Surveyor's Report

BOYRO Monitoring Well

NMI Project No. 1078.023

Report Date: February 23rd, 2007

Submittal: Final

Prepared for:

South Florida Water Management District

NICK MILLER, INC.

2560 RCA Boulevard, Suite 105 ● Palm Beach Gardens, Florida 33410
ph: 561.627.5200 ● fax: 561.627.0983 ● email: info@nickmillerinc.com
www.nickmillerinc.com

TABLE OF CONTENTS

Overview of The Project

PURPOSE

The purpose of the BOYRO Monitoring Well Project is to establish a vertical control mark near the monitoring well. The project 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.

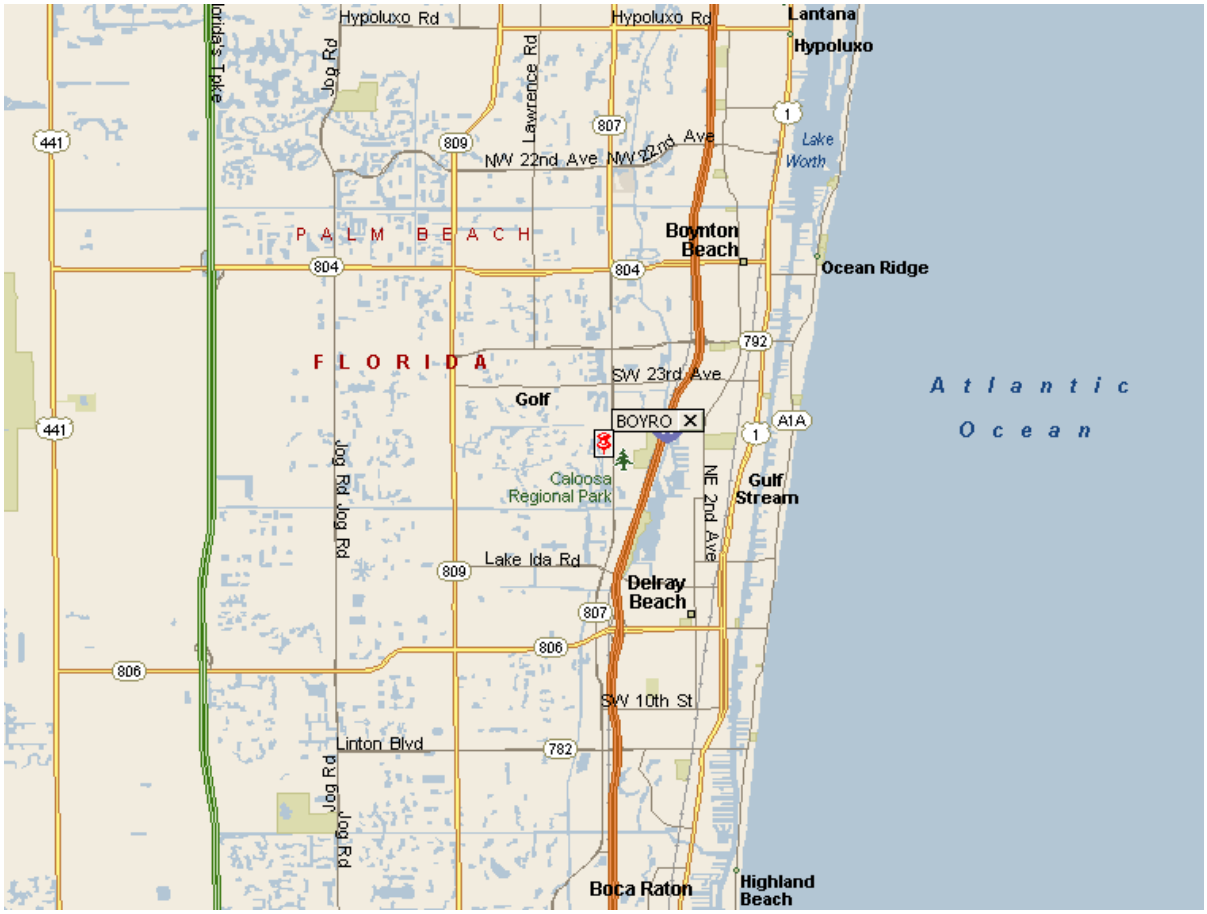
This project utilizes uncalibrated "off-the-shelf" fiberglass level rods. Such rods are not currently approved by NGS for precise leveling (Second-Order Class II and above) for three primary reasons:

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

This project is located in Palm Beach County (Boynton Beach). Following is a vicinity map.



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 well 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.

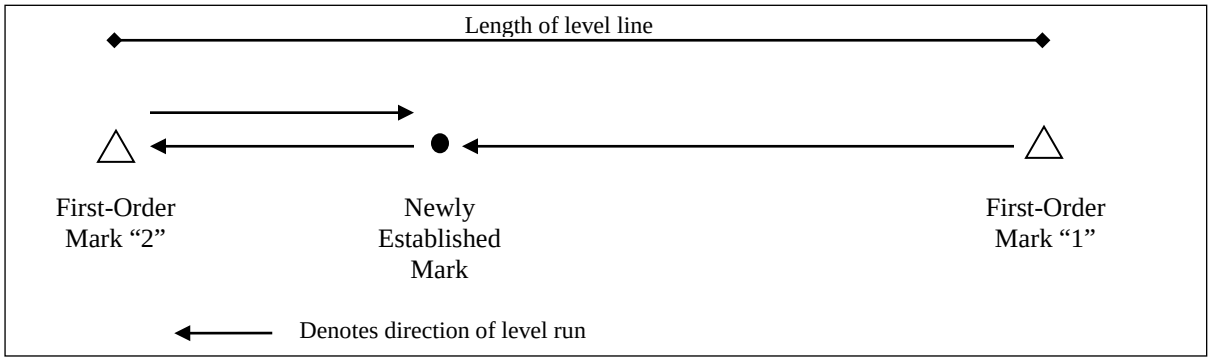
Leveling Methods

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.

PROJECT RESULTS

The following table lists the elevations established for the new mark, the level run misclosure, "to-reach" description for the mark and a photo of the mark. All elevations are in US Survey Feet.

BOYRO	Elevation:	**11.98 ft**	(NAVD 88)	13.53 ft	(NGVD 29)
Bench Mark 1:	F 402	12.98 ft	(NAVD 88)	14.53 ft	(NGVD 29)
Bench Mark 2:	E 402	14.15 ft	(NAVD 88)	15.70 ft	(NGVD 29)
Monitoring Well:	BOYRO	15.09 ft	(NAVD 88)	16.64 ft	(NGVD 29)
Concrete Pad:	BOYRO	13.16 ft	(NAVD 88)	14.71 ft	(NGVD 29)
Ground Elevation:	BOYRO	12.17 ft	(NAVD 88)	13.72 ft	(NGVD 29)
Length of Run:	1.02 km				
Max Allowable Misclosure:	8 mm				
Actual Misclosure:	1 mm				

To Reach BOYRO:

FROM THE INTERSECTION OF WOOLBRIGHT ROAD AND CONGRESS AVENUE. HEAD SOUTH ON CONGRESS AVENUE FOR 1.3 MILES TO WXEL WPB PARKING LOT. TURN RIGHT AND HEAD NORTHWESTERLY FOR +/-325 FEET TO DIRT ROAD. TURN LEFT AND HEAD SOUTHWESTERLY FOR +/-350 FEET TO MARK IN OPEN FIELD. LOCATED 192.75 FEET NORTHEAST OF NORTH CORNER OF PUMP STATION, 7.55 FEET WEST OF BOYRO MONITORING WELL AND 196.32 FEET NORTHWEST OF NORTHWEST CORNER OF LIFT STATION. MONUMENT IS A POURED-IN-PLACE CONCRETE MONUMENT WITH ALUMINMUM DISK RECESSED 0.3 FEET BELOW GROUND LEVEL. SET MAGNET 1 FOOT NORTH OF MONUMENT.

