° 03' 41.894"	80° 26' 35.755"	FCE1566	7.155	26.44	1.50
S9_TW	26° 03' 41.755"	80° 26' 37.527"	FCE1566	7.155	26.41	1.50
S9A_HW	26° 03' 42.189"	80° 26' 35.674"	FCE1566	7.155	11.25	1.50
S9A_TW	26° 03' 42.706"	80° 26' 38.475"	FCE1566	7.155	13.63	1.50
S9XS_HW	26° 03' 36.36"	80° 26' 35.65"	FCE1566	7.155	9.49	1.50
S13AW_HW	26° 03' 52.611"	80° 16' 55.03"	S.N.R 10	7.787	9.12	1.61
S13AW_TW	26° 03' 52.678"	80° 16' 51.652"	S.N.R 10	7.787	9.60	1.61
S124_HW	26° 07' 46.155"	80° 21' 56.05"	K697	6.99	8.68	1.54
S124_TW	26° 07' 45.128"	80° 21' 57.251"	K697	6.99	9.53	1.54
S125_HW	26° 09' 51.679"	80° 17' 52.443"	S125	6.457	10.32	1.56
S125_TW	26° 09' 49.681"	80° 17' 52.607"	S125	6.457	10.96	1.56
S381_HW	26° 03' 41.305"	80° 25' 12.524"	S381	6.049	9.44	1.51
S381_TW	26° 03' 42.213"	80° 25' 07.513"	S381	6.049	10.31	1.51

Staff Gauge Site	Latitude	Longitude	Benchmark Used	Benchmark Elevation NAVD88	Well Head Reference BM Elevation	Conversion Elevation to NGVD29
3A-NE	26°16'8.00"	80°36'52.40"	3ANE	11.25	17.05	1.46
3A-NE_GW	26°16'8.00"	80°36'52.40"	3ANE	11.25	18.05	1.46
G3A12	26°10'14.20"	80°40'56.00"	3A12	11.72	16.89	1.46
L28S2	26° 05' 37.32"	80° 50' 06.223"	L28S2	12.838	17.13	1.46
LHPS_HW	26° 09' 54.098"	80° 15' 04.526"	LHPS	9.649	11.70	1.57
LHPS_TW	26° 09' 51.768"	80° 15' 05.187"	LHPS	9.649	13.40	1.57
PGAW02_GW1	26° 50' 27.98"	80° 09' 59.03"	Brockway Az Mk	23.134	17.96	1.52
PGAW02_GW2	26° 50' 27.98"	80° 09' 59.03"	Brockway Az Mk	23.134	17.95	1.52
WCA2U1	26° 14' 27.31"	80° 21' 20.38"	WCA2U1	12.303	15.40	1.52
WCA2U1_GW1	26° 14' 27.31"	80° 21' 20.38"	WCA2U1	12.303	15.22	1.52
WCA2U1_GW2	26° 14' 27.31"	80° 21' 20.38"	WCA2U1	12.303	15.22	1.52
S9X-N	26°03'43.8"	80°26'35.00"	FCE 1566	7.155		1.50

