

# SPECIFIC PURPOSE SURVEY C111 IFAS GW WELL REPORT REFERENCE ELEVATION

April, 2017



**SOUTH FLORIDA WATER MANAGEMENT DISTRICT  
SURVEY SECTION**

3301 Gun Club Road West Palm Beach, Florida 33406

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# Surveyor's Report

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Report Date: 4/13/17

Submittal: Final

Prepared for: Brenda Mills & Hydrogeology – Linda Lindstrom

## South Florida Water Management District



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**South Florida Water Management District**  
**SURVEY SECTION**

3301 Gun Club Road West Palm Beach, Florida  
33406 Phone; 561.686.8800 Fax: 561.682.0066



## OVERVIEW OF THE PROJECT

### **PURPOSE**

The purpose of this Survey is to establish Reference Elevation for Groundwater wells monitored by the South Florida Water Management District (SFWMD). Third order elevations referring to both the North American Vertical Datum of 1988 (NAVD88) and the National Geodetic Vertical Datum of 1929 (NGVD29). NGVD 29 elevation shall be based on offset from NAVD 88 using USACE Corpscon 6.0.1.

### **Location of Project**

The project is located in Miami/Dade County, Florida. Following is a map of Location.

General Location (Not to Scale)



### **VERTICAL DATUM FOR THE PROJECT**

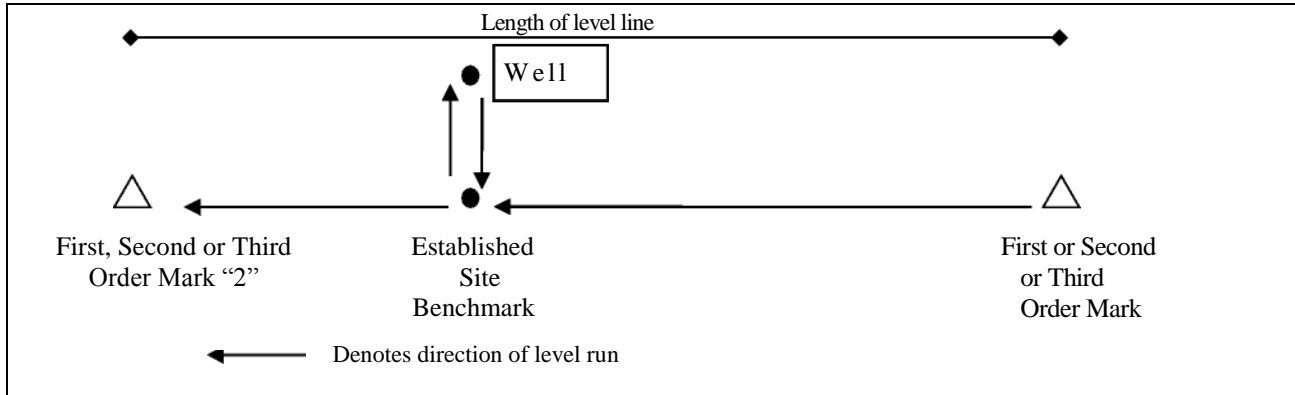
The vertical datum for the project is the North American Vertical Datum of 1988. For correlation with older data sets, the elevations of the benchmarks are also shown in the National Geodetic Vertical Datum (NGVD) of 1929. The NGVD 29 elevations were derived using data from published NGS superseded values when applicable, otherwise values provided by the South Florida Water Management District in a file named “NGVD29.txt” were used. The linear unit for all elevations is the U.S. survey feet 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 is as follows. The run was started at one of the First or Second Order marks and continued through the Site Benchmark (Found or Established) at the well and closed on the original or additional First or Second Order NGS vertical mark. (See Figure 1. below).

For each well site, a closed loop was run from an established Third Order vertical mark and a Site Benchmark established.



**Figure 1 Typical Level Run Pattern**

The FGCS maximum allowable misclosure for this type of run is 0.03' multiplied by the square root of the length of the line in miles.

### EQUIPMENT USED

All leveling was performed with a Topcon Digital and Topcon A2G2 Levels.

### INTRODUCTION

The following instrument was used for GPS observations:

- (1) Garmin GPS Map 78.

### BENCHMARKS USED

Description	X, (Easting) 83/86 Coordinates	Y, (Northing) 83/86 Coordinates	Latitude	Longitude
<b>BM J-477-R</b>	806857	442404	25 33 00	80 32 34.5
<b>BM MB-44</b>	807114	421195	25 29 29.9	80 32 32.5
<b>BM P-532</b>	807246	410471	25 27 43.7	80 32 31.5
<b>BM J-500</b>	807387	399949	25 25 59.5	80 32 30.4

**CONTROL BENCHMARK**



**Vertical Control Points  
J-477-R IS NEW**

**Name:**J-477-R

**Elev(NGVD29):** 7.88

**Elev(NAVD88):** 6.36

**Northing:** 442,404

**Easting:** 806,857

**Location1:**

SW 232 ST --- 14' NORTH OF PROJECTED C/L FROM THE EAST

**Location2:**

SW 217 AVE --- 12' WEST OF PROJECTED C/L FROM THE SOUTH

**Location3:**

**Description1:** 1/2" IP 0.7' BELOW ASPHALT.

**Description2:**

**Field Book:** 612-64

**Zones:**

**Circuit:** DA-132-B-R

**Set Date:** 03-19-2011

**Locator:**6843

**Last-Check:** 12-09-2009

**Adjustment:**

**Adjustment-Date:** 03-19-2011

**Status:**NEW

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## Vertical Control Points MB-44 IS EXISTING

**Name:**MB-44

**Elev(NGVD29):** 8.33

**Elev(NAVD88):** 6.81

**Northing:** 421,195

**Easting:** 807,114

**Location1:**

SW 296 ST --- 92.5' NORTH OF C/L

**Location2:**

SW 217 AVE --- 16.0' EAST OF C/L

**Location3:**

**Description1:** BRASS BAR IN CONC MON.

**Description2:**

**Field Book:** 431-04

**Zones:** V

**Circuit:** 620.622

**Set Date:**

**Locator:**7841

**Last-Check:** 02-23-2012

**Adjustment:**

**Adjustment-Date:** 03-09-2011

**Status:**EXISTING

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**Vertical Control Points**  
**P-532 IS EXISTING**

**Name:**P-532

**Elev(NGVD29):** 8.18

**Elev(NAVD88):** 6.67

**Northing:** 410,471

**Easting:** 807,246

**Location1:**

SW 328 ST --- 2' NORTH OF C/L

**Location2:**

SW 217 AVE --- ON C/L

**Location3:**

**Description1:** PK NAIL AND BRASS WASHER ON THE EXISTING SEC COR MON IN INTERSECTION.

**Description2:**

**Field Book:** 529-21

**Zones:** V

**Circuit:** 558

**Set Date:**

**Locator:**7843

**Last-Check:** 02-21-2012

**Adjustment:**

**Adjustment-Date:** 03-09-2011

**Status:**EXISTING

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## Vertical Control Points J-500 IS CHANGED

**Name:**J-500

**Elev(NGVD29):** 6.74

**Elev(NAVD88):** 5.23

**Northing:** 399,949

**Easting:** 807,387

**Location1:**

SW 360 ST --- 82' NORTH OF C/L

**Location2:**

SW 217 AVE --- 15' EAST OF C/L

**Location3:**

**Description1:** BRASS BAR IN CONC MON.

**Description2:**

**Field Book:** 431-02

**Zones:** V

**Circuit:** 560,596,605

**Set Date:** 08-19-2007

**Locator:**7845

**Last-Check:** 02-16-2012

**Adjustment:**

**Adjustment-Date:** 03-09-2011

**Status:**CHANGED

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**PROJECT RESULTS**

The following tables list the elevations established for each existing or new mark, the level run misclosure, “to-reach” description for each mark and a photo of the mark. All elevations and coordinates are in US Survey Feet.