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 this project has been submitted to Mr. Ronnie Taylor, NGS Advisor for the State of Florida for further analysis and recommendations.

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.

NICK MILLER, INC.
DBPR Authorization No. 4318

January 29th, 2007
Date of Survey

By: _____
Stephen M. Gordon, PSM
Professional Surveyor and Mapper
State of Florida
Certificate No. 5974

```
Identification_Information:
        Citation:
                Citation_Information:
                        Originator: Nick Miller, Inc.(comp.)
                        Originator: Stephen M. Gordon, PSM(ed.)
                        Publication_Date: 20070209
                        Publication_Time: Unknown
                        Title: S.F.W.M.D. Monitoring Well BOYRO
                        Edition: 1
                        Series_Information:
                        Publication_Information:
                                Publication_Place: West Palm Beach, FL
                                Publisher: South Florida Water Management District
                        Larger_Work_Citation:
                                Citation_Information:
                                        Originator: Stephen M. Gordon, PSM
                                        Series_Information:
                                        Publication_Information:
        Description:
                Abstract:
                        South Florida Water Management District Monitoring Well
                        BOYRO.
                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: 20070209
                        Range_of_Dates/Times:
                        Multiple_Dates/Times:
                Currentness_Reference: Publication Date
        Status:
                Progress: Complete
                Maintenance_and_Update_Frequency: Unknown
        Spatial_Domain:
                Bounding_Coordinates:
                        West_Bounding_Coordinate: -080D 05M 31.0S
                        East_Bounding_Coordinate: -080D 03M 46.0S
                        North_Bounding_Coordinate: +26D 30M 27.0S
                        South_Bounding_Coordinate: +26D 29M 38.0S
        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 BOYRO
                        Place_Keyword: Sec. 6, Twp. 43 S., Rge. 43 E
                        Place_Keyword: Palm Beach County, Florida
                        Place_Keyword_Thesaurus: Geographic Names Information System
                        Place_Keyword: Florida
                        Place_Keyword: Palm Beach County
                        Place_Keyword: Delray Beach
                Stratum:
                Temporal:
        Access_Constraints: None
        Use_Constraints: None
        Point_of_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Horward Ehmke
```

```
                        Contact_Organization: South Florida Water Management
District
                Contact_Organization_Primary:
                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
        Security_Information:
        Cross_Reference:
                Citation_Information:
                        Series_Information:
                        Publication_Information:
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 F 402 & E 402.  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.  +26D 29M 38.0S
                Long.  -080D 05M 31.0S
                N 786,253 ft
                E 953,167 ft
                Site Benchmark.
                "BOYRO" is a South Florida Water Management District
                (SFWMD) alumninum disk set in concrete at BOYRO site.
                FROM THE INTERSECTION OF WOOLBRIGHT ROAD
                AND CONGRESS AVENUE. HEAD SOUTH ON
                CONGRESS AVENUE FOR 1.3 MILES TO WXEL WPB
                PARKING LOT. TURN RIGHT AND HEAD
                NORTHWESTERLY FOR +/-325 FEET TO DIRT ROAD.
                TURN LEFT AND HEAD SOUTHWESTERLY FOR
                +/-350 FEET TO MARK IN OPEN FIELD.
                LOCATED 192.75 FEET NORTHEAST OF NORTH
                CORNER OF PUMP STATION, 7.55 FEET WEST OF
                BOYRO MONITORING WELL AND 196.32 FEET
                NORTHWEST OF NORTHWEST CORNER OF LIFT
                STATION. MONUMENT IS A POURED-IN-PLACE
                CONCRETE MONUMENT WITH ALUMINMUM DISK
                RECESSED 0.3 FEET BELOW GROUND LEVEL.
                SET MAGNET 1 FOOT NORTH OF MONUMENT.
                Benchmark Elevation is 11.98 feet (NAVD 88).
                Ground Elevation is 12.17 feet (NAVD 88).
                Concrete Pad Elevation is 13.16 feet (NAVD 88).
                Well Elevation for BOYRO is 15.09 feet (NAVD 88)
                as observed at a newly established reference mark for
                the well which is a stamped X mark with a stamped box
                surrounding the X mark on the top of the north side of the
                flange for the well.
                NGVD 29 minus NAVD 88 equals 1.549 feet.
                The NGVD 1929 value was taken from the published NGS
                superseded value for benchmark E 402.
                Vertical Control used F 402 El. 3.957 (m) (NAVD 88) El.
```

```
                4.430 (m) (NGVD 29), E 402 El. 4.314 (m) (NAVD 88) El.
                4.786 (m) (NGVD 29).
        Positional_Accuracy:
                Horizontal_Positional_Accuracy:
                        Horizontal_Positional_Accuracy_Report:
                                The horizontal position of Site Benchmark "BOYRO"
                                was established using a mapping grade GPS receiver
                                (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 F 402
                                and terminating at benchmark E 402 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: 0.001 m
                                Vertical_Positional_Accuracy_Explanation: NAVD 88
level loop, 0.001 m closure in 1.02 km, max. allowed 0.008m.
        Lineage:
                Source_Information:
                        Source_Citation:
                                Citation_Information:
                                        Series_Information:
                                        Publication_Information:
                                        Larger_Work_Citation:
                                                Citation_Information:
                                                        Series_Information:
                                                        Publication_Information:
                        Source_Time_Period_of_Content:
                                Time_Period_Information:
                                        Single_Date/Time:
                                        Range_of_Dates/Times:
                                        Multiple_Dates/Times:
                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: 20070209
                        Process_Contact:
                                Contact_Information:
                                        Contact_Person_Primary:
                                        Contact_Organization_Primary:
                                        Contact_Address:
Spatial_Data_Organization_Information:
        Spatial_Reference_Information:
                Horizontal_Coordinate_System_Definition:
                        Geographic:
                        Planar:
                                Map_Projection:
                                        Albers_Conical_Equal_Area:
                                        Azimuthal_Equidistant:
                                        Equidistant_Conic:
                                        Equirectangular:
                                        General_Vertical_Near-sided_Perspective:
                                        Gnomonic:
```

```
                                        BOYRO.gen
                                           Lambert_Azimuthal_Equal_Area:
                                           Lambert_Conformal_Conic:
                                           Mercator:
                                           Modified_Stereographic_for_Alaska:
                                           Miller_Cylindrical:
                                           Oblique_Mercator:
                                                   Oblique_Line_Point:
                                           Orthographic:
                                           Polar_Stereographic:
                                           Polyconic:
                                           Robinson:
                                           Sinusoidal:
                                           van_der_Grinten:
                                           Space_Oblique_Mercator_(Landsat):
                                           Stereographic:
                                           Transverse_Mercator:
                                           van_der_Grinten:
                                   Grid_Coordinate_System:
                                           Universal_Transverse_Mercator:
                                                   Transverse_Mercator:
                                           Universal_Polar_Stereographic:
                                                   Polar_Stereographic:
                                           State_Plane_Coordinate_System:
                                                   Lambert_Conformal_Conic:
                                                   Transverse_Mercator:
                                                   Oblique_Mercator:
                                                           Oblique_Line_Point:
                                                   Polyconic:
                                           ARC_Coordinate_System:
                                                   Equirectangular:
                                                   Azimuthal_Equidistant:
                                   Local_Planar:
                                   Planar_Coordinate_Information:
                                           Coordinate_Representation:
                                           Distance_and_Bearing_Representation:
                           Local:
                           Geodetic_Model:
                   Vertical_Coordinate_System_Definition:
                           Altitude_System_Definition:
                           Depth_System_Definition:
Entity_and_Attribute_Information:
        Detailed_Description:
                Entity_Type:
                Attribute:
                        Attribute_Domain_Values:
                        Attribute_Value_Accuracy_Information:
        Overview_Description:
Distribution_Information:
        Distributor:
                Contact_Information:
                        Contact_Person_Primary:
                        Contact_Organization_Primary:
                        Contact_Address:
        Standard_Order_Process:
                Digital_Form:
                        Digital_Transfer_Information:
                        Digital_Transfer_Option:
                                Online_Option:
                                        Computer_Contact_Information:
                                                Network_Address:
                                                Dialup_Instructions:
                                OffLine_Option:
                                        Recording_Capacity:
```

```
        Available_Time_Period:
                Time_Period_Information:
                        Single_Date/Time:
                        Range_of_Dates/Times:
                        Multiple_Dates/Times:
Metadata_Reference_Information:
        Metadata_Date: 20070209
        Metadata_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Stephen M. Gordon
                                Contact_Organization: Nick Miller, Inc.
                        Contact_Organization_Primary:
                        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
```

