



SURVEYOR'S REPORT

**Specific Purpose Survey of the
United States Geological Survey
Recorder Well G-620
in
Miami-Dade County, Florida**

Prepared for:

South Florida Water Management District

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Prepared by:

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Florida Professional Surveyor and Mapper
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State of Florida

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Tel (305) 324-7671

Field Date: May 07, 2019
Report Date: May 21, 2019
BEC Order #: 03-86445

INSPIRED BEYOND MEASURE • SINCE 1898

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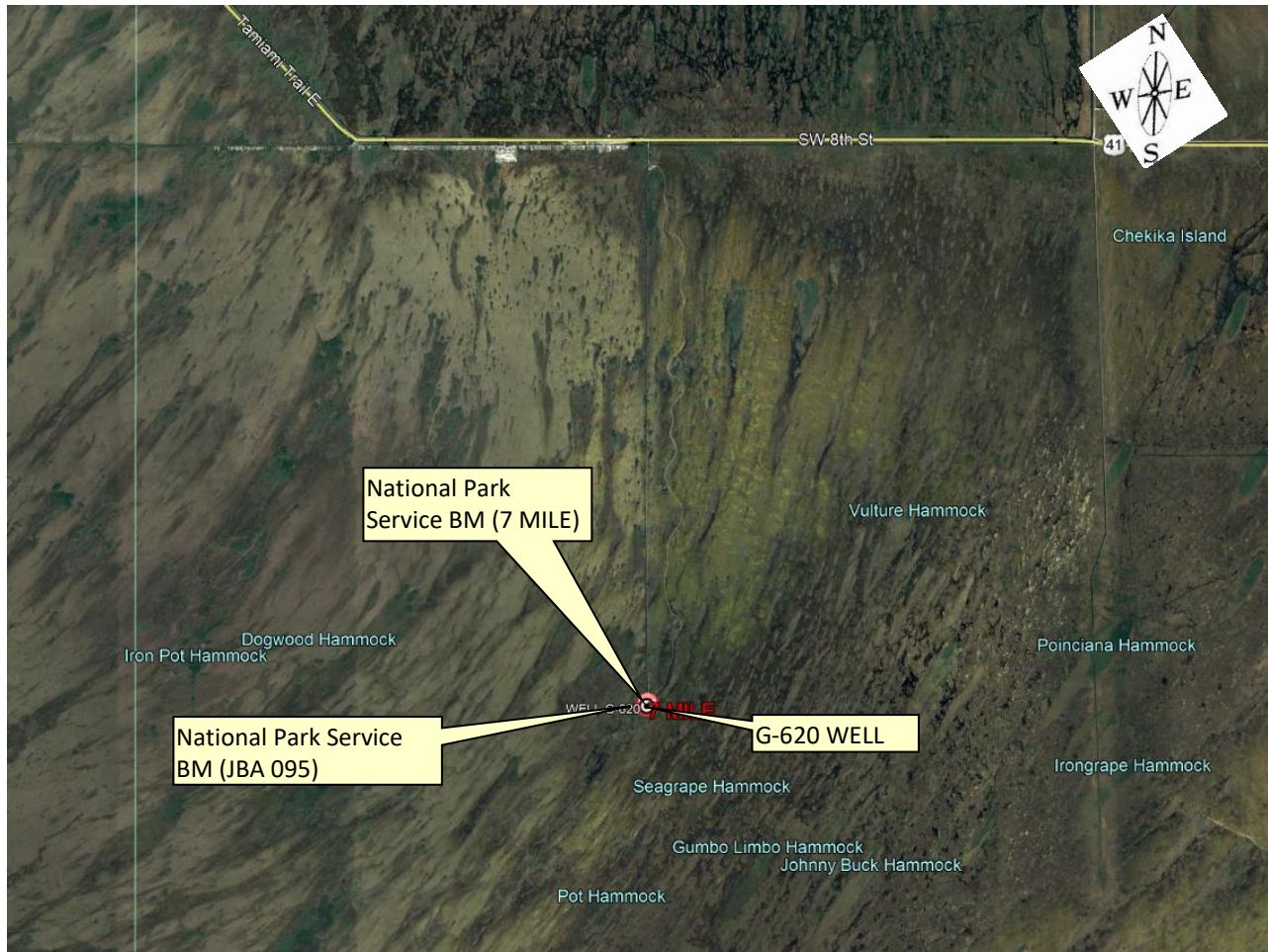
SURVEYOR'S REPORT

PURPOSE

The purpose of this survey is to establish an Elevation Reference Mark (Benchmark) consisting of a 3 1/2" aluminum disc stamped JBA 95 and to establish a North American Vertical Datum of 1988 (NAVD 88) elevation on said Benchmark and on an additional Reference Point with a Brass plate, both at United States Geological Survey Well **G-620**.

LOCATION OF PROJECT

The United States Geological Survey's Recorder Well **G-620** is located in Section 30, Township 55 South, Range 36 East, Miami-Dade County, Florida.



General Location (Intended Display scale is "Not to Scale")

PROJECT VERTICAL DATUM

The project vertical datum is the North American Vertical Datum (NAVD) of 1988.

To convert the NAVD 88 elevation to the National Geodetic Vertical Datum of 1929 at station **G-620 add 1.50'**. These values are based on Corpscon 6.0.1 a US. Army Corps of Engineers Engineering Research and Development Center Topographic Engineering Center Alexandria, Virginia Windows-based program to convert coordinates and elevations between datum's using vertcon05.txt and vertcon05.05 files supplied by the US. Army Corps of Engineers South Atlantic Division, Jacksonville Fl.

PROJECT HORIZONTAL DATUM

The project horizontal datum is the North American Datum 83 (NAD 83(2011)) (EPOCH:2010.0000).

LEVELING METHODS

The leveling for this project was performed in accordance with standard survey practice using conventional third order methods, techniques and equipment.