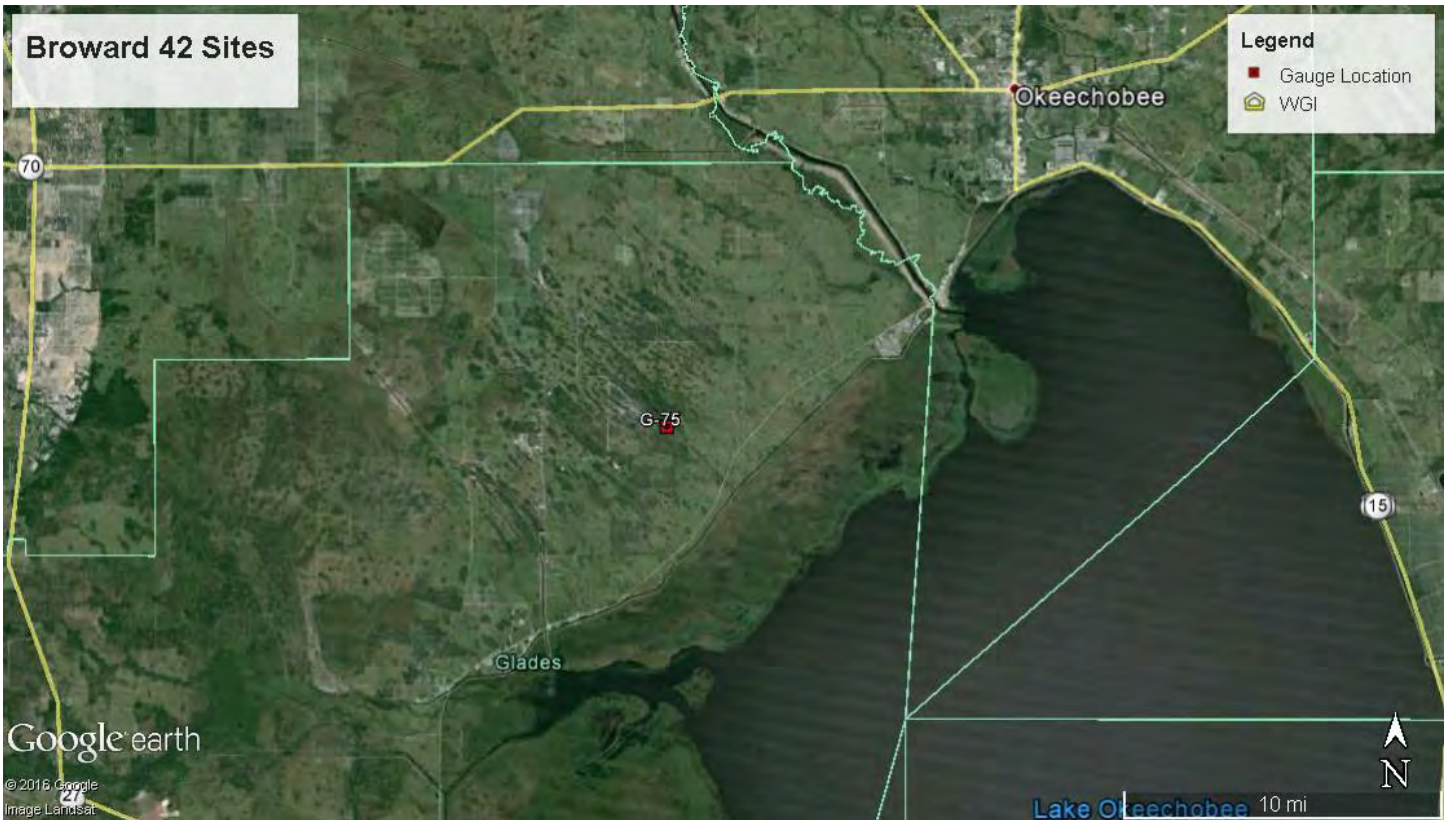
- All Elevations shown are NAVD 88

Project Location Maps:

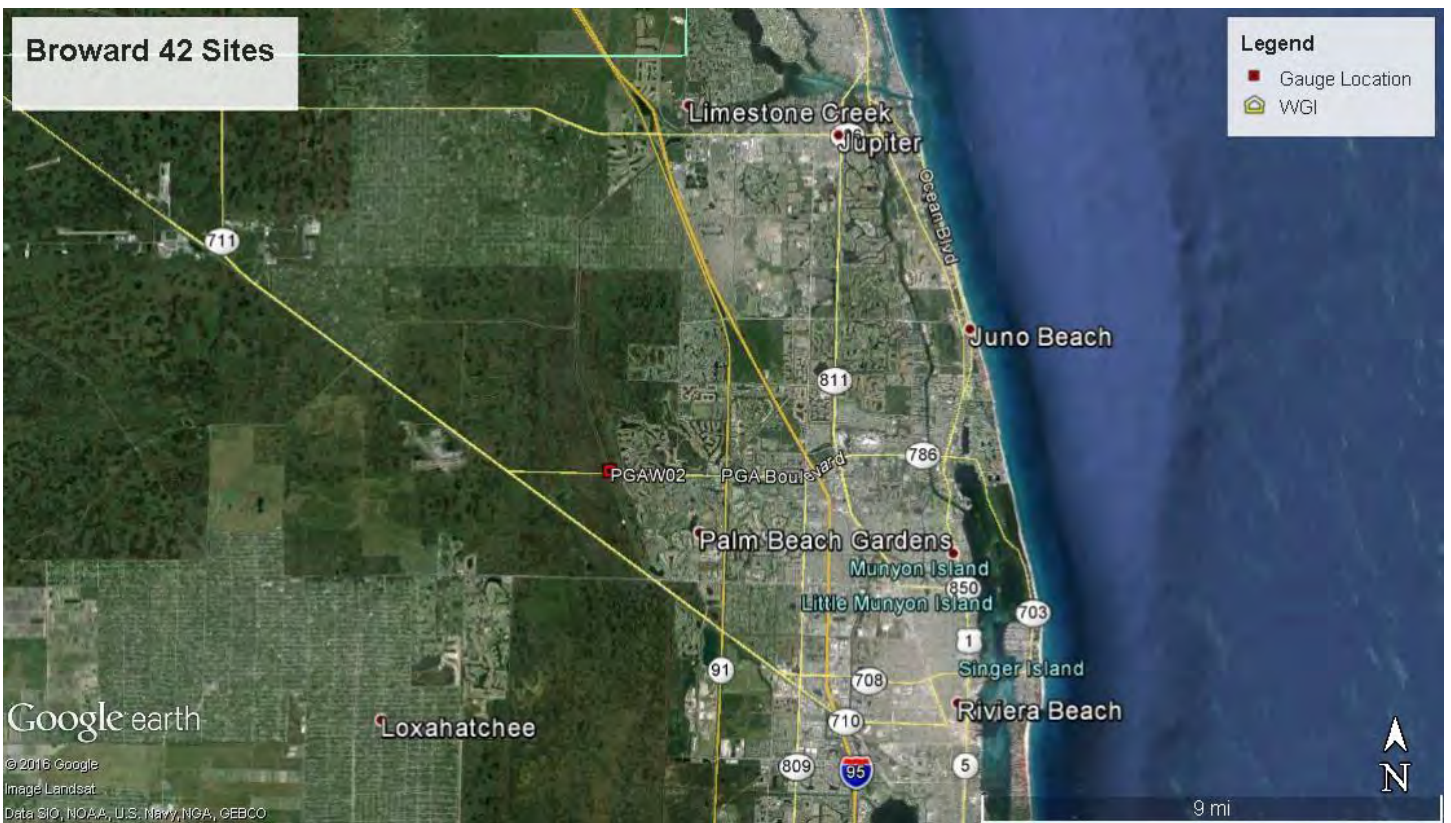
Overall Site