BOYRO

Nick Miller, Inc.
Date of Photo: January 25, 2007
View: Looking at the wells facing north

BOYRO

Nick Miller, Inc.
Date of Photo: January 25, 2007
View: Close-up of the showing the contractor's markings

BOYRO

Nick Miller, Inc.
Date of Photo: January 25, 2007
View: Looking at the benchmark facing east

BOYRO

Nick Miller, Inc.
Date of Photo: January 25, 2007
View: A top view of the benchmark

SET BENCH MARK

1078 BOYRO SFWMD

SET POURED IN PLACE CONCRETE MONUMENT WITH ALUMINUM DISK STAMPED: BOYRO 2007 (ALSO STAMPED SO. FLA. WATER MANAGEMENT DIST.)

COORDINATES ON MONUMENT:
LAT: 26° 29' 38" N
LONG: 80° 05' 31" W

COORDINATES ON MONITORING WELL:
LAT: 26° 29' 38" N
LONG: 80° 05' 30" W

TIES FOR MONUMENT:
- 192.75' N.E. FROM N. COR. OF PUMP STATION
- 7.55' W FROM MONITORING WELL
- 196.32' N.W. FROM N.W. COR. OF LIFT STATION.

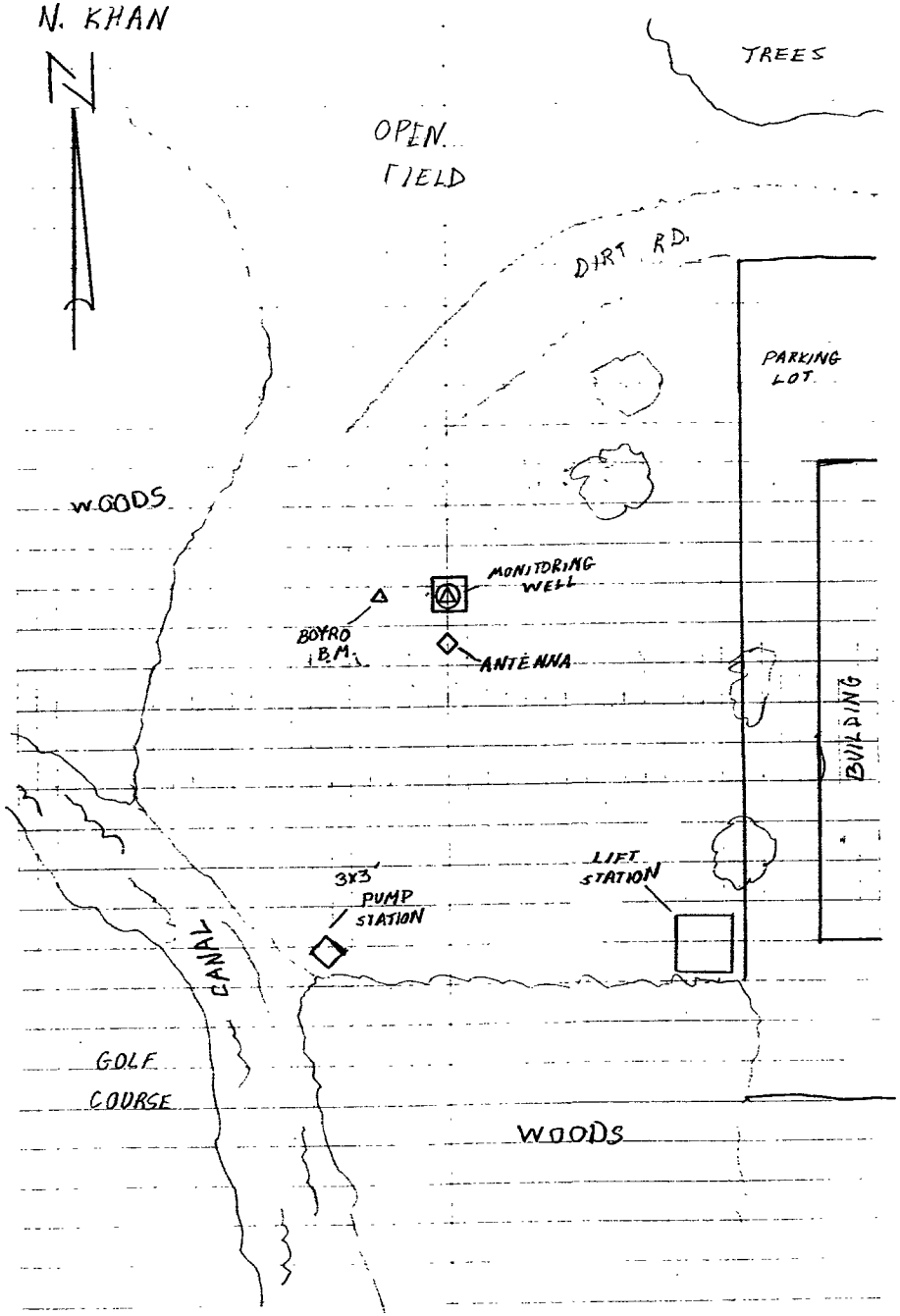
PICTURE #'S 101-0304 THROUGH 101-0307
SONY CYBERSHOT MODEL # DSC-S600

A MAGNET WAS SET 1.0' NORTH OF MONUMENT

J. CAMPBELL
A. APONTE
N. KHAN

THUR. JAN. 25, 2007

SFWMD-15,73



SET BENCH MARK

1078 BOYRO-2 SFWMD

SET POURED IN PLACE CONCRETE MONUMENT WITH ALUMINUM DISK STAMPED: BOYRO-2 2007 (ALSO STAMPED SO. FLA. WATER MANAGEMENT DIST.)