The allowable error (.05 √ miles) on this project meets or exceeds third order closures as required by SFWMD for this project per executed SOW for 4600003705-WO04 and discussions with SFWMD.

A level loop was run from the National Park Service Benchmark 7 MILE, through the well site, and to the National Park Service Benchmark JBA 095. The measurements were collected using a Digital Level and were hand written in Biscayne Engineering Co, Inc. Field Book 2981 Pages 55-59, dated May 7, 2019 reduced and adjusted electronically. Additional data was manually recorded in the field book.

GPS METHODS

Latitude and Longitude for Benchmark JBA 095 were established by observing a 3-minute session of GPS data on May 7, 2019 using a Trimble R-8-S and The Florida Permanent Reference Network (FPRN). The FPRN network consists of nearly 100 Continuously Operating Reference Stations (CORS) located throughout Florida.


EQUIPMENT USED


- Trimble GPS unit R-8-S, Serial Number 5625R066188.
- TOPCON DL-500 digital level Serial Number 512386 and a folding bar code rod.
- TOPCON Total Station GM-103, Serial Number ZQ000748.

SURVEYOR'S REPORT

VERTICAL CONTROL POINT

The Vertical Control point utilized and set as part of this survey is the:

NPS BM 7 Mile						
25° 39' 22.02" (N)	80° 45' 59.78" (W)		5.86 ft.	(NAVD88)	1.79 m	Published
			7.36 ft.	(NGVD29)	2.24 m	Published
			<p>THE MARK IS LOCATED: ABOUT 22 MILES NORTHWEST OF HOMESTEAD AND ABOUT 8 MILES SOUTH SOUTHEAST OF FORTY MILE BEND ON THE TAMiami TRAIL AND AT THE SITE OF THE SEVEN MILE EVERGLADES NATIONAL PARK FIRE LOOKOUT TOWER. STATION IS 128 FEET SOUTHWEST OF THE APPROXIMATE CENTER OF LOOKOUT TOWER, 48 FEET WEST OF THE APPROXIMATE CENTER OF TRACK ROAD, 34 FEET NORTH OF THE EDGE OF CANAL AND 2 FEET NORTHEAST OF A STEEL WITNESS POST WITH METAL SIGN</p> <p>ALUMINUM DISC IN CONCRETE STAMPED SEVEN MILE.</p>			

NPS BM JBA 095 (Recovered as part of this survey)						
25° 39' 21.82" (N)	80° 45' 59.37" (W)		6.76 ft.	(NAVD88)	2.06 m	Published
OPUS - NAD_83(2011)(EPOCH:2010.0000)			8.27 ft.	(NGVD29)	2.52 m	Published
			<p>THE MARK IS LOCATED: FROM THE INTERSECTION OF KROME AVENUE AND THE TAMiami TRAIL, GO WEST ON THE TAMiami TRAIL TO SHARK VALLEY TOWER ROAD, ALSO KNOWN AS SEVEN MILE ROAD, PROCEED SOUTHERLY TO A GATE AT THE SOUTHEAST CORNER OF THE PUBLIC PARKING AREA. FROM THIS GATE GO SOUTH FOR APPROX. 7 MILES TO THE END OF SEVEN MILE ROAD. 10 FEET S-SE OF EDGE OF RAMP TO TOWER, 8 FEET NORTH OF NORTH BANK OF POND, AND 15 FEET W-NW OF MOST WESTERLY LEG OF TOWER. 3 1/2" ALUMINUM DISC SET ATOP A 5/8" STAINLESS STEEL ROD DRIVEN TO REFUSAL, STAMPED JBA 095</p>			

SURVEYOR'S REPORT

PROJECT RESULTS

Field Book 2981, Page 59

O. LUNA I. BALLESTEROS ALEX S-07-19 DINI SET		BEC #03-86445 S. F. W. M. D. MIAMI DADE (26 WELLS) LOCATION AND ELEVATION (NAVD-88) OF USGS WELL G-620							
BS	DIST	HI	FS	DIST	ELEV.	BM ELEV.	DESC.		
AC 4451	4.976	53.15	10.831			5.855	FIND ALUM. DISC. IN CONI SEVEN MILE 1961, ELEV.:		
TP N. 3				4.495	32.71	6.356	SET MAX		
SHAKE	6.378	56.34	12.714						
TRAV 2				6.677	57.38	6.057	SET 1/2C BEL 0129		
SHAKE	6.001	60.14	12.038			6.02'	OPUS:		
TP N. 5	3.027	40.32	9.011						
SHAKE	8.824	31.46	17.8						
TRAV 1						6.86'	SET MINW BEC 012		
SHAKE	0.928	37.53	17.504						
TP 6				9.545	20.83				
SHAKE	3.095	22.93	11.054						
BM JBA 95				4.28	23.24	6.775	FIND ALUM. DISC., STAM BENCHMARK, ELEV.		
						6.763			
							ELEV. +0.02		

**BM JBA 095
ELEVATION: 6.76'
(NAVD88)**

SURVEYOR'S REPORT

Overall Site



G-620 Well Site
Latitude: **25° 39' 21.83"**
Longitude: **80° 45' 59.34"**
Reference elevation
8.33' (NAVD88)

Benchmark "JBA 095"
El. **6.76' (NAVD88)**

Looking Southerly (Oblique not to scale)

