SURVEYOR'S REPORT

Specific Purpose Survey of

Well Site G3ANW

Broward County, Florida

Prepared for:

South Florida Water Management District

Prepared by:

301 East Atlantic Boulevard

Pompano Beach, Florida 33060-6643

Ph. (954) 788-3400 Fax (954) 788-3500
Licensed Business (L.B.) 6860

South Florida Water Management District's

Purchase Order number 4500013259

Keith and Associates project number 07050.04,

Task 001

Report Date: October 11, 2007

Submittal: First

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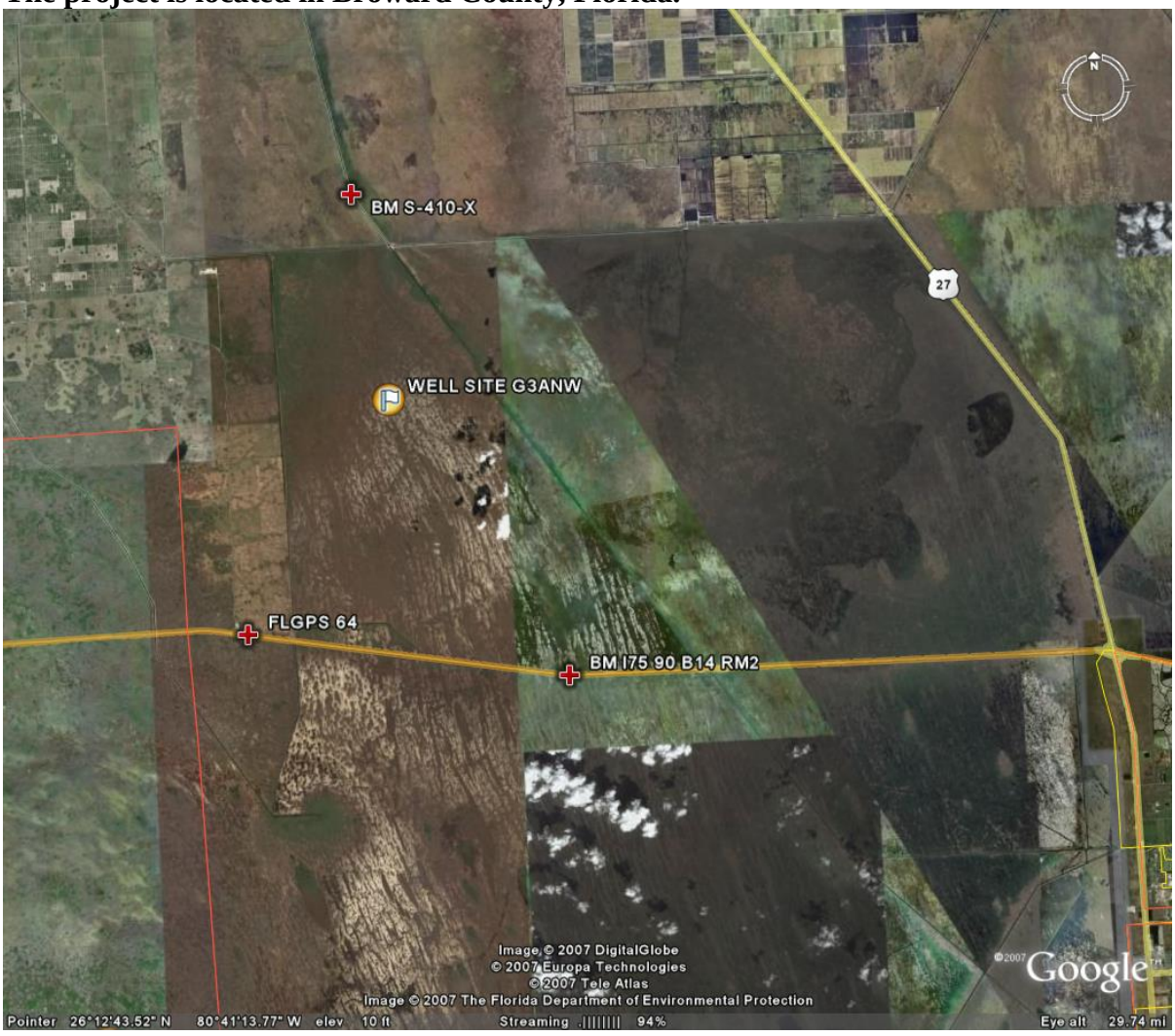
SURVEYOR'S REPORT

PURPOSE

To establish (NAVD 1988 and NGVD 1929) vertical data at the site.
Set a site benchmark and elevate the well.

LOCATION OF PROJECT

The project is located in Broward County, Florida.



SURVEYOR'S REPORT

ITEMS DELIVERED TO THE DISTRICT

1. **Electronic copy of field notes.**
2. **Electronic copy of all computation sheets.**
3. **CORPSMET 95 file.**
4. **Site photographs.**
5. **Surveyor's Report.**
6. **District Benchmark Sheets.**
7. **District Well Sheet.**

DATUM FOR THE PROJECT

The vertical datum for the project is National Geodetic Vertical Datum of 1929 (NGVD 29) and North American Vertical Datum of 1988 (NAVD 88). NGVD 1929 elevations and offset were derived using Vertcon version 6.0.1. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90).

GPS PROCEDURES AND EQUIPMENT

Horizontal and Vertical data on the site benchmark was established using the following methods.
A stainless steel rod located 8.0' south of the southeast corner of well platform was driven to refusal at a depth of 10' ±. That rod was encased in a section of 6" PVC pipe, backfilled with rock and a 6" logo cap was glued to the top and stamped G3ANW 2007. Site benchmark G3ANW was occupied a total of three times consisting of four-hour GPS static sessions each time. The observed GPS baselines were from benchmark G3ANW 2007 to The National Geodetic Survey monuments I-75 90 B20 RM2, S-410 X and FLGPS 64. Those National Geodetic Survey monuments were also connected to each other by four-hour static sessions.
Trimble 5700 receivers and Zephyr model number 39105.00 antennas (without ground plane) were used for all static sessions.
The baseline files were processed and adjusted using Trimble Geomatics Office version 1.62. The three observed adjusted values were averaged to obtain the final elevation of benchmark G3ANW 2007. All the baselines passed the Chi Square Test at 95% confidence level. The expected accuracy for the final elevation of site benchmark "G3ANW 2007" is ± 0.10'.

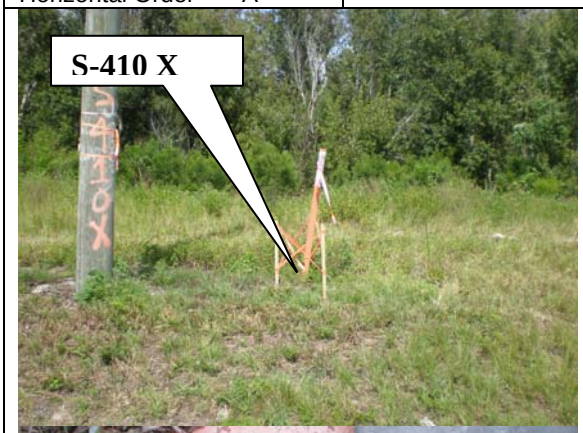
HORIZONTAL LOCATIONS

Horizontal locations at the site were obtained using a Trimble 5700 receiver and RTK cellular link.

SURVEYOR'S REPORT

VERTICAL AND HORIZONTAL CONTROL

S-410 X	Elevation:	**NAVD 1988**	**18.356'**	**NGVD 1929**	**19.793'**
PID AD8147	Latitude	26°21'16.72086"			
State/County FL/Palm Beach	Longitude	-80°47'29.55230"			
USGS QUAD North of Lone Palm (1979)					
Vertical Order First Class II Horizontal Order A		The horizontal coordinates were established by GPS observations and adjusted by the National Geodetic Survey in December 2002 . The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in September 1992. 14.9 km (9.25 mi) southerly along Miami Canal Road and the west levee road of the Miami Canal from the post office in Lake Harbor, thence 0.1 km (0.05 mi) easterly along a paved road, thence 23.9 km (14.85 mi) southerly along the east levee road of the Miami Canal, 7.4 m (24.3 ft) northeast of and level with the center of the road, 1.8 m (5.9 ft) southeast of a utility pole, and 0.5 m (1.6 ft) northwest of a witness post. Note access to the datum point is through a 5-inch logo cap.			

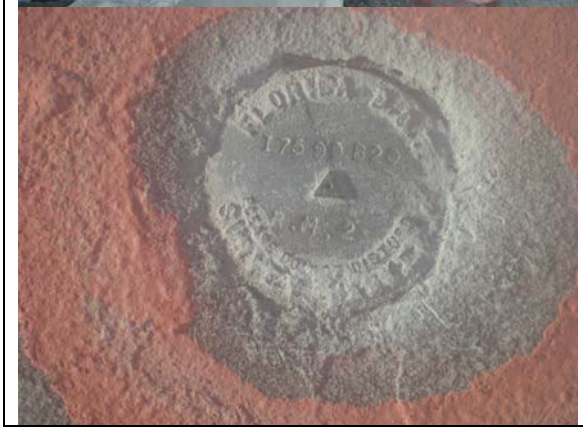


SURVEYOR'S REPORT

VERTICAL AND HORIZONTAL CONTROL (CONTINUED)

<table>
<tr><td colspan="2">I 75 90 B20 RM2</td><td>Elevation:</td><td>NAVD 1988</td><td>35.951'</td><td>NGVD 1929</td><td>None</td></tr>
<tr><td colspan="2">PID AH2136</td><td>Latitude</td><td>26°08'47.37067"</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">State/County
FL/Broward</td><td>Longitude</td><td>-80°38'01.70762"</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">USGS QUAD
East of Lone Palm (1973)</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Vertical Order Second
Class II

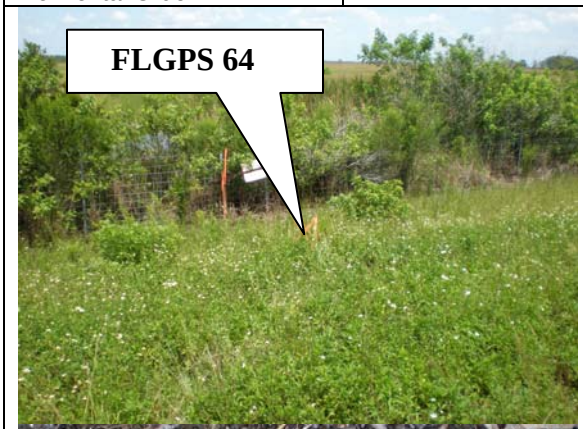
Horizontal Order First</td><td></td><td colspan="4" rowspan="2">The horizontal coordinates were established by GPS observations and adjusted by the National Geodetic Survey in December 2002. The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in December 2001. The station is located approximately 30.65 miles (49.33 km) west of Fort Lauderdale, along Interstate Highway 75, is in the top southwest corner of the west abutment of westbound bridge over Miami Canal. To reach station from the intersection of U.S. Highway 27 and Interstate Highway 75, in Broward County, proceed west 11.75 miles (18.91 km) along Interstate Highway 75 to station. The station is 0.8 feet (24.4 cm) west of joint of bridge and road, 1.8 feet (0.5 m) east of southwest corner of westbound lane concrete bridge abutment and 7.5 feet (2.3 m) south of south edge of westbound lane.</td></tr>
<tr><td colspan="3"> 