**SURVEYOR’S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW06**

<b>BM J-477-R</b>	Elevation:	<b>6.36ft</b>	(NAVD 88)	<b>7.88 ft.</b>	(NGVD 29)
Site BM	<b>L31NW06</b>	<b>6.24 ft.</b>	(NAVD 88)	<b>7.81ft</b>	(NGVD 29)
Reference Elevation		9.72ft	(NAVD 88)	11.29ft	(NGVD 29)
Top of Well Pad Elevation		6.22ft	(NAVD 88)	7.79ft	(NGVD 29)
Ground Elevation		6.3ft	(NAVD 88)	7.9ft	(NGVD 29)
Length of Run:	.40 mi	<b>To Reach WELL L31NW06:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of			
Actual Misclosure:	0.00 ft	SW 232 St and SW 217 Ave. Go South on 217 Ave for 0.25 mile to the North Side of a farm field and fence line. Go west on North side of farm field (South fence line) for 0.14 mile to Well Site and Mark. Well is inside Wooden enclosure with gate. Mark is SFWMD Alum Disk set in Concrete base for Well and Stamped “BM L31NW06 2017”.			
					
<b>L31NW06 WELLSITE</b>		Benchmark set at wellsite for well <b>L31NW06</b>			

**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW02 GW1**


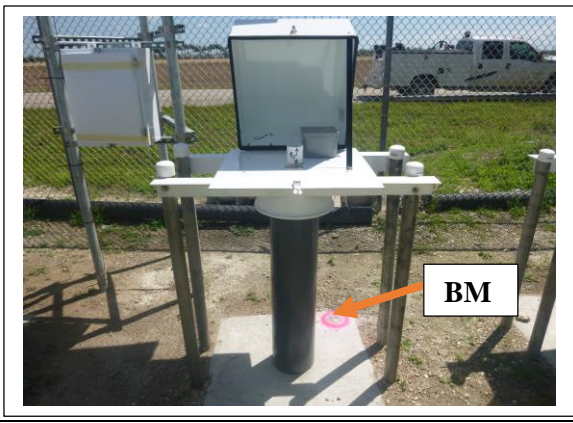
<b>BM MB44</b>	Elevation:	<b>6.81ft</b>	(NAVD 88)	8.35ft	(NGVD 29)
Site BM	<b>L31NW02</b>	<b>7.04 ft.</b>	(NAVD 88)	<b>8.58ft</b>	(NGVD 29)
Reference Elevation		10.56ft	(NAVD 88)	12.10ft	(NGVD 29)
Top of Well Pad Elevation		6.97ft	(NAVD 88)	8.51ft	(NGVD 29)
Ground Elevation		6.9ft	(NAVD 88)	8.4ft	(NGVD 29)
Length of Run:	.05 mi	<b>To Reach WELL L31NW02:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of			
Actual Misclosure:	0.00 ft	SW 296 St. (Avocado) and SW 217 Ave. go North on SW 217 Ave for 450 feet. Site is located inside chain link fence enclosure for the Airport. (For Access go North on SW 217 <sup>th</sup> Ave to Main Airport entrance. Enter and go 125ft +/- to the end of fence. Make U turn to get on inside of fence and follow fence line back to Site). Mark is SFWMD Alum Disk set in Concrete Base for GW3 (Middle Well) and Stamped: BM L31NW02 2017.			
					
<b>L31NW02 WELLSITE</b>		Benchmark Set at wellsite for wells <b>L31NW02 – GW1, GW2 and GW3.</b>			

**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW02 GW2**

<b>BM MB44</b>	Elevation:	<b>6.81ft</b>	(NAVD 88)	8.35ft	(NGVD 29)
Site BM	<b>L31NW02</b>	<b>7.04 ft.</b>	(NAVD 88)	<b>8.58ft</b>	(NGVD 29)
Reference Elevation		10.45ft	(NAVD 88)	11.99ft	(NGVD 29)
Top of Well Pad Elevation		6.97ft	(NAVD 88)	8.51ft	(NGVD 29)
Ground Elevation		6.8ft	(NAVD 88)	8.3ft	(NGVD 29)
Length of Run:	.05 mi		<b>To Reach WELL L31NW02:</b>		
Max Allowable Misclosure:	0.00 ft		<b>TO REACH</b> the Mark and Site from the intersection of SW 296 St. (Avocado) and SW 217 Ave. go North on SW 217 Ave for 450 feet. Site is located inside chain link fence enclosure for the Airport. (For Access go North on SW 217 <sup>th</sup> Ave to Main Airport entrance. Enter and go 125ft +/- to the end of fence. Make U turn to get on inside of fence and follow fence line back to Site). Mark is SFWMD Alum Disk set in Concrete Base for GW3 (Middle Well) and Stamped: BM L31NW02 2017.		
Actual Misclosure:	0.00 ft				
					
			Benchmark Set at wellsite for wells <b>L31NW02 – GW1, GW2 and GW3.</b>		



**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW02 GW3**

<b>BM MB44</b>	Elevation:	<b>6.81ft</b>	(NAVD 88)	8.35ft	(NGVD 29)
Site BM	<b>L31NW02</b>	<b>7.04 ft.</b>	(NAVD 88)	<b>8.58ft</b>	(NGVD 29)
Reference Elevation		10.73ft	(NAVD 88)	12.27ft	(NGVD 29)
Top of Well Pad Elevation		7.03ft	(NAVD 88)	8.57ft	(NGVD 29)
Ground Elevation		7.0ft	(NAVD 88)	8.5ft	(NGVD 29)
Length of Run:	.05 mi	<b>To Reach WELL L31NW02:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of SW 296 St. (Avocado) and SW 217 Ave. go North on SW 217 Ave for 450 feet. Site is located inside chain link fence enclosure for the Airport. (For Access go North on SW 217 <sup>th</sup> Ave to Main Airport entrance. Enter and go 125ft +/- to the end of fence. Make U turn to get on inside of fence and follow fence line back to Site). Mark is SFWMD Alum Disk set in Concrete Base for GW3 (Middle Well) and Stamped: BM L31NW02 2017.			
Actual Misclosure:	0.00 ft				
					


**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW03 GW1**

<b>BM P-532</b>	Elevation:	<b>6.67ft</b>	(NAVD 88)	8.22ft	(NGVD 29)
Site BM	<b>L31NW03</b>	<b>6.89 ft.</b>	(NAVD 88)	<b>8.44ft</b>	(NGVD 29)
Reference Elevation		10.68ft	(NAVD 88)	12.23ft	(NGVD 29)
Top of Well Pad Elevation		6.89ft	(NAVD 88)	8.44ft	(NGVD 29)
Ground Elevation		6.9ft	(NAVD 88)	8.5ft	(NGVD 29)
Length of Run:	.05 mi	<b>To Reach WELL L31NW03:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of			
Actual Misclosure:	0.00 ft	SW 328 St. and SW 217 Ave. go South on SW 217 Ave for 0.5ml. To a Shell Rock Rd on Left (SW 336 St.) Make Left and go 0.13ml to Well Site and BM. Mark is SFWMD Alum Disk set in Concrete Base for GW1 (North Well) and Stamped: BM L31NW03 2017.			
					

