Surveyor's Report

Orange, Osceola & Everglades Wells

NMI Project No. 1078.008

Report Date: November 7th, 2007

Submittal: Two of Two

(Update S65AMW)

Prepared for:

South Florida Water Management District

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OVERVIEW OF THE PROJECT

PURPOSE

The purpose of the Orange, Osceola & Everglades Wells Project is to establish vertical control marks near each monitoring well. The monitoring wells are divided into two groups. The first group is located in Orange and Osceola Counties. They are near established benchmarks which enabled us to utilize standard level runs to determine the elevations on those wells. The second group is located in remote areas of the Everglades. The remoteness of these wells meant that GPS observations were the only way to establish elevations on them. Also, due to the terrain, the Everglades sites were only accessible by helicopter.

The first group of wells in this project also further tests the application of Federal Geodetic Control Subcommittee (FGCS) Second-Order, Class II leveling procedures with Third-Order equipment. The goal of this hybrid pairing of procedures and equipment is to produce leveling measurements that will be acceptable to the National Geodetic Survey (NGS) and used in future vertical adjustments throughout the District.

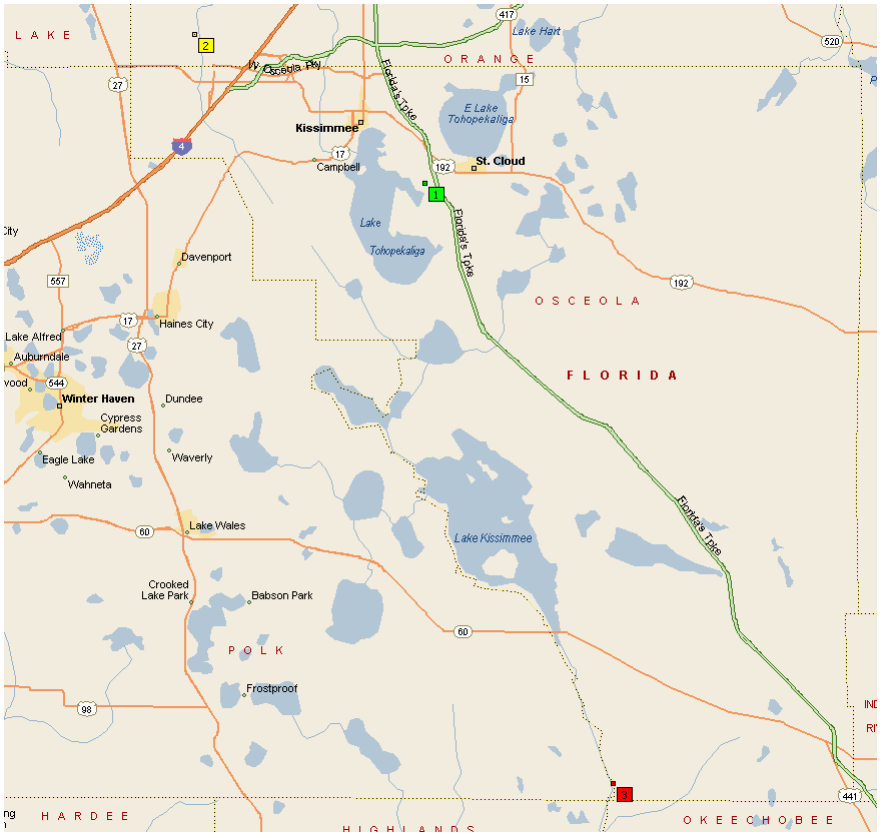
This project utilizes uncalibrated "off-the-shelf" fiberglass level rods. Such rods are not currently approved by NGS for precise leveling (Second-Order Class II and above) for three primary reasons:

1. The fiberglass material used to construct the rods is less dimensionally stable than rods constructed of Invar metal.
2. The fiberglass rods are not individually calibrated by the manufacturer to identify scale errors across the length of the rod.
3. The fiberglass rods are a three-section snap-together style that will, over time, wear at the connection points creating error in measurements on the top two sections.

While these limitations make the rods unsuitable for the extreme precision required in First-Order and Second-Order, Class I leveling, it is the hypothesis of this project that such rods can deliver Second-Order, Class II precisions. Fiberglass rods are commonly used by surveyors today. In contrast, Invar level rods are expensive and specialized equipment only used by surveyors working on the highest precision vertical control surveys. By demonstrating that fiberglass level rods such as those used in this project are suitable for Second-Order, Class II leveling the District will benefit from the increased number of consultants using these rods. As a result, more level lines run within the District should meet NGS's requirements for inclusion in future vertical adjustments, further refining the elevation models used for water control.

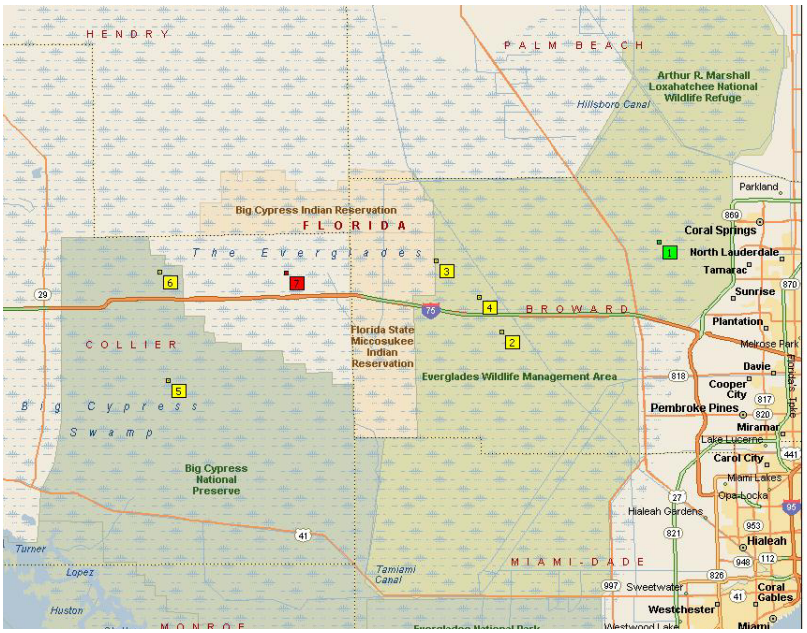
LOCATION OF PROJECT

The project is located in Orange and Osceola Counties. Following is a map and legend.



1. C31GFS
2. REDYCK
3. S65AMW

The remainder of the project is located in the Everglades.
Following is a map and legend of that area:



1. 2A300
2. 3A09
3. 3A11
4. 3A12
5. BCA16
6. BCA17
7. BCA18

ITEMS DELIVERED TO THE CLIENT

The following items are delivered to the client with this report. Neither the report nor the items listed below are complete without the other.

1. Paper and electronic copy of field notes
2. Paper and electronic copy of all computation sheets
3. CORPSMET file for each site
4. Paper and electronic copy of site photographs
5. Paper copy of South Florida Water Management District Benchmark Description
6. Paper and electronic copy of NGS Blue Book submittal

VERTICAL DATUM FOR THE PROJECT

The vertical datum for the project is the North American Vertical Datum of 1988. For correlation with older data sets, the elevations of the benchmarks are also shown in the National Geodetic Vertical Datum (NGVD) of 1929. The NGVD 29 elevations were derived using data provided by the South Florida Water Management District in a file named "NGVD29.ABS" when applicable, otherwise NGS superseded values were used. The linear unit for all elevations is the meter unless otherwise stated.

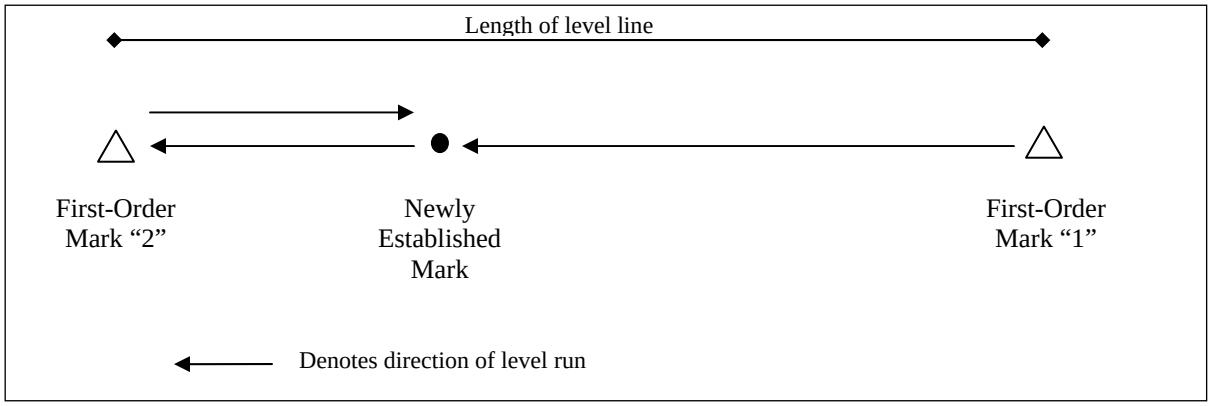
LEVELING METHODS

CONFIGURATION OF LEVEL RUNS

The leveling for the project was performed in accordance with the Federal Geodetic Control Subcommittee standard for Second-Order, Class II geodetic leveling. A brief description of the procedures used follows.