COORDINATES ON MONUMENT:
LAT: 26° 30' 26" N
LONG: 80° 04' 47" W

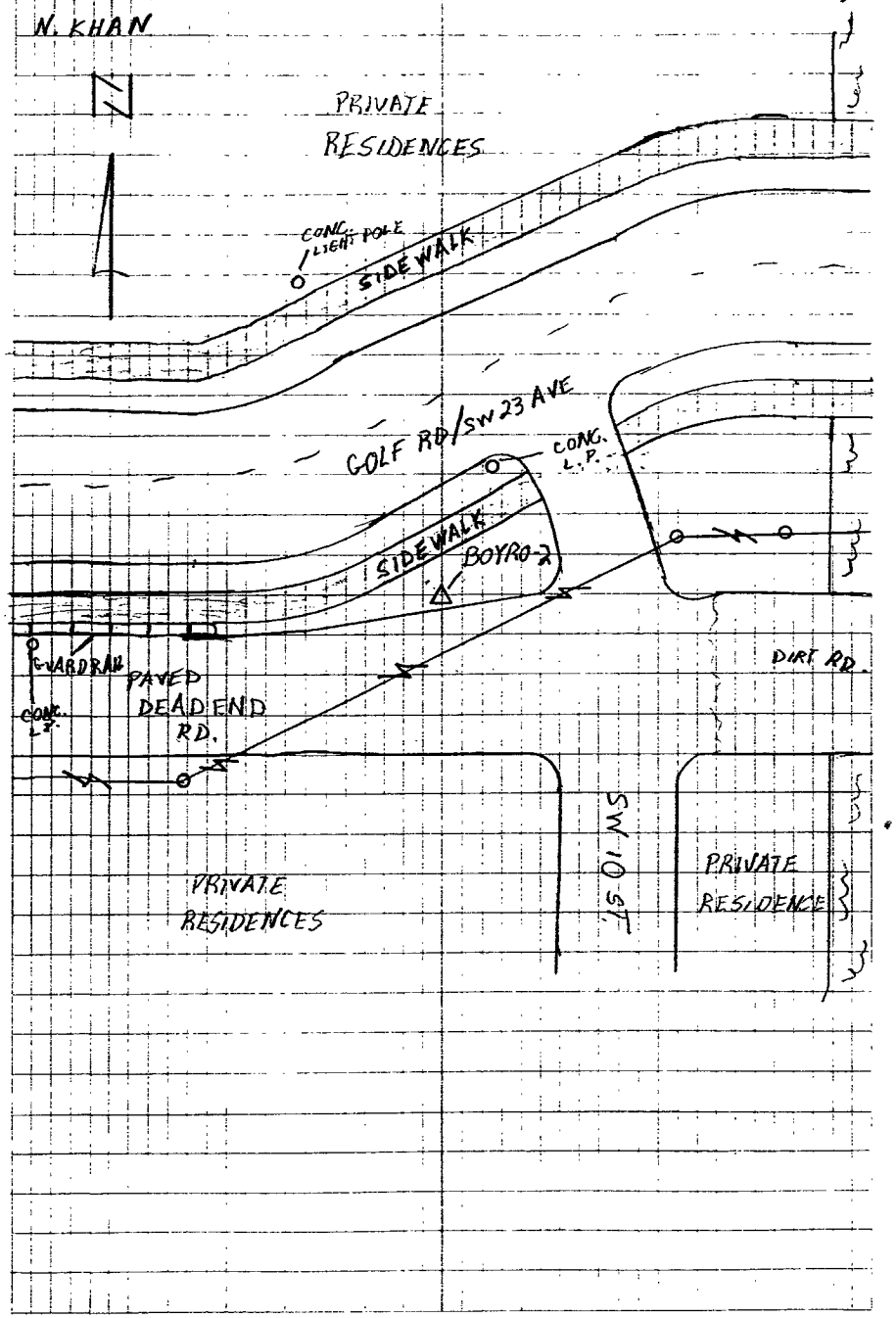
TIES FOR MONUMENT
- 108.60' EAST FROM GUARDRAIL BULLNOSE
- 12.0' SOUTH FROM GOLF RD/SW 23 AVE. E.P.
- 99.60' WEST FROM CONCRETE LIGHT POLE

PICTURE #'S 101-0308, 101-0309
SONY CYBERSHOT MODEL # DSC-S600

A MAGNET WAS SET 1.0' NORTH OF MONUMENT

J. CAMPBELL THUR. JAN. 25, 2007
A. APONTE
N. KHAN

SFWMD-1524



LEVEL RUN

RAGER.J MON, JANUARY 29, 2007

1078.023 SFWMD KHAN SFWMD-18.31

SMITH

BOYRO2 → PB1627A

COL: -5.8

	+	HI	-	EL	DESC.
8	1.0068 [69.40]				BOYRO2
			1.7431 [68.62]		SET PK W.BOUND E/P GOLF RD.
9	1.8882 [20.39]				
			1.7672 [19.84]		PB1627-4
11					

PB1627A → BOYRO2

	+	HI	-	EL	
	1.6745 [60.31]				PB1627A
12			1.5118 [60.850]		SET PK W.BOUND E/P GOLF RD.
	1.9819 [16.92]				
13			1.5299 [15.46]		BOYRO2
14					

VΔ = 0.0006 M

LEVEL RUN

1078.023

PB1627A → Boy80

	+	HI	−	EL	DESC.
8	1.8925				PB1627A
1	[69.32]		1.8389		
			[69.64]		SET PK W. BOUND E/P GOLF RD.
9	2.0039				
2	[69.27]		1.6118		"
			[69.26]		
11	1.3974				
3	[69.10]		1.7090		"
			[69.63]		
1	1.7913				
4	[68.52]		1.5299		"
			[68.83]		
1:	1.5935				
5	[69.99]		1.7986		"
			[68.62]		
13	1.7383				
6	[69.41]		1.8218		"
			[68.82]		
1					

SFWMD

RIGGER.J 1/29/07

KHAN

SMITH

SFWMD - 18.32'

LEVEL RUN

RAGERT 1/29/07

1078.023

SFUMD

KHAN

SMITH

SFUMD-18,33

PBL6274 → BOYD CONT

	+	HI	−	EL
7	1.9680 [66.16]			
			1.9393 [65.95]	
8	1.9809 [67.49]			
			2.1503 [69.06]	
9	1.8083 [69.25]			
			1.8465 [69.16]	
10	1.8332 [68.62]			
			1.8315 [68.85]	
11	1.8342 [69.49]			
			1.6217 [69.23]	
12	1.5785 [69.91]			
			1.4596 [69.83]	

SET PK S. BOUND E/P CONGRESS

"

"

"

"

"

LEVEL RUN

1078.023 SFWMD

PBICCTA → BOYRD CONST

	+	HI	−	EL
E	1.5414			
13	[69.82]		1.8524	
			[69.85]	
C	1.6448			
14	[69.60]		1.5403	
			[69.27]	
1	2.0192			
15	[69.91]		1.6869	
			[68.87]	
1	1.7719			
16	[69.26]		1.3503	
			[67.94]	
1.	1.3359			
17	[68.82]		1.5964	
			[69.69]	
1:	1.5146			
18	[14.73]		1.9124	
			[16.25]	
1.				