**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW03 GW2**



<b>BM P-532</b>	Elevation:	<b>6.67ft</b>	(NAVD 88)	8.22ft	(NGVD 29)
Site BM	<b>L31NW03</b>	<b>6.89 ft.</b>	(NAVD 88)	<b>8.44ft</b>	(NGVD 29)
Reference Elevation		10.41ft	(NAVD 88)	11.96ft	(NGVD 29)
Top of Well Pad Elevation		6.72ft	(NAVD 88)	8.27ft	(NGVD 29)
Ground Elevation		6.7ft	(NAVD 88)	8.2ft	(NGVD 29)
Length of Run:	.05 mi	<b>To Reach WELL L31NW03:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of SW 328 St. and SW 217 Ave. go South on SW 217 Ave for 0.5mi. To a Shell Rock Rd on Left (SW 336 St.) Make Left and go 0.13mi to Well Site and BM. Mark is SFWMD Alum Disk set in Concrete Base for GW1 (North Well) and Stamped: BM L31NW03 2017.			
Actual Misclosure:	0.00 ft				
					

**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL - L31NW03 GW3**

<b>BM P-532</b>	Elevation:	<b>6.67ft</b>	(NAVD 88)	8.22ft	(NGVD 29)
Site BM	<b>L31NW03</b>	<b>6.89 ft.</b>	(NAVD 88)	<b>8.44ft</b>	(NGVD 29)
Reference Elevation		10.27ft	(NAVD 88)	11.82ft	(NGVD 29)
Top of Well Pad Elevation		6.44ft	(NAVD 88)	7.99ft	(NGVD 29)
Ground Elevation		6.5ft	(NAVD 88)	8.0ft	(NGVD 29)
Length of Run:	.05 mi	<b>To Reach WELL L31NW03:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of			
Actual Misclosure:	0.00 ft	SW 328 St. and SW 217 Ave. go South on SW 217 Ave for 0.5ml. To a Shell Rock Rd on Left (SW 336 St.) Make Left and go 0.13ml to Well Site and BM. Mark is SFWMD Alum Disk set in Concrete Base for GW1 (North Well) and Stamped: BM L31NW03 2017.			
					






**SURVEYOR'S REPORT**  
**VERTICAL CONTROL**  
**WELL – C111W11 GW**

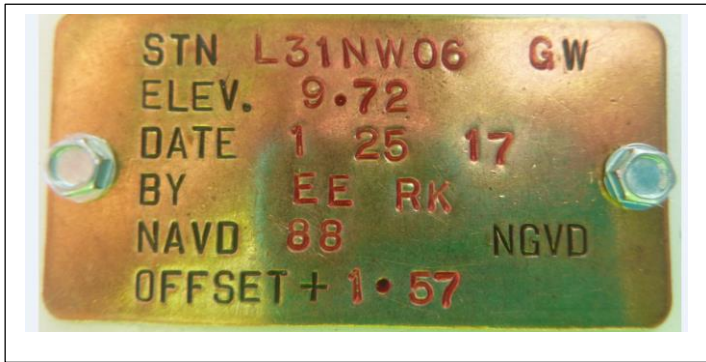
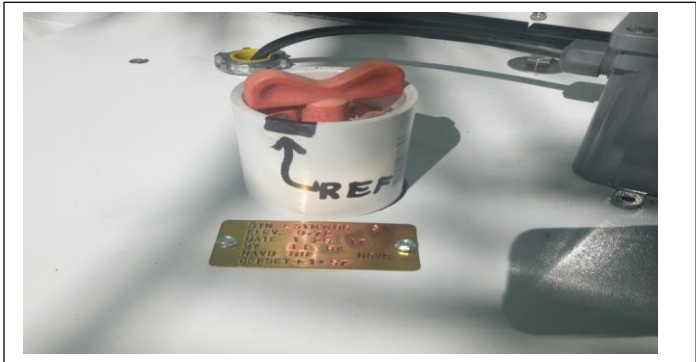
<b>BM J-500</b>	Elevation:	<b>5.23ft</b>	(NAVD 88)	6.79ft	(NGVD 29)
Site BM	<b>C111W11</b>	<b>5.03 ft.</b>	(NAVD 88)	<b>6.59ft</b>	(NGVD 29)
Reference Elevation (Well A & B)		4.537ft	(NAVD 88)	6.097ft	(NGVD 29)
Top of Well Pad Elevation		5.00ft	(NAVD 88)	6.56ft	(NGVD 29)
Ground Elevation		5.0ft	(NAVD 88)	6.6ft	(NGVD 29)
Length of Run:	.13 mi	<b>To Reach WELL C111W11 GW:</b>			
Max Allowable Misclosure:	0.00 ft	<b>TO REACH</b> the Mark and Site from the intersection of			
Actual Misclosure:	0.00 ft	SW 360 St. and SW 217 Ave. go West on SW 360 St for 0.13mi. (Shell Rock Rd) to Well Site and BM on the right. Mark is SFWMD Alum Disk set in Concrete Base for GW Well (Manhole Cover) and Stamped: BM C111W11 2017.			
					

**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW06 GW**

<b>Site L31NW06 GW</b>		<b>Date of Field Work</b> 1/25/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 38
<b>Site Benchmark Name</b> L31NW06 2017	<b>Benchmark Elev. (NAVD 88)</b> 6.24ft	<b>Datum Offset to NGVD29</b> +1.57
<b>Reference Elevation (NAVD 88)</b> 9.72ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 32' 46.9"		<b>Longitude</b> 80° 32' 42.3"

**Photographs**

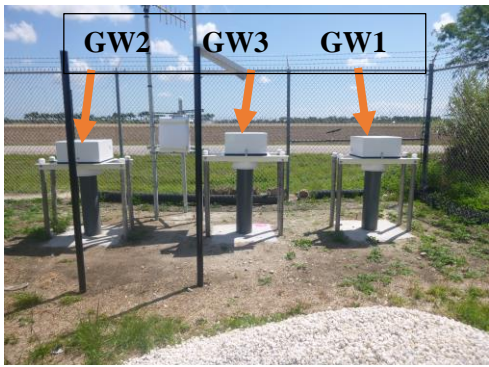


Overall Site	Benchmark Location	Benchmark Close Up
		


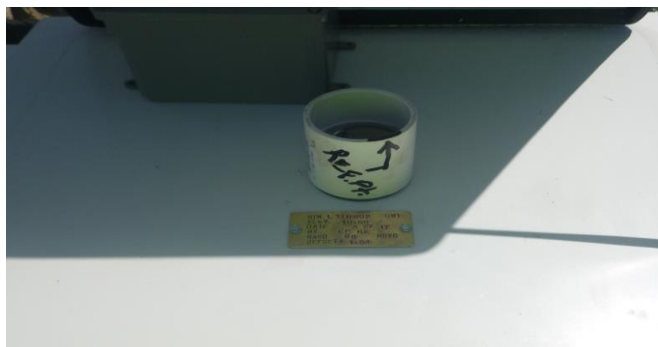
Brass Tag Close Up	Brass Tag + Reference Mark
	

**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW02 GW1**

<b>Site L31NW02 GW1</b>		<b>Date of Field Work</b> 3/27/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 45
<b>Site Benchmark Name</b> L31NW02 2017	<b>Benchmark Elev. (NAVD 88)</b> 7.04ft	<b>Datum Offset to NGVD29</b> +1.54
<b>Reference Elevation (NAVD 88)</b> 10.56ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 29' 33.5"		<b>Longitude</b> 80° 32' 33.4"