SURVEYOR'S REPORT


Tabular Form

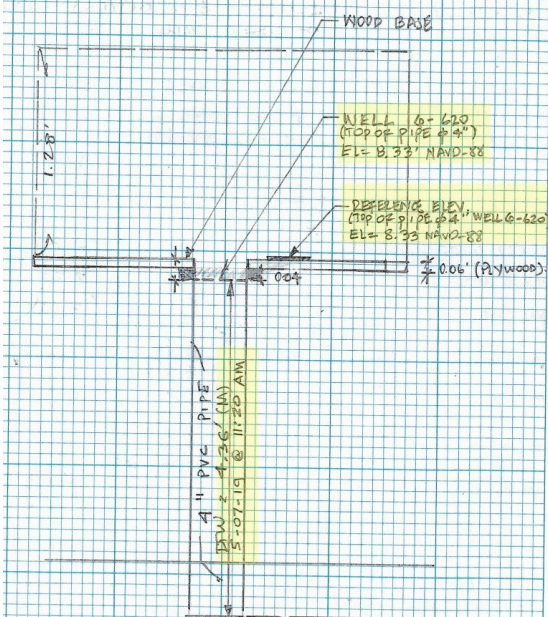
Reference and Ground Elevations: NAVD88				
Well	Ground Elevation	Reference Elevation	Comments	
G-620	5.38 ft.	8.33 ft.	Top of 4" PVC Pipe.	
Well diameter		Casing material	DTW	
4"		Metal	4.36 ft. (5/7/19 at 11:20 am)	

USGS Published: (Per USGS Report Site #: 254000080460001 G-620) (NGVD29)				
Well	Ground Elevation	Reference Elevation	Comments	
G-620	-	9.85 ft.	Top of Shelf	

Source & Site Benchmark	NAVD88	NGVD29 (Published)	NGVD29 (Corpscon)
7 MILE (NPS)	5.86 ft.		7.36 ft.
JBA 095 (NPS)	6.76 ft.		8.26 ft.

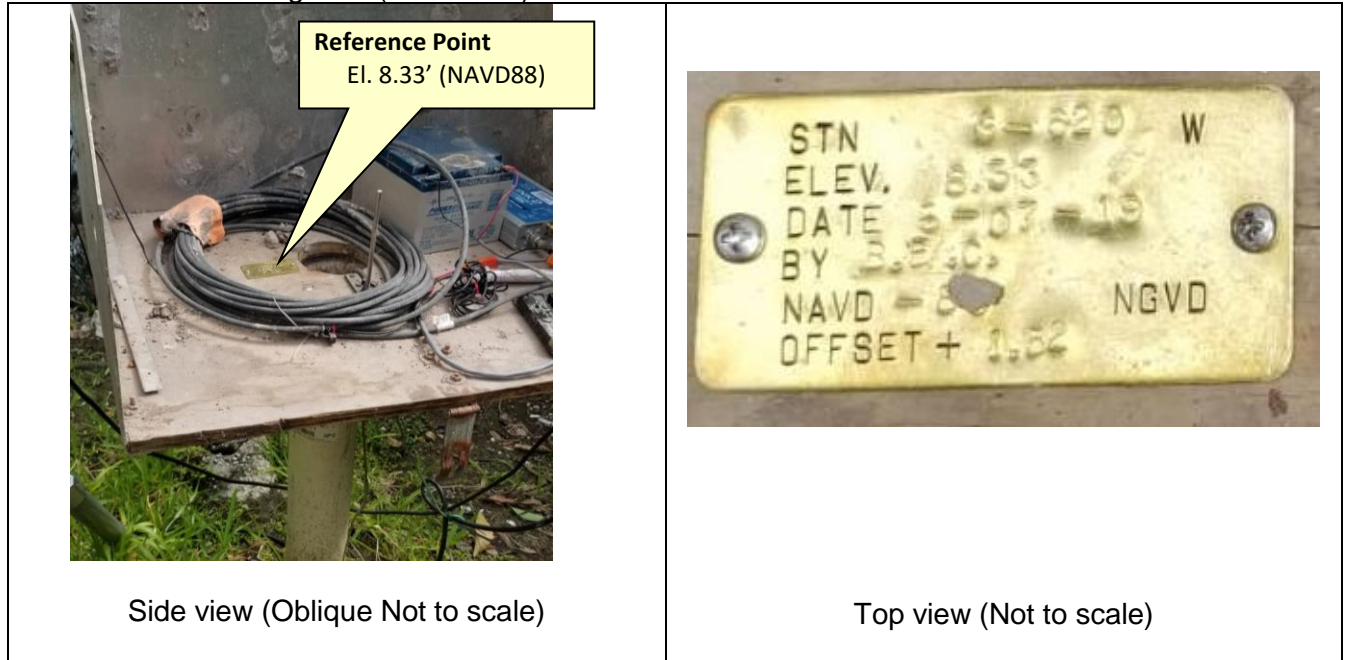
Well Photos and Diagrams (Continued)





SURVEYOR'S REPORT

Well Photos and Diagrams (Continued)



Surveyor's Notes:

1. All measurements herein are in United States Survey feet and decimal thereof, unless otherwise specified.
2. Underground utilities were not located as part of this survey.
3. This survey report or copies thereof are not valid without the original signature and seal of a Florida licensed Surveyor and Mapper.
4. Additions or deletions to this survey report by other than the signing party (or parties) is prohibited without written consent of the signing party (or parties).
5. To convert from NAVD 88 to NGVD 29 add 1.50 feet. This value is based on Corpscon 6.0.1 a U.S. Army Corps of Engineers Engineering Research and Development Center Topographic Engineering Center Alexandria, Virginia Windows-based program to convert coordinates and elevations between datum's using vertcon05.txt and vertcon05.05 files supplied by the U.S. Army Corps of Engineers South Atlantic Division, Jacksonville Fl.
6. Date of last field work: May 7, 2019, BEC job No. 03-86445.
7. SFWMD Data records (on file at the District's headquarters):
 - A. Electronic Data files:
 - Miscellaneous picture files
 - B. Conventional reporting
 - Field Book: 2981 pages 55-59

SURVEYOR'S REPORT

Abbreviations:

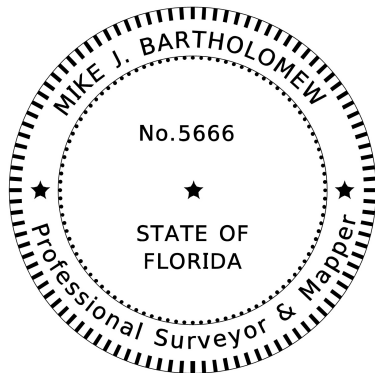
EI.	-	Elevation
DTW	-	Distance to the water table inside the well
M-DC	-	Miami-Dade County
NAVD88	-	North American Vertical Datum of 1988
NGVD29	-	National Geodetic Vertical Datum of 1929
NGS	-	National Geodetic Survey
PSM	-	Professional Surveyor & Mapper
PID	-	Permanent Identifiers
SFWMD	-	South Florida Water Management District
USGS	-	United States Geological Survey
BEC	-	Biscayne Engineering Company, Inc.
NPS	-	National Park Service

SURVEYOR'S CERTIFICATION

In my professional opinion this Specific Purpose Survey meets applicable portions of the Standards of Practice set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J-17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.