 </td></tr>
</table>

SURVEYOR'S REPORT

VERTICAL AND HORIZONTAL CONTROL (CONTINUED)

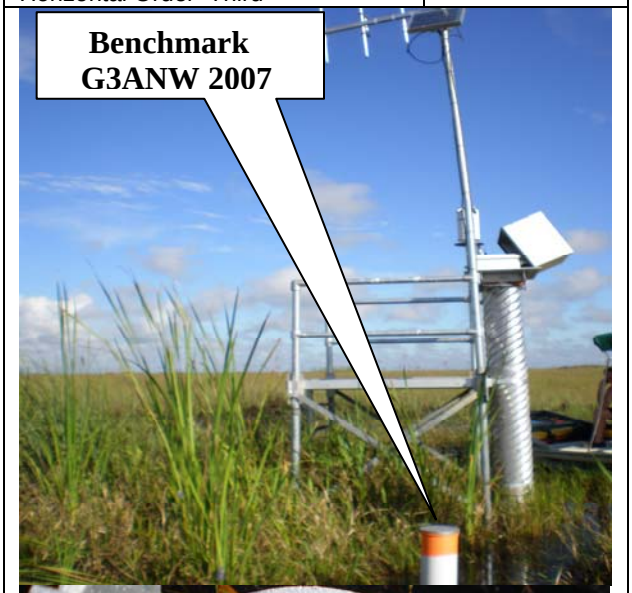
FLGPS 64	Elevation:	**NAVD 1988**	**9.829'**	**NGVD 1929**	**11.282'**
PID AD7900	Latitude	26°10'12.25857"		From NGVD 29.txt file	
State/County FL/Broward	Longitude	-80°51'00.42355"			
USGS QUAD Lone Palm Head (1973)					
Vertical Order First Class II Horizontal Order A		The horizontal coordinates were established by GPS observations and adjusted by the National Geodetic Survey in April 2001. The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in December 2001. The station is located in the Miccosukee Indian Reservation, about 40.8 km (25.35 mi) west of Andytown, in the right-of-way of the northbound lane (west bound) of Interstate Highway 75. Ownership--state of Florida DOT. To reach the station from the intersection of Snake Road and Interstate Highway 75, near Andytown, go east along Interstate Highway 75 southbound lanes for 0.64 km (0.40 mi) to a canal and the station on left, on the north side of interstate highway westbound lanes. The station is recessed 7 cm below ground. Located 6.1 m (20.0 ft) south of the south edge of canal, 10 m (32.8 ft) east of a small drain pipe, 11 m (36.1 ft) north of the north edge of pavement of the shoulder of the westbound lanes of interstate highway and 1.22 m (4.0 ft) south of a carsonite witness post.				



SURVEYOR'S REPORT

VERTICAL CONTROL SITE BENCHMARK

G3ANW 2007	Elevation:	**NAVD 1988**	**11.9'**	**NGVD 1929**	**13.3'**
	Latitude	26°15'59.1"	Elevation derived from GPS.		Elevation derived from GPS.
State/County FL/Broward	Longitude	-80°46'46.2"			
USGS QUAD Goddens Strand					
Vertical Order Third Horizontal Order Third					



Benchmark is accessible only by buggy, airboat or helicopter and is located approximately 7.3 miles north of Interstate 75 and 4.7 miles east of Lemon Grove Road (C.R. 833). The benchmark is a stainless steel rod driven to refusal at a depth of 10' ± encased in a 6" PVC pipe, backfilled with rock and a 6" logo cap glued atop stamped G3ANW 2007. The benchmark is located 8.0' east of the S.E. corner of the well platform and 5.7' S.W. of the staff gauge.

SURVEYOR'S REPORT

SITE PHOTOS

G3ANW Well and Platform

SURVEYOR'S REPORT

SITE PHOTOS (CONTINUED)

G3ANW Previous information

SURVEYOR'S REPORT

SITE PHOTOS (CONTINUED)

G3ANW Brass Tag and with new information stamped

SURVEYOR'S REPORT

SITE PHOTOS (CONTINUED)

G3ANW Staff Gauge

SURVEYOR'S REPORT

PROJECT RESULTS

Well Site G3ANW

Reference mark: **Fnd. X-Mark on well deck.**

New Information at the site:

Mark El. **20.7'** (NGVD 29).

Initials: **K&A**
Date:**10/4/07**
Offset : -**1.45' to NAVD 1988**

Previous Information at the site:

Reference Mark Elevation(s)
El. **20.42'**
Date: **4/13/07**
Initals: **Hydrogage Inc.**
Reference Mark location
Same as found mark noted above.

DTW (Distance to water inside well)

Reference mark:
Same as Fnd. Mark above noted above.

Measurement to water: **8.8'**
El. **11.8'** (NGVD 29)
Date: **10/4/07**
Time: **10:10 a.m.**

SURVEYOR'S REPORT

Comments

Elevations shown hereon are NGVD 1929 datum unless noted otherwise.
Party Chief: D. Ferels , Field Book: 273 Page 54 and Field Book: 279 Page 20
Bench Mark: "G3ANW 2007" El. 11.9', Vertical Datum: NAVD1988
El. 13.3', Vertical Datum: NGVD1929
Offset: 1.45' SFWMD VALUE (subtract this value to convert to NAVD 1988)
Offset: 1.45' NGS VALUE (subtract this value to convert to NAVD 1988)
The offset values referred to as "SFWMD VALUE" and "NGS VALUE" were derived by subtracting the NAVD 1988 value from the NGVD 1929 value at site Benchmark "G3ANW 2007. The NGVD 1929 value was derived using Vertcon version 6.0.1.
NAVD 88 - North American Vertical Datum of 1988
NGVD29 -National Geodetic Vertical Datum of 1929
NAD - North American Datum (Horizontal Datum)
NGS - National Geodetic Survey
SFWMD - South Florida Water Management District
PVC - Polyvinyl Chloride
L.B. - Licensed Business
GPS – Global Positioning System
RTK – Real Time Kinematic

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 61-G17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.

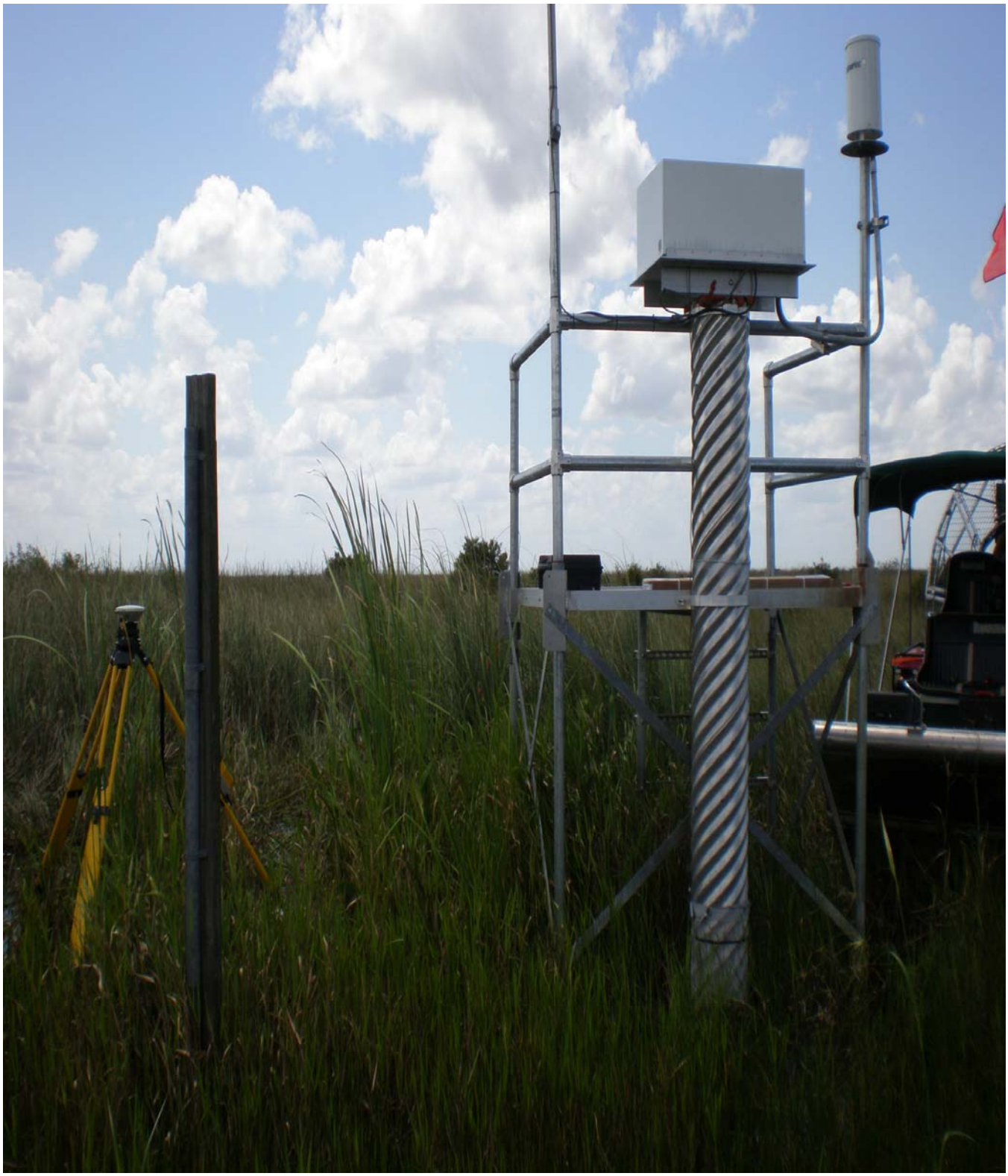
Keith and Associates, Inc.
L.B. number 6860

By:

Date of Survey
October 4, 2007

Michael M. Mossey, PSM
Professional Surveyor and Mapper
State of Florida
Certificate No. 5660

G3ANW WELL SITE



09/7/07

Keith and Associates, Inc.

