PROFESSIONAL SURVEYORS & MAPPERS
INCORPORATED

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Statewide: 800.386.1066 www.gcyinc.com

SURVEYOR'S REPORT

Specific Purpose Survey of the United States
Geological Survey Well **STL 213**
in
St Lucie County, Florida

Prepared for:

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

Prepared by:
Peter Andersen, PSM, Vice President
Florida Professional Surveyor and Mapper
License Number 5199
State of Florida

GCY, Inc. LB 4108
PO Box 1469/1505 SW Martin Highway
Palm City, Florida 33491/33490
772-286-8083

TABLE OF CONTENTS

PURPOSE

The Purpose of this survey is to set an Elevation Referenced Mark (Benchmark) using the guidelines for a National Geodetic Survey (NGS), Class "C" concrete monument and to establish a North American Vertical Datum of 1988 (NAVD 88) on said Benchmark and on an additional Reference Point with a Brass Plate, both at United States Geological Survey Well **"STL 213"**.

LOCATION OF PROJECT

The United States Geological Survey Well **"STL 213"** is located in the Section 26, Township 35 South, Range 39 East, St Lucie County, Florida.

General Location (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 (NGVD) of 1929 at **Station STL 213 add 1.483.** These values are based on Corpscon 6.0.1, a U.S. Army Corps of Engineers, Engineering Research and Development Center Windows based program to convert coordinates and elevations between datums using the updated vertcon05.txt and the vertcone.05 files supplied by the U.S Army Corps of Engineers. South Atlantic Division, Jacksonville, Florida.

PROJECT HORIZONTAL DATUM

The project horizontal datum is the State Plane Coordinate System, Florida East Zone, North American Datum 83, adjustment of 2011.

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 on this project meets or exceeds closures as required by SFWMD (.02 √ miles) per executed SOW for 4600003703 WO07. Leveling was run from SFWMD BM 33C through the site benchmark and closing on the National Geodetic Survey (NGS) monument "DUCK" (NGS PID AF7699). Leveling was done using a Leica DNA 10 digital level S/N 331745

GPS METHODS

Latitude and longitude for the New Benchmark **"STL 213"** were established by observing a 4.5-hour Static Sessions on February 13, 2020 using a Trimble 5700 dual frequency receiver S/N 0220381397. The data from these sessions was sent to the NGS "OPUS" site for post processing on May 14, 2020 and the reports were received from the "OPUS" site the same day.

Surveyors' 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 1.483 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: February 13, 2020, GCY job No. 18-1020-07.
7. SFWMD Data records (on file at the District's headquarters):

A. Electronic Data files:

Miscellaneous picture files

Digital level run

File names: XXXXXX.DAT

B. Conventional reporting

Field Book: 1862 pages 41-45

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.

February 13, 2020

Last date of Survey

Peter Andersen, PSM, Vice President
Florida Professional Surveyor and Mapper
License Number 5199
State of Florida
GCY, Inc. LB No 4108

NOTE:
This is an electronically signed and sealed document pursuant to Chapter 5J-17.062, Florida Administrative Code. The printed survey map or report or copies thereof are not valid without the original signature and seal of a Florida licensed surveyor or mapper.

PROFESSIONAL SURVEYORS & MAPPERS
INCORPORATED

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

U.S.G.S. Station Name: **STL 213**	U.S.G.S. Station Number: 272427080240201	Agency: **GCY, INC.**	Date of Field Work: **2/13/2020**
Party Chief: LAPOLLA	Field Book: **GCY 1862**	Page(s): **41-45**	Report Prepared by: ANDERSEN