For each level line, two existing First or Second Order vertical marks were used. The run was started at one of the First or Second Order marks and continued through the newly established mark near the structure and closed on the second First or Second Order vertical mark. The run was then looped back from the second First or Second Order mark to the newly established mark (see Figure 1 below).

Figure 1 Typical Level Run Pattern



The FGCS maximum allowable misclosure for this type of run is eight millimeters multiplied by the length of the line in kilometers.

EQUIPMENT USED

All leveling during the project was performed with a Leica DNA03 digital level and Leica three-section, fiberglass bar-code level rods. Information and technical specification for the Leica DNA03 digital level are available at http://www.leica-geosystems.com.

GPS METHODS

INTRODUCTION

Due to the remote locations of the monuments located in the Everglades, it was decided that GPS observations were the only way to find elevation data on them. It was also determined that the most efficient mode of travel would be by helicopter.

The GPS observations for the project were performed in accordance with the Guidelines for Establishing GPS-Derived Ellipsoidal Heights (National Geodetic Survey Technical Memorandum NOS NGS-58).

GPS observations were conducted over three days:

- Tuesday, July 18th, 2006
- Wednesday, July 19th, 2006
- Thursday, July 27th, 2006

The following instrumentation was used for the GPS observations:

(1) Trimble 4800 receiver/antennas
(2) Trimble 5800 receiver/antenna
(2) Trimble R8 receiver/antennas

DATA PROCESSING

Data Acquisition

Data was downloaded from receivers to a desktop computer through the Trimble Geomatics Office software, version 1.63 (TGO).

Data Quality

The quality of the data was checked using the Timeline feature in the TGO software. Areas of the data that showed cycle slips were disabled. Due to minor problems with baseline processing, the Signal-to-Noise Ratio (SNR) was investigated for each satellite during each observation. Areas of data that had high SNR were removed before processing the baselines.

Baseline Processing

Baselines were processed using TGO. For each session, (n-1) baselines were selected that produced fixed integer solutions with the lowest possible RMS values.

Adjustment

The ADJUST software package from NGS was used for the network adjustment. The B-file, G-file and Serfil were exported from TGO. Initial positions and ellipsoidal heights of new marks were supplied in the creation of the B-file. Both the B-file and G-file were checked using the file-checking utilities that are a part of the ADJUST software package. The B-file was edited to conform to the structure and data content necessary to remove any errors found in the file-checking utilities. This included using NAVD88 as the vertical datum and GEOID03 for the geoid.

After all files were checked and found to be satisfactory, a minimally-constrained adjustment was performed with no weighting applied. The ellipsoid and orthometric heights of the non-fixed control points were then checked against their published values. When these heights did not correlate well with the published values, they were removed from the adjustment. This was the case with the NGS benchmark FCE 3932.

Using the standard deviation of unit weight from the first minimally-constrained adjustment, standard errors were scaled using the MODGEE program. A second minimally-constrained adjustment was performed with satisfactory results.

For the constrained horizontal adjustment, the published horizontal position and orthometric height for the control stations were fixed. The modified G-file, using the scaled standard errors, was used for this adjustment. The network adjustment was performed and no major shifts in position were found.

A minimally-constrained vertical adjustment was performed, with the horizontal position and orthometric height of a single control station being fixed. Again, the scaled G-file was used for this vertical adjustment. The orthometric heights of the non-fixed control points were checked against their published values.

A fully-constrained vertical adjustment was then performed with the published horizontal position and orthometric height of all accepted control stations being fixed.

Lastly, a final minimally-constrained adjustment with accuracies was performed, with little change in the statistics.

Although no major shifts in position were found in any of the networks following the adjustment in ADJUST, the residuals were unusually high in the adjustment results. This is most likely due to multi-path from the solar panel at each well location. When the networks were adjusted in TGO, the residuals were within tolerance. However, NGS will only accept adjustments that come from the ADJUST software. Since those residuals are out of tolerance, they are not acceptable for blue booking. The confidence in the elevations reported is still high since the different adjustment programs agreed very well on the final elevations.

S65AMW	No new bench mark was set, use bench mark KR 1388				
Bench Mark 1:	C 474	45.44 ft	(NAVD 88)	46.56 ft	(NGVD 29)
Bench Mark 2:	B 474	47.25 ft	(NAVD 88)	48.37 ft	(NGVD 29)
Site Bench Mark:	KR 1388	52.838 ~~52.74~~ ft	(NAVD 88)	54.038 3.86 ft	(NGVD 29)
Monitoring Well:	S65AMW (NE)	55.22 55.12 ft	(NAVD 88)	56.42 56.24 ft	(NGVD 29)
Monitoring Well:	S65AMW (NW)	55.36 55.26 ft	(NAVD 88)	56.56 56.38 ft	(NGVD 29)
Monitoring Well:	S65AMW (SE)	55.06 54.96 ft	(NAVD 88)	56.26 56.08 ft	(NGVD 29)
Monitoring Well:	S65AMW (SW)	55.22 51.12 ft	(NAVD 88)	56.42 52.24 ft	(NGVD 29)
Concrete Pad:	S65AMW	52.60 ft	(NAVD 88)	53.72 ft	(NGVD 29)
Ground Elevation:	S65AMW	52.23 ft	(NAVD 88)	53.35 ft	(NGVD 29)
Length of Run:	4.78 km				
Max Allowable Misclosure:	18 mm				
Actual Misclosure:	4 mm				

To Reach KR 1388:

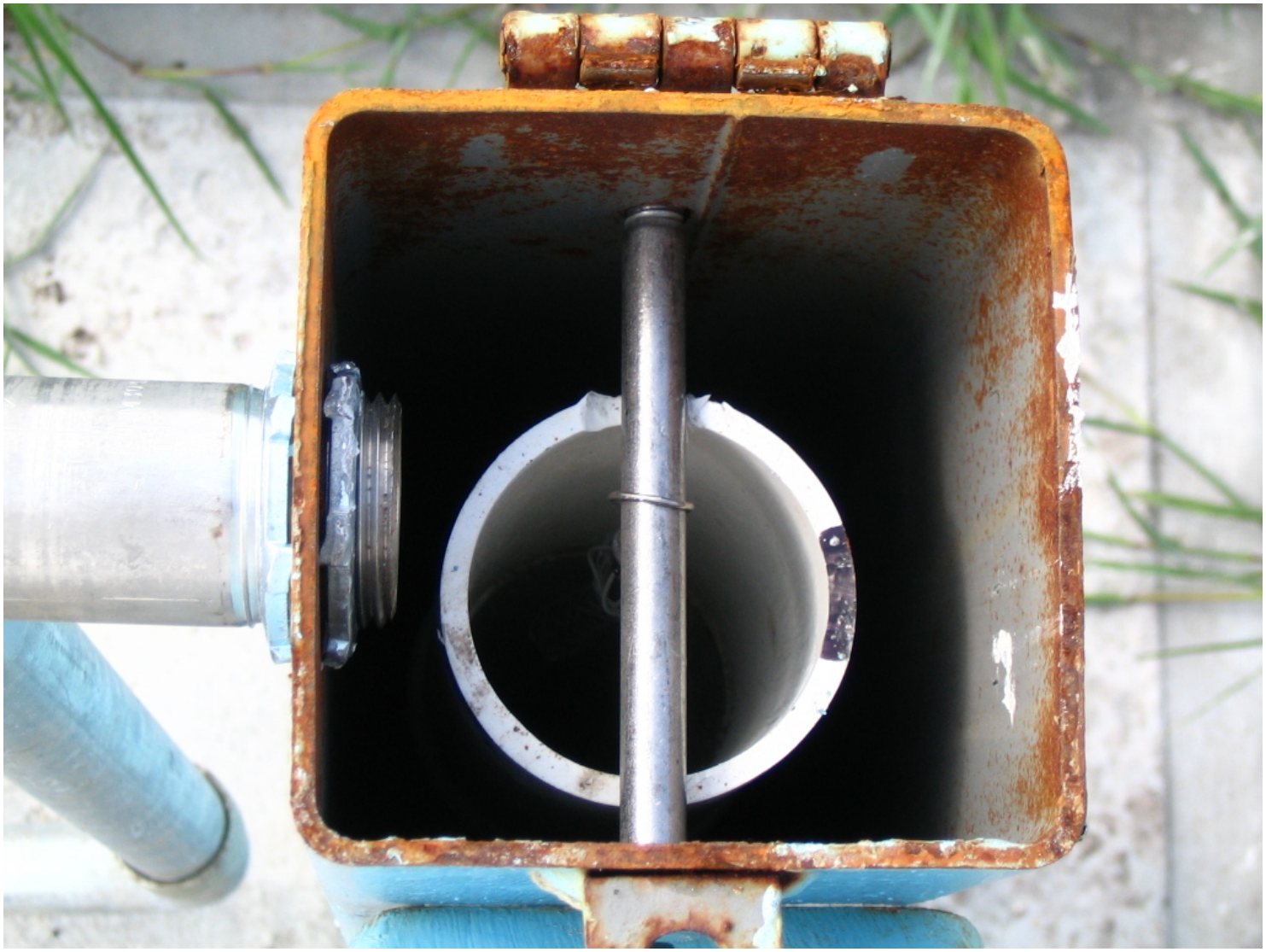
THE MARK IS ABOUT 39.0 MILES (62.8 KILOMETERS) SOUTHEAST OF LAKE WALES IN SECTION 28, TOWNSHIP 32 SOUTH, RANGE 32 EAST. TO REACH THE MARK FROM THE INTERSECTION OF STATE ROAD 27 AND STATE ROAD 60 IN LAKE WALES, GO EAST-SOUTHEAST ON STATE ROAD 60 FOR 26.9 MILES (43.3 KILOMETERS) TO THE WEST END OF THE BRIDGE OVER THE KISSIMMEE RIVER, CONTINUE EAST FOR 11.05 MILES (17.78 KILOMETERS) TO THE JUNCTION OF A DIRT ROAD ON THE RIGHT, TURN RIGHT ON DIRT ROAD AND GO SOUTH FOR 5.6 MILES (9.0 KILOMETERS) TO A Y-JUNCTION, BEAR LEFT AND GO SOUTH ON THE DIRT ROAD FOR 2.6 MILES (4.2 KILOMETERS) TO A METAL GATE, CONTINUE WEST FOR 0.05 MILES (0.08 KILOMETERS) TO THE MARK ON THE RIGHT, SET IN THE TOP OF A ROUND CONCRETE MONUMENT FLUSH WITH THE GROUND AND 0.4 FEET (12.2 CENTIMETERS) ABOVE THE LEVEL OF THE DIRT ROAD. LOCATED 143.5 FEET (43.7 METERS) EAST OF THE NORTHEAST CORNER OF STURCTURE S-65A, 20.8 FEET (6.3 METERS) SOUTH OF A METAL WITNESS POST IN THE BARBWIRE FENCE AND 10.8 FEET (3.3 METERS) NORTH OF THE APPROXIMATE CENTERLINE OF THE DIRT ROAD.

The combination of Second-Order, Class II methods and Third-Order fiberglass level rods produced errors of closure within the FGCS standard for Second-Order, Class II geodetic leveling. The data gathered during the conventional leveling phase of this project has been submitted to Mr. Ronnie Taylor, NGS Advisor for the State of Florida for further analysis and recommendations.

S65AMW

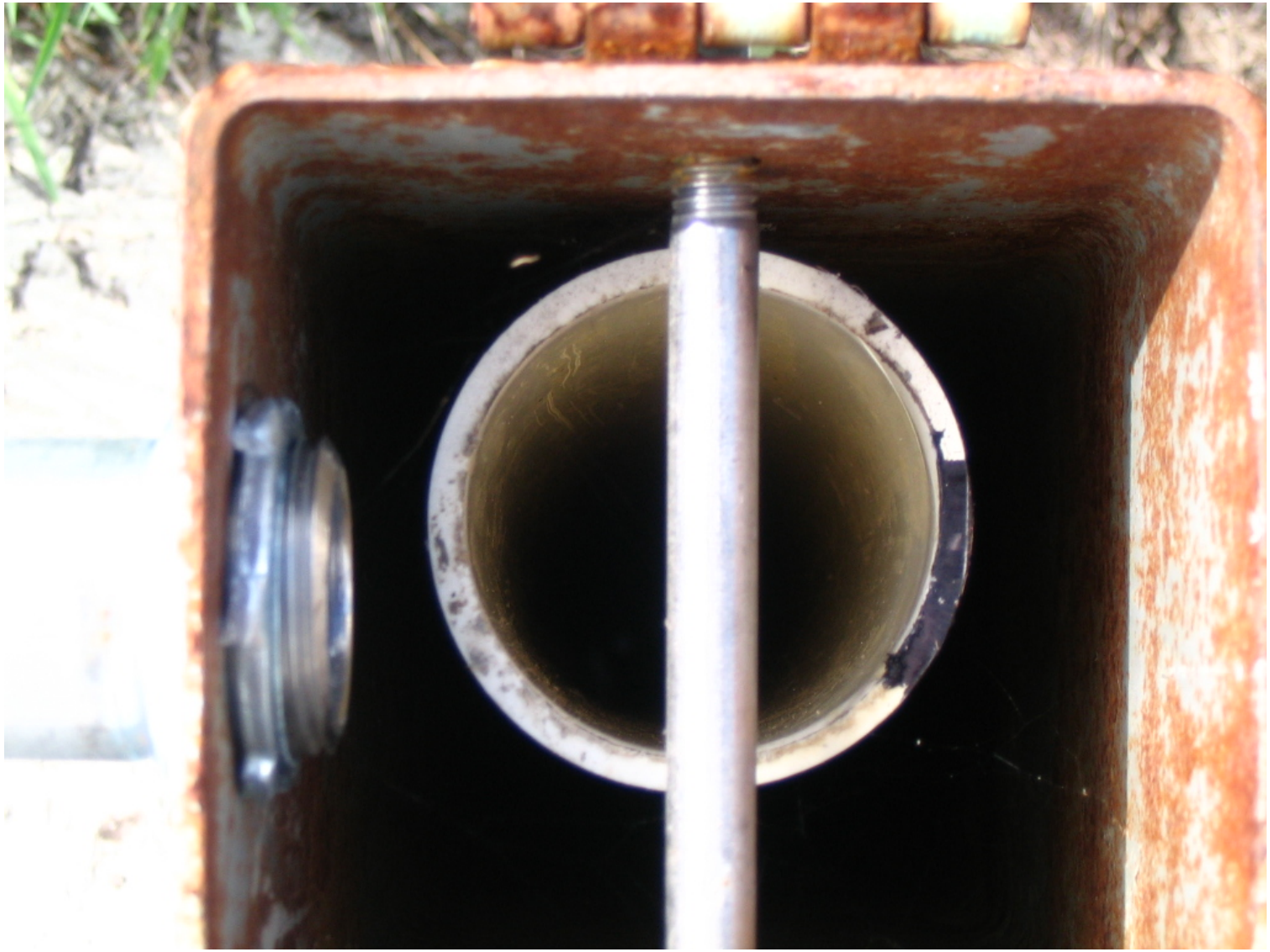
Nick Miller, Inc.
Date of Photo: June 19, 2006
View: Looking at the well S65AMW facing north