Well

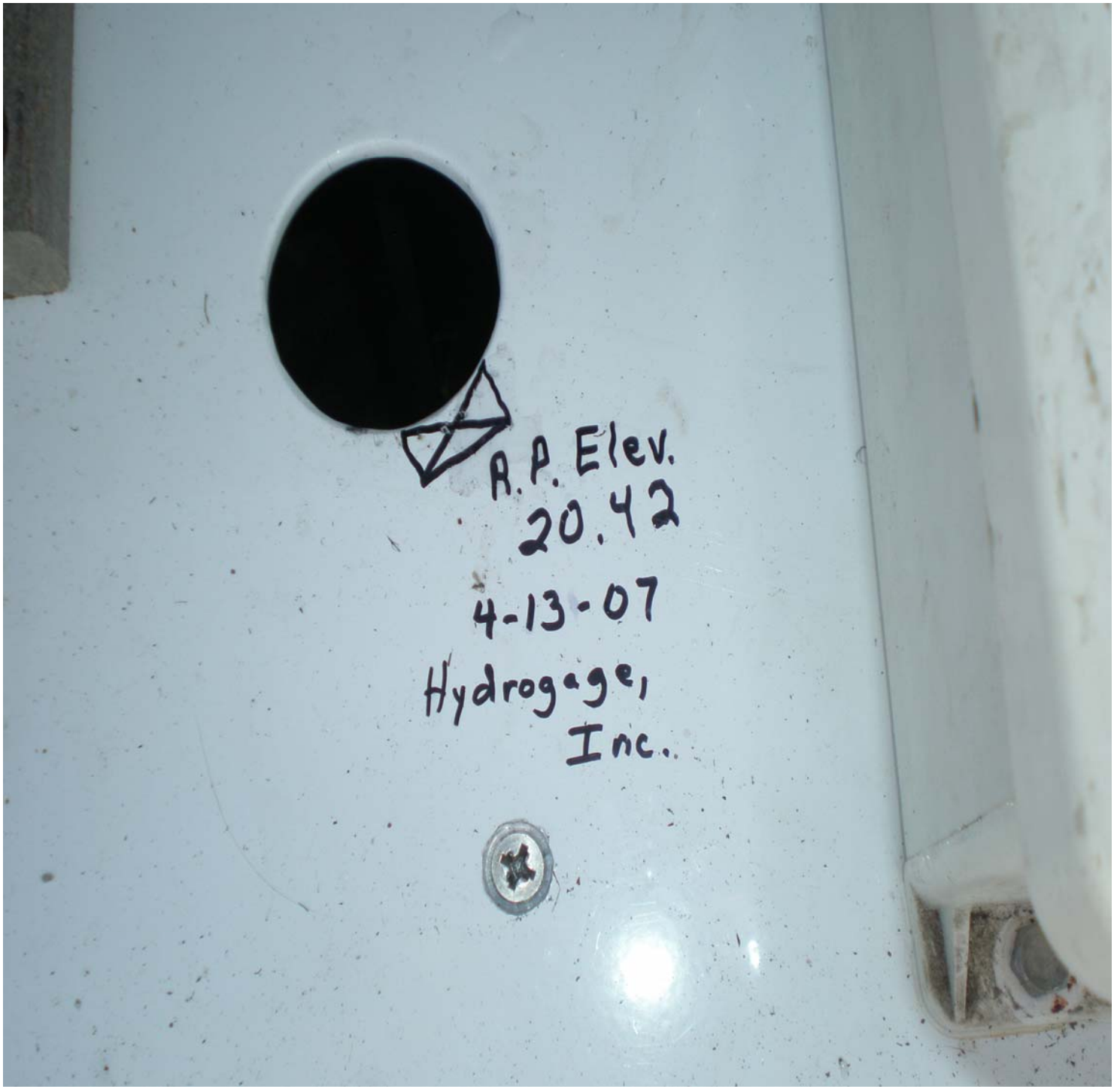
G3ANW WELL SITE

09/7/07

Keith and Associates, Inc.

Staff Gauge

G3ANW WELL SITE



09/7/07

Keith and Associates, Inc.

Previous Survey Information

G3ANW WELL SITE

09/7/07

Keith and Associates, Inc.

Site Benchmark G3ANW 2007

G3ANW WELL SITE

09/7/07

Keith and Associates, Inc.

Site Benchmark G3ANW 2007

G3ANW WELL SITE

09/7/07

Keith and Associates, Inc.

New Well Elevation and Offset

SFWMD 07050-04

G3ANW GPS OBSERVATIONS

9-4-07 F.B 278/32

0220280228 } FLGPS GA X FILES (2470)
Hi 5.41' } 1.649 m

0220279869 ✓ 0.637 m
Hi = 2.09' } I-7590 B20 RM2

DOES NOT SEEM TO BE

9-7-07 F.B. 278/33 FILES (2500)

// // 0228 } 1.009 m
Hi = 3.31' } G-3ANW ✓

// // 9869 } 0.655 m
Hi = 2.15' } I-7590 B20 RM2 ✓

9-8-07 F.B 278/34 FILES (2510)

// 0228 } 1.042 m
Hi 3.42' } G3ANW XV

// // 9869 } 1.415 m
Hi 5.30' } S-A10-X DOES NOT SEEM TO BE GPS

9-9-07 F.B. 278/35 FILES (2520)

// // 0228 } G3ANW 0.939 m ✓
Hi = 3.08'

// // 9869 } 1.682 m FLGPS GA DOES NOT SEEM
Hi = 5.52' } S.F.

9-10-07 F.B. 278/37

// // 0228 } 1.410 m OBS 8-HRS
5.58' Hi } 1.701 m

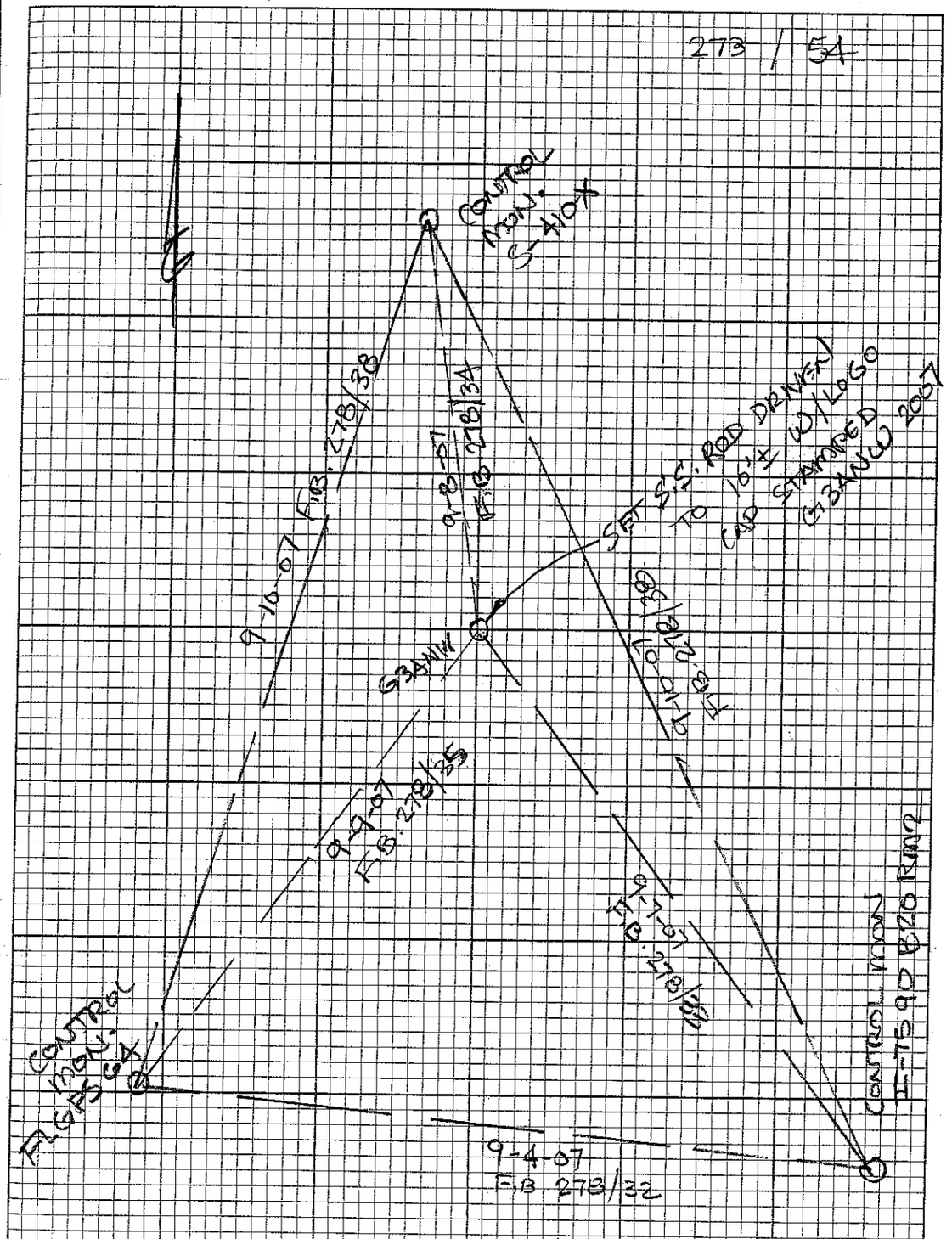
// // 9869 } I-7590 B20 RM2 OBS 4-HRS
Hi = 2.25' } 1.704 m FLGPS GA OBS 4-HRS

// // 9869 } FILE 2531
Hi 5.59'

DOES NOT SEEM

DOES NOT SEEM

FILES 2530 0.686 m ✓



10-4-07
FERELS
GREES

S. F. W. M. D.
G3ANW
GPS " G3ANW LOC. "

	+	HI	−	NGVD 1929 ELEV	
BM	2.630	15.940		13.31	G3ANW
T.S.			2.670	13.27	13.0 MARK
T.O.W.			4.070	11.87	TOP OF WATER
N.G.			4.570	11.37	NATURAL
REFUSAL			3.000	12.94	TOP OF 4.12'
WELL (T.P.)	(+)4.520	16.160	(+)4.740	20.68	END ☒
BM			2.85	13.31	G3ANW

ON TIDE STAFF @ 10:15 AM

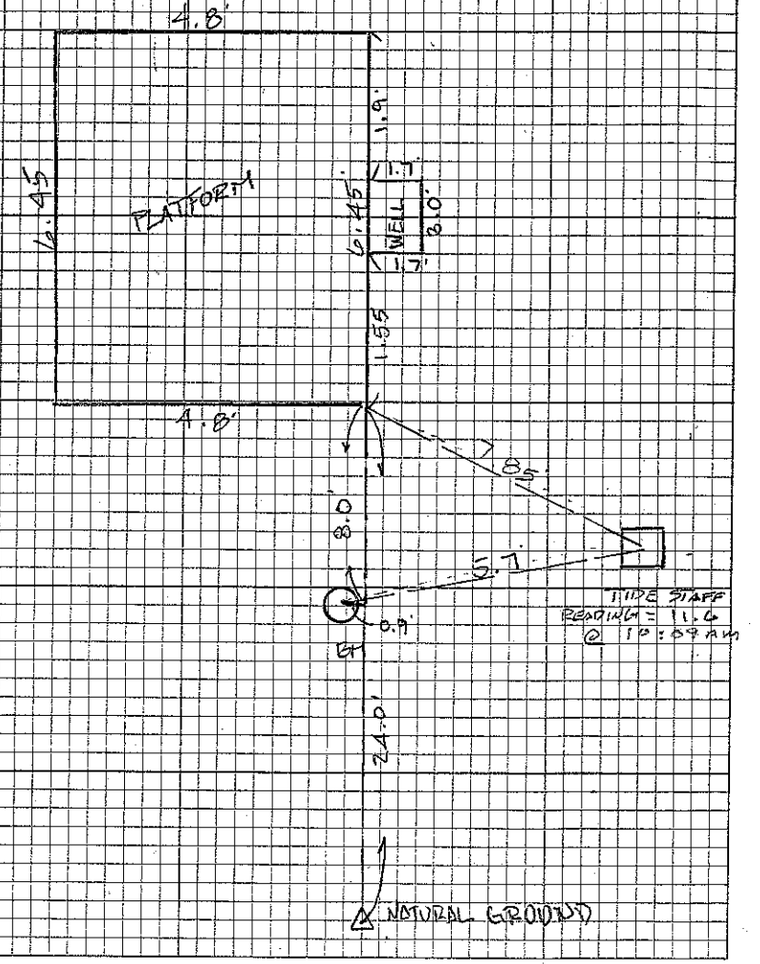
GROUND

PROBING ROD

MARK IN WELL

PREVIOUS INFO: R.P. ELEV. = 20.42
4-13-07
HYDROGAGE INC.