RAGER, J 1/29/07

KHAN SFWMD - 18.34

SMITH

SET PK S. BOUND E/P CONGRESS

"

"

SET IR IN SAND

SET IR IN SAND

BOYRD

DIST = 2.37772 km

LEVEL RUN

1078.023

SFWMD

BOYRO → PB-16274

	+	#1	−	EL
1	1.6966 [69.60]		1.1905 [69.65]	
2	1.6305 [69.66]		1.9747 [69.76]	
3	1.7693 [68.56]		1.8743 [69.11]	
4	1.6443 [64.63]		1.9642 [64.57]	
5	1.7691 [69.47]		1.4658 [69.61]	
6	1.6742 [69.03]		1.7350 [69.34]	
7	1.7474 [67.25]		1.9878 [68.90]	

RAGER.J 1/29/07

KHAN

SMITH

SFWMD - 18.35

DESC.

BOYRO

SET. IR IN SAND

SET PK IN E/P CONGRESS (N. BOUND) ~~E STDE~~

"

"

"

LEVEL RUN

1078.023

BOYRO → PB1627A CONT

	+	HI	−	EL	DESC.
8	1.8407 [69.94]				
			1.6905 [67.02]		SET NAIL N. BOUND E/P CONGRESS
9	1.5517 [69.13]				
			1.5260 [68.39]		"
10	1.5804 [69.36]				
			1.2627 [69.81]		"
11	1.3097 [67.30]				
			1.7049 [67.05]		SET NAIL E. BOUND E/P GOLF RD.
12	1.8602 [69.42]				
			1.5486 [69.48]		"
13	1.6951 [68.21]				
			1.6275 [69.05]		"
14	1.5428 [69.30]				
			1.6509 [69.04]		"

SFUMD

RAGER, J 1/29/07

KHAN

SMITH

SFUMD - 18,36

LEVEL RUN

1078.023

SFWMD

PAGE R.J 1/29/07

KHAN

SMITH

SFWMD - 18.37

BOYRO → PB1627A CONT.

+	HI	-	EL	DESC.
1.4840				
B [69.47]				
		1.4040		
		[69.57]		SET NAIL E.BOUND E/P GOLF RD.
1.6822				
16 [69.03]				
		1.8696		"
		[68.84]		
1.7276				
17 [68.07]				
		1.6792		"
		[67.87]		
1.5601				
18 [68.12]				
		1.7897		
		[68.13]		PB1627A

VΔ=0.0002 M

DIST = 2.37 TO

1078.023 LEVEL RUN

SFWMD

E402 → F402

	+	H.I.	−	ELEV.
	1.5268			4.314M
1	68.71		1.7273	
			68.44	
	1.3946			
2	69.47		1.4823	
			69.69	
	1.4706			
3	69.69		1.6833	
			69.60	
	1.5278			
4	68.66		1.5479	
			68.85	
	1.3694			
5	69.23		1.3799	
			69.23	
	1.5504			
6	69.55		1.5233	
			69.28	
	1.6678			
7	68.91		1.4131	
			69.05	

T. CAMPBELL MON. JAN. 29, 2007

R. RAGER III

A. APONTE

SFWMD 19,12

DESC.

E402 BM

60D. NAIL SET ON SIDE OF FLORIDA EAST COAST RAILWAY

1078.023 LEVEL RUN SFWMD CAMPBELL MON. JAN. 29, 2007

RAGER JR

APONTE

SFWMD 19, 13

E402 → F402

	+	H.I.	−	ELEV.	DESC.
	1.6169				60 D. NAIL SET ON WEST SIDE OF FLA. EASTCOAST RAILWAY
8	25.69		1.7255	3.9656	F402 BM
			24.63		

TOTAL DIST: 1.01867 KM

1.4 MM ✓

F402 → BOYRO 2

	+	H.I.	−	ELEV.	DESC.
	1.7162			3.957	F402 BM
1	69.04		1.0189		60 D. NAIL SET ON NORTH SIDE OF GOLF RD/SW 23 AVE.
			68.93		
	1.5021				〃 〃 〃
2	69.31		12616		〃 〃 〃
			69.26		
	1.2686				〃 〃 〃
3	59.19		1.6645		〃 〃 〃
			59.56		
	1.6142				〃 〃 〃
4	69.53		1.0560		〃 〃 〃
			69.88		

1078.023

LEVEL RUN

SFWMD

F402 → BOYR02 (CONT'D.)

	+	H.I.	−	ELEV.
	2.0979			
5	41.38		0.7114	
			40.39	
	3.1335			
6	69.24		1.4841	
			68.04	
	1.1670			
7	69.46		2.6079	
			69.77	
	1.3944			
8	33.44		1.8886	
			33.72	
	2.0518			
9	38.05		1.0526	
			40.13	
	3.0827			
10	37.31		0.5605	
			36.73	
	3.2169			
11	30.22		0.5846	
			30.40	

J. CAMPBELL MON. JAN. 29, 2007

G. RAGER III

A. APONTE

SFWMD19,14

DESC.

60D. NAIL SET ON NORTH SIDE OF GOLFRD/SW23 AVE

1078.023 LEVEL RUN SFWMD

F 402 → BOYRO2 (CONT'D)

J. CAMPBELL MON. JAN. 29, 2007
G. RAGER III SFWMD 19, 15
A. APONTE

	+	H.I.	−	ELEV.	DESC.
					60D. NAIL SET ON NORTH SIDE OF GOLF RD. 1SW23 AVE.
12	2.6185 / 30.10		1.0623 / 27.62		〃 〃
13	2.3630 / 67.86		1.3668 / 68.60		〃 〃 〃 〃
14	0.8820 / 54.42		3.0155 / 54.77		〃 〃 〃 〃
15	0.5852 / 35.97		3.2198 / 35.84		〃 〃 〃 〃
16	0.5481 / 28.93		3.0321 / 28.69		〃 〃 〃 〃
17	0.5246 / 26.12		2.6975 / 26.36		〃 〃 〃 〃
18	1.1142 / 26.83		2.4332 / 28.01	4.120IM	BOYRO2 BM

TOTAL DIST: 1.713V1 KM

10.78.023 LEVEL RUN SFWMD J. CAMPBELL TUE. JAN. 30, 2007
ELEVATE WELL G. RAGER III SFWMD-19, 16
BOYRO A. SMITH

+	H.I.	−	ELEV.	DESC.
5.195	505.195		500	BOYRO BM
		5.01	500.185	GROUND
		4.01	501.185	CONC. PAD
		2.09	503.105	BOYRO REFERENCE MARK (NORTH SIDE OF WELL)
1.740	504.845			
		3.670	501.175	CONC. PAD
		4.840	500.005	BOYRO BM