**Photographs**

Overall Site	Benchmark Location	Benchmark Close Up
		

Brass Tag Close Up	Brass Tag + Reference Mark
	

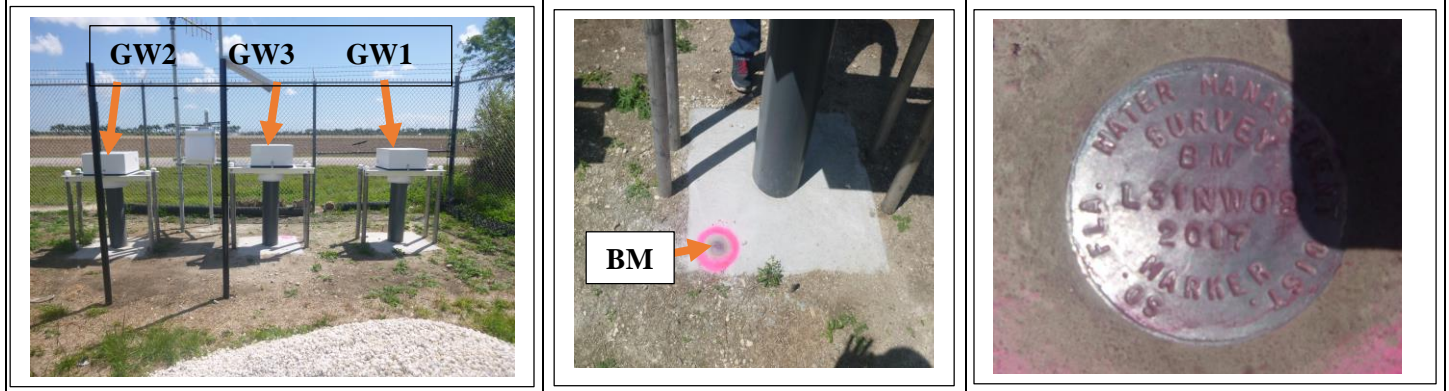


**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW02 GW2**

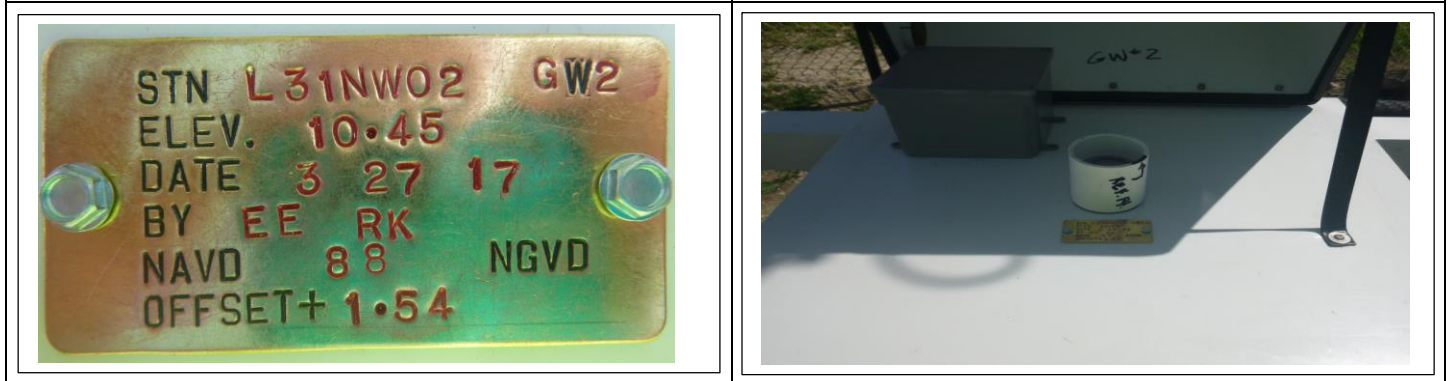
<b>Site L31NW02 GW2</b>		<b>Date of Field Work</b> 3/27/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 45
<b>Site Benchmark Name</b> L31NW02 2017	<b>Benchmark Elev. (NAVD 88)</b> 7.04ft	<b>Datum Offset to NGVD29</b> +1.54
<b>Reference Elevation (NAVD 88)</b> 10.45ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 29' 33.5"		<b>Longitude</b> 80° 32' 33.4"

**Photographs**

<b>Overall Site</b>	<b>Benchmark Location</b>	<b>Benchmark Close Up</b>
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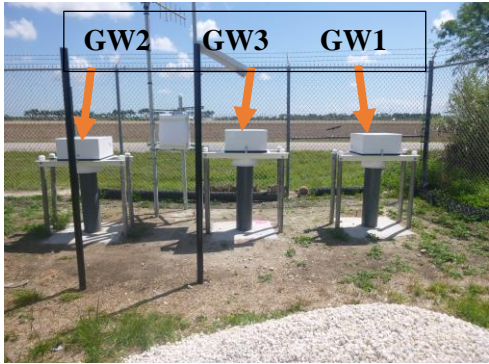


<b>Brass Tag Close Up</b>	<b>Brass Tag + Reference Mark</b>
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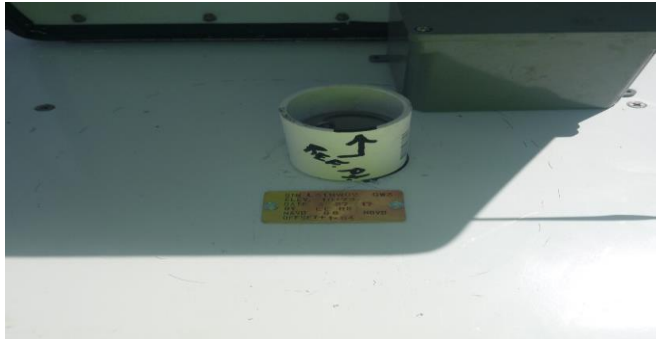
**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW02 GW3**

<b>Site L31NW02 GW3</b>		<b>Date of Field Work</b> 3/27/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 45
<b>Site Benchmark Name</b> L31NW02 2017	<b>Benchmark Elev. (NAVD 88)</b> 7.04ft	<b>Datum Offset to NGVD29</b> +1.54
<b>Reference Elevation (NAVD 88)</b> 10.73ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 29' 33.5"		<b>Longitude</b> 80° 32' 33.4"

**Photographs**

Overall Site	Benchmark Location	Benchmark Close Up
		




Brass Tag Close Up	Brass Tag + Reference Mark
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**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW03 GW1**

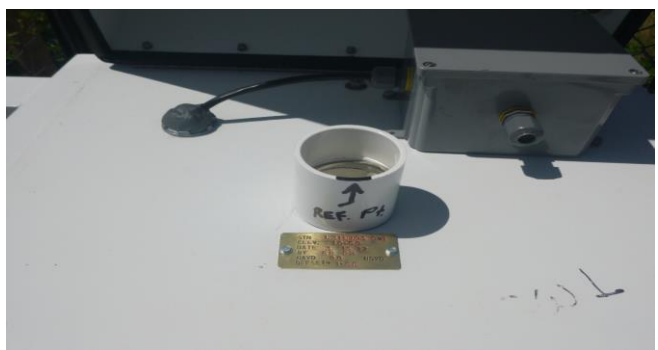
<b>Site L31NW03 GW1</b>		<b>Date of Field Work</b> 2/23/17 & 3/15/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 41 & 44
<b>Site Benchmark Name</b> L31NW03 2017	<b>Benchmark Elev. (NAVD 88)</b> 6.89ft	<b>Datum Offset to NGVD29</b> +1.55
<b>Reference Elevation (NAVD 88)</b> 10.68ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 27' 17.5"		<b>Longitude</b> 80° 32' 24.1"