D.T.W. = 8.85'
@ 10:10 AM



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                Citation_Information:
                        Originator: Michael M. Mossey, P.S.M.(ed.)
                        Publication_Date: 20071011
                        Publication_Time: Unknown
                        Title: Stilling Well G3ANW
                        Edition: 1
                        Publication_Information:
                                Publication_Place: Not Published
                                Publisher: None
                        Online_Linkage: mmossey@keith-associates.com
        Description:
                Abstract: Stilling Well G3ANW.
                Purpose:
                        To establish reference elevations in NAVD 1988 and
                        NGVD 1929 datum on the well, set a site benchmark and
                        obtain a distance to water elevation. Site benchmark
                        elevations were established by GPS.
        Time_Period_of_Content:
                Time_Period_Information:
                        Range_of_Dates/Times:
                                Beginning_Date: 20070904
                                Ending_Date: 20071004
                Currentness_Reference: Publication Date
        Status:
                Progress: Complete
                Maintenance_and_Update_Frequency: Weekly
        Spatial_Domain:
                Bounding_Coordinates:
                        West_Bounding_Coordinate: 80°46'46.2"
                        East_Bounding_Coordinate: 80°46'46.2"
                        North_Bounding_Coordinate: 26°15'59.1"
                        South_Bounding_Coordinate: 26°15'59.1"
        Keywords:
                Theme:
                        Theme_Keyword_Thesaurus: Specific Purpose Survey
                        Theme_Keyword: Well
                Place:
                        Place_Keyword_Thesaurus: Broward County, Florida
                        Place_Keyword: Stilling Well G3ANW
                        Place_Keyword: Place_Keyword
        Access_Constraints: Access to site is by buggy, airboat or helicopter.
        Use_Constraints: Need S-key to gain access to well.
        Point_of_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Howard Ehmke
                                Contact_Organization: South Florida Water Management
District
                        Contact_Position: Lead Project Manager Acceler8
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address:
                                        2301 Centre Park West Drive,
                                        Suite # 150,
                                City: West Palm Beach
                                State_or_Province: Florida
                                Postal_Code: 33409
                                Country: USA
                        Contact_Voice_Telephone: Office 561-242-5520 ext: 4064
                        Contact_Facsimile_Telephone: 561-242-5528
                        Contact_Electronic_Mail_Address: hehmke@sfwmd.gov
                        Hours_of_Service: 8:00 am to 5:00 pm EST
Data_Quality_Information:
        Attribute_Accuracy:
                Attribute_Accuracy_Report:
                        The horizontal locations at the site were obtained using
                        sub-meter GPS methods. Vertical data on site
                        benchmark "G3ANW 2007 " was established using GPS.
```

Mike Mossey
Keith & Associates

Howard Ehmke
SFWMD

The site elevations were obtained using benchmark "G3ANW 2007 " and recorded to the nearest tenth of a foot.

Logical_Consistency_Report:
Vertical data at the site was established using site Benchmark ""G3ANW 2007 "".

Completeness_Report:

G3ANW Well Site

NGS Benchmark I 75 90 B20 RM2
NAVD 1988 elevation 35.951',
NGVD 1929 elevation None.
NGS Benchmark FLGPS 64 NAVD 1988
elevation 9.829', NGVD 1929 elevation 11.282'.
NGS Benchmark S-410 X NAVD 1988 elevation 18.356',
NGVD 1929 elevation 19.793'.
Site benchmark "G3ANW 2007" NAVD 1988 elevation 11.9', NGVD 1929 elevation 13.3'.
Well measuring point elevation NAVD 1988 elevation 20.7', NGVD 1929 elevation 19.2'.
Offset written on well -1.45' to NAVD 1988.

Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The horizontal locations of the benchmark , pad and guy-wires were obtained using sub-meter GPS methods.
Quantitative_Horizontal_Positional_Accuracy_Assessment:
Horizontal_Positional_Accuracy_Value: +/-3'
Horizontal_Positional_Accuracy_Explanation: Values derived using Trimble 5700 RTK celluar link.
Vertical_Positional_Accuracy:
Vertical_Positional_Accuracy_Report:
The onsite benchmark was used to establish the the well and site elevations.
Quantitative_Vertical_Positional_Accuracy_Assessment:
Vertical_Positional_Accuracy_Value: 0.10ft. NAVD88
Vertical_Positional_Accuracy_Explanation: Benchmark established using GPS
Quantitative_Vertical_Positional_Accuracy_Assessment:
Vertical_Positional_Accuracy_Value: 0.10ft. NGVD 29
Vertical_Positional_Accuracy_Explanation: Benchmark established using GPS

Lineage:
Process_Step:
Process_Description:

G3ANW Benchmark

Vertical data on the site benchmark was established using the following GPS methods. A stainless steel rod located 8.0' south of the southeast corner of well platform was driven to refusal at a depth of 10' ±. That rod was encased

in a section of 6" PVC pipe, backfilled with rock and a 6" logo cap was glued to the top and stamped G3ANW 2007. Site benchmark G3ANW was occupied a total of three times consisting of four-hour GPS static sessions each time. The observed GPS baselines were from benchmark G3ANW 2007 to The National Geodetic Survey monuments I-75 90 B20 RM2, S-410 X and FLGPS 64. Those National Geodetic Survey monuments were also connected to each other by four-hour static sessions. Trimble 5700 receivers and Zephyr model number 39105.00 antennas (without ground plane) were used for all static sessions. The baseline files were processed and adjusted using Trimble Geomatics Office version 1.62. The three observed adjusted values were averaged to obtain the final elevation of benchmark G3ANW 2007. The NGVD 1929 value of benchmark G3ANW 2007 was established using Vertcon version 6.0.1 program.

Process_Date: 20070914

Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Geographic:
Latitude_Resolution: 26°15'59.1"