Last date of Survey
May 7, 2019

Mike Bartholomew, PSM, President
Florida Professional Surveyor and Mapper
License Number 5666
State of Florida
Biscayne Engineering Company, Inc. LB No 0129
529 West Flagler Street, Miami, FL. 33130
Tel (305) 324-7671





SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/18

DESIGNATION: G-620		PROJECT: G-620	
ESTABLISHED BY: SOUTH FLORIDA WATER MANAGEMENT DISTRICT		SURVEYOR: Mike Bartholomew	
RECOVERED BY: BISCAYNE ENGINEERING CO.		DATE: 05/07/19	
GEOGRAPHIC POSITION			
SECTION 30	TOWNSHIP 56 SOUTH	RANGE 36 EAST	
COUNTY: MIAMI-DADE	NAME OF QUADRANGLE: SHARK VALLEY LOOKOUT TOWER GEOGRAPHIC INDEX OF QUAD:		
HORIZONTAL DATUM: 1927 (1983) 2022 Other _____ (circle one) ZONE (E) or W			
VERTICAL DATUM: MSL 1929 (1988) 2022 Other _____ (circle one)			
VERTICAL ACCURACY: 1 2 (3)			
STATE PLANE COORDINATE	(N) Y= 480755.05	(E) X= 733084.46	NAVD 88 EL. 6.76' NGVD 29 EL. 8.26'
CORPSCON 6.0.1 CONVERSION FACTOR (NAVD88 TO NGVD29): (A U.S. Army Corps of Engineers Engineering Research and Development Center Topographic Engineering Center Alexandria, Virginia Windows-based program to convert coordinates and elevations between datum's using vertcon05.txt and vertcon05.05 files supplied by the U.S. Army Corps of Engineers South Atlantic Division, Jacksonville FL.) ACTUAL NGS or (ngvd29.txt file) OPUS Ortho Height			
LATITUDE: 25 ° 39' 21.82 " (N)		LONGITUDE: 80 ° 45' 59.37" (W) (Source) GPS RTK (FPRN)	
RECOVERY DATA			
Stamping: JBA 095			
To Reach: FROM THE INTERSECTION OF KROME AVENUE AND THE TAMIAMI TRAIL, GO WEST ON THE TAMIAMI TRAIL TO SHARK VALLEY TOWER ROAD, ALSO KNOWN AS SEVEN MILE ROAD, PROCEED SOUTHERLY TO A GATE AT THE SOUTHEAST CORNER OF THE PUBLIC PARKING AREA. FROM THIS GATE GO SOUTH FOR APPROX. 7 MILES TO THE END OF SEVEN MILE ROAD. THE MARK IS LOCATED 10 FEET S-SE OF EDGE OF RAMP TO TOWER, 8 FEET NORTH OF NORTH BANK OF POND, AND 15 FEET W-NW OF MOST WESTERLY LEG OF TOWER			
NOTABLE LAND MARKS: SHARK VALLEY OBSERVATION TOWER			
National Park Service-SOURCE BENCHMARK: 7 MILE			
FIELD BOOK PAGE <u>2981-59</u>			
PICTURES			
Aerial Overall Site			
<div style="border: 1px solid black; padding: 5px; display: inline-block;">NOT TO SCALE (Google Earth product)</div>			