BOYRO ✓ 0.005'

− PICTURE #'s 101-0310, 101-0311,
(CYBERSHOT MODEL # DSC-S600)
101-0312, 101-0313

1078.023 LEVEL RUN SFWMD J. CAMPBELL TUE. JAN. 30, 2007
G. RAGER III
A. SMITH
SFWMD-19, 17

BOYRO2 → F402

CHECK AND ADJUST: 0.5

	+	H.I.	−	ELEV.	DESC.
				4.1201M	BOYRO2 BM
					60D. NAIL SET ON ~~NORTH~~ SOUTH SIDE OF GOLF RD/SW 23 AVE.
1	2.3804		0.7428		
	[31.81]		[32.02]		
					〃 〃 〃
2	3.2188		0.6401		
	[30.55]		[29.86]		
					〃 〃 〃
3	3.4080		0.5903		
	[32.39]		[31.24]		
					〃 〃 〃
4	2.9271		1.0480		
	[28.94]		[29.59]		
					〃 〃 〃
5	3.1966		1.5463		
	[68.47]		[69.77]		
					〃 〃 〃
6	0.9915		3.0706		
	[69.48]		[69.57]		
					〃 〃 〃
7	0.7226		3.2289		
	[30.37]		[29.67]		

1078.023 LEVEL RUN SFWMD

BOYRO 2 → F 402 (CONT'D)

J. CAMPBELL TUE. JAN. 30, 2007
G. RAGER III
A. SMITH

SFWMD-19, 18

	+	H.I.	−	ELEV.	DESC.
8	0.1686 [29.95]		2.9735 [30.21]		60D. NAIL SET ON SOUTH SIDE OF GOLF RD. / SW 23 AVE.
9	0.5198 [65.50]		2.0821 [64.98]		
10	2.6081 [66.96]		1.0484 [67.79]		
11	2.2221 [69.43]		2.3086 [69.61]		
12	0.6374 [39.16]		2.8481 [40.62]		
13	0.8425 [69.26]		1.8072 [69.48]		
14	1.7723 [68.25]		1.4870 [68.46]		

1078.023 LEVEL RUN SFWMD J. CAMPBELL TUE. JAN. 30, 2007
G. RAGER III SFWMD-19, 19
A. SMITH

BOYR02 → F402 (CONT'D)

	+	H.I.	−	ELEV.	DESC
	1.5414 ~~1.524~~				60 D. NAIL SET ON NORTHSIDE OF GOLFRD/SW 23 AVE.
15	~~69.61~~ 69.72		1.5929 69.84		〃 〃 〃
16	1.3887 69.56		1.9954 69.38		〃 〃 〃
17	1.5273 13.89		1.7185 12.81		〃 〃 〃
18	1.6443 6.92		1.6642 5.81		〃 〃 〃
				3.9634M	F402 BM

TOTAL DIST: 1.72131 KM
6.4MM ✓

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/01

COUNTY PALM BEACH	**PROJECT Hydrology – BOYRO Monitoring Well**	**DESIGNATION BOYRO**
SECTION 6	**TOWNSHIP 46 SOUTH**	**RANGE 43 EAST**

GEOGRAPHIC INDEX OF QUAD

Established by Nick Miller Inc. **Recovered by**	**NAME OF QUADRANGLE** **DELRAY BEACH**
SURVEYOR Stephen M. Gordon **DATE** 1/29/2007	**FIELD BOOK** 15 **PAGE** 73

HORIZONTAL DATUM: **1927** (**1983**) **Other**_____ (circle one) ZONE (**E**) or **W**

STATE PLANE COORDINATES	**E 953,167 ft**	**N 786,253 ft**
LATITUDE: N 26.49389°	**LONGITUDE: W 80.09194°**	
VERTICAL DATUM: MSL **1929** (**1988**) **Other** _____ (circle one)		**EL. 11.98 ft**
VERTICAL DATUM: MSL (**1929**) **1988 Other** _____ (circle one)		**EL. 13.53 ft**

CONTROL ACCURACY: HORIZONTAL 1 2 3 (SUB-METER) (circle one) **VERTICAL 1 2 (3)**

DESCRIPTION

To Reach:

FROM THE INTERSECTION OF WOOLBRIGHT ROAD AND CONGRESS AVENUE. HEAD SOUTH ON CONGRESS AVENUE FOR 1.3 MILES TO WXEL WPB PARKING LOT. TURN RIGHT AND HEAD NORTHWESTERLY FOR +/-325 FEET TO DIRT ROAD. TURN LEFT AND HEAD SOUTHWESTERLY FOR +/-350 FEET TO MARK IN OPEN FIELD. LOCATED 192.75 FEET NORTHEAST OF NORTH CORNER OF PUMP STATION, 7.55 FEET WEST OF BOYRO MONITORING WELL AND 196.32 FEET NORTHWEST OF NORTHWEST CORNER OF LIFT STATION. MONUMENT IS A POURED-IN-PLACE CONCRETE MONUMENT WITH ALUMINMUM DISK RECESSED 0.3 FEET BELOW GROUND LEVEL. SET MAGNET 1 FOOT NORTH OF MONUMENT.