```
                        Longitude_Resolution: -80°46'46.2"
                        Geographic_Coordinate_Units: Degrees, minutes, and decimal seconds
Distribution_Information:
        Distributor:
                Contact_Information:
                        Contact_Organization_Primary:
                                Contact_Organization: Keith and Associates
                                Contact_Person: Michael Mossey
                        Contact_Position: Project Surveyor
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address: 301 East Atlantic Boulevard
                                City: Pompano Beach
                                State_or_Province: Florida
                                Postal_Code: 33060-6643
                                Country: Broward
                        Contact_Voice_Telephone: 954-788-3400 ext. 304
                        Contact_Facsimile_Telephone: 954-788-3500
                        Contact_Electronic_Mail_Address: mmossey@keith-associates.com
                        Hours_of_Service: 8:00-5:00 est.
        Distribution_Liability: None
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        Metadata_Date: 20071011
        Metadata_Review_Date: 20050721
        Metadata_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Michael M.Mossey, P.S.M.
                                Contact_Organization: Keith and Associates
                        Contact_Position: Project Surveyor
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address: 301 East Atlantic Boulevard
                                City: Pompano Beach
                                State_or_Province: FL
                                Postal_Code: 33060-6643
                                Country: USA
                        Contact_Voice_Telephone: 954-788-3400 ext. 304
                        Contact_Facsimile_Telephone: 954-788-3500
                        Contact_Electronic_Mail_Address: mmossey@keith-associates.com
                        Hours_of_Service: 8:00 am to 5:00 pm EST
        Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
        Metadata_Standard_Version: 19940608
```

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/01

COUNTY Broward	**PROJECT** G3ANW Well Site	**DESIGNATION** "G3ANW 2007"
SECTION None	**TOWNSHIP** None	**RANGE** None

GEOGRAPHIC INDEX OF QUAD

Established by Keith and Associates	**NAME OF QUADRANGLE** Goddens Strand
SURVEYOR D. Ferels **DATE** 09/10/2007	**FIELD BOOKS** 273 **PAGE** 54 and 279 **PAGE** 20

HORIZONTAL DATUM: **1983/99** ZONE **E**

VERTICAL DATUM: **NGVD 1929 and NAVD 1988 Benchmark was established by GPS**

CONTROL ACCURACY: HORIZONTAL **Third** **VERTICAL** **Third**

STATE PLANE COORDINATES	**X 728423.2**	**Y 702587.7**	**NGVD 1929 EL.** 13.3' **NAVD 1988 EL.** 11.9'

LATITUDE **26°15'59.1"** LONGITUDE **-80°46'46.2"**

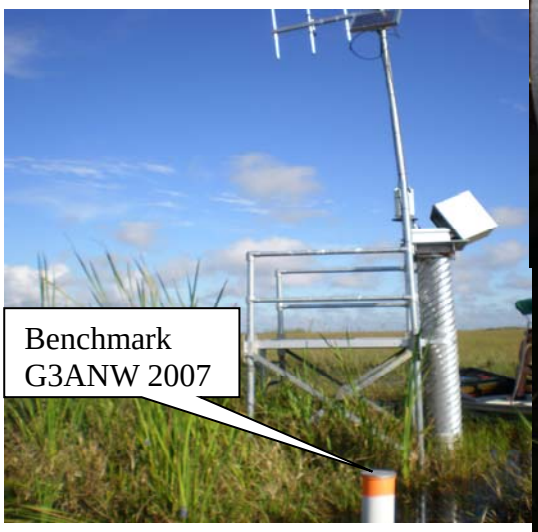
DESCRIPTION

To Reach:

Benchmark is accessible only by buggy, airboat or helicopter and is located approximately 7.3 miles north of Interstate 75 and 4.7 miles east of Lemon Grove Road (C.R. 833). The benchmark is a stainless steel rod driven to refusal at a depth of 10' ± encased in a 6" PVC pipe backfilled with rock with a 6" logo cap glued atop and stamped G3ANW 2007. The benchmark and PVC pipe are located 8.0' east of the S.E. corner of the well platform and 5.7' S.W. of the staff gauge.

Notable Land marks:

SKETCH **See Attached photos.**


Benchmark
G3ANW 2007

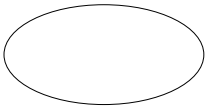

G3ANW 2007


SURVEY MONUMENT
DO NOT DISTURB
G3ANW 2007

Network Adjustment Report

Project : G3ANW 2

User name	mmossey	**Date & Time**	1:37:08 PM 10/11/2007
Coordinate System	US State Plane 1983	**Zone**	Florida East 0901
Project Datum	NAD 1983 (Conus)		
Vertical Datum		**Geoid Model**	sub0307(2)
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		



Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft
Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal
Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 1.96

Three-Dimensional
Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 1.96

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS
Error in Height of Antenna : 0.000sft
Centering Error : 0.000sft

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Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 5.00

Sub-Network 1 Statistics

Reference Factor : 0.91
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 1.76

Sub-Network 2 Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 3 Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 4

Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 5 Statistics

Reference Factor : 1.05
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 3.24

GPS Observation Statistics

Reference Factor : 1.00
Redundancy Number (r) : 5.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B1	0.91	1.76
B2	1.00	0.00
B3	1.00	0.00
B4	1.00	0.00
B5	1.15	1.33
B6	0.97	1.91

Weighting Strategies

GPS Observations

User-defined Scalar Applied to All Observations

Scalar : 8.03

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Sub-Network 1 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2
Number of Constrained Points : 2
Horizontal and Height Only : 2

Adjusted Grid Coordinates

Errors are reported using 1.96σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
FLGPS 64 1	667533.179sft	0.000sft	705324.489sft	0.000sft	N/A	N/A	N E h
I7590B20RM2 1	659103.528sft	0.000sft	776293.552sft	0.000sft	N/A	N/A	N E h

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
FLGPS 64 1	26°10'12.25857"N	0.000sft	80°51'00.42355"W	0.000sft	-71.079sft	0.000sft	Lat Long h
I7590B20RM2 1	26°08'47.37067"N	0.000sft	80°38'01.70762"W	0.000sft	-45.000sft	0.000sft	Lat Long h

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
FLGPS 64 1	0.000sft	0.000sft	N/A	0.000sft	N/A
I7590B20RM2 1	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 2 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2
Number of Constrained Points : 1
Horizontal and Height Only : 1

Adjusted Grid Coordinates

Errors are reported using 1.96σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
S 410 X 1	734646.421sft	0.000sft	724427.844sft	0.000sft	N/A	N/A	N E h
02282510 G3ANW 2	702587.714sft	0.099sft	728423.222sft	0.416sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
S 410 X 1	26°21'16.72086" N	0.000sft	80°47'29.55230" W	0.000sft	-63.077sft	0.000sft	Lat Long h
02282510 G3ANW 2	26°15'59.13205" N	0.099sft	80°46'46.22946" W	0.416sft	-69.202sft	0.668sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
S 410 X 1	0.000sft	0.000sft	N/A	0.000sft	N/A
02282510 G3ANW 2	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 3 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2
Number of Constrained Points : 1
Horizontal and Height Only : 1

Adjusted Grid Coordinates

Errors are reported using 1.96σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
FLGPS 64 2	667533.179sft	0.000sft	705324.489sft	0.000sft	N/A	N/A	N E h
02282520 G3ANW 3	702587.712sft	0.049sft	728423.195sft	0.152sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
FLGPS 64 2	26°10'12.25857" N	0.000sft	80°51'00.42355" W	0.000sft	-71.079sft	0.000sft	Lat Long h
02282520 G3ANW 3	26°15'59.13202" N	0.049sft	80°46'46.22976" W	0.152sft	-69.418sft	0.347sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
FLGPS 64 2	0.000sft	0.000sft	N/A	0.000sft	N/A

02282520 G3ANW 3	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 4 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2
Number of Constrained Points : 1
Horizontal and Height Only : 1

Adjusted Grid Coordinates

Errors are reported using 1.96σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
I7590B20RM2 2	659103.528sft	0.000sft	776293.552sft	0.000sft	N/A	N/A	N E h
02282500 G3ANW 1	702587.696sft	0.067sft	728423.294sft	0.327sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
I7590B20RM2 2	26°08'47.37067"N	0.000sft	80°38'01.70762"W	0.000sft	-45.000sft	0.000sft	Lat Long h
02282500 G3ANW 1	26°15'59.13187"N	0.067sft	80°46'46.22866"W	0.327sft	-69.419sft	0.430sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
I7590B20RM2 2	0.000sft	0.000sft	N/A	0.000sft	N/A
02282500 G3ANW 1	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 5 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 3
Number of Constrained Points : 3
Horizontal and Height Only : 3

Adjusted Grid Coordinates

Errors are reported using 1.96σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
S 410 X 3	734646.421sft	0.000sft	724427.844sft	0.000sft	N/A	N/A	N E h
FLGPS 64 3	667533.179sft	0.000sft	705324.489sft	0.000sft	N/A	N/A	N E h
I7590B20RM 2 3	659103.528sft	0.000sft	776293.552sft	0.000sft	N/A	N/A	N E h

Adjusted Geodetic Coordinates

Errors are reported using 1.96σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
S 410 X 3	26°21'16.72086"N	0.000sft	80°47'29.55230"W	0.000sft	-63.077sft	0.000sft	Lat Long h
FLGPS 64 3	26°10'12.25857"N	0.000sft	80°51'00.42355"W	0.000sft	-71.079sft	0.000sft	Lat Long h
I7590B20RM 2 3	26°08'47.37067"N	0.000sft	80°38'01.70762"W	0.000sft	-45.000sft	0.000sft	Lat Long h

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
S 410 X 3	0.000sft	0.000sft	N/A	0.000sft	N/A
FLGPS 64 3	0.000sft	0.000sft	N/A	0.000sft	N/A
I7590B20RM 2 3	0.000sft	0.000sft	N/A	0.000sft	N/A

Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight
FLGPS 64 1	N/A	N/A	N/A	N/A
I7590B20RM2 1	N/A	N/A	N/A	N/A
S 410 X 1	N/A	N/A	N/A	N/A
FLGPS 64 2	N/A	N/A	N/A	N/A
I7590B20RM2 2	N/A	N/A	N/A	N/A
S 410 X 3	N/A	N/A	N/A	N/A
FLGPS 64 3	N/A	N/A	N/A	N/A
I7590B20RM 2 3	N/A	N/A	N/A	N/A

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Adjusted Observations

Adjustment performed in WGS-84 GPS Observations

GPS Transformation Group: <GPS Default>

Deflection in Longitude	: 0°00'00.4321"	**(1.96σ)**	: 0°00'00.6536"