**Photographs**

Overall Site	Benchmark Location	Benchmark Close Up
		

**Brass Tag Close Up**

**Brass Tag + Reference Mark**




	
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**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW03 GW2**

<b>Site L31NW03 GW2</b>		<b>Date of Field Work</b> 2/23/17 & 3/15/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 41 & 44
<b>Site Benchmark Name</b> L31NW03 2017	<b>Benchmark Elev. (NAVD 88)</b> 6.89ft	<b>Datum Offset to NGVD29</b> +1.55
<b>Reference Elevation (NAVD 88)</b> 10.41ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 27' 17.5"		<b>Longitude</b> 80° 32' 24.1"

**Photographs**

Overall Site	Benchmark Location	Benchmark Close Up
		




Brass Tag Close Up	Brass Tag + Reference Mark
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**SURVEYOR'S REPORT**  
**PROJECT RESULTS**  
**WELL L31NW03 GW3**

<b>Site L31NW03 GW3</b>		<b>Date of Field Work</b> 2/23/17 & 3/15/17
<b>Party Chief</b> Ebanks/Kett	<b>Field Book Name/Number</b> SCADA #12	<b>Page Number(s)</b> Pg. 41 & 44
<b>Site Benchmark Name</b> L31NW03 2017	<b>Benchmark Elev. (NAVD 88)</b> 6.89ft	<b>Datum Offset to NGVD29</b> +1.55
<b>Reference Elevation (NAVD 88)</b> 10.27ft		<b>Existing Tag Elevation (Datum)</b> NA
<b>Latitude</b> 25° 27' 17.5"		<b>Longitude</b> 80° 32' 24.1"

**Photographs**

<b>Overall Site</b>	<b>Benchmark Location</b>	<b>Benchmark Close Up</b>
		

**Brass Tag Close Up**

**Brass Tag + Reference Mark**

	
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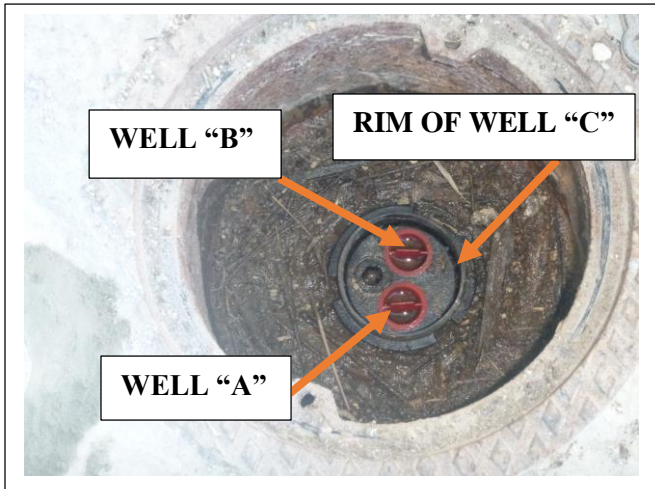


## Well Site: C111W11 GW

<b>Party Chief:</b> Elvie Ebanks	<b>Field Book Number:</b> SCADA #12	<b>Page Number:</b> 44
<b>Benchmark Elevation (NAVD 88):</b> 5.03'	<b>Date of Field Work:</b> March 15, 2017	<b>Datum Offset to NGVD 29:</b> 1.56'
<b>Benchmark Agency:</b> SFWMD	<b>Benchmark Type:</b> Alum. Disk Set in Concrete	<b>Benchmark Stamp:</b> BM C111W11 2017
<b>Reference Elevation (NAVD88):</b> Removable Cap "A" & "B" = 4.537' (stamp on tag) Rim of Well "C" = 4.59'		<b>Natural Ground:</b> Adjacent Elevations Near Well Range from 5.0' to 5.1'
<b>Latitude:</b> 25 25' 58.8"		<b>Longitude:</b> -080 32' 37.8"

### Photographs:

**Pic#1:**



**Pic#2:**



**Pic#3 3Ft:**



**Pic#3 10Ft:**

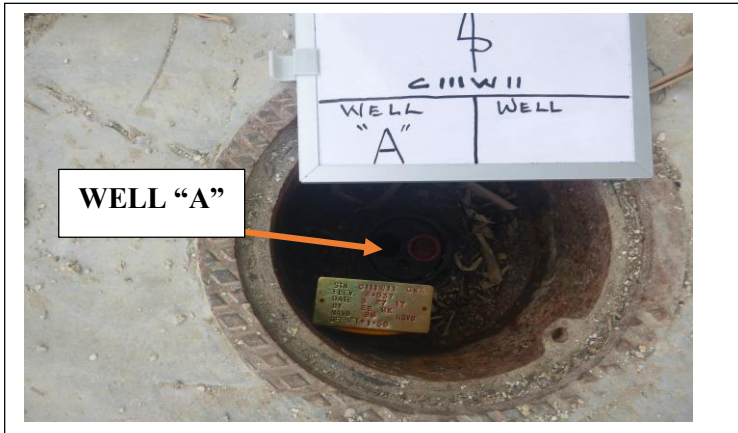




## Well Site: C111W11 GW Continued

**Pic#4:**

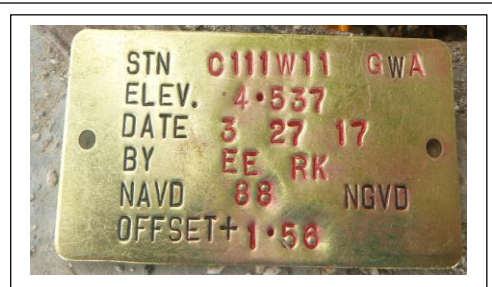
**Pic#5**



**Pic#6 3Ft:**

**Pic#6 10Ft:**

**Pic#7:**



1. A Picture looking down (top view) at the open well.
2. A picture looking down at the well head (with a ruler on it).
3. An oblique picture of the well approximately 3 feet and one at 10 feet from the well head.
4. A picture of the well and reference points A & B.
5. A picture looking down (Top view) of the benchmark disk.
6. An oblique picture of the benchmark at approximately 3 feet and on at 10 feet from the benchmark
7. A picture of the Brass Tag.