S65AMW



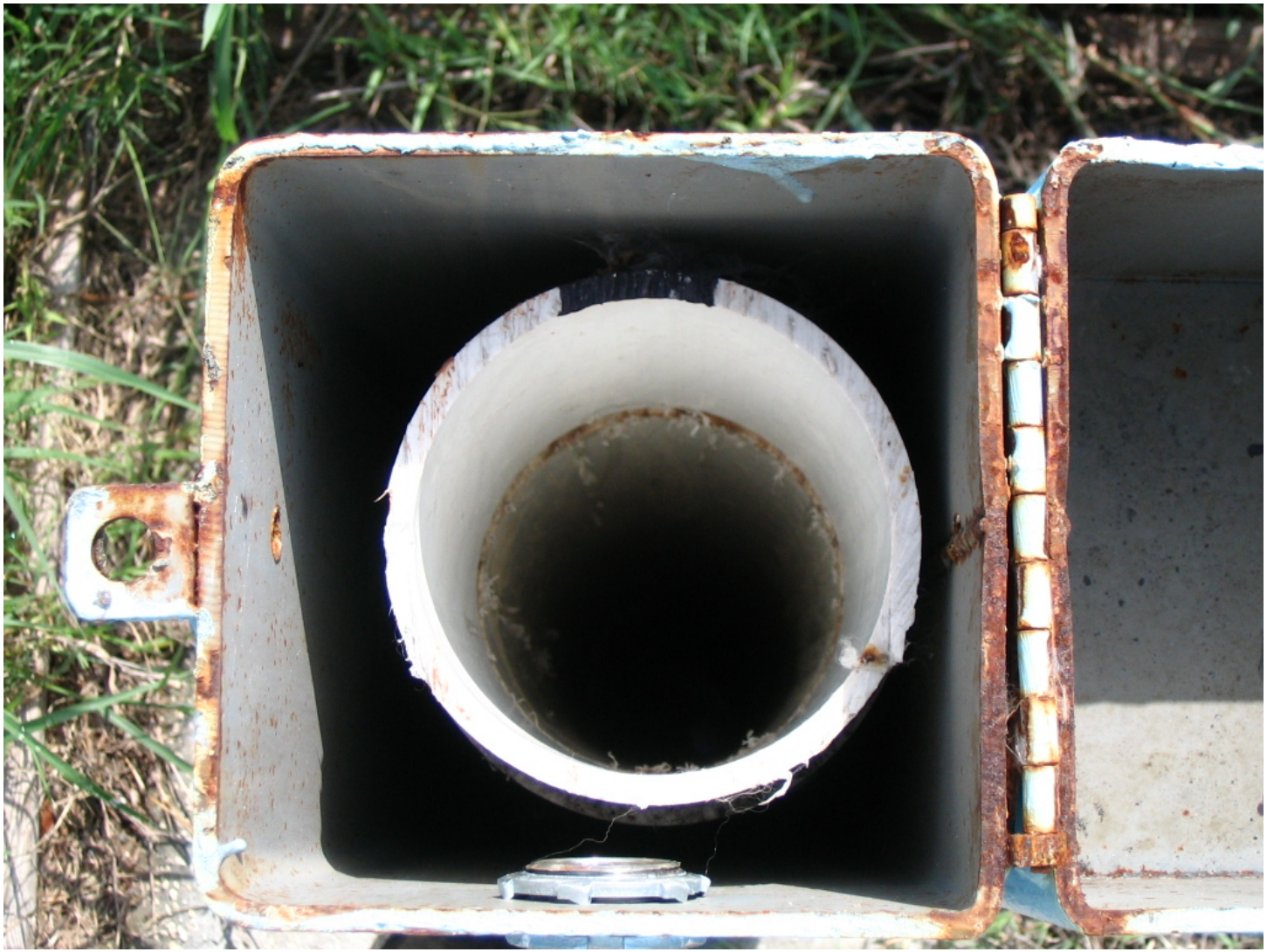
Nick Miller, Inc.
Date of Photo: June 19, 2006
View: Close-up of the northwest well showing the contractor's markings

S65AMW



Nick Miller, Inc.
Date of Photo: June 19, 2006
View: Close-up of the southwest well showing the contractor's markings

S65AMW



Nick Miller, Inc.
Date of Photo: June 19, 2006
View: Close-up of the southeast well showing the contractor's markings

S65AMW

Nick Miller, Inc.
Date of Photo: June 19, 2006
View: Close-up of the northeast well showing the contractor's markings

S65AMW

Nick Miller, Inc.
Date of Photo: June 19, 2006
View: Looking at the benchmark KR 1388 facing north

S65AMW

Nick Miller, Inc.
Date of Photo: June 19, 2006
View: A top view of the benchmark KR 1388

1078.008

BENCH RUN

SFWMD

C474 → KR 1388

+	H.I.	−	ELEV
1.8948	15.7448		
65.3		1.5433	
		66.0	14.2015
1.5787	15.7802		
67.7		1.5062	
		66.4	14.274
1.5149	15.7889		
69.5		1.5837	
		68.5	14.2052
1.5741			
67.8	15.7793	1.5444	
		67.9	14.2349
1.5184			
65.8	15.7533	1.6120	
		67.8	14.1413
1.5177			
65.2	15.659	1.3530	
		66.7	14.306
[illegible]			
[illegible]	15.7971	1.6154	
		66.1	14.1817
1.5101			
67.5	15.6918	1.5690	
		68.0	14.1228
1.6262			
68.1	15.749	1.5539	
		65.0	14.1951
1.7093			
66.3	15.9044	1.4724	
		66.6	14.432

J. SZULEWSKI

6-15-06

8, 61

G. RAGER III

R. BRUST

DESC

C474

60D NAIL SET ON LEVEE RD.

BENCH RUN

1078.008 STWMD

BS +	H.I.	FS −	ELEV.
1.4291	15.8611		
[69.7]		1.4438	
		[67.8]	14.4173
1.6773			
[67.4]	16.0946	1.8694	
		[67.3]	14.2252
1.7218			
[69.5]	15.947	1.5792	
		[68.1]	14.3678
1.6159			
[illegible]	15.9837	1.4408	
		[69.2]	14.5429
1.7021			
[illegible]	16.245	0.9828	
		[38.8]	15.2622
2.4147			
[illegible]	17.6769	FS 1.5229	
		[66.1]	16.154
1.5522 BS			
[illegible]	17.7062	1.5652	
		[39.2]	16.141
1.4648			
[13.4]	17.6058	1.5322	
		[12.9]	16.0736
1.6606			
[68.85]	17.7342	1.6293	
		[66.7]	16.1049
1.5987			
[24.1]	17.7086	1.[illegible]9	
		[illegible]	16.0837

J. Szulewski 6-15-06

G. Raber III 8,62

R. Beust

DESC.

60 D NAIL SET ON LEVEE RD.

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

KR 1388

" " "

60 D NAIL SET ON LEVEE RD

" "

473 (10)

BENCH RUN

1078.008 SFWMD

Z-473 → C474

+	H.I.	−	ELEV.
1.5578			
[69.3]		1.4922	
		[68.4]	
1.5348			
[24.9]		1.6093	
		[26.9]	
1.6425			
[66.9]		1.6382	
		[67.0]	
1.6452			
[66.8]		3.0284	
		[67.4]	
1.3254			
[69.1]		1.5603	
		[68.7]	
1.4242			
[69.8]		1.6398	
		[69.2]	
1.[illegible]96			
[68.8]		1.4855	
		[67.9]	
1.4819			
[68.3]		1.6542	
		[69.0]	
1.5143			
[46.3]		1.4087	
		[50.[illegible]]	
1.2446			
[68.3]		1.4253	
		[69.6]	

J. SZWIAWSKI 6-15-06

G. RAGER III 8,63

R. BRUST

DESC.

Z 473

60D NAIL SET ON LEVEE ROAD

" " "

KR 1388

" " "

60D NAIL SET ON LEVEE ROAD

" " "

" " "

" "

B474 → C474 (Stopped)

"

60D NAIL SET ON LEVEE ROAD

BENCH RUN

1078.008 SRWMD

+	H.I.	−	ELEV.
1.3940			
[67.6]		1.4844	
		[68.0]	
1.5316			
[68.7]		1.3051	
		[67.2]	
1.4372			
[65.8]		1.6317	
		[66.5]	
1.4785			
[66.7]		1.3853	
		[67.4]	
1.5307			
[68.7]		1.6050	
		[66.2]	
1.5271			
[68.97]		1.3460	
		[67.9]	
1.4165			
[67.3]		1.49[illegible]	
		[68.3]	
1.4331			
[66.7]		1.4[illegible]	
		[67.[illegible]]	
1.6257			
[23.7]		1.5614	
		[23.0]	
1.5087			
[114.0]		2.0031	
		[1[illegible]]	

J. SZULCZEWSKI 6-15-06

C. RAGER III 8.64

R. BRUST

DESC.

60D NAIL SET ON LEVEE RD.