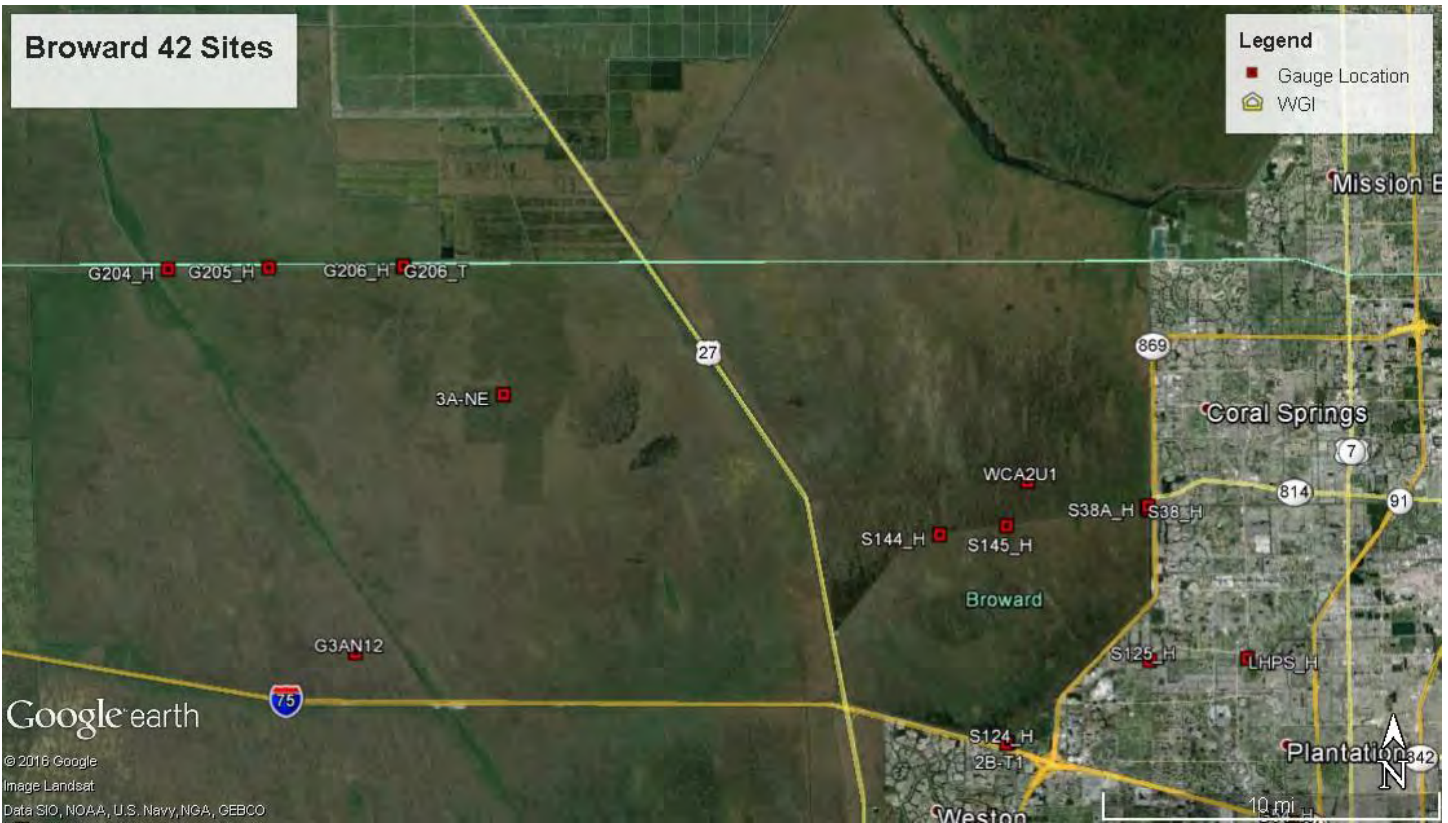
Site Close Up 1 of 4:



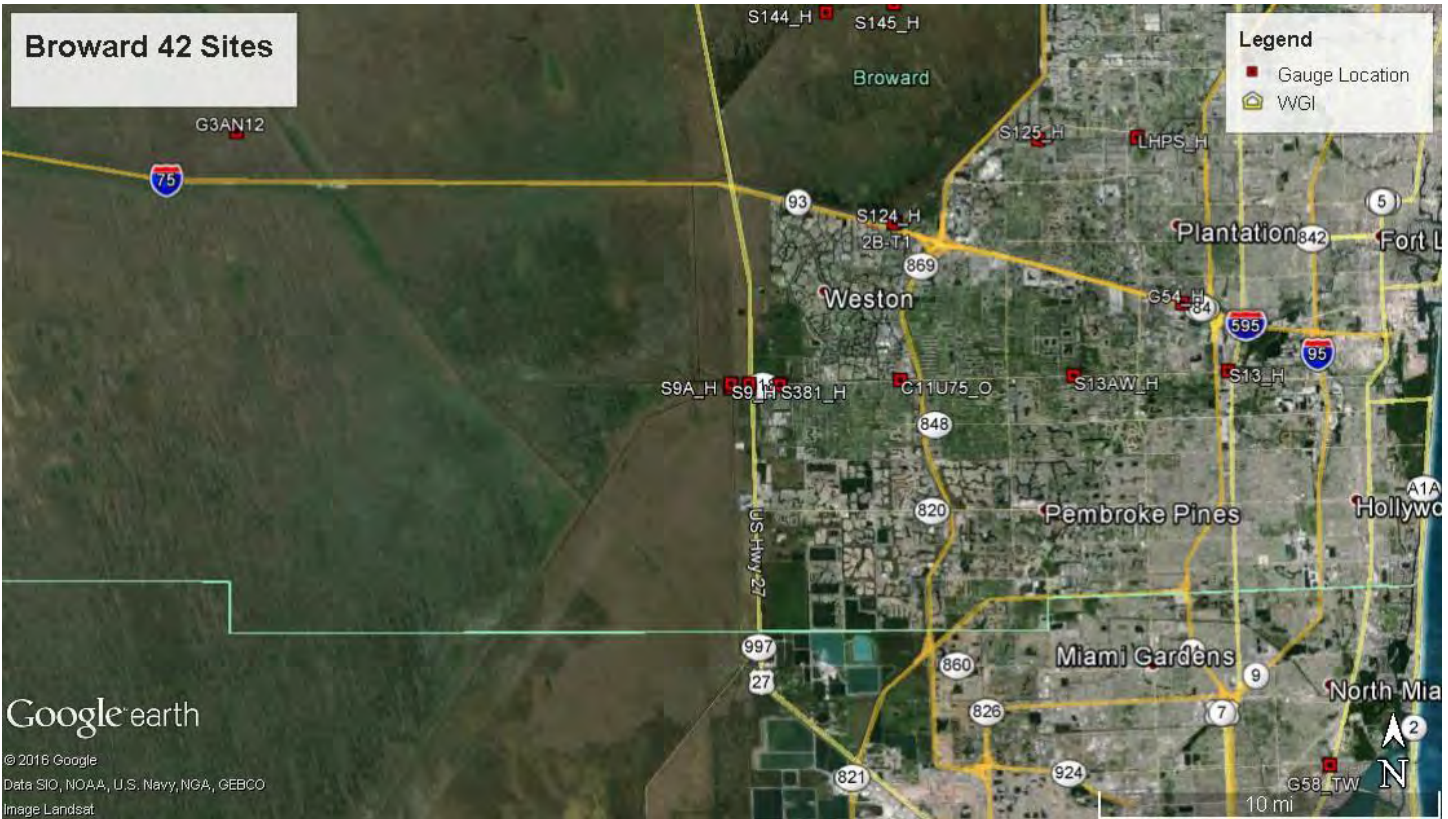
Site Close Up 2 of 4:



Site Close Up 3 of 4:



Site Close Up 4 of 4:



Stage Recorder Site: G3ANE

Party Chief: Ray Miller	Field Book Number: 613/ BK 11	Page Number: 44-45
Benchmark Elevation (NAVD 88): 11.25	Date of Field Work: March 3, 2016	Datum Offset to NGVD 29: +1.46
Benchmark Agency: SFWMD	Benchmark Type: Precision Rod w/Sleeve	Benchmark Stamp: SFWMD
Reference Elevation (NAVD88): 17.05		Existing Tag Elevation (Datum): 18.50 NGVD29
Latitude: 26° 16' 8.00"		Longitude: 80° 36' 52.40"
Notes: Datum difference SFWMD +1.46 Field +1.45		
Removed Old Board: Existing gauge plate removed, mounting board & pole not removed		

Photographs:

Overall Site:



Benchmark Location:



Benchmark Close Up:



Brass Tag Close Up:



Reference Mark:



Brass Tag & Reference:



New Staff Gauge:
Front View:



Side View:

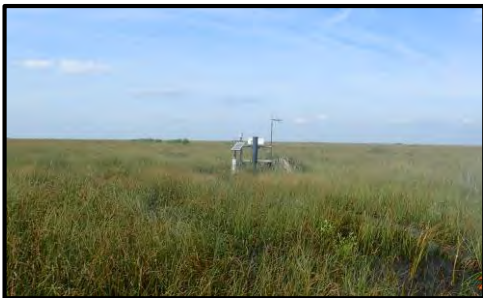


Stage Recorder Site: G3ANE_GW

Party Chief: Ray Miller	Field Book Number: 613/ BK 11	Page Number: 44-45
Benchmark Elevation (NAVD 88): 11.25	Date of Field Work: March 3, 2016	Datum Offset to NGVD 29: +1.46
Benchmark Agency: SFWMD	Benchmark Type: Precision Rod w/Sleeve	Benchmark Stamp: SFWMD
Reference Elevation (NAVD88): 18.05		Existing Tag Elevation (Datum): 19.52 NGVD29
Latitude: 26° 16' 8.00"		Longitude: 80° 36' 52.40"
Notes: Datum difference SFWMD +1.46 Field +1.47		
Removed Old Board:		