**Abbreviation:**

- NAVD 88 – North American Vertical Datum of 1988**
- NGVD 29 – National Geodetic Vertical Datum of 1929**
- NAD 83/99- (Horizontal Datum) North American Datum**
- NGS – National Geodetic Survey.**
- SFWMD – South Florida Water Management District**
- PSM – Professional Surveyor & Mapper**

**SURVEYOR’S CERTIFICATION**

**I hereby certify that this Specific Purpose Survey was made under my responsible charge and meets applicable portions of the Standards of Practice set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J, Florida Administrative Code, pursuant to Section 472.027, Florida State Statutes.**

**This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.**



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**Date of Survey**  
**January 25<sup>th</sup> thru March 27, 2017**


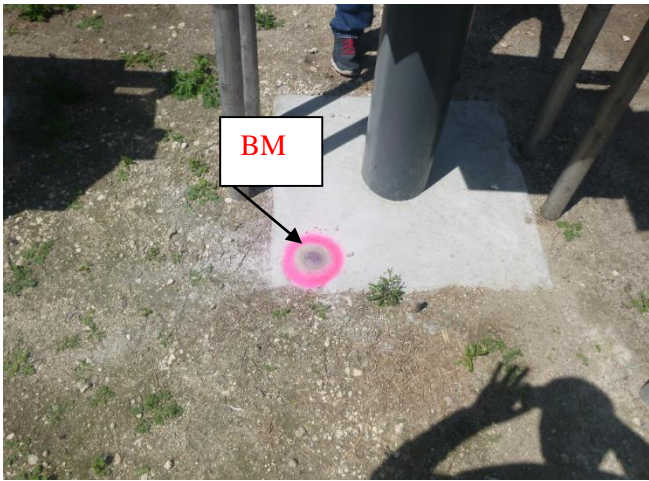
-----  
**Elvie D. Ebanks PSM**  
**Professional Surveyor and Mapper**  
**State of Florida**  
**Certificate No. 5765**




## **Appendix**






## Benchmark Description Sheets

COUNTY MIAMI/DADE	PROJECT C-111 Spreader	DESIGNATION BM L31NW06 2017
SECTION 20__	TOWNSHIP 56_ SOUTH	RANGE _38_ EAST
NAME OF QUADRANGLE _____		
Established by E. Ebanks_SFWMD		Recovered by _____ (Surveyor / Firm Name)
DATE 1/25/17 (Established or Recovered)		FIELD BOOK SCADA FB#12 PAGE 38
HORIZONTAL DATUM: 1927 (1983) ADJ ____ Other ____ (circle one) ZONE E (or) W		
STATE PLANE COORDINATES		N 441,086.953 ft E 806,136.885 ft
LATITUDE: N 25° 32' 47.02"		LONGITUDE: W 80° 32' 42.49"
VERTICAL DATUM: MSL 1929 (1988) Other ____ (circle one)		EL. 6.24ft
VERTICAL DATUM: MSL 1929 1988 Other ____ (circle one)		EL. ft
CONTROL ACCURACY: HORIZONTAL 1 2 (3) SUB-METER (circle one) VERTICAL 1 2 (3)		
<b>DESCRIPTION</b>		
<p>To Reach:</p> <p>From the Intersection of SW 232<sup>nd</sup> St and SW 217th Ave. in Homestead, go South on SW 217th Ave. 0.25 ml. to a Farm Access Rd on Right. (north side of Farm field along Fence line) go west on Farm Access Rd. for 0.14 ml. to Well Site on Right (Fence Line) surrounded with wood fence enclosure and mark. Mark is located Top of Concrete Base for Well. Located at SE Corner.</p> <p>NGS Benchmarks Used: Dade County Benchmark J-477-R</p> <p>Notable Land marks: Well site L31NW06</p>		
SKETCH		
PICTURE		
		

COUNTY MIAMI/DADE	PROJECT C-111 Spreader	DESIGNATION BM L31NW02 2017
SECTION 5__	TOWNSHIP 57_ SOUTH	RANGE _38_ EAST
NAME OF QUADRANGLE _____		
Established by E. Ebanks SFWMD	Recovered by _____ (Surveyor / Firm Name)	
DATE 3/27/17 (Established or Recovered)	FIELD BOOK SCADA FB#12	PAGE 45
HORIZONTAL DATUM: 1927 (1983) ADJ ____ Other ____ (circle one) ZONE E (or) W		
STATE PLANE COORDINATES	N 421,542.885 ft	E 807,036.624 ft
LATITUDE: N 25° 29' 33.4"	LONGITUDE: W 80° 32' 33.4"	
VERTICAL DATUM: MSL 1929 (1988) Other ____ (circle one)	EL. 7.04ft	
VERTICAL DATUM: MSL 1929 1988 Other ____ (circle one)	EL. ft	
CONTROL ACCURACY: HORIZONTAL 1 2 (3) SUB-METER (circle one) VERTICAL 1 2 (3)		
<b>DESCRIPTION</b>		
<p>To Reach:</p> <p>From the Intersection of SW 296<sup>nd</sup> St (Avocado) and SW 217th Ave. in Homestead, go North on SW 217th Ave. for 450ft. +/- to the Northside of a Tree Cluster inside fence line for Homestead Airport and Station location. Mark is set on SE Corner of Middle Well (GW3). For Access to Station, go North on SW217th Ave to Main Airport entrance. Enter and go 150ft +/- to end of chain link and make U-Turn to follow inside fence line to site.</p> <p>NGS Benchmarks Used: <b>Dade County Benchmark MB-44</b></p> <p>Notable Land marks: Well site L31NW02</p>		
SKETCH		
PICTURE		
 		

DESIGNATION: <b>L31NW03</b>		PROJECT: <b>C111 WELLS</b>	
ESTABLISHED BY: <b>SFWMD</b>		SURVEYOR: <b>EBANKS</b>	
RECOVERED BY:		DATE: <b>2/23/17</b>	
<b>GEOGRAPHIC POSITION</b>			
SECTION <b>21</b>	TOWNSHIP <b>57</b> SOUTH	RANGE <b>38</b> EAST	
COUNTY <b>MIAMI/DADE</b>	NAME OF QUADRANGLE GEOGRAPHIC INDEX OF QUAD		
HORIZONTAL DATUM: 1927 (1983) Other _____ (circle one) ZONE (E) or W			
VERTICAL DATUM: MSL 1929 (1988) Other _____ (circle one)			
VERTICAL ACCURACY: 1 2 (3)			
STATE PLANE COORDINATE	(N) Y= 407,805.959	(E) X= 807,963.689	NAVD 88 <b>EL. 6.894'</b> NGVD 29 EL.
CORPSCON 6.0.1 CONVERSION FACTOR (NAVD88 TO NGVD29): Offset = <b>1.55'</b>			
LATITUDE: <b>25 27 17.3</b>		LONGITUDE: <b>80 32 23.8</b>	
<b>RECOVERY DATA</b>			
Stamping: " <b>BM L31NW03 2017</b> "			
From the Intersection of SW 328th and SW 217th Ave. in Homestead, go South on SW 217th Ave. for 0.5miles to SW 336 <sup>th</sup> St (Shell Rock Rd) on Left. Take SW 336 <sup>th</sup> St. on left for 0.13 mile to Wellsite on right and Mark. Mark is located Top of Concrete Base for GW1 (North Well).			
NOTABLE LAND MARKS:			
NGS SOURCE BENCHMARK: <b>Dade County P-532</b>			
FIELD BOOK <b>SCADA #12</b>	PAGE <b>41</b>		
<b>PICTURES</b>			
Overall Site			
			