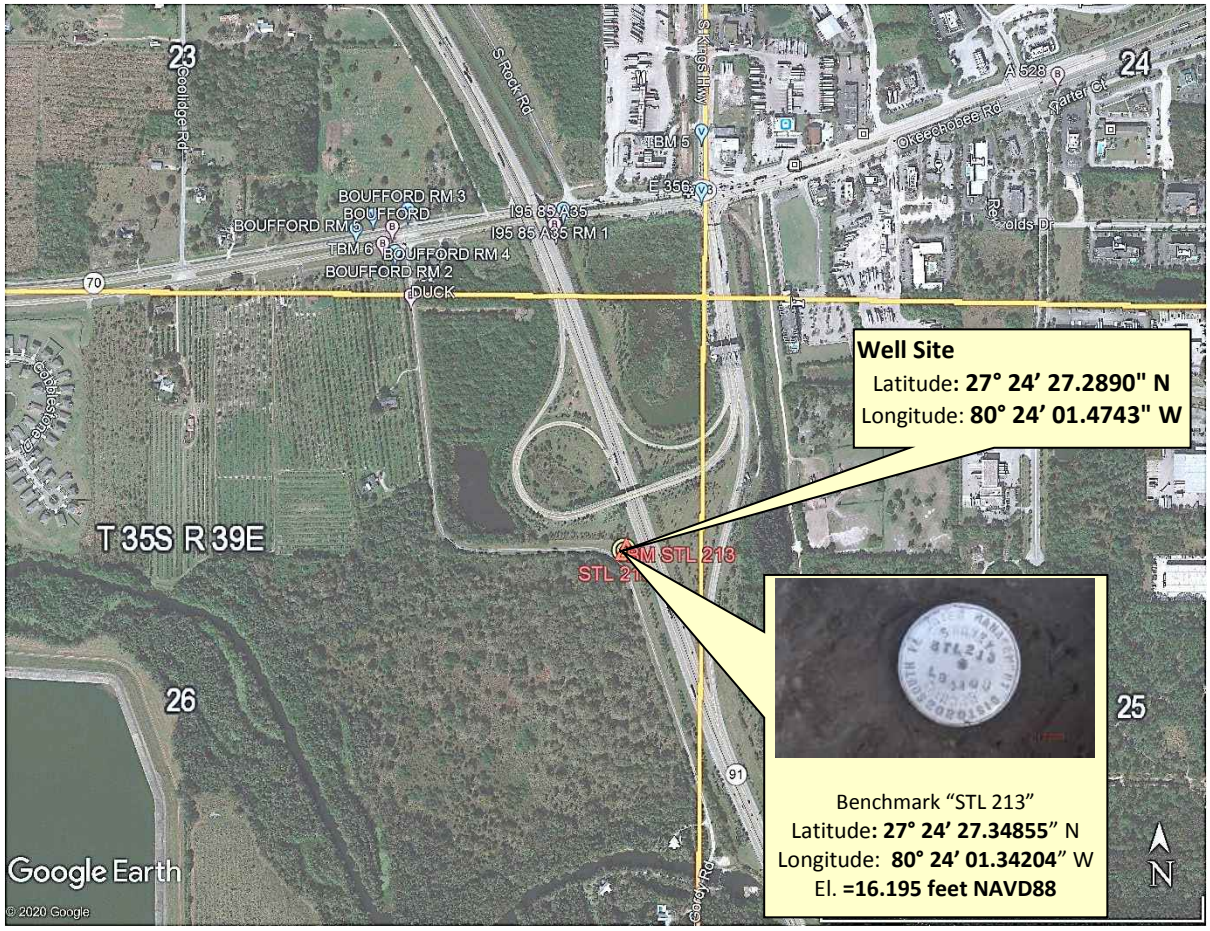
SITE SPECIFIC DATA			
Site Benchmark: **STL 213**	Benchmark Elevation(s) *(NAVD88)*: **16.195**	Corpscon 6.0.1 Conversion Factor (*NAVD88 to NGVD29*) **+ 1.483**	
Well Reference Elevation (*NAVD88*): 18.322	DTW: **8.35** (02/ 13/ 2020 at 3:25 PM)	Ground Elevation *(NAVD88)*: **16.6**	Pad Elevation (*NAVD88*): **N/A**

GEOGRAPHIC DATA		
Section **26**	Township **35 S**	Range **39 E**
Well Latitude: **27° 24’ 27.2890" N**	Well Longitude: **80° 24’ 01.4743" W**	Location Source: **RTK GPS**
State Plane Coordinates:	Northing (Y) = 1117802.39	Easting (X) = 850698.31

Notes: **NAVD88** – North American Vertical Datum of 1988; **NGVD29**- National Geodetic Vertical Datum of 1929; **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.

PICTURES

Aerial of Overall Well Site



Not to scale (GoogleEarth product)

Well Site and Well Head

Well: “STL 213”
Reference Point: MAGIC MARKER BOX

Reference Point El. =**18.322 feet NAVD88**

Distance to Water =8.35 **feet** from reference point
(02/ 13/ 2020 at 3:25 PM)