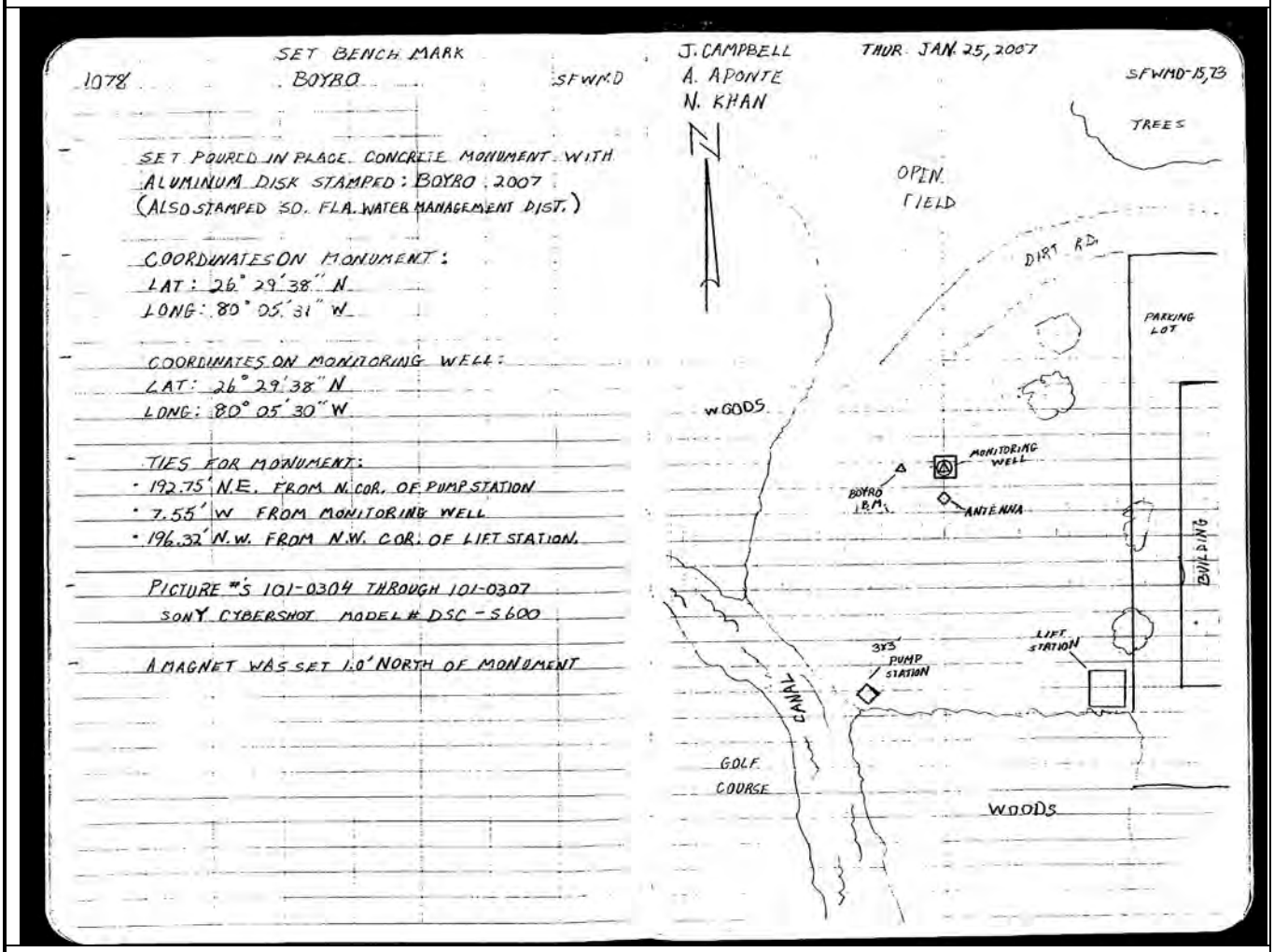
Benchmarks Used: F 402, E 402

Notable Land marks:

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/01

SKETCH



The NGS Data Sheet

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

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.58
1        National Geodetic Survey,   Retrieval Date = FEBRUARY  8, 2008
 AD8039 ***********************************************************************
 AD8039  DESIGNATION -  F 402
 AD8039  PID         -  AD8039
 AD8039  STATE/COUNTY-  FL/PALM BEACH
 AD8039  USGS QUAD   -  LAKE WORTH (1983)
 AD8039
 AD8039                          *CURRENT SURVEY CONTROL
 AD8039 ______________________________________________________________________
 AD8039* NAD 83(1986)-  26 30 27.     (N)    080 03 46.     (W)     SCALED
 AD8039* NAVD 88     -          3.957  (meters)      12.98   (feet)  ADJUSTED
 AD8039 ______________________________________________________________________
 AD8039  GEOID HEIGHT-         -26.12  (meters)                      GEOID03
 AD8039  DYNAMIC HT  -           3.951 (meters)      12.96  (feet)  COMP
 AD8039  MODELED GRAV-     979,098.5   (mgal)                        NAVD 88
 AD8039
 AD8039  VERT ORDER  -  FIRST     CLASS II
 AD8039
 AD8039.The horizontal coordinates were scaled from a topographic map and have
 AD8039.an estimated accuracy of +/- 6 seconds.
 AD8039
 AD8039.The orthometric height was determined by differential leveling
 AD8039.and adjusted in May 1994.
 AD8039
 AD8039.The geoid height was determined by GEOID03.
 AD8039
 AD8039.The dynamic height is computed by dividing the NAVD 88
 AD8039.geopotential number by the normal gravity value computed on the
 AD8039.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AD8039.degrees latitude (g = 980.6199 gals.).
 AD8039
 AD8039.The modeled gravity was interpolated from observed gravity values.
 AD8039
 AD8039;                     North         East     Units  Estimated Accuracy
 AD8039;SPC FL E     -   241,180.      293,420.      MT  (+/- 180 meters Scaled)
 AD8039
 AD8039                          SUPERSEDED SURVEY CONTROL
 AD8039
 AD8039  NGVD 29 (09/01/92)    4.430  (m)           14.53   (f) ADJUSTED    1 2
 AD8039
 AD8039.Superseded values are not recommended for survey control.
 AD8039.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AD8039.See file dsdata.txt to determine how the superseded data were derived.
 AD8039
 AD8039_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK933322(NAD 83)
 AD8039_MARKER: I = METAL ROD
 AD8039_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
 AD8039_SP_SET: STAINLESS STEEL ROD
 AD8039_STAMPING: F 402 1991
 AD8039_MARK LOGO: NGS
 AD8039_PROJECTION: FLUSH
 AD8039_MAGNETIC: I = MARKER IS A STEEL ROD
 AD8039_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 AD8039+STABILITY: POSITION/ELEVATION WELL
 AD8039_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AD8039+SATELLITE: SATELLITE OBSERVATIONS - December 08, 2004
 AD8039_ROD/PIPE-DEPTH: 12.6 meters
 AD8039
 AD8039  HISTORY     - Date     Condition        Report By
 AD8039  HISTORY     - 1991     MONUMENTED       NGS
 AD8039  HISTORY     - 20020204 GOOD             USPSQD
 AD8039  HISTORY     - 20041208 GOOD             USPSQD
 AD8039
 AD8039                          STATION DESCRIPTION
 AD8039
 AD8039'DESCRIBED BY NATIONAL GEODETIC SURVEY 1991
 AD8039'IN BOYNTON BEACH, AT THE INTERSECTION OF THE FLORIDA EAST COAST
 AD8039'RAILROAD AND SOUTHEAST 23RD AVENUE, 28.2 M (92.5 FT) NORTH OF AND
```

```
AD8039'LEVEL WITH THE AVENUE CENTERLINE, 13.6 M (44.6 FT) EAST OF THE NEAR
AD8039'RAIL, 2.4 M (7.9 FT) SOUTHWEST OF A UTILITY POLE WITH A TRANSFORMER,
AD8039'1.1 M (3.6 FT) EAST OF A RIGHT-OF-WAY POST, 0.4 M (1.3 FT) WEST OF A
AD8039'RIGHT-OF-WAY POST, AND 0.3 M (1.0 FT) SOUTH OF A WITNESS POST.
AD8039'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
AD8039
AD8039                          STATION RECOVERY (2002)
AD8039
AD8039'RECOVERY NOTE BY US POWER SQUADRON 2002 (BJS)
AD8039'RECOVERED IN GOOD CONDITION.
AD8039
AD8039                          STATION RECOVERY (2004)
AD8039
AD8039'RECOVERY NOTE BY US POWER SQUADRON 2004 (AAS)
AD8039'RECOVERED IN GOOD CONDITION.