			
<b>SKETCH</b>			



DESIGNATION: <b>C111W11</b>		PROJECT: <b>C111 WELLS</b>	
ESTABLISHED BY: <b>SFWMD</b>		SURVEYOR: <b>EBANKS</b>	
RECOVERED BY:		DATE: <b>3/15/17</b>	
<b>GEOGRAPHIC POSITION</b>			
SECTION <b>29</b>	TOWNSHIP <b>57 SOUTH</b>	RANGE <b>38 EAST</b>	
COUNTY <b>MIAMI/DADE</b>	NAME OF QUADRANGLE GEOGRAPHIC INDEX OF QUAD		
HORIZONTAL DATUM: 1927 (1983) Other _____ (circle one) ZONE <b>E</b> or W			
VERTICAL DATUM: MSL 1929 (1988) Other _____ (circle one)			
VERTICAL ACCURACY: 1 2 (3)			
STATE PLANE COORDINATE	(N) Y= 399,886.739	(E) X= 806,707.592	NAVD 88 EL. <b>5.03'</b> NGVD 29 EL.
CORPSCON 6.0.1 CONVERSION FACTOR (NAVD88 TO NGVD29): Offset = <b>1.56'</b>			
LATITUDE: <b>25 25 58.9</b>		LONGITUDE: <b>80 32 37.8</b>	
<b>RECOVERY DATA</b>			
Stamping: " <b>BM C111W11 2017</b> "			
To Reach: From the Intersection of CR997 (Krome Ave.) and SW 296 St. (Avocado) Go west on Avocado for 4.0 mls to SW 217 Ave. Go south on SW 217th Ave to SW 360th St. Make right and go 0.13ml to Well Site on Right. Mark set in Concrete Base for Well, North of MH cover.			
NOTABLE LAND MARKS:			
NGS SOURCE BENCHMARK: <b>Dade County J500</b>			
FIELD BOOK <b>SCADA #12</b>	PAGE <b>44</b>		
<b>PICTURES</b>			
Overall Site			
			
			
<b>SKETCH</b>			

38

HCADA FB#12 1-25-17

FLGANTS KATH

Establish benchmark (L3INWOG) AND R.F. ELEV. FOR GW WELL.

HTA	HTI.	ELEV	REMARKS
BM. J-477R	11.88	6.36 (88)	Found 1/2" x 1/4" IRON ROD @ 5' x 23" x 15' x 27" NK
TP.	4.944	11.91	4.911 6.97
TP.	4.944	11.64	7.24 6.70
TP.	4.16	11.16	4.644 7.00
TP.	4.75	11.05	4.86 6.30
BM L3INWOG	10.88	6.24	4.81 6.24
TP.	4.64	11.05	4.59 6.29
TP.	4.76	11.05	4.09 6.96

SET UP FOUND IRON ROD L3INWOG OR WALL ROD.

39

HCADA FB#12 1-25-11

LEVEL ROW CONT.

HTA	HTI.	ELEV	REMARKS
TP.	4.59	11.55	4.90 6.65
TP.	5.15	11.80	4.89 6.91
BM J-477R	4.84	11.75	5.40 6.35 (6.36)
BM L3INWOG	4.72	10.96	6.24
WELL PVC 3"	1.24	9.72	✓
WELL PTD	4.74	6.22	
GPS SHOT	4.7	6.3	
BM	4.72	6.24	

FOR WELL L3INWOG



Sec. 5 Twp 57 R9e 38 Elkins  
Kett

Branch Run to Establish Elev. for  
BM "L31NW02 2017" at well site -  
Homestead Airport

STA	Hill	Elev	Remarks
BM MB244		6.81	Fwd. Good
TP	3.95	7.24	
BM L31NW02 2017	4.30	7.04	BM on SE corner well G.W. 3. 2017
TP	4.38	7.24	
ME 74	3.94	6.81	
<u>FR Wells L31NW02</u>			
BM L31NW02 2017	4.40	7.04	
GW 1 (South)	0.88	10.56	
GW 2 (North)	0.71	10.73	
GW 2 (North)	0.99	10.45	
GW 1 PAD	4.47	6.97	
GW 1 GD	4.6	6.9	✓
GW 3 PAD	4.41	7.03	
GW 3 GD	4.4	7.0	✓
GW 2 PAD	4.47	6.97	
GW 2 GD	4.6	6.8	✓
BM L31NW02	4.40	7.04	



BK 3/20/17 HEC, 21 TWP 57 R9E 38 Elands  
 bench Run to Establish Elev. for SITE BM  
 L31NW03 2017. @ well site: ESTABLISH  
 REF. Elev FOR WELLS @ L31NW03

DIGITAL LEVEL FILE: L31NW03  
 LINE 1  
 PT DESC ELEV AOT BM  
 7 P532 — 7.82  
 8 TBM 7.814 7.82  
 1/15 P532 6.658 — 6.67  
 $\Delta = -0.012$  BS = 3260.56 FS = 3292.25

IR WELLS  
 TBM #18 3.94 11.76 7.82 Iron Rod  
 BM L31NW03 2017 4.866 6.894 METSFIND  
 MUD DISK  
 GNE PAD.  
 GN 1 REF. 1.283 10.53  
 GN 1 PAD. 4.87 6.89  
 GN 1 GD. 4.9 6.86  
 GN 2 REF. 1.50 10.26  
 GN 2 PAD. 5.04 6.72  
 GN 2 GD. 5.1 6.66  
 GN 3 REF. 1.639 10.12  
 GN 3 PAD. 5.32 6.44  
 GN 3 GD. 5.3 6.46  
 BM L31NW03 4.866 6.894  
 TBM #18 3.94 7.82

Note: Well head modified after survey See pg. 44

NCADA FB #12 3-15-17 44  
 HEC 21 TWP 57 R9E 38 Elands  
 Henderson  
 Re-Shoot Elev. for WELLS @ L31NW03  
 (Contractor modify well heads) See this  
 book pg. 41  
 STA + H.I. - Elev Remarks  
 BM L31NW03 471 11.60 6.89 Stamp New  
 DISK.  
 L31NW03 GWT 0.90 10.68  
 GWT 1.19 10.41  
 GWT 1.33 10.27  
 BM 4.71 6.89 ✓

<b>Project Information</b>		<b>Coordinate System</b>	
Name:		Name:	Default
Size:		Datum:	WGS 1984
Modified:	2/15/2012 8:48:57 AM (UTC:-7)	Zone:	Default
Time zone:	Mountain Standard Time	Geoid:	
Reference number:		Vertical datum:	
Description:			

### Level Report

**Imported file:** [L31NW03.DAT](#)  
**Instrument:** DiNi  
**Standard error per kilometer of double leveling:** 0.00230 ft  
**Standard error per turn/station setup:** 0.00000 ft  
**Creation option:** Delta elevations  
**Description usage:** Feature codes

#### Run - 1 Raw Observations

**Raw Misclosure:** -0.01200 ft  
**Σ BS Distances:** 3260.560 ft  
**Σ FS Distances:** 3292.240 ft  
**Run Length:** 6552.800 ft  
**Reduction:** Adjusted Values

Create	Point ID	BS	IS	FS	Δ Elevation	Raw Elevation	Correction	Adj. Elevation	Type	Distance	Description
<input checked="" type="checkbox"/>	1	4.13700 ft			0.00000 ft	6.670 ft	0.00000 ft	6.670 ft ▲	Benchmark	245.280 ft	P532 3
<input type="checkbox"/>	2			4.16500 ft	-0.02800 ft	6.642 ft	0.00096 ft	6.643 ft	Computed	258.990 ft	3
	2	4.05900 ft								262.270 ft	3
<input type="checkbox"/>	3			4.04000 ft	0.01900 ft	6.661 ft	0.00204 ft	6.663 ft	Computed	270.500 ft	3
	3	4.31400 ft								264.240 ft	3
<input type="checkbox"/>	4			4.15700 ft	0.15700 ft	6.818 ft	0.00308 ft	6.821 ft	Computed	259.580 ft	3
	4	4.44500 ft								255.740 ft	3
<input type="checkbox"/>	5			4.65800 ft	-0.21300 ft	6.605 ft	0.00413 ft	6.609 ft	Computed	269.850 ft	3
	5	4.11000 ft								237.830 ft	3
<input type="checkbox"/>	6			4.27400 ft	-0.16400 ft	6.441 ft	0.00509 ft	6.446 ft	Computed	266.270 ft	3
		4.43400 ft								196.550 ft	