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" " "

" "

474

BENCH RUN

6.008

GROUND

ELEVATE MONITORING WELLS

+	H.I.	-	ELEV.
67	57.508		52.838
4.67			
		2.29	55.218
		4.89	
		2.45	55.058
		5.01	
		2.29	55.218
		4.89	
		2.15	55.358
		4.81	
.45	57.798		
2.45		2.59	
		2.75	
		2.59	
		5.48	
		4.96	52.838

J SZUDZINSKI
J CAMPBELL
R. BRUST

6-19-06

8,65

DESC

KR 1388

NE WELL
C. PAD

SE WELL
C. PAD

SW WELL
C. PAD

NW WELL
C. PAD

NW WELL
SW WELL

SE WELL

NE WELL

GROUND SHOT
KR 1388

BENCH RUN

1079.008 SFWMD

S654MW

- USED NGS BENCHMARK KR 1388 AS BENCHMARK
REF: NGS DATA SHEET FOR TO REACH DESCRIPTION

COORDINATES FOR BENCHMARK
LAT: 27°39'35" N
LONG: 081°08'02" W

COORDINATES FOR WELL
LAT: 27°39'34" N
LONG: 080°07'59" W

81

J. SZULKOWSKI
J. CAMPBELL
R. BRUST

6-19-06

8, 66

△ KR 1388

CARE TAKERS HOUSE

BARB WIRE FENCE

```
Identification_Information:
        Citation:
                Citation_Information:
                        Originator: Nick Miller, Inc.(comp.)
                        Originator: Stephen M. Gordon, PSM(ed.)
                        Publication_Date: 20060628
                        Publication_Time: Unknown
                        Title: S.F.W.M.D. Monitoring Well S65AMW
                        Edition: 1
                        Publication_Information:
                                Publication_Place: West Palm Beach, FL
                                Publisher: South Florida Water Management District
        Description:
                Abstract:
                        South Florida Water Management District Monitoring Well
                        S65AMW.
                Purpose:
                        To determine as built dimensions relative to NAVD 88 and
                        NGVD 29 vertical datum
        Time_Period_of_Content:
                Time_Period_Information:
                        Single_Date/Time:
                                Calendar_Date: 20060628
                Currentness_Reference: Publication Date
        Status:
                Progress: Complete
                Maintenance_and_Update_Frequency: Unknown
        Spatial_Domain:
                Bounding_Coordinates:
                        West_Bounding_Coordinate: -081D 08M 05.0S
                        East_Bounding_Coordinate: -081D 07M 54.0S
                        North_Bounding_Coordinate: +27D 39M 38.0S
                        South_Bounding_Coordinate: +27D 39M 35.0S
        Keywords:
                Theme:
                        Theme_Keyword_Thesaurus: Tri - Service Spatial Data Standard
                        Theme_Keyword: Improvement
                        Theme_Keyword: Geodedic/Cadastral
                Place:
                        Place_Keyword_Thesaurus: None
                        Place_Keyword: S.F.W.M.D. Monitoring Well S65AMW
                        Place_Keyword: Sec. 28, Twp. 32 S., Rge. 32 E
                        Place_Keyword: Osceola County, Florida
                        Place_Keyword_Thesaurus: Geographic Names Information System
                        Place_Keyword: Florida
                        Place_Keyword: Osceola County
                        Place_Keyword: Fort Kissimmee NW
        Access_Constraints: None
        Use_Constraints: None
        Point_of_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Howard Ehmke
                                Contact_Organization: South Florida Water Management
District
                        Contact_Position: Project Manager
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address: 3301 Gun Club Road
                                City: West Palm Beach
                                State_or_Province: Florida
                                Postal_Code: 33406
                                Country: USA
                        Contact_Voice_Telephone: 561-682-6672
                        Contact_Electronic_Mail_Address: hehmke@sfwmd.gov
Data_Quality_Information:
        Attribute_Accuracy:
                Attribute_Accuracy_Report: N/A
        Logical_Consistency_Report:
                Horizontal data was established using mapping grade GPS
```

equipment. Vertical data was established using NGS control points C 474 & B 474. Coordinates are in the Florida State Plane Coordinate System, East Zone, NAD 83/90. Elevations are in the NAVD 88 and the NGVD 29.

Completeness_Report:

Horizontal location taken at site benchmark
Lat. +27D 39M 35.0S
Long. -081D 08M 02.0S
N 1,209,020 ft
E 612,827 ft
Site Benchmark.
"KR 1388" is a National Geodetic Survey (NGS) aluminum disk set in concrete.
TO REACH THE MARK THE MARK IS ABOUT 39.0 MILES (62.8 KILOMETERS) SOUTHEAST OF LAKE WALES IN SECTION 28, TOWNSHIP 32 SOUTH, RANGE 32 EAST. TO REACH THE MARK FROM THE INTERSECTION OF STATE ROAD 27 AND STATE ROAD 60 IN LAKE WALES, GO EAST-SOUTHEAST ON STATE ROAD 60 FOR 26.9 MILES (43.3 KILOMETERS) TO THE WEST END OF THE BRIDGE OVER THE KISSIMMEE RIVER, CONTINUE EAST FOR 11.05 MILES (17.78 KILOMETERS) TO THE JUNCTION OF A DIRT ROAD ON THE RIGHT, TURN RIGHT ON DIRT ROAD AND GO SOUTH FOR 5.6 MILES (9.0 KILOMETERS) TO A Y-JUNCTION, BEAR LEFT AND GO SOUTH ON THE DIRT ROAD FOR 2.6 MILES (4.2 KILOMETERS) TO A METAL GATE, CONTINUE WEST FOR 0.05 MILES (0.08 KILOMETERS) TO THE MARK ON THE RIGHT, SET IN THE TOP OF A ROUND CONCRETE MONUMENT FLUSH WITH THE GROUND AND 0.4 FEET (12.2 CENTIMETERS) ABOVE THE LEVEL OF THE DIRT ROAD. LOCATED 143.5 FEET (43.7 METERS) EAST OF THE NORTHEAST CORNER OF STURCTURE S-65A, 20.8 FEET (6.3 METERS) SOUTH OF A METAL WITNESS POST IN THE BARBWIRE FENCE AND 10.8 FEET (3.3 METERS) NORTH OF THE APPROXIMATE CENTERLINE OF THE DIRT ROAD.

52.838
Benchmark Elevation is ~~52.74~~ feet (NAVD 88).

Well Elevation (S65AMW NE) is 55.12 feet (NAVD 88) as observed at the existing reference mark for the well which is a black mark at the top of a PVC pipe at the center of the recorder box floor.

2.38' difference
55.218' new el.

Well Elevation (S65AMW NW) is 55.26 feet (NAVD 88) as observed at the existing reference mark for the well which is a black mark at the top of a PVC pipe at the center of the recorder box floor.

2.52' difference
55.358' new el.

Coon (DI9157)
21.2320m NAVD88
21.5980m NGVD29
0.366m (1.200785')

Well Elevation (S65AMW SE) is 54.96 feet (NAVD 88) as observed at the existing reference mark for the well which is a black mark at the top of a PVC pipe at the center of the recorder box floor.

2.22' difference
55.058' new el.

Well Elevation (S65AMW SW) is 55.12 feet (NAVD 88) as observed at the existing reference mark for the well which is a black mark at the top of a PVC pipe at the center of the recorder box floor.

2.38' difference
55.218' new el.
not reflected in field notes

Concrete Pad Elevation is 52.60 feet (NAVD 88).
Ground Elevation is 52.23 feet (NAVD 88).
NGVD 29 minus NAVD 88 equals 1.120 feet. ~~The NGVD 1929 value was taken from the NGS adjustment of the CERP Geodetic Vertical Control Network for~~ benchmark COON.
Vertical Control used C 474 El. 13.850 (m) (NAVD 88) El. N/A (m) (NGVD 29), B 474 El. 14.401 (m) (NAVD 88) El. N/A (m) (NGVD 29).

Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The horizontal position of Site Benchmark "KR 1388" was established using a mapping grade GPS receiver

The datum difference taken from the FLDEP original level run L25854.ABS & the NGVD29.ABS files
KR1388
16.12298m (NAVD88)
16.48698m (NGVD29)
0.3640029m (1.19423284775')

(Trimble Pro XR in accordance with the Florida Minimum Technical Standards (Chapter 61G17-6, Florida Administrative Code).
Quantitative_Horizontal_Positional_Accuracy_Assessment:
Horizontal_Positional_Accuracy_Value: 3 to 5 meters
Horizontal_Positional_Accuracy_Explanation: The intended positional accuracy for this survey is 3 to 5 meters more or less.
Vertical_Positional_Accuracy:
Vertical_Positional_Accuracy_Report:
A level line was run originating on benchmark C 474 through benchmark B 474 and terminating back on benchmark C 474 with an allowable error of 8mm times the square root of the distance leveled (in kilometers).
Quantitative_Vertical_Positional_Accuracy_Assessment:
Vertical_Positional_Accuracy_Value: 0.004 m
Vertical_Positional_Accuracy_Explanation: NAVD 88 level loop, 0.004 m closure in 4.78 km, max. allowed 0.018m.
Lineage:
Process_Step:
Process_Description:
The horizontal work was performed using a Trimble Pro XR GPS receiver (mapping grade). The level loop was run with a Leica DNA03 digital level.
Process_Date: 20060621
Metadata_Reference_Information:
Metadata_Date: 20060628
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Stephen M. Gordon
Contact_Organization: Nick Miller, Inc.
Contact_Position: Project Surveyor
Contact_Address:
Address_Type: mailing and physical address
Address: 2560 RCA Blvd., Suite 105
City: Palm Beach Gardens
State_or_Province: Florida
Postal_Code: 33410
Country: USA
Contact_Voice_Telephone: 561-627-5200
Contact_Facsimile_Telephone: 561-627-0983
Contact_Electronic_Mail_Address: sgordon@nickmillerinc.com
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: 2.0
Metadata_Time_Convention: Local time
Metadata_Access_Constraints: South Florida Water Management District controls access.
Metadata_Use_Constraints: Per South Florida Water Management District
Metadata_Security_Information:
Metadata_Security_Handling_Description: None
Metadata_Security_Classification: Unclassified
Metadata_Security_Classification_System: Structure