Deflection in Latitude	: 0°00'00.4681"	**(1.96σ)**	: 0°00'00.6235"
Azimuth Rotation	: 0°00'00.0333"	**(1.96σ)**	: 0°00'00.0819"
Network Scale	: 0.99999997	**(1.96σ)**	: 0.00000042
Number of Observations	: 6		
Number of Outliers	: 3		

Sub-Network 1

Observation Adjustment (Critical Tau = 1.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B1	FLGP S 64 1	I7590B20RM 2 1	**Az.**	96°50'23.5865"	0°00'00.0745"	0°00'00.0493"	1.07
			ΔHt.	25.911sft	0.200sft	-0.017sft	-0.23
			Dist.	71471.525sft	0.027sft	-0.065sft	-1.26

Sub-Network 2

Observation Adjustment (Critical Tau = 1.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B2	S 410 X 1	02282510 G3ANW 2	**Az.**	172°59'18.3648"	0°00'02.6272"	0°00'00.0000"	0.00
			ΔHt.	-6.206sft	0.661sft	0.000sft	0.00
			Dist.	32308.430sft	0.117sft	0.000sft	0.00

Sub-Network 3

Observation Adjustment (Critical Tau = 1.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B3	FLGP S 64 2	02282520 G3ANW 3	**Az.**	33°26'54.9015"	0°00'00.6463"	0°00'00.0000"	0.00
			ΔHt.	1.692sft	0.316sft	0.000sft	0.00
			Dist.	41982.885sft	0.088sft	0.000sft	0.00

Sub-Network 4

Observation Adjustment (Critical Tau = 1.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B4	I7590B20RM2 2	02282500 G3ANW 1	**Az.**	312°24'46.4951"	0°00'00.6811"	0°00'00.0000"	0.00
			ΔHt.	-24.220sft	0.393sft	0.000sft	0.00
			Dist.	64674.847sft	0.254sft	0.000sft	0.00

Sub-Network 5

Observation Adjustment (Critical Tau = 1.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (1.96σ)	Residual	Stand. Residual
B5	S 410 X 3	FLGPS 64 3	**Az.**	195°58'51.3863"	0°00'00.0858"	0°00'00.0154"	0.27
			ΔHt.	-8.114sft	0.236sft	0.007sft	0.09
			Dist.	69782.944sft	0.031sft	0.027sft	1.86
B6	S 410 X 3	I7590B20RM 2 3	**Az.**	145°37'10.8646"	0°00'00.0858"	0°00'00.0795"	0.54
			ΔHt.	17.797sft	0.258sft	-0.128sft	-0.90
			Dist.	91638.381sft	0.041sft	-0.061sft	-1.22

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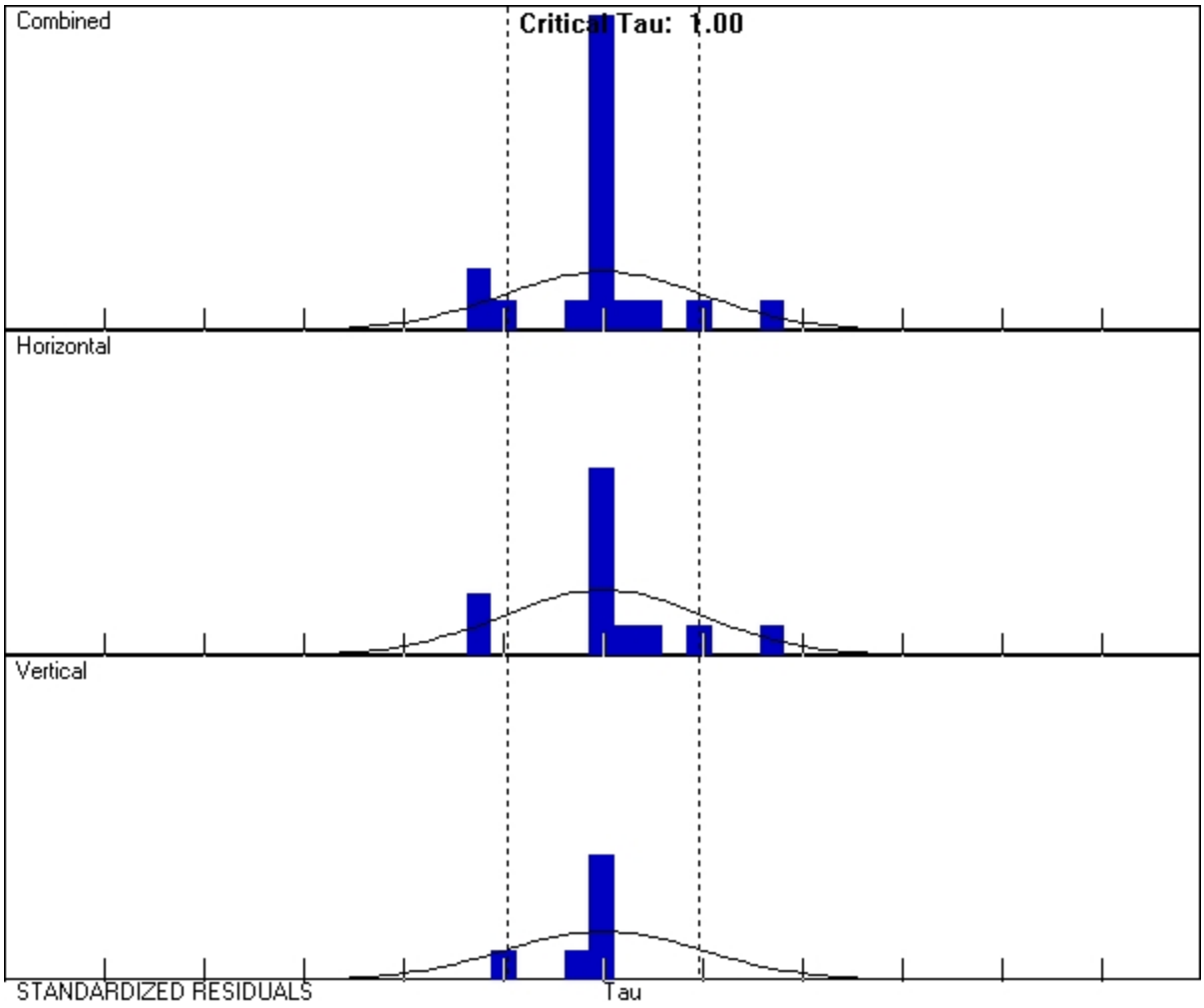
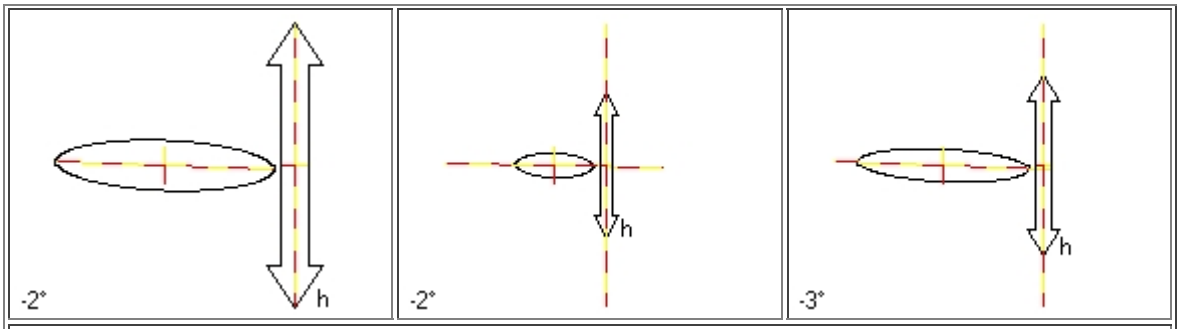
Histograms of Standardized Residuals



Point Error Ellipses

02282510 G3ANW 2	02282520 G3ANW 3	02282500 G3ANW 1



Tick Size: 0.1000sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ

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Covariant Terms

Adjustment performed in WGS-84

From Point	To Point		Components	A-posteriori Error (1.96σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
FLGPS 64 1	I7590B20RM 2 1	**Az.**	96°50'23.5524"	0°00'00.0000"	1:0	1:0
		ΔHt.	26.079sft	0.000sft		
		ΔElev.	?	?		
		Dist.	71471.527sft	0.000sft		
S 410 X 1	02282510 G3ANW 2	**Az.**	172°59'18.3317"	0°00'02.6285"	1:274873	1:274873
		ΔHt.	-6.125sft	0.668sft		
		ΔElev.	?	?		
		Dist.	32308.431sft	0.118sft		
FLGPS 64 2	02282520 G3ANW 3	**Az.**	33°26'54.8675"	0°00'00.6515"	1:466389	1:466389
		ΔHt.	1.661sft	0.347sft		
		ΔElev.	?	?		
		Dist.	41982.886sft	0.090sft		

I7590B20RM 2 2	02282500 G3ANW 1	**Az.**	312°24'46.4618"	0°00'00.6860"	1:252978	1:252978
		ΔHt.	-24.419sft	0.430sft		
		ΔElev.	?	?		
		Dist.	64674.849sft	0.256sft		
S 410 X 3	FLGPS 64 3	**Az.**	195°58'51.3539"	0°00'00.0000"	1:0	1:0
		ΔHt.	-8.002sft	0.000sft		
		ΔElev.	?	?		
		Dist.	69782.946sft	0.000sft		
S 410 X 3	I7590B20RM 2 3	**Az.**	145°37'10.8315"	0°00'00.0000"	1:0	1:0
		ΔHt.	18.077sft	0.000sft		
		ΔElev.	?	?		
		Dist.	91638.383sft	0.000sft		

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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST 15, 2015
 AD8147 ***********************************************************************
 AD8147  DESIGNATION -  S 410 X
 AD8147  PID         -  AD8147
 AD8147  STATE/COUNTY-  FL/PALM BEACH
 AD8147  COUNTRY     -  US
 AD8147  USGS QUAD   -  NORTH OF LONE PALM (1979)
 AD8147
 AD8147                        *CURRENT SURVEY CONTROL
 AD8147  ______________________________________________________________________
 AD8147* NAD 83(2011) POSITION- 26 21 16.72066(N) 080 47 29.55160(W)   ADJUSTED
 AD8147* NAD 83(2011) ELLIP HT-   -19.239 (meters)        (06/27/12)   ADJUSTED
 AD8147* NAD 83(2011) EPOCH    -  2010.00
 AD8147* NAVD 88 ORTHO HEIGHT -     5.595 (meters)       18.36  (feet) ADJUSTED
 AD8147  ______________________________________________________________________
 AD8147  NAD 83(2011) X  -    915,189.373 (meters)                     COMP
 AD8147  NAD 83(2011) Y  - -5,645,269.521 (meters)                     COMP
 AD8147  NAD 83(2011) Z  -  2,814,314.690 (meters)                     COMP
 AD8147  LAPLACE CORR    -         -0.24  (seconds)                    DEFLEC12B
 AD8147  GEOID HEIGHT    -        -24.84  (meters)                     GEOID12B
 AD8147  DYNAMIC HEIGHT  -          5.586 (meters)       18.33  (feet) COMP
 AD8147  MODELED GRAVITY -    979,063.2   (mgal)                       NAVD 88
 AD8147
 AD8147  VERT ORDER      -  FIRST     CLASS II
 AD8147
 AD8147  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AD8147  Standards:
 AD8147         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AD8147            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AD8147  ------------------------------------------------------------------
 AD8147  NETWORK    0.58   0.90          0.22   0.25   0.46     -0.06932361
 AD8147  ------------------------------------------------------------------
 AD8147  Click here for local accuracies and other accuracy information.
 AD8147
 AD8147
 AD8147.The horizontal coordinates were established by GPS observations
 AD8147.and adjusted by the National Geodetic Survey in June 2012.
 AD8147
 AD8147.NAD 83(2011) refers to NAD 83 coordinates where the reference
 AD8147.frame has been affixed to the stable North American tectonic plate. See
 AD8147.NA2011 for more information.
 AD8147
 AD8147.The horizontal coordinates are valid at the epoch date displayed above
 AD8147.which is a decimal equivalence of Year/Month/Day.
 AD8147
 AD8147.The orthometric height was determined by differential leveling and
 AD8147.adjusted by the NATIONAL GEODETIC SURVEY
 AD8147.in September 1992.
 AD8147
 AD8147.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AD8147
 AD8147.The Laplace correction was computed from DEFLEC12B derived deflections.
 AD8147
 AD8147.The ellipsoidal height was determined by GPS observations
 AD8147.and is referenced to NAD 83.
 AD8147
```

```
AD8147.The dynamic height is computed by dividing the NAVD 88
AD8147.geopotential number by the normal gravity value computed on the
AD8147.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AD8147.degrees latitude (g = 980.6199 gals.).
AD8147
AD8147.The modeled gravity was interpolated from observed gravity values.
AD8147
AD8147. The following values were computed from the NAD 83(2011) position.
AD8147
AD8147;                    North         East     Units Scale Factor Converg.
AD8147;SPC FL E     -   223,920.671   220,806.068   MT  0.99994652   +0 05 33.1
AD8147;SPC FL E     -   734,646.40    724,427.91    sFT  0.99994652   +0 05 33.1
AD8147;UTM  17      - 2,914,976.252   520,798.969   MT  0.99960534   +0 05 33.1
AD8147
AD8147!             -  Elev Factor  x  Scale Factor =   Combined Factor
AD8147!SPC FL E     -   1.00000302  x   0.99994652  =   0.99994954
AD8147!UTM  17      -   1.00000302  x   0.99960534  =   0.99960836
AD8147
AD8147                          SUPERSEDED SURVEY CONTROL
AD8147
AD8147  NAD 83(2007)-  26 21 16.72080(N)    080 47 29.55225(W) AD(2002.00) 0
AD8147  ELLIP H (02/10/07)  -19.216  (m)                       GP(2002.00)
AD8147  NAD 83(1999)-  26 21 16.72086(N)    080 47 29.55230(W) AD(       ) A
AD8147  ELLIP H (12/09/02)  -19.226  (m)                       GP(       ) 4 1
AD8147  NAVD 88 (12/09/02)    5.60   (m)           18.4    (f) LEVELING    3
AD8147  NGVD 29 (09/01/92)    6.033  (m)           19.79   (f) ADJUSTED    1 2
AD8147
AD8147.Superseded values are not recommended for survey control.
AD8147
AD8147.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AD8147.See file dsdata.txt to determine how the superseded data were derived.
AD8147
AD8147_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK2079814976(NAD 83)
AD8147
AD8147_MARKER: F = FLANGE-ENCASED ROD
AD8147_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL
AD8147+WITH SETTING: INFORMATION.
AD8147_SP_SET: STAINLESS STEEL ROD
AD8147_STAMPING: S 410 X 1992
AD8147_MARK LOGO: NGS
AD8147_PROJECTION: RECESSED 150 CENTIMETERS
AD8147_MAGNETIC: N = NO MAGNETIC MATERIAL
AD8147_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
AD8147_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AD8147+SATELLITE: SATELLITE OBSERVATIONS - November 19, 2008
AD8147_ROD/PIPE-DEPTH:  1.5 meters
AD8147
AD8147  HISTORY     - Date     Condition        Report By
AD8147  HISTORY     - 1992     MONUMENTED       NGS
AD8147  HISTORY     - 20020227 GOOD             MAPTEC
AD8147  HISTORY     - 20030930 GOOD             FLDEP
AD8147  HISTORY     - 20041005 GOOD             MCKIM
AD8147  HISTORY     - 20051010 GOOD             NGS
AD8147  HISTORY     - 20070618 GOOD             GCT
AD8147  HISTORY     - 20071101 GOOD             GCT
AD8147  HISTORY     - 20081119 GOOD             WANTGP
AD8147
AD8147                          STATION DESCRIPTION
AD8147
AD8147'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992
AD8147'14.9 KM (9.25 MI) SOUTHERLY ALONG MIAMI CANAL ROAD AND THE WEST LEVEE
AD8147'ROAD OF THE MIAMI CANAL FROM THE POST OFFICE IN LAKE HARBOR, THENCE
AD8147'0.1 KM (0.05 MI) EASTERLY ALONG A PAVED ROAD, THENCE 23.9 KM (14.85
AD8147'MI) SOUTHERLY ALONG THE EAST LEVEE ROAD OF THE MIAMI CANAL, 7.4 M
AD8147'(24.3 FT) NORTHEAST OF AND LEVEL WITH THE CENTER OF THE ROAD, 1.8 M
AD8147'(5.9 FT) SOUTHEAST OF A UTILITY POLE, AND 0.5 M (1.6 FT) NORTHWEST OF
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AD8147'A WITNESS POST.  NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH
AD8147'LOGO CAP.  THE ROAD WAS DRIVEN TO REFUSAL AND ANCHORED.