	6	ft								ft	3
<input type="checkbox"/>	7		✓ 4.30300 ft	0.13100 ft	6.572 ft	0.00569 ft	6.578 ft	Computed	203.480 ft	3	
	7	✓ 4.83400 ft							141.470 ft	3	
<input type="checkbox"/>	8		✓ 3.59100 ft	1.24300 ft	7.815 ft	0.00601 ft	7.821 ft	Computed	146.420 ft	TBM 3	
	8	✓ 3.49100 ft							145.370 ft	TBM 3	
<input type="checkbox"/>	9		✓ 4.73400 ft	-1.24300 ft	6.572 ft	0.00632 ft	6.578 ft	Computed	142.520 ft	3	
	9	✓ 4.11200 ft							202.330 ft	3	
<input type="checkbox"/>	10		✓ 4.22900 ft	-0.11700 ft	6.455 ft	0.00693 ft	6.462 ft	Computed	197.570 ft	3	
	10	✓ 4.42500 ft							255.350 ft	3	
<input type="checkbox"/>	11		✓ 4.29800 ft	0.12700 ft	6.582 ft	0.00790 ft	6.590 ft	Computed	250.950 ft	3	
	11	✓ 4.74500 ft							269.090 ft	3	
<input type="checkbox"/>	12		✓ 4.56500 ft	0.18000 ft	6.762 ft	0.00894 ft	6.771 ft	Computed	255.220 ft	3	
	12	✓ 4.05900 ft							257.780 ft	3	
<input type="checkbox"/>	13		✓ 4.20600 ft	-0.14700 ft	6.615 ft	0.00997 ft	6.625 ft	Computed	262.370 ft	3	
	13	✓ 4.26000 ft							267.980 ft	3	
<input type="checkbox"/>	14		✓ 4.29600 ft	-0.03600 ft	6.579 ft	0.01103 ft	6.590 ft	Computed	263.020 ft	3	
	14	✓ 4.71600 ft							259.280 ft	3	
	1		✓ 4.63700 ft	0.07900 ft	6.658 ft	0.01200 ft	6.670 ft	Benchmark	245.500 ft	P532 3	

**Run - 1 (N1) Reduced Observations**

Observation	Status	Raw Δ Elevation	Correction	Final Δ Elevation	Setups	Length	Σ BS Readings	Σ FS Readings	Std. Error
1-1 (E1)	Enabled	-0.01200 ft	0.01200 ft	0.00000 ft	14	6552.800 ft	60.14100 ft	60.15300 ft	0.04643 ft

**Run - 1 (N1) Reduced Coordinates**

Point ID	Status	Elevation
1	Enabled	6.67000 ft



Project Information		Coordinate System	
Name:		Name:	Default
Size:		Datum:	WGS 1984
Modified:	2/15/2012 8:48:57 AM (UTC:-7)	Zone:	Default
Time zone:	Mountain Standard Time	Geoid:	
Reference number:		Vertical datum:	
Description:			

### Level Report

**Imported file:** [C111W11.DAT](#)  
**Instrument:** DiNi  
**Standard error per kilometer of double leveling:** 0.00230 ft  
**Standard error per turn/station setup:** 0.00000 ft  
**Creation option:** Delta elevations  
**Description usage:** Feature codes

#### Run - 1 Raw Observations

**Raw Misclosure:** 0.00100 ft  
**Σ BS Distances:** 814.080 ft  
**Σ FS Distances:** 813.390 ft  
**Run Length:** 1627.470 ft  
**Reduction:** Adjusted Values

Create	Point ID	BS	IS	FS	Δ Elevation	Raw Elevation	Correction	Adj. Elevation	Type	Distance	Description
<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/> 5.10300 ft			0.00000 ft	5.230 ft	0.00000 ft	5.230 ft ▲	Benchmark	136.880 ft	J500 3
<input type="checkbox"/>	2			<input checked="" type="checkbox"/> 4.92200 ft	0.18100 ft	5.411 ft	-0.00015 ft	5.411 ft	Computed	134.190 ft	3
	2	<input checked="" type="checkbox"/> 5.30200 ft								198.200 ft	3
<input type="checkbox"/>	3			<input checked="" type="checkbox"/> 4.99200 ft	0.31000 ft	5.721 ft	-0.00047 ft	5.721 ft	Computed	188.350 ft	3
	3	<input checked="" type="checkbox"/> 4.55700 ft								60.530 ft	3
<input type="checkbox"/>	4			<input checked="" type="checkbox"/> 5.68700 ft	-1.13000 ft	4.591 ft	-0.00049 ft	4.591 ft	Computed	47.440 ft	3
	4	<input checked="" type="checkbox"/> 5.72700 ft								47.380 ft	3
<input type="checkbox"/>	5			<input checked="" type="checkbox"/> 5.28500 ft	0.44200 ft	5.033 ft	-0.00051 ft	5.032 ft	Computed	47.970 ft	BM 3
	5	<input checked="" type="checkbox"/> 5.25700 ft								48.000 ft	BM 3
<input type="checkbox"/>	6			<input checked="" type="checkbox"/> 4.56900 ft	0.68800 ft	5.721 ft	-0.00053 ft	5.720 ft	Computed	60.500 ft	3
		<input checked="" type="checkbox"/> 5.03900								188.940	

	6	ft								ft	3
<input type="checkbox"/>	7		✓ 5.41300 ft	-0.37400 ft	5.347 ft	-0.00085 ft	5.346 ft	Computed	197.440 ft	3	
	7	✓ 4.91200 ft							134.150 ft	3	
	1		✓ 5.02800 ft	-0.11600 ft	5.231 ft	-0.00100 ft	5.230 ft	Benchmark	137.500 ft	J500 3	

**Run - 1 (N2) Reduced Observations**

Observation	Status	Raw A Elevation	Correction	Final A Elevation	Setups	Length	Σ BS Readings	Σ FS Readings	Std. Error
1-1 (E2)	Enabled	0.00100 ft	-0.00100 ft	0.00000 ft	7	1627.470 ft	35.89700 ft	35.89600 ft	0.01805 ft

**Run - 1 (N2) Reduced Coordinates**

Point ID	Status	Elevation
1	Enabled	5.23000 ft

Date: 3/29/2017 7:41:21 AM	Project:	Trimble Business Center
----------------------------	----------	-------------------------

44 GCADA PB #12 3-15-17 Ebanks Hudson

hcc. sup. pax  
 Establish elev for BM. C-111 well plus  
 well: C-111 well # C-111 well B  
 File: C-111 well  
 pt. 1 Dade Co BM. 1500 Elev = 5.23  
 pt. 4 North Edge of well C-111 well  
 pt. 5 BM C-111 well 2017 (Est)  
 pt. # 8 Dade BM 1500

$$\Delta 0.001'$$

$$\frac{25'25'' 58.8''}{80'31'' 37.8''}$$

3/27/17  
 \* MEASURE DOWN FROM N EDGE OF  
 WELL TO TOP OF WELL A/B w/  
 PLUG REMOVED = 0.06'

$$4.59 - 0.06 = 4.53$$

STA	HT.	Elev	Remarks
BM C-111 well	5.19	5.03	
well A (removed)	5.683	4.537	
well B "	5.683	4.537	
rim of casing for well B	5.673	4.59	
inner rim of mt. (cover off)	5.23	4.99	
top of mt. cover on.	5.183	5.037	
gd. (found)	5.1	5.1	gd. elev
BM C-111 well	5.19	5.03	" "
	5.19	5.03	✓