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/18

Overall Site



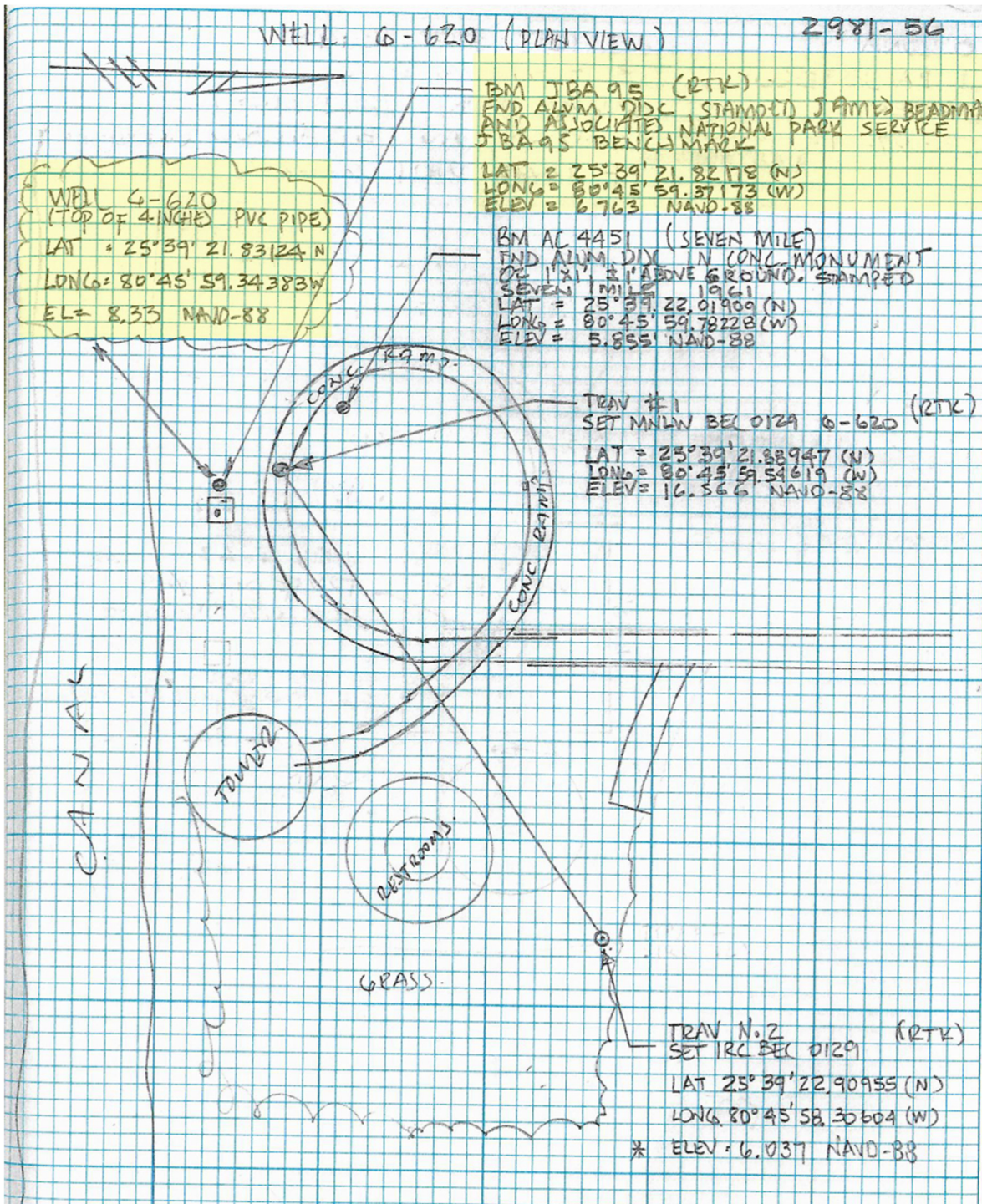
Looking Southerly (Oblique not to scale)



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/18

SKETCH



Office

Project

21 May 2019

INPUT

Geographic, NAD83
Vertical - NAVD88, U.S. Feet

OUTPUT

Geographic, NAD83
Vertical - NGVD29 (Vertcon94), U.S. Feet

JBA 095

1/1

Latitude: 25 39 21.82
Longitude: 80 45 59.37
Elevation/Z: 6.763

Latitude: 25 39 21.82000
Longitude: 80 45 59.37000
Elevation/Z: 8.266

Remark:

Office

Project

21 May 2019

INPUT

Geographic, NAD83
Vertical - NAVD88, U.S. Feet

OUTPUT

Geographic, NAD83
Vertical - NGVD29 (Vertcon94), U.S. Feet

WELL G620

1/1

Latitude: 25 39 21.83
Longitude: 80 45 59.34
Elevation/Z: 8.33

Latitude: 25 39 21.83000
Longitude: 80 45 59.34000
Elevation/Z: 9.833

Remark:

O. LUNA
L. BALLESTEROS
A. LEAL
5-07-19

BEC #03-86445
S. F. W. M. D.
MIAMI DADE (26 WELLS)
LOCATION & ELEVATIONS (NAVD-88)
OR USGS WELL G-620

TRIMBLE GPS R-10-S.

GPS → TRIMBLE R-10-S (FPRN)
TRAV. #1 → BTK (SMNLW 0129) 5' 4.9"
TRAV # → BTK (SIRC 0129) 7' 32"

" VIA OPUS "