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

The NGS Data Sheet

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

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.58
1        National Geodetic Survey,   Retrieval Date = FEBRUARY  8, 2008
 AD8040 ***********************************************************************
 AD8040  DESIGNATION -  E 402
 AD8040  PID         -  AD8040
 AD8040  STATE/COUNTY-  FL/PALM BEACH
 AD8040  USGS QUAD   -  DELRAY BEACH (1983)
 AD8040
 AD8040                         *CURRENT SURVEY CONTROL
 AD8040  ______________________________________________________________________
 AD8040* NAD 83(1986)-  26 29 54.     (N)    080 03 51.     (W)     SCALED
 AD8040* NAVD 88     -          4.314  (meters)      14.15   (feet)  ADJUSTED
 AD8040  ______________________________________________________________________
 AD8040  GEOID HEIGHT-          -26.11  (meters)                      GEOID03
 AD8040  DYNAMIC HT  -            4.307 (meters)      14.13  (feet)  COMP
 AD8040  MODELED GRAV-      979,098.7   (mgal)                        NAVD 88
 AD8040
 AD8040  VERT ORDER  -  FIRST     CLASS II
 AD8040
 AD8040.The horizontal coordinates were scaled from a topographic map and have
 AD8040.an estimated accuracy of +/- 6 seconds.
 AD8040
 AD8040.The orthometric height was determined by differential leveling
 AD8040.and adjusted in May 1994.
 AD8040
 AD8040.The geoid height was determined by GEOID03.
 AD8040
 AD8040.The dynamic height is computed by dividing the NAVD 88
 AD8040.geopotential number by the normal gravity value computed on the
 AD8040.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AD8040.degrees latitude (g = 980.6199 gals.).
 AD8040
 AD8040.The modeled gravity was interpolated from observed gravity values.
 AD8040
 AD8040;                     North         East     Units  Estimated Accuracy
 AD8040;SPC FL E     -   240,160.      293,290.      MT  (+/- 180 meters Scaled)
 AD8040
 AD8040                          SUPERSEDED SURVEY CONTROL
 AD8040
 AD8040  NGVD 29 (09/01/92)    4.786  (m)           15.70   (f) ADJUSTED    1 2
 AD8040
 AD8040.Superseded values are not recommended for survey control.
 AD8040.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AD8040.See file dsdata.txt to determine how the superseded data were derived.
 AD8040
 AD8040_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK932312(NAD 83)
 AD8040_MARKER: I = METAL ROD
 AD8040_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
 AD8040_SP_SET: STAINLESS STEEL ROD
 AD8040_STAMPING: E 402 1991
 AD8040_MARK LOGO: NGS
 AD8040_PROJECTION: FLUSH
 AD8040_MAGNETIC: I = MARKER IS A STEEL ROD
 AD8040_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 AD8040+STABILITY: POSITION/ELEVATION WELL
 AD8040_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AD8040+SATELLITE: SATELLITE OBSERVATIONS - January 27, 2005
 AD8040_ROD/PIPE-DEPTH: 9.4  meters
 AD8040
 AD8040  HISTORY     - Date     Condition        Report By
 AD8040  HISTORY     - 1991     MONUMENTED       NGS
 AD8040  HISTORY     - 20031227 GOOD             USPSQD
 AD8040  HISTORY     - 20050127 GOOD             USPSQD
 AD8040
 AD8040                          STATION DESCRIPTION
 AD8040
 AD8040'DESCRIBED BY NATIONAL GEODETIC SURVEY 1991
 AD8040'0.8 KM (0.5 MI) NORTHERLY ALONG THE FLORIDA EAST COAST RAILROAD FROM
 AD8040'THE JUNCTION OF SOUTHEAST 36TH AVENUE IN BOYNTON BEACH, 8.2 M (26.9
```

```
AD8040'FT) WEST OF THE EXTENDED CENTERLINE OF THE SOUTHBOUND LANES OF OLD
AD8040'DIXIE HIGHWAY, 8.0 M (26.2 FT) EAST OF THE NEAR RAIL, 4.6 M (15.1 FT)
AD8040'NORTHWEST OF AND LEVEL WITH THE EXTENDED CENTER OF NORTHBOUND LANES
AD8040'OF THE HIGHWAY, 0.5 M (1.6 FT) SOUTH OF A RIGHT-OF-WAY POST, AND 0.3
AD8040'M (1.0 FT) EAST OF A WITNESS POST.  NOTE--ACCESS TO THE DATUM POINT
AD8040'IS THROUGH A 5-INCH LOGO CAP.
AD8040
AD8040                          STATION RECOVERY (2003)
AD8040
AD8040'RECOVERY NOTE BY US POWER SQUADRON 2003 (AAS)
AD8040'RECOVERED IN GOOD CONDITION.
AD8040
AD8040                          STATION RECOVERY (2005)
AD8040
AD8040'RECOVERY NOTE BY US POWER SQUADRON 2005 (AAS)
AD8040'RECOVERED IN GOOD CONDITION.

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

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

January 2006

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

PROJECT TITLE

BOYRO Monitoring Well

LINE TITLE FOR **L10785**

**ESTABLISH BENCH MARK NEAR MONITORING WELL
IN PALM BEACH 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 an existing Ground Water Monitoring Well 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 Palm Beach 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.

NICK MILLER, INC.

III. COMMENTS

A. Reconnaissance

See the To-Reach Descriptions included, for a clear access to all L10785 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

This is a new second order, class 2 level run by Nick Miller, Inc.

D. Problems

No problems occurred during this project.

IV. Closures

Loop closures were computed and are included in the package for L10785.

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

-*- FIELD ABSTRACT -*-

070129-070130 HGZ L10785 8.0 MM ORDER 2 CLASS 2 PAGE 1
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
ESTABLISH BENCH MARK NEAR MONITORING WELL BOYRO
LOCATED IN PALM BEACH COUNTY

FROM / TO	START	F/B	DIST TOTAL (KM)	ELEV DIFF (MT)		-(F+B) TOTAL (MM)	MEAN DIFF FLD ELEV (MT)	I C
0147 F 402							3.95700	
0147 F 402	1291320	B	1.02	-0.35837	*	0.00	0.35837	1
0146 E 402								
	SL 1		1.02			0.00	4.31537	
0147 F 402	1291425	F	1.71	0.16317	*	-6.31	0.16002	1
0145 BOYRO-2	1300930	B	1.72	-0.15686	*			2
			1.71			-6.31	4.11702	
0145 BOYRO-2	1291025	F	0.18	-0.61539	*	0.66	-0.61507	3
0143 PB 1627 A	1291040	B	0.15	0.61474	*			3
			1.87			-5.66	3.50195	
0143 PB 1627 A	1291115	F	2.38	0.15027	*	-0.32	0.15011	3
0144 BOYRO	1291415	B	2.37	-0.14995	*			3
			4.24			-5.98	3.65206♀	

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 - 331132	396 - 333	396 - 444
2	243 - 331132	396 - 555	396 - 666
3	243 - 332854	396 - 666	396 - 555

♀

LEVEL LINE SECTION RUNNING TREE

0147 (0146)
0145
0143
0144♀

FROM	TO	N. LATITUDE	W. LONGITUDE	FIELD DISTANCE	VS. COMPUTED	
	0147	263027	0800346	0.00	0.00	
0147	0146	262954	0800351	1.02	1.03	
0147	0145	263026	0800447	1.71	1.69	
0145	0143	263025	0800452	0.15	0.14	
0143	0144	262938	0800531	2.37	1.81	**♀

Windows Abstra Version 2.3 -- Jan 1, 2004 -- Fri Feb 23 08:12:41 2007

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

0143 0144 *** Field distance exceeds computed distance by more than 0.50 KM!