AD8147
AD8147                          STATION RECOVERY (2002)
AD8147
AD8147'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (RLT)
AD8147'RECOVERED AS DESCRIBED
AD8147'
AD8147'
AD8147'
AD8147'
AD8147
AD8147                          STATION RECOVERY (2003)
AD8147
AD8147'RECOVERY NOTE BY FL DEPT OF ENV PRO 2003 (RWH)
AD8147'RECOVERY IN GOOD CONDITION EXCEPT, THE ROD WAS DRIVEN TO REFUSAL AND
AD8147'ANCHORED.  NOT--THE ROAD WAS DRIVEN TO REFUSAL AND ANCHORED.
AD8147
AD8147                          STATION RECOVERY (2004)
AD8147
AD8147'RECOVERY NOTE BY MCKIM AND CREED 2004 (BRH)
AD8147'RECOVERED IN GOOD CONDITION.
AD8147
AD8147                          STATION RECOVERY (2005)
AD8147
AD8147'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2005 (ECD)
AD8147'RECOVERED AS DESCRIBED.
AD8147
AD8147                          STATION RECOVERY (2007)
AD8147
AD8147'RECOVERY NOTE BY GUSTIN, COTHERN, AND TUCKER, I 2007 (WBM)
AD8147'RECOVERED IN GOOD CONDITION.
AD8147
AD8147                          STATION RECOVERY (2007)
AD8147
AD8147'RECOVERY NOTE BY GUSTIN, COTHERN, AND TUCKER, I 2007 (HWW)
AD8147'RECOVERED IN GOOD CONDITION.
AD8147
AD8147                          STATION RECOVERY (2008)
AD8147
AD8147'RECOVERY NOTE BY WANTMAN GROUP INC 2008 (PA)
AD8147'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:06
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

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PROGRAM = datasheet95, VERSION = 8.7.1
1         National Geodetic Survey,   Retrieval Date = AUGUST 15, 2015
 AH2136 ***********************************************************************
 AH2136  DESIGNATION -  I75 90 B20 RM 2
 AH2136  PID         -  AH2136
 AH2136  STATE/COUNTY-  FL/BROWARD
 AH2136  COUNTRY     -  US
 AH2136  USGS QUAD   -  EAST OF LONE PALM (1973)
 AH2136
 AH2136                        *CURRENT SURVEY CONTROL
 AH2136  ______________________________________________________________________
 AH2136* NAD 83(2011) POSITION- 26 08 47.37035(N) 080 38 01.70652(W)   ADJUSTED
 AH2136* NAD 83(2011) ELLIP HT-   -13.745 (meters)        (06/27/12)   ADJUSTED
 AH2136* NAD 83(2011) EPOCH    -  2010.00
 AH2136* NAVD 88 ORTHO HEIGHT -    10.958 (meters)       35.95  (feet) ADJUSTED
 AH2136  ______________________________________________________________________
 AH2136  NAD 83(2011) X  -    932,388.060 (meters)                     COMP
 AH2136  NAD 83(2011) Y  - -5,652,797.577 (meters)                     COMP
 AH2136  NAD 83(2011) Z  -  2,793,633.930 (meters)                     COMP
 AH2136  LAPLACE CORR    -         -0.70  (seconds)                    DEFLEC12B
 AH2136  GEOID HEIGHT    -        -24.69  (meters)                     GEOID12B
 AH2136  DYNAMIC HEIGHT  -         10.940 (meters)       35.89  (feet) COMP
 AH2136  MODELED GRAVITY -    979,057.1   (mgal)                       NAVD 88
 AH2136
 AH2136  VERT ORDER      -  SECOND    CLASS II
 AH2136
 AH2136  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AH2136  Standards:
 AH2136         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AH2136            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AH2136  ------------------------------------------------------------------
 AH2136  NETWORK    0.91   1.43          0.37   0.37   0.73     -0.11953873
 AH2136  ------------------------------------------------------------------
 AH2136  Click here for local accuracies and other accuracy information.
 AH2136
 AH2136
 AH2136.The horizontal coordinates were established by GPS observations
 AH2136.and adjusted by the National Geodetic Survey in June 2012.
 AH2136
 AH2136.NAD 83(2011) refers to NAD 83 coordinates where the reference
 AH2136.frame has been affixed to the stable North American tectonic plate. See
 AH2136.NA2011 for more information.
 AH2136
 AH2136.The horizontal coordinates are valid at the epoch date displayed above
 AH2136.which is a decimal equivalence of Year/Month/Day.
 AH2136
 AH2136.The orthometric height was determined by differential leveling and
 AH2136.adjusted by the NATIONAL GEODETIC SURVEY
 AH2136.in December 2001.
 AH2136
 AH2136.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AH2136
 AH2136.The Laplace correction was computed from DEFLEC12B derived deflections.
 AH2136
 AH2136.The ellipsoidal height was determined by GPS observations
 AH2136.and is referenced to NAD 83.
 AH2136
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AH2136.The dynamic height is computed by dividing the NAVD 88
AH2136.geopotential number by the normal gravity value computed on the
AH2136.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AH2136.degrees latitude (g = 980.6199 gals.).
AH2136
AH2136.The modeled gravity was interpolated from observed gravity values.
AH2136
AH2136. The following values were computed from the NAD 83(2011) position.
AH2136
AH2136;                    North         East     Units Scale Factor Converg.
AH2136;SPC FL E     -   200,895.147   236,614.779   MT  0.99995772   +0 09 40.9
AH2136;SPC FL E     -   659,103.49    776,293.65   sFT  0.99995772   +0 09 40.9
AH2136;UTM  17      - 2,891,958.584   536,602.286   MT  0.99961654   +0 09 40.9
AH2136
AH2136!             -  Elev Factor  x  Scale Factor =   Combined Factor
AH2136!SPC FL E     -   1.00000216  x   0.99995772  =   0.99995988
AH2136!UTM  17      -   1.00000216  x   0.99961654  =   0.99961870
AH2136
AH2136                          SUPERSEDED SURVEY CONTROL
AH2136
AH2136  NAD 83(2007)-  26 08 47.37048(N)    080 38 01.70718(W) AD(2002.00) 0
AH2136  ELLIP H (02/10/07)  -13.723  (m)                       GP(2002.00)
AH2136  NAD 83(1999)-  26 08 47.37067(N)    080 38 01.70762(W) AD(       ) 1
AH2136  ELLIP H (12/12/02)  -13.716  (m)                       GP(       ) 4 1
AH2136  NAD 88 (12/12/02)   10.96   (m)           36.0    (f) LEVELING    3
AH2136
AH2136.Superseded values are not recommended for survey control.
AH2136
AH2136.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AH2136.See file dsdata.txt to determine how the superseded data were derived.
AH2136
AH2136_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ3660291958(NAD 83)
AH2136
AH2136_MARKER: DD = SURVEY DISK
AH2136_SETTING: 38 = SET IN THE ABUTMENT OR PIER OF A LARGE BRIDGE
AH2136_SP_SET: BRIDGE ABUTMENT
AH2136_STAMPING: I75 90 B20 RM 2
AH2136_MARK LOGO: FLDT
AH2136_MAGNETIC: N = NO MAGNETIC MATERIAL
AH2136_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AH2136_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AH2136+SATELLITE: SATELLITE OBSERVATIONS - August 17, 2006
AH2136
AH2136  HISTORY     - Date     Condition        Report By
AH2136  HISTORY     - 1990     MONUMENTED       FLDT
AH2136  HISTORY     - 20020524 GOOD             MAPTEC
AH2136  HISTORY     - 20060817 GOOD             INDIV
AH2136
AH2136                          STATION DESCRIPTION
AH2136
AH2136'DESCRIBED BY FLORIDA DEPARTMENT OF TRANSPORTATION 1990 (CDM)
AH2136'THE STATION IS LOCATED APPROXIMATELY 30.65 MILES (49.33 KM) WEST OF
AH2136'FORT LAUDERDALE, ALONG INTERSTATE HIGHWAY 75, IS IN THE TOP SOUTHWEST
AH2136'CORNER OF THE WEST ABUTMENT OF WESTBOUND BRIDGE OVER MIAMI CANAL. TO
AH2136'REACH STATION FROM THE INTERSECTION OF U.S. HIGHWAY 27 AND INTERSTATE
AH2136'HIGHWAY 75, IN BROWARD COUNTY, PROCEED WEST 11.75 MILES (18.91 KM)
AH2136'ALONG INTERSTATE HIGHWAY 75 TO STATION. THE STATION IS 0.8 FEET (24.4
AH2136'CM) WEST OF JOINT OF BRIDGE AND ROAD, 1.8 FEET (0.5 M) EAST OF
AH2136'SOUTHWEST CORNER OF WESTBOUND LANE CONCRETE BRIDGE ABUTMENT AND 7.5
AH2136'FEET (2.3 M) SOUTH OF SOUTH EDGE OF WESTBOUND LANE.
AH2136
AH2136                          STATION RECOVERY (2002)
AH2136
AH2136'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP)
AH2136'STATION RECOVERY (2002)
AH2136'RECOVERY NOTE BY MAPTECH, INCORPORATED 2002 (CDP)
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AH2136'RECOVERED AS DESCRIBED.
AH2136'
AH2136'
AH2136
AH2136                          STATION RECOVERY (2006)
AH2136
AH2136'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2006 (DF)
AH2136'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:05
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

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PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST 15, 2015
 AD7900 ***********************************************************************
 AD7900  CBN         -  This is a Cooperative Base Network Control Station.
 AD7900  DESIGNATION -  FLGPS 64
 AD7900  PID         -  AD7900
 AD7900  STATE/COUNTY-  FL/BROWARD
 AD7900  COUNTRY     -  US
 AD7900  USGS QUAD   -  LONE PALM HEAD (1973)
 AD7900
 AD7900                        *CURRENT SURVEY CONTROL
 AD7900  ______________________________________________________________________
 AD7900* NAD 83(2011) POSITION- 26 10 12.25864(N) 080 51 00.42266(W)   ADJUSTED
 AD7900* NAD 83(2011) ELLIP HT-   -21.694 (meters)        (06/27/12)   ADJUSTED
 AD7900* NAD 83(2011) EPOCH   -  2010.00
 AD7900* NAVD 88 ORTHO HEIGHT -     2.996 (meters)        9.83   (feet) ADJUSTED
 AD7900  ______________________________________________________________________
 AD7900  NAD 83(2011) X  -    910,856.058 (meters)                      COMP
 AD7900  NAD 83(2011) Y  - -5,655,133.260 (meters)                      COMP
 AD7900  NAD 83(2011) Z  -  2,795,975.298 (meters)                      COMP
 AD7900  LAPLACE CORR    -          0.74  (seconds)                     DEFLEC12B
 AD7900  GEOID HEIGHT    -        -24.69  (meters)                      GEOID12B
 AD7900  DYNAMIC HEIGHT  -          2.991 (meters)        9.81   (feet) COMP
 AD7900  MODELED GRAVITY -    979,041.6   (mgal)                        NAVD 88
 AD7900
 AD7900  VERT ORDER      -  FIRST     CLASS II
 AD7900
 AD7900  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AD7900  Standards:
 AD7900         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AD7900            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AD7900  ------------------------------------------------------------------
 AD7900  NETWORK    0.33   0.67          0.14   0.13   0.34     -0.06231981
 AD7900  ------------------------------------------------------------------
 AD7900  Click here for local accuracies and other accuracy information.
 AD7900
 AD7900
 AD7900.The horizontal coordinates were established by GPS observations
 AD7900.and adjusted by the National Geodetic Survey in June 2012.
 AD7900
 AD7900.NAD 83(2011) refers to NAD 83 coordinates where the reference
 AD7900.frame has been affixed to the stable North American tectonic plate. See
 AD7900.NA2011 for more information.
 AD7900
 AD7900.The horizontal coordinates are valid at the epoch date displayed above
 AD7900.which is a decimal equivalence of Year/Month/Day.
 AD7900
 AD7900.The orthometric height was determined by differential leveling and
 AD7900.adjusted by the NATIONAL GEODETIC SURVEY
 AD7900.in December 2001.
 AD7900
 AD7900.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AD7900
 AD7900.The Laplace correction was computed from DEFLEC12B derived deflections.
 AD7900
 AD7900.The ellipsoidal height was determined by GPS observations
 AD7900.and is referenced to NAD 83.
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AD7900
AD7900.The dynamic height is computed by dividing the NAVD 88
AD7900.geopotential number by the normal gravity value computed on the
AD7900.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AD7900.degrees latitude (g = 980.6199 gals.).
AD7900
AD7900.The modeled gravity was interpolated from observed gravity values.
AD7900
AD7900. The following values were computed from the NAD 83(2011) position.
AD7900
AD7900;                    North         East     Units Scale Factor Converg.
AD7900;SPC FL E     -   203,464.522   214,983.359   MT  0.99994395   +0 03 58.0
AD7900;SPC FL E     -   667,533.19    705,324.57   sFT  0.99994395   +0 03 58.0
AD7900;UTM  17      - 2,894,527.082   514,978.247   MT  0.99960277   +0 03 58.0
AD7900
AD7900!             -  Elev Factor  x  Scale Factor =   Combined Factor
AD7900!SPC FL E     -   1.00000341  x   0.99994395  =   0.99994736
AD7900!UTM  17      -   1.00000341  x   0.99960277  =   0.99960618
AD7900
AD7900:                Primary Azimuth Mark                    Grid Az
AD7900:SPC FL E     -  FLGPS 64 AZ MK                         099 44 25.9
AD7900:UTM  17      -  FLGPS 64 AZ MK                         099 44 25.9
AD7900
AD7900|-----------------------------------------------------------------------|
AD7900| PID    Reference Object                    Distance      Geod. Az   |
AD7900|                                                          dddmmss.s  |
AD7900| AD7926 FLGPS 64 AZ MK                    APPROX. 1.0 KM 0994823.9  |
AD7900|-----------------------------------------------------------------------|
AD7900
AD7900                          SUPERSEDED SURVEY CONTROL
AD7900
AD7900  NAD 83(2007)-  26 10 12.25878(N)    080 51 00.42330(W) AD(2002.00) 0
AD7900  ELLIP H (02/10/07)  -21.677  (m)                       GP(2002.00)
AD7900  NAD 83(1999)-  26 10 12.25857(N)    080 51 00.42355(W) AD(       ) A
AD7900  ELLIP H (04/12/01)  -21.665  (m)                       GP(       ) 4 1
AD7900  NAD 83(1990)-  26 10 12.25738(N)    080 51 00.42383(W) AD(       ) B
AD7900  ELLIP H (09/13/90)  -21.656  (m)                       GP(       ) 4 1
AD7900  NAVD 88 (03/08/99)    3.00   (m)            9.8    (f) LEVELING    3
AD7900  NAVD 88 (05/28/98)    3.0    (m)  GEOID96 model used   GPS OBS
AD7900  NAVD 88 (06/02/94)    2.9    (m)  GEOID93 model used   GPS OBS
AD7900  NGVD 29 (09/13/90)    3.5    (m)  FFT MET model used   GPS OBS
AD7900
AD7900.Superseded values are not recommended for survey control.
AD7900
AD7900.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AD7900.See file dsdata.txt to determine how the superseded data were derived.
AD7900
AD7900_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ1497894527(NAD 83)
AD7900
AD7900_MARKER: F = FLANGE-ENCASED ROD
AD7900_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AD7900_SP_SET: STAINLESS STEEL ROD IN SLEEVE
AD7900_STAMPING: FLGPS 64 1989
AD7900_MARK LOGO: NGS
AD7900_PROJECTION: RECESSED 8 CENTIMETERS
AD7900_MAGNETIC: I = MARKER IS A STEEL ROD
AD7900_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AD7900_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AD7900+SATELLITE: SATELLITE OBSERVATIONS - September 21, 2009
AD7900_ROD/PIPE-DEPTH:  4.3 meters
AD7900_SLEEVE-DEPTH  :  0.9 meters
AD7900
AD7900  HISTORY     - Date     Condition        Report By
AD7900  HISTORY     - 1989     MONUMENTED       NGS
AD7900  HISTORY     - 19950511 GOOD             FLDT
AD7900  HISTORY     - 19980223 GOOD             FLDEP
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AD7900  HISTORY     - 19980715 GOOD            GCYI
AD7900  HISTORY     - 19990405 GOOD            FL-011
AD7900  HISTORY     - 19990803 GOOD            BAH
AD7900  HISTORY     - 20000825 GOOD            FLDEP
AD7900  HISTORY     - 2002     GOOD            MAPTEC
AD7900  HISTORY     - 20020222 GOOD            NGS
AD7900  HISTORY     - 20020227 GOOD            MAPTEC
AD7900  HISTORY     - 20030930 GOOD            FLDEP
AD7900  HISTORY     - 20050603 GOOD            FLDEP
AD7900  HISTORY     - 20090921 GOOD            GCT
AD7900
AD7900                          STATION DESCRIPTION
AD7900
AD7900'DESCRIBED BY NATIONAL GEODETIC SURVEY 1989
AD7900'THE STATION IS LOCATED IN THE MICCOSUKEE INDIAN RESERVATION, ABOUT
AD7900'40.8 KM (25.35 MI) WEST OF ANDYTOWN, IN THE RIGHT-OF-WAY OF THE
AD7900'NORTHBOUND LANE (WEST BOUND) OF INTERSTATE HIGHWAY 75.
AD7900'OWNERSHIP--STATE OF FLORIDA DOT.
AD7900'TO REACH THE STATION FROM THE INTERSECTION OF SNAKE ROAD AND
AD7900'INTERSTATE HIGHWAY 75, NEAR ANDYTOWN, GO EAST ALONG INTERSTATE HIGHWAY
AD7900'75 SOUTHBOUND LANES FOR 0.64 KM (0.40 MI) TO A CANAL AND THE STATION
AD7900'ON LEFT, ON THE NORTH SIDE OF INTERSTATE HIGHWAY WESTBOUND LANES.
AD7900'THE STATION IS RECESSED 7 CM BELWO GROUND.  LOCATED 6.1 M (20.0 FT)
AD7900'SOUTH OF THE SOUTH EDGE OF CANAL, 10 M (32.8 FT) EAST OF A SMALL DRAIN
AD7900'PIPE, 11 M (36.1 FT) NORTH OF THE NORTH EDGE OF PAVEMENT OF THE
AD7900'SHOULDER OF THE WESTBOUND LANES OF INTERSTATE HIGHWAY AND 1.22 M
AD7900'(4.0 FT) SOUTH OF A CARSONITE WITNESS POST.
AD7900'DESCRIBED BY R.L. MALLOY.
AD7900
AD7900                          STATION RECOVERY (1995)
AD7900
AD7900'RECOVERY NOTE BY FLORIDA DEPARTMENT OF TRANSPORTATION 1995 (CDM)
AD7900'RECOVERED AS DESCRIBED BY R.L. MALLOY.
AD7900
AD7900                          STATION RECOVERY (1998)
AD7900
AD7900'RECOVERY NOTE BY FL DEPT OF ENV PRO 1998 (JLM)
AD7900'RECOVERED IN GOOD CONDITION WITH THESE CHANGES, 177.0 FT (53.9 M) EAST
AD7900'OF THE NORTH MOST LEG OF THE EXIT SIGN NUMBER 14 INDIAN RESERVATION,
AD7900'72.5 FT (22.1 M) WEST OF A SQUARE CONCRETE POWER POLE, 67.5 FT (20.6
AD7900'M) NORTHWEST OF MILE POST NUMBER 49 AND 12.0 FT (3.7 M) SOUTH OF A
AD7900'CARSONITE WITNESS POST IN THE EAST-WEST HOG WIRE FENCE LINE.
AD7900
AD7900                          STATION RECOVERY (1998)
AD7900
AD7900'RECOVERY NOTE BY G.C.Y., INCORPORATED 1998 (GCY)
AD7900'RECOVERED AS DESCRIBED.
AD7900
AD7900                          STATION RECOVERY (1999)
AD7900
AD7900'RECOVERY NOTE BY BROWARD COUNTY FLORIDA 1999
AD7900'RECOVERED AS DESCRIBED.
AD7900
AD7900                          STATION RECOVERY (1999)
AD7900
AD7900'RECOVERY NOTE BY BERRYMAN & HENIGAR 1999 (KK)
AD7900'RECOVERED AS DESCRIBED.
AD7900
AD7900                          STATION RECOVERY (2000)
AD7900
AD7900'RECOVERY NOTE BY FL DEPT OF ENV PRO 2000 (JLM)
AD7900'RECOVERED AS DESCRIBED.
AD7900
AD7900                          STATION RECOVERY (2002)
AD7900
AD7900'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CP)
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AD7900'STATION RECOVERY (2002)
AD7900'RECOVERY NOTE BY MAPTECH, INCORPORATED 2002 (CP)
AD7900'RECOVERED AS DESCRIBED.
AD7900'
AD7900'
AD7900
AD7900                          STATION RECOVERY (2002)
AD7900
AD7900'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2002 (RWA)
AD7900'RECOVERED IN GOOD CONDITION.
AD7900
AD7900                          STATION RECOVERY (2002)
AD7900
AD7900'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (RLT)
AD7900'RECOVERED AS DESCRIBED
AD7900'
AD7900'
AD7900'
AD7900'
AD7900
AD7900                          STATION RECOVERY (2003)
AD7900
AD7900'RECOVERY NOTE BY FL DEPT OF ENV PRO 2003 (RWH)
AD7900'RECOVERED AS DESCRIBED.
AD7900'
AD7900'
AD7900
AD7900                          STATION RECOVERY (2005)
AD7900
AD7900'RECOVERY NOTE BY FL DEPT OF ENV PRO 2005 (BPJ)
AD7900'RECOVERED IN GOOD CONDITION.
AD7900
AD7900                          STATION RECOVERY (2009)
AD7900
AD7900'RECOVERY NOTE BY GUSTIN, COTHERN, AND TUCKER, I 2009
AD7900'RECOVERED AS DESCRIBED (HANDHELD GPS 26 10 12.3 N, 080 51 00.4 W)

*** retrieval complete.
Elapsed Time = 00:00:08
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Hydrogage, Inc.
Survey Notes

Project: G3ANW
Client: SFWMD
Date: 4-13-07

Survey Crew
Instrument: MS?
Rod: R. Munoz

Bench Mark: Staffgage RP BOLT **Elevation:** 15.22
Datum Used:

Survey Datum Provided by:

Station STA	+	IT	-	Elev.	Remarks
SG RP				15.22	3" X 1/4" SS LAG BOLT
	6.16				
		21.38			
TEMP BM			4.57	16.81	NW Corner Bracket
Shelter floor RP			0.96	20.42	MARK on Alum. Shelter floor
RESET TO	CLOSE				
Shelter floor RP				20.42	MARK on Alum Shelter floor
	0.87				
		21.29			
TEMP BM			4.48	16.81	NW Corner Bracket
SG RP			6.07	15.22	3"X1/4" SS LAG BOLT

Survey Checked by: [signature]
Date: 4-13-07
Result:

Transcribed by: JLJ
Transcription checked by: MSP

"Notes"
STA: Station
Elev: Elevation
IT Instrument Height