TRAV #2 (SET IRC 0129) $\pi = 5.30$ FT
START → 10:50 AM
END → 12:55 PM

TRAV #1 (SET MNLW BEC 0129) $\pi = 5.02$ FT
G-620
START → 1:07 PM
END → 3:22 PM

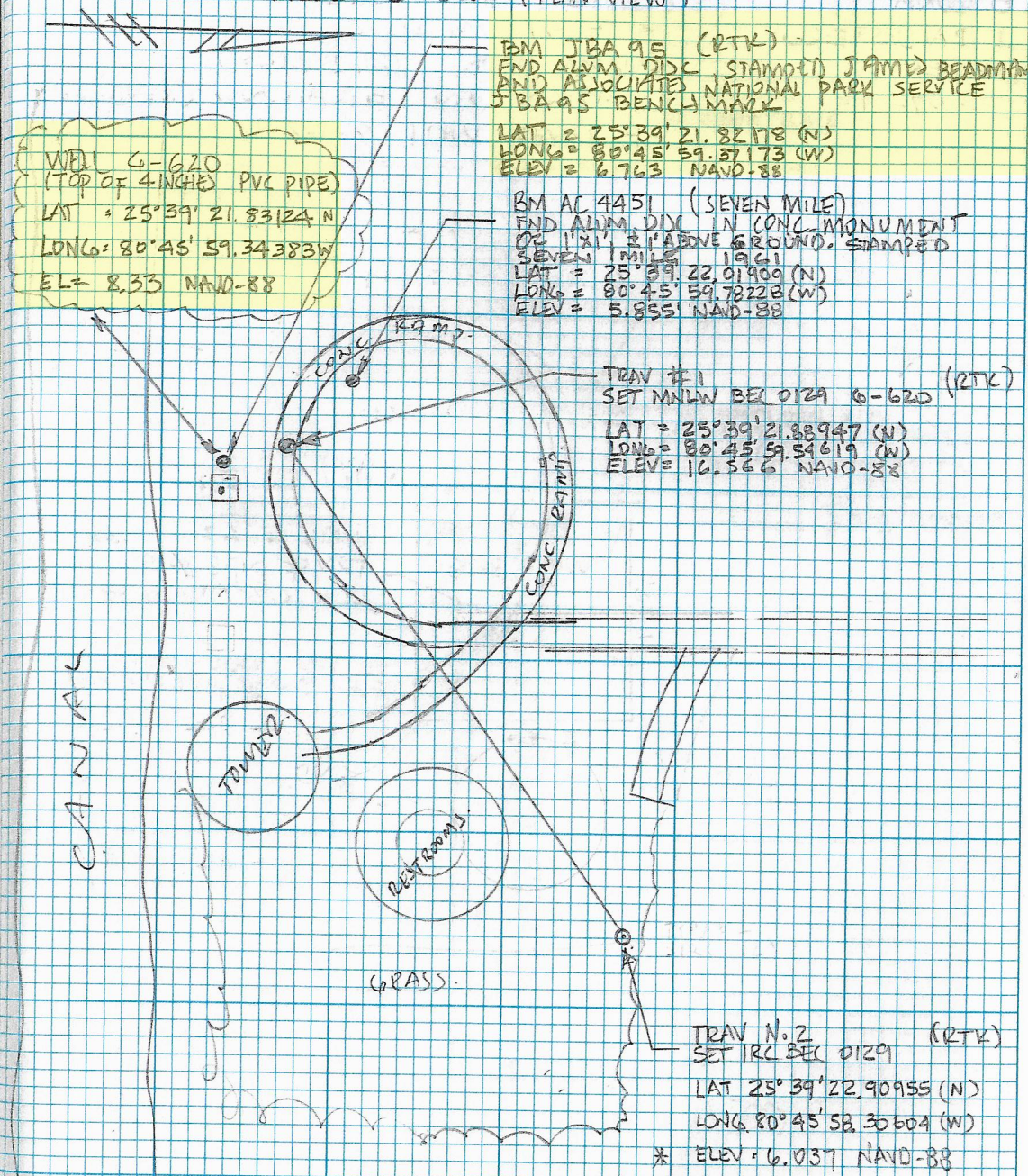
OLUNA.
 L. BAILESTEROS
 A. LEAL
 5-07-19
 86445 L20
 TOPCON ZQ0007A8