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.7
1        National Geodetic Survey,   Retrieval Date = JULY 21, 2015
 AH8839 ***********************************************************************
 AH8839  DESIGNATION -  KR 1388
 AH8839  PID         -  AH8839
 AH8839  STATE/COUNTY-  FL/POLK
 AH8839  COUNTRY     -  US
 AH8839  USGS QUAD   -  FORT KISSIMMEE NW (1972)
 AH8839
 AH8839                        *CURRENT SURVEY CONTROL
 AH8839  ______________________________________________________________________
 AH8839* NAD 83(1986) POSITION- 27 39 35.     (N) 081 08 02.     (W)    SCALED
 AH8839* NAVD 88 ORTHO HEIGHT -    16.105 (meters)       52.84   (feet) ADJUSTED
 AH8839  ______________________________________________________________________
 AH8839  GEOID HEIGHT    -        -26.37  (meters)                      GEOID12B
 AH8839  DYNAMIC HEIGHT  -         16.081 (meters)       52.76   (feet) COMP
 AH8839  MODELED GRAVITY -    979,165.3   (mgal)                        NAVD 88
 AH8839
 AH8839  VERT ORDER      -  SECOND    CLASS I
 AH8839
 AH8839.The horizontal coordinates were scaled from a topographic map and have
 AH8839.an estimated accuracy of +/- 6 seconds.
 AH8839.
 AH8839.The orthometric height was determined by differential leveling and
 AH8839.adjusted by the NATIONAL GEODETIC SURVEY
 AH8839.in July 1999.
 AH8839
 AH8839.No vertical observational check was made to the station.
 AH8839
 AH8839.The dynamic height is computed by dividing the NAVD 88
 AH8839.geopotential number by the normal gravity value computed on the
 AH8839.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AH8839.degrees latitude (g = 980.6199 gals.).
 AH8839
 AH8839.The modeled gravity was interpolated from observed gravity values.
 AH8839
 AH8839;                    North         East     Units  Estimated Accuracy
 AH8839;SPC FL W     -   368,800.      285,460.      MT  (+/- 180 meters Scaled)
 AH8839
 AH8839                          SUPERSEDED SURVEY CONTROL
 AH8839
 AH8839.No superseded survey control is available for this station.
 AH8839
 AH8839_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RML867595(NAD 83)
 AH8839
 AH8839_MARKER: DD = SURVEY DISK
 AH8839_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AH8839_STAMPING: KR 1388 1979 JAX FL
 AH8839_MARK LOGO: USE
 AH8839_MAGNETIC: N = NO MAGNETIC MATERIAL
 AH8839_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 AH8839+STABILITY: SURFACE MOTION
 AH8839_SATELLITE: THE SITE LOCATION WAS REPORTED AS NOT SUITABLE FOR
 AH8839+SATELLITE: SATELLITE OBSERVATIONS - August 15, 2007
 AH8839
 AH8839  HISTORY     - Date     Condition        Report By
 AH8839  HISTORY     - 1979     MONUMENTED       USE
```

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AH8839  HISTORY     - 19971116 GOOD             FLDEP
AH8839  HISTORY     - 20070815 GOOD             INDIV
AH8839
AH8839                          STATION DESCRIPTION
AH8839
AH8839'DESCRIBED BY FL DEPT OF ENV PRO 1997 (JLM)
AH8839'THE MARK IS ABOUT 39.0 MI (62.8 KM) SOUTHEAST OF LAKE WALES IN SECTION
AH8839'28, TOWNSHIP 32 SOUTH, RANGE 32 EAST. TO REACH THE MARK FROM THE
AH8839'INTERSECTION OF STATE ROAD 27 AND STATE ROAD 60 IN LAKE WALES, GO
AH8839'EAST-SOUTHEAST ON STATE ROAD 60 FOR 26.9 MI (43.3 KM) TO THE WEST END
AH8839'OF THE BRIDGE OVER THE KISSIMMEE RIVER, CONTINUE EAST FOR 11.05 MI
AH8839'(17.78 KM) TO THE JUNCTION OF A DIRT ROAD ON THE RIGHT, TURN RIGHT ON
AH8839'DIRT ROAD AND GO SOUTH FOR 5.6 MI (9.0 KM) TO A Y-JUNCTION, BEAR LEFT
AH8839'AND GO SOUTH ON THE DIRT ROAD FOR 2.6 MI (4.2 KM) TO A METAL GATE,
AH8839'CONTINUE WEST FOR 0.05 MI (0.08 KM) TO THE MARK ON THE RIGHT, SET IN
AH8839'THE TOP OF A ROUND CONCRETE MONUMENT FLUSH WITH THE GROUND AND 0.4 FT
AH8839'(12.2 CM) ABOVE THE LEVEL OF THE DIRT ROAD. LOCATED 143.5 FT (43.7 M)
AH8839'EAST OF THE NORTHEAST CORNER OF STURCTURE S-65A, 20.8 FT (6.3 M) SOUTH
AH8839'OF A METAL WITNESS POST IN THE BARBWIRE FENCE AND 10.8 FT (3.3 M)
AH8839'NORTH OF THE APPROXIMATE CENTERLINE OF THE DIRT ROAD.
AH8839
AH8839                          STATION RECOVERY (2007)
AH8839
AH8839'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2007 (RS)
AH8839'KR1388 PUBLISHED NAVD 1988 AND NGVD 1929 ELEVATIONS DO NOT AGREE
AH8839'USING BENCHMARKS Z-473, MACK AND P-1. THERE IS 0.20' DIFFERENCE IN THE
AH8839'NGVD 1929 VALUE AND A 0.16' DIFFERENCE IN THE NAVD 1988 VALUE. BOTH
AH8839'BEING LOWER THAN THE PUBLISHED VALUES.
AH8839'

*** retrieval complete.
Elapsed Time = 00:00:02
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The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.7
1        National Geodetic Survey,   Retrieval Date = JULY 21, 2015
 AH8847 ***********************************************************************
 AH8847  DESIGNATION -  B 474
 AH8847  PID         -  AH8847
 AH8847  STATE/COUNTY-  FL/OSCEOLA
 AH8847  COUNTRY     -  US
 AH8847  USGS QUAD   -  FORT KISSIMMEE NW (1972)
 AH8847
 AH8847                        *CURRENT SURVEY CONTROL
 AH8847  ______________________________________________________________________
 AH8847* NAD 83(1986) POSITION- 27 39 18.     (N) 081 07 54.     (W)    SCALED
 AH8847* NAVD 88 ORTHO HEIGHT -    14.410 (meters)       47.28  (feet) ADJUSTED
 AH8847  ______________________________________________________________________
 AH8847  GEOID HEIGHT    -        -26.35  (meters)                     GEOID12B
 AH8847  DYNAMIC HEIGHT  -         14.389 (meters)       47.21  (feet) COMP
 AH8847  MODELED GRAVITY -    979,165.2   (mgal)                       NAVD 88
 AH8847
 AH8847  VERT ORDER      -  SECOND    CLASS I
 AH8847
 AH8847.The horizontal coordinates were scaled from a topographic map and have
 AH8847.an estimated accuracy of +/- 6 seconds.
 AH8847.
 AH8847.The orthometric height was determined by differential leveling and
 AH8847.adjusted by the NATIONAL GEODETIC SURVEY
 AH8847.in January 2008.
 AH8847
 AH8847.The dynamic height is computed by dividing the NAVD 88
 AH8847.geopotential number by the normal gravity value computed on the
 AH8847.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AH8847.degrees latitude (g = 980.6199 gals.).
 AH8847
 AH8847.The modeled gravity was interpolated from observed gravity values.
 AH8847
 AH8847;                    North         East     Units  Estimated Accuracy
 AH8847;SPC FL E     -   367,990.      187,010.      MT  (+/- 180 meters Scaled)
 AH8847
 AH8847                          SUPERSEDED SURVEY CONTROL
 AH8847
 AH8847  NAVD 88 (07/21/99)   14.401  (m)           47.25   (f) SUPERSEDED  2 1
 AH8847
 AH8847.Superseded values are not recommended for survey control.
 AH8847
 AH8847.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AH8847.See file dsdata.txt to determine how the superseded data were derived.
 AH8847
 AH8847_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RML870589(NAD 83)
 AH8847
 AH8847_MARKER: DD = SURVEY DISK
 AH8847_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AH8847_STAMPING: B 474 1998
 AH8847_MARK LOGO: FLDEP
 AH8847_MAGNETIC: N = NO MAGNETIC MATERIAL
 AH8847_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 AH8847+STABILITY: SURFACE MOTION
 AH8847_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AH8847+SATELLITE: SATELLITE OBSERVATIONS - September 22, 2002
```

```
AH8847
AH8847  HISTORY     - Date     Condition        Report By
AH8847  HISTORY     - 1998     MONUMENTED       FLDEP
AH8847  HISTORY     - 20010909 GOOD             FLDEP
AH8847  HISTORY     - 20020922 GOOD             FLDEP
AH8847
AH8847                          STATION DESCRIPTION
AH8847
AH8847'DESCRIBED BY FL DEPT OF ENV PRO 1998 (JLM)
AH8847'THE MARK IS ABOUT 39.5 MI (63.6 KM) SOUTHEAST OF LAKE WALES IN SECTION
AH8847'33, TOWNSHIP 32 SOUTH, RANGE 32 EAST. TO REACH THE MARK FROM THE
AH8847'INTERSECTION OF STATE ROAD 27 AND STATE ROAD 60 IN LAKE WALES, GO
AH8847'EAST-SOUTHEAST ON STATE ROAD 60 FOR 26.9 MI (43.3 KM) TO THE WEST END
AH8847'OF THE BRIDGE OVER THE KISSIMMEE RIVER, CONTINUE EAST FOR 11.05 MI
AH8847'(17.78 KM) TO THE JUNCTION OF A DIRT ROAD ON THE RIGHT, TURN RIGHT ON
AH8847'THE DIRT ROAD AND GO SOUTH FOR 5.6 MI (9.0 KM) TO A Y-JUNCTION, BEAR
AH8847'LEFT AND GO SOUTH ON THE DIRT ROAD FOR 2.55 MI (4.10 KM) TO THE
AH8847'JUNCTION OF A DIM TRAIL ON THE LEFT LEADING SOUTH ALONG THE FENCE
AH8847'LINE, TURN LEFT ON THE DIM TRAIL AND GO SOUTH FOR 0.4 MI (0.6 KM) TO
AH8847'THE MARK ON THE LEFT, SET IN TOP OF A ROUND CONCRETE MONUMENT 0.1 FT
AH8847'(3.0 CM) ABOVE THE LEVEL OF THE GROUND AND THE TRAIL. LOCATED
AH8847'APPROXIMATELY 75.0 FT (22.9 M) EAST OF KISSIMMEE RIVER, 24.2 FT (7.4
AH8847'M) EAST OF THE APPROXIMATE CENTERLINE OF THE BERM TRAIL AND 1.3 FT
AH8847'(0.4 M) WEST OF A CARSONITE WITNESS POST AND BARBWIRE FENCE.
AH8847
AH8847                          STATION RECOVERY (2001)
AH8847
AH8847'RECOVERY NOTE BY FL DEPT OF ENV PRO 2001 (JLM)
AH8847'RECOVERED AS DESCRIBED.
AH8847'
AH8847'
AH8847'
AH8847
AH8847                          STATION RECOVERY (2002)
AH8847
AH8847'RECOVERY NOTE BY FL DEPT OF ENV PRO 2002 (JLM)
AH8847'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:02
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The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.7
1        National Geodetic Survey,   Retrieval Date = JULY 21, 2015
 AH8848 ***********************************************************************
 AH8848  DESIGNATION -  C 474
 AH8848  PID         -  AH8848
 AH8848  STATE/COUNTY-  FL/OSCEOLA
 AH8848  COUNTRY     -  US
 AH8848  USGS QUAD   -  FORT KISSIMMEE NW (1972)
 AH8848
 AH8848                        *CURRENT SURVEY CONTROL
 AH8848  ______________________________________________________________________
 AH8848* NAD 83(1986) POSITION- 27 38 43.     (N) 081 08 05.     (W)    SCALED
 AH8848* NAVD 88 ORTHO HEIGHT -    13.850 (meters)       45.44  (feet) ADJUSTED
 AH8848  ______________________________________________________________________
 AH8848  GEOID HEIGHT    -        -26.34  (meters)                     GEOID12B
 AH8848  DYNAMIC HEIGHT  -         13.829 (meters)       45.37  (feet) COMP
 AH8848  MODELED GRAVITY -    979,163.5   (mgal)                       NAVD 88
 AH8848
 AH8848  VERT ORDER      -  SECOND    CLASS I
 AH8848
 AH8848.The horizontal coordinates were scaled from a topographic map and have
 AH8848.an estimated accuracy of +/- 6 seconds.
 AH8848.
 AH8848.The orthometric height was determined by differential leveling and
 AH8848.adjusted by the NATIONAL GEODETIC SURVEY
 AH8848.in May 2004.
 AH8848
 AH8848.The dynamic height is computed by dividing the NAVD 88
 AH8848.geopotential number by the normal gravity value computed on the
 AH8848.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AH8848.degrees latitude (g = 980.6199 gals.).
 AH8848
 AH8848.The modeled gravity was interpolated from observed gravity values.
 AH8848
 AH8848;                    North         East     Units  Estimated Accuracy
 AH8848;SPC FL E     -   366,910.      186,710.      MT  (+/- 180 meters Scaled)
 AH8848
 AH8848                          SUPERSEDED SURVEY CONTROL
 AH8848
 AH8848  NAVD 88 (07/21/99)   13.838  (m)           45.40   (f) SUPERSEDED  2 1
 AH8848
 AH8848.Superseded values are not recommended for survey control.
 AH8848
 AH8848.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AH8848.See file dsdata.txt to determine how the superseded data were derived.
 AH8848
 AH8848_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RML867579(NAD 83)
 AH8848
 AH8848_MARKER: DD = SURVEY DISK
 AH8848_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AH8848_STAMPING: C 474 1998
 AH8848_MARK LOGO: FLDEP
 AH8848_MAGNETIC: N = NO MAGNETIC MATERIAL
 AH8848_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 AH8848+STABILITY: SURFACE MOTION
 AH8848_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AH8848+SATELLITE: SATELLITE OBSERVATIONS - September 22, 2002
```

```
AH8848
AH8848  HISTORY     - Date     Condition        Report By
AH8848  HISTORY     - 1998     MONUMENTED       FLDEP
AH8848  HISTORY     - 20010909 GOOD             FLDEP
AH8848  HISTORY     - 20020922 GOOD             FLDEP
AH8848
AH8848                          STATION DESCRIPTION
AH8848
AH8848'DESCRIBED BY FL DEPT OF ENV PRO 1998 (JLM)
AH8848'THE MARK IS ABOUT 40.2 MI (64.7 KM) SOUTHEAST OF LAKE WALES IN SECTION
AH8848'33, TOWNSHIP 32 SOUTH, RANGE 32 EAST. TO REACH THE MARK FROM THE
AH8848'INTERSECTION OF STATE ROAD 27 AND STATE ROAD 60 IN LAKE WALES, GO
AH8848'EAST-SOUTHEAST ON STATE ROAD 60 FOR 26.9 MI (43.3 KM) TO THE WEST END
AH8848'OF THE BRIDGE OVER THE KISSIMMEE RIVER, CONTINUE EAST FOR 11.05 MI
AH8848'(17.78 KM) TO THE JUNCTION OF A DIRT ROAD ON THE RIGHT, TURN RIGHT ON
AH8848'THE DIRT ROAD AND GO SOUTH FOR 5.6 MI (9.0 KM) TO A Y-JUNCTION, BEAR
AH8848'LEFT AND GO SOUTH ON THE DIRT ROAD FOR 2.55 MI (4.10 KM) TO THE
AH8848'JUNCTION OF A DIM TRAIL ON THE LEFT LEADING SOUTH, TURN LEFT ON THE
AH8848'DIM TRAIL AND GO SOUTH FOR 1.1 MI (1.8 KM) TO A METAL GATE AND THE
AH8848'MARK ON THE LEFT, SET IN THE TOP OF A ROUND CONCRETE MONUMENT LEVEL
AH8848'WITH THE GROUND AND 0.6 FT (18.3 CM) BELOW THE LEVEL OF THE TRAIL.
AH8848'LOCATED 26.6 FT (8.1 M) EAST OF A BARBWIRE FENCE LEADING NORTH, 15.0
AH8848'FT (4.6 M) EAST OF THE APPROXIMATE CENTERLINE OF THE BERM TRAIL, 14.0
AH8848'FT (4.3 M) WEST OF A BARBWIRE FENCE LEADING NORTH AND SOUTH AND 1.0 FT
AH8848'(0.3 M) NORTH OF A BARBWIRE FENCE AND A CARSONITE WITNESS POST.
AH8848
AH8848                          STATION RECOVERY (2001)
AH8848
AH8848'RECOVERY NOTE BY FL DEPT OF ENV PRO 2001 (JLM)
AH8848'RECOVERED AS DESCRIBED.
AH8848'
AH8848'
AH8848'
AH8848'
AH8848
AH8848                          STATION RECOVERY (2002)
AH8848
AH8848'RECOVERY NOTE BY FL DEPT OF ENV PRO 2002 (JLM)
AH8848'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:03
```