Photographs:

Overall Site:



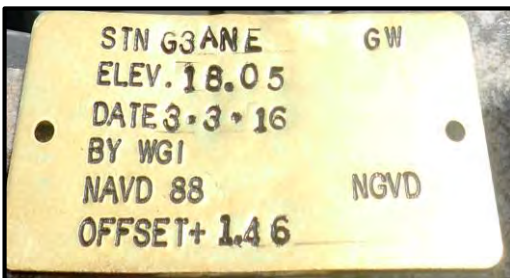
Benchmark Location:



Benchmark Close Up:



Brass Tag Close Up:



Reference Mark:



Brass Tag & Reference:



Project Results

Deliverable Items to South Florida Water Management District:

The following items were delivered to South Florida Water Management District with this Surveyor's Report. Neither the report nor the items listed below are complete without the other.

A CD Containing the following digital information:

- Survey Report in PDF Format
- Digital Photos of Set Staff Gauges
- Electronic Copy of Field Notes in PDF Format

Legend:

BM – Bench Mark

NAVD 88 – North American Vertical Datum of 1988

NGVD 29 – National Geodetic Vertical Datum of 1929

NGS – National Geodetic Survey

SFWMD – South Florida Water Management District

ACOE – Army Corp of Engineers

O.D. – Outside Diameter

Survey Notes:

1. Survey map & report, or copies thereof, are not valid without the signature and the original raised seal of a Florida Licensed Surveyor and Mapper.
2. Additions or deletions to the survey maps or reports by other than the signing party or parties are prohibited without the written consent of the signing party or parties.
3. The purpose of the survey is to show results of establishing reference elevations and calibrating staff gauges, as shown herein.
4. Latitude and longitude, as shown on page 5, was provided by the District and not verified as part of this survey.
5. Pursuant to client's request, the face boards of old NGVD 29 staff gauges were removed when possible. Posts were not removed.
6. New 4" galvanized posts were driven to a minimum depth of 10' below ground, unless otherwise noted in field notes. All pipes were structurally stable and plumb at time of installation.

Surveyor's Certification:

I hereby certify that this Specific Purpose Survey meets applicable portions of the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J-17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable. All NAVD88 staff gauges were calibrated to a vertical accuracy of +/- 0.02' and reference elevations calibrated to a vertical accuracy of +/- 0.01'.

**Wantman Group, Inc.
2035 Vista Parkway
West Palm Beach, FL 33411
L.B. Number 7055**

**By: _____
Derek G. Zeman, PSM
State of Florida
Certificate No. LS5655**

3-3-16
MILLER
LAST
PEREZ

SFWMD
G3ANE



3 WIRE +	HI	3 WIRE -	ELEV	ADS ELEV	DESC
7.60			11.25		SFWMD
7.575	7.575	18.825			
7.55					
		1.80			
		1.78	17.045	17.05	MARK @
		1.76			
1.60					
1.58	1.58	18.625			
1.56					
		7.40			
		7.375	7.375	11.25	TURN ON
		7.35			
7.93					
7.905	7.905	19.155			
7.88					
		1.14			
		1.11	18.045	18.05	MARK @
		1.08			
.92					
.895	.895	18.94			
.87					
		7.72			
		7.69	7.69	11.25	
		7.66			

3011071.10

4/3/4
DL17

STAINLESS STEEL ROD INSIDE 6 INCH PVC PIPE CASING

G3ANE - STA WELL EX EL 18.50 CALC 1.45

SITE BM

G3ANE - GW EX EL 19.52 CALC DICK (14.7)

3-3-16
MILLER
LAST
PEREZ

SUNNY
78°

+	HI	-	ELEV	DISC
			11.25	
7.69	18.94			
		8.67	10.27	H2O @ 10.19 IN GAUGE
7.39	18.64		11.25	Broke setup
		4.76	13.88	TOP OF SET GAUGE
5.10	18.98			
		1.94	17.04	VIN @ GAUGE - STG

31011071.10

6/3/45
DL 17

ELV 11.79

NEW DATUM DICE
1.76

NOTE - 1/2" WAS REMOVED FROM BOARD

WELL