BEC #03-86445
 S. F. W. M. D.
 MIAMI DADE (26 WELLS)
 LOCATION AND ELEVATION (NAVD-88)
 OF USGS WELL G-620

INST @ TRAV # 1
 HX = 5.02

STA	TI	H002	VERT	SLOPE	DIST	WDC
580 = 2	S. 15	00'00"06	93°52'43"	153.615	SIRC 0129	

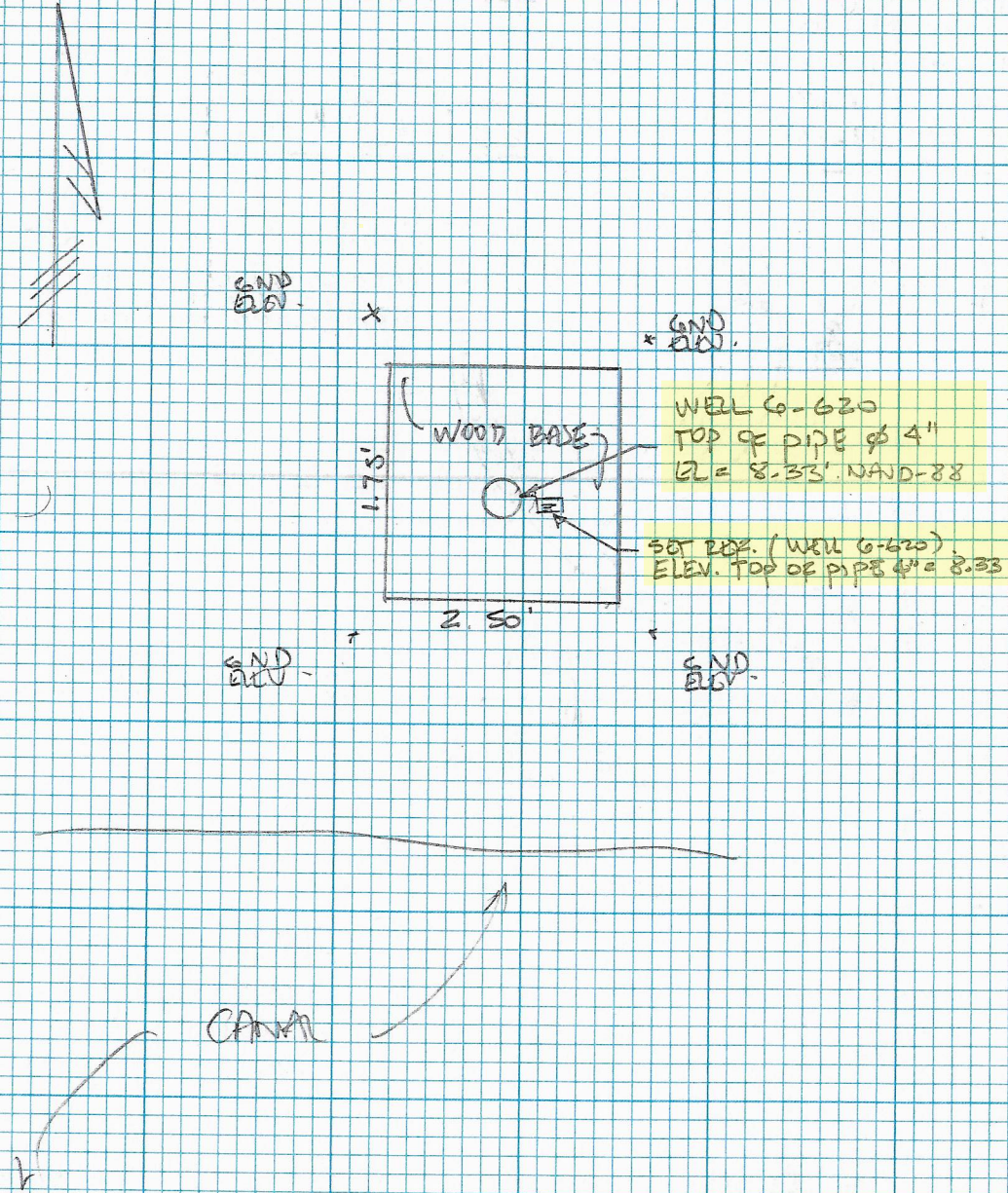
WELL: G-620 (PLAN VIEW) 2981-56



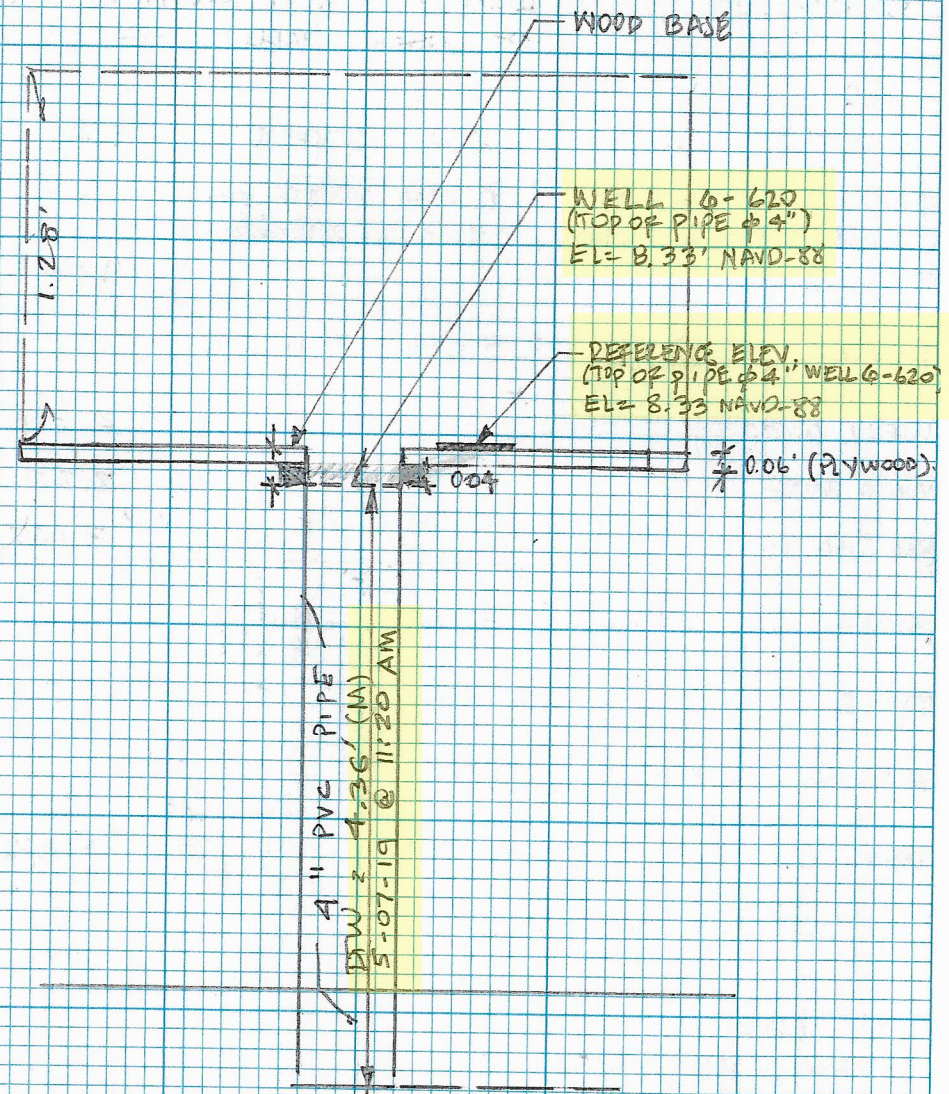
THE ELEVATIONS SHOWN IN THIS PAGE WERE CALCULATED HAVING EXISTING BENCHMARKS IN THE SITE

O. LUNA
 L. BALLESTEROS
 A. LEAL
 5-07-19

BEC #03.86445
 S. F. W. M. D.
 MIAMI DADE (26 WELLS)
 LOCATION AND ELEVATIONS (NAVD-88)
 OF USGS WELL G-620



WELL G-620 (PROFILE VIEW)
 (LOOKING NORTH) 2981-57



O. LUNA
 L. BALLESTEROS
 A. LEAL
 5-07-19

BEC # 03-86445
 S. F. W. M. D.
 MIAMI DADE (26 WELLS)
 LOCATION & ELEVATION (NAVD-88)
 OF USGS WELL G-620

DINI

SET	DIST	BS	HI	FS	DIST
TRA 1	37.07	0.714	17.819 17.28		
TP 1				9.065	20.77
SHAKE	22.77	2.506	11.260 10.721		
WELL G-620				2.39	21.00
WOOD BADE				2.29	21.00
BM JBA 95				3.947	23.56
SHAKE	23.65	4.055	11.267 10.829		
TP 2				2.702	22.64
SHAKE	54.66	4.337	13.002 12.464		
TRAV 2				6.429	59.42

ELEVAT BM ELEV. DESCRIPTION
 16.566 SET MNLW BEC 0129 G-620
 SEE PAGE N. 59, ELEV = 16.566 NAVD-88

~~8.783~~
8.215

8.33

8.431

~~7.312~~ 6.774

~~8.685~~
8.127

~~6.573~~
6.035

~~6.865~~
6.037

SET IRON REBAR AND CAP BEC 0129.
 SEE PAGE N. 59, ELEV = 6.037 NAVD-88

ELEVATION = -0.002

GND ELE. 5.38'