-*- FIELD ABSTRACT -*-

060615-060615 HGZ L10788 8.0 MM ORDER 2 CLASS 2 PAGE 1
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
EVERGLADES AND ORLANDO AREA WELLS
ESTABLISH THIRD-ORDER ELEVATIONS ON MONITORING WELL S65AMW

FROM / TO	START	F/B	DIST TOTAL (KM)	ELEV DIFF (MT)		-(F+B) TOTAL (MM)	MEAN DIFF FLD ELEV (MT)	I C
0515 C 474							13.85000	
0515 C 474	6151130	F	2.20	2.22383	*	0.00	2.22383	1
0518 KR 1388								
	SL 1		2.20			0.00	16.07383	
0518 KR 1388	6151330	F	0.19	0.01010	*	0.00	0.01010	1
0516 Z 473								
	SL 1		2.39			0.00	16.08393	
0516 Z 473	6151400	F	1.11	-1.68156	*	0.00	-1.68156	1
0517 B 474								
	SL 1		3.49			0.00	14.40237	
0517 B 474	6151500	F	1.29	-0.54847	*	0.00	-0.54847	1
0515 C 474								
	SL 1		4.78			0.00	13.85390♀	

ELEVATION REJECTION AND ERROR CODES

C - section elevation difference was rejected for cause
ie. *43* record rejection code set to "F"
R - section elevation difference was rejected by Halperin rejection algorithm
@ - section elevation difference does not include refraction correction
* - section elevation difference does not include rod correction

♀
INSTRUMENT CODE INSTRUMENT RODS

1 243 - 332854 396 - 333 396 - 444

♀
LEVEL LINE SECTION RUNNING TREE

0515 (0518
0516
0517
0515♀

FROM	TO	N. LATITUDE	W. LONGITUDE	FIELD DISTANCE	VS. COMPUTED	
	0515	273843	0810805	0.00	0.00	
0515	0518	273935	0810802	2.20	1.60	**
0518	0516	273938	0810754	0.19	0.24	
0516	0517	273918	0810754	1.11	0.62	
0517	0515	273843	0810805	1.29	1.12♀	

Windows Abstra Version 2.3 -- Jan 1, 2004 -- Wed Jun 21 11:51:45 2006

SECTION
FROM TO E R R O R M E S S A G E S

0515 0518 *** Field distance exceeds computed distance by more than 0.50 KM!

SURVEYOR'S CERTIFICATION

In my professional opinion, this report of 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. Additions or deletions to survey report by other than the signing party is prohibited without written consent of the signing party. Survey report or the copies thereof are not valid without the signature and the original raised seal of a Florida licensed surveyor and mapper.

Nick Miller, Inc. D/B/A GlobalMind
DBPR Authorization No. 4318

July 27th, 2006
Date of Survey

By: _____

Timothy C. Whitaker, PSM
Professional Surveyor and Mapper
State of Florida
Certificate No. 6620

U.S DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL GEODETIC SURVEY

Charles W. Challstrom
Director

PROJECT REPORT
Second Order Class II Leveling and Mark Setting

May 2006

Ronnie L. Taylor
National Geodetic Survey, NOAA
National Ocean Service Advisor, Florida

PROJECT TITLE

Orange & Osceola County Wells

LINE TITLE FOR **L26803**

ESTABLISH BENCH MARKS NEAR WELLS IN ORANGE COUNTY
STARTING HEIGHT IS BASED ON NAVD 88 HEIGHTS.
NOTE: COLLIMATION STORED IN ELECTRONIC INSTRUMENT.
NOTE: LATITUDE AND LONGITUDE WAS OBTAINED FROM
SUB-METER GPS OBSERVATIONS.

JOB CODE **AA**

2560 rca boulevard, suite 105 • palm beach gardens, florida 33410-3335 • ph: 561.627.5200 • fax: 561.627.0983
1933 commonwealth lane • tallahassee, florida 32303-3196 • ph: 850.222.0599 • fax: 850.222.4255
email: info@nickmillerinc.com • web: www.nickmillerinc.com

NICK MILLER, INC.

PROJECT REPORT

I. INTRODUCTION

A. Authority

Bench Mark Setting and Leveling along this level route was authorized by a contract between the South Florida Water Management District and Nick Miller Incorporated.

B. Purpose

The purpose of this leveling project was to establish precise NAVD 88 heights near existing Ground Water Monitoring Wells for use by the South Florida Water Management District and the citizens of the State of Florida.

II. PROJECT AREA

A. Locality

This project is located in Orange County, Florida.

B. Terrain

The terrain is flat to rolling.

C. Specifications

FGCS Specifications and Procedures to Incorporate Electronic Digital/Bar-Code Leveling Systems were followed.

D. Monumentation

Monuments are set in concrete with a South Florida Water Management survey disk. A Magnetic device was either placed in or near the monuments. Please see descriptions for magnetic placements.

E. Instrumentation

Two LEICA DNA03 Electronic Digital Level Instruments were used along with two sets of LEICA Digital/Bar-Code Leveling Rods.

III. COMMENTS

A. Reconnaissance

See the To-Reach Descriptions included, for a clear access to all L26803 Stations.

B. Specifications

There were no deviations from the FGCS Specifications and Procedures to Incorporate Electronic Digital/Bar-Code Leveling Systems.

C. Route

The leveling route varied for each leveling part.

STARTING ELEVATION BASED ON NAVD 88 HEIGHTS PUBLISHED FROM THE NGS DATABASE. NOTE: COLLIMATION STORED IN ELECTRONIC INSTRUMENT. NOTE: LATITUDE AND LONGITUDE WAS DERIVED FROM NGS DATA SHEETS AND GPS SUB-METER OBSERVATIONS

These are all new second order, class 2 level runs by Nick Miller, Inc.

D. Problems

There was no NGS control near REDYCK. However, the South Florida Water Management District had completed a new bench run through the area (L26791) and two of those benchmarks were held as control for this survey.

IV. Closures

Loop closures were computed and are included in the package for L26803.

A. Status

All records will be kept at Nick Miller, Inc. For information on these records please contact Stephen M. Gordon at (561)627-5200.

For question concerning the collection or processing of this data please call Ronnie L. Taylor or Randy Wegner at (850)245-2606.

B. Attachments

The following are included in this package:

Hardcopy of the ABS & BOK files and Quad Maps

Disk containing the following data files is attached to the front of the folder containing the ABS, and BOK Files:

- DSC
- BLU
- HGZ
- ABS
- BOK
- LST RAW
- BACKUP.GSI
- BACKUP.RAW (RAW DATA UNTOUCHED)
- PHOTO'S
- LST