LINE LEVELING RESULTS
 DISTANCES BS 138.16 FT
 FS 126.38 FT

FINAL DIFF ~~-0.008~~
 -0.002

O. LVNA

BEC #03-86445

L. BALLESTEROS

S. F. W. M. D.

A LEAL

MIAMI DADE (26 WELLS)

5-07-19

LOCATION AND ELEVATION (NAVD-88)

OF USGS WELL G-620

DINI

SET	BS	DIJT	HI	FS	DIJT	ELEV	BM ELEV	DESC.
AC 4451	4.976	53.15	10.831				5.855	FWD ALUM. DISC. IN CONN SEVEN MILE 1961, ELEV =
NAVD88								
TP N. 3				4.495	32.71	6.336		SET MY
SHAKE	6.378	56.36	12.714					
TRAV 2				6.677	57.38	6.057		SET IRC BEL 0129
						OPUS: 6.02'		
SHAKE	6.001	60.14	12.038					
TP N. 5	3.027	40.32	9.011					
SHAKE	8.824	31.46	17.835					
TRAV L				12.69	35.79	16.566		SET MNLW BEC 012
						OPUS: 16.86'		
SHAKE	0.938	37.53	17.504					
TP 6				9.545	20.83	7.959		
SHAKE	3.095	22.93	11.054					
BM JBA 95				4.28	23.26	6.775	6.763	FWD ALUM. DISC., STAMP BENCHMARK, ELEV =
NAVD88								
						ERROR +0.012		

James Beadman and Assoc. Inc.
Consulting Surveyors
Phone 305/252-0741
Email=Beadman@msn.com

**VERTICAL AND HORIZONTAL CONTROL
MONUMENTS**
FOR NATIONAL PARK SERVICE

DESIGNATION: 7 MILE

Project: ENP/SHARK VALLEY	PID: AC4451	SSN: NONE
State: FLORIDA	County: DADF	USGS Quad: SHARK VALLEY LOOKOUT TOWER
Date Set: 1/1/1961	Set by: COAST AND GEODETIC SURVEY	
Last Recovered: 8/5/1995	Last Recovered By: JBA	

VERTICAL ORDER: SECOND CLASS TWO

NGVD 29 FEET:	7.361	NAVD 88 FEET:	5.855
NGVD 29 METERS:	2.2436	88 MINUS 29	-0.459 in meters

NAD 1927 HORIZONTAL ORDER: SCALED FROM A TOPO

UTM EASTING: 523417.000	LATITUDE: 25 39 60	SPC EASTING:
UTM NORTHING: 2838629.000	LONGITUDE: 080 46 00	SPC NORTHING:

STAMPED: 7 MILE

DESCRIPTION:

UMINUM DISC IN 1'X1' CONCRETE MONUMENT. APPROX. 1 FOOT ABOVE GROUND.

STATION DESCRIPTION:

FROM THE INTERSECTION OF KROME AVENUE (SW 177TH AVENUE) AND THE TAMiami TRAIL (US 41), GO WEST ON THE TAMiami TRAIL TO SHARK VALLEY TOWER ROAD, ALSO KNOWN AS SEVEN MILE ROAD, PROCEED SOUTHERLY TO A GATE AT THE SOUTHEAST CORNER OF THE PUBLIC PARKING AREA. FROM THIS GATE GO SOUTH FOR APPROX. 7 MILES TO THE END OF SEVEN MILE ROAD. MONUMENT 7 MILE IS LOCATED APPROX. 10 FEET NORTH OF SOUTHERN MOST POINT OF INTERIOR WALL OF WALKWAY LEADING TO TOWER.

James Beadman and Assoc, Inc.
Consulting Surveyors
Phone 305/252-0741
Email=Beadman@msn.com

**VERTICAL AND HORIZONTAL CONTROL
MONUMENTS**
FOR NATIONAL PARK SERVICE

DESIGNATION: JBA 095

Project :	ENP/SHARK VALLEY/G-620	PID: NONE	SSN: NONE
State:	FLORIDA	County: DADE	USGS Quad: SHARK VALLEY LOOKOUT TOWER
Date Set:	8/25/1995	Set by:	JBA
Last Recovered:	8/25/1995	Last Recovered By:	JBA

VERTICAL ORDER: SECOND CLASS TWO

NGVD 29 FEET:	8.269	NAVD 88 FEET:	6.763
NGVD 29 METERS:	2.5204	88 MINUS 29	-0.459 in meters

NAD 1927 HORIZONTAL ORDER: HAND GPS

UTM EASTING: 523417.000	LATITUDE: 25 39 59.97	SPC EASTING:
UTM NORTHING: 2838629.000	LONGITUDE: 080 46 00.02	SPC NORTHING:

STAMPED: JAMES BEADMAN & ASSOC., NATIONAL PARK SERVICE BENCHMARK JBA 95

DESCRIPTION:

STATION MARK IS A 3 1/2" ALUMINUM DISC SET ATOP A 5/8" STAINLESS STEEL ROD DRIVEN TO REFUSAL SET NEXT TO WELL G-620. APPROX. 1.6 FEET ABOVE GROUND LEVEL.

STATION DESCRIPTION:

FROM THE INTERSECTION OF KROME AVENUE (SW 177TH AVENUE) AND THE TAMiami TRAIL (US 41), GO WEST ON THE TAMiami TRAIL TO SHARK VALLEY TOWER ROAD, ALSO KNOWN AS SEVEN MILE ROAD, PROCEED SOUTHERLY TO A GATE AT THE SOUTHEAST CORNER OF THE PUBLIC PARKING AREA. FROM THIS GATE GO SOUTH FOR APPROX. 7 MILES TO THE END OF SEVEN MILE ROAD. MONUMENT JBA 095 IS LOCATED 1.5 FEET WEST OF WELL G-620, 10 FEET S-SE OF EDGE OF RAMP TO TOWER, 8 FEET NORTH OF NORTH BANK OF POND, AND 15 FEET W-NW OF MOST WESTERLY LEG OF TOWER