New Aluminum Tag

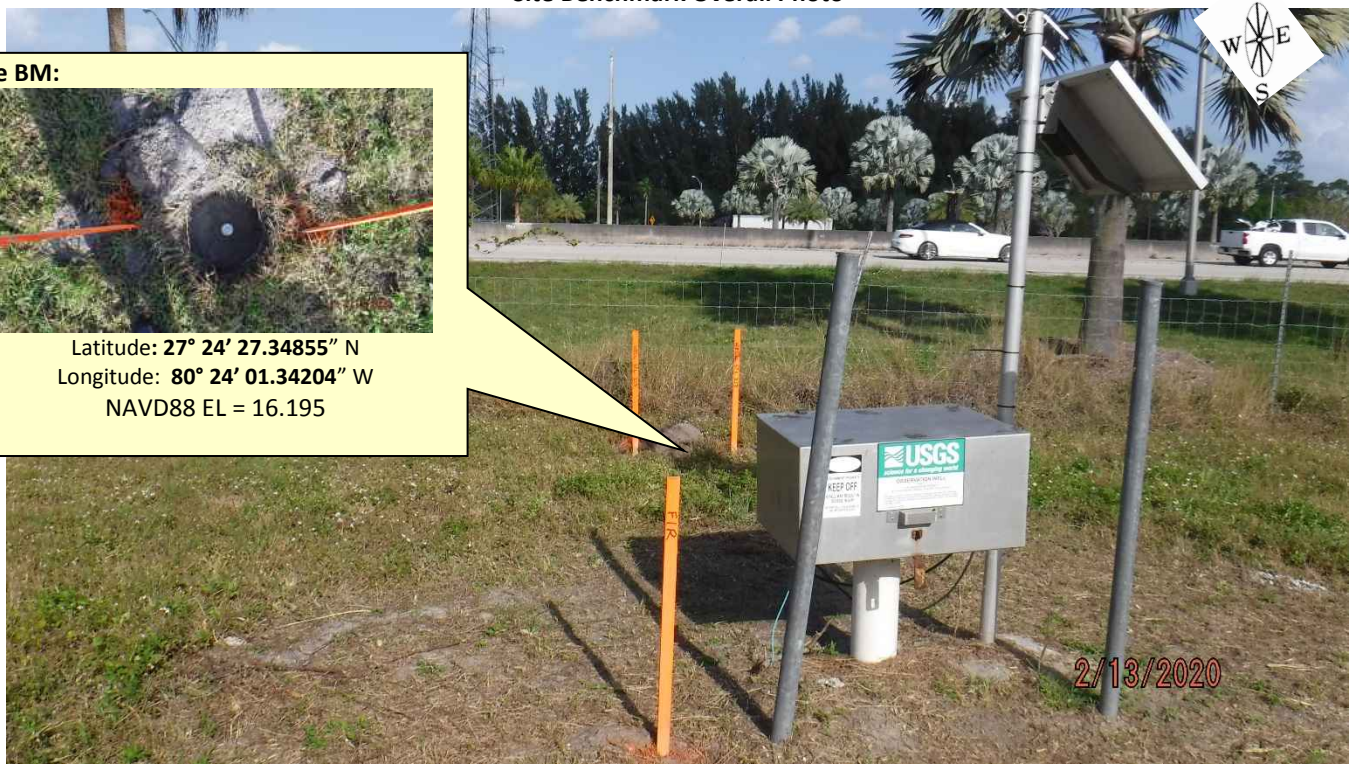
USGS RMs

Site BM RM-1:

NAVD88 EL = 16.364

Site Benchmark

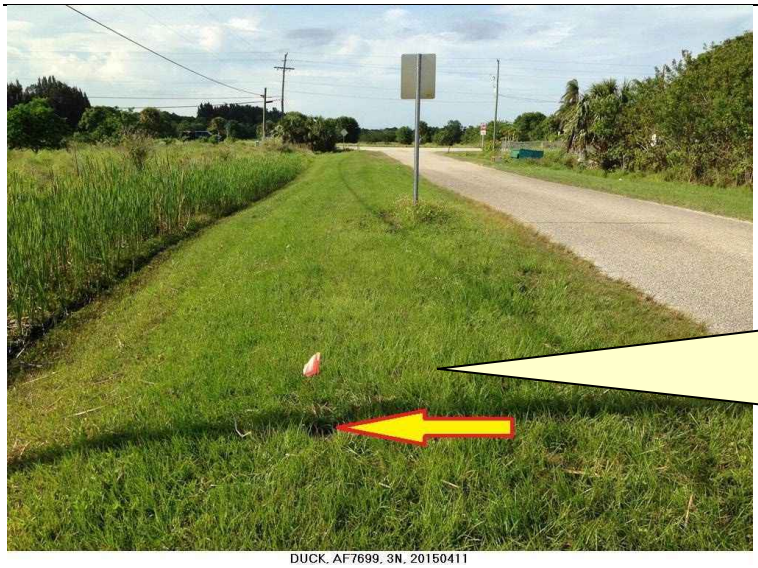
Site Benchmark Overall Photo



Site BM:

Latitude**: 27° 24' 27.34855**" N
Longitude: **80° 24' 01.34204**" W
NAVD88 EL = 16.195

Source Benchmarks



DUCK, AF7699, 3N, 20150411

Source BM – "DUCK"

Latitude**: 27° 24' 39.57094**" N
Longitude: **80° 24' 13.83196**" W
NAVD88 EL = 16.645

"DUCK" Benchmark Datasheet (1 OF 3)

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.12.5.7
Starting Datasheet Retrieval...
1         National Geodetic Survey,   Retrieval Date = MAY 14, 2020
 AF7699 ***********************************************************************
 AF7699  DESIGNATION -  DUCK
 AF7699  PID         -  AF7699
 AF7699  STATE/COUNTY-  FL/ST LUCIE
 AF7699  COUNTRY     -  US
 AF7699  USGS QUAD   -  FORT PIERCE NW (2018)
 AF7699
 AF7699                         *CURRENT SURVEY CONTROL
 AF7699  ______________________________________________________________________
 AF7699* NAD 83(2011) POSITION- 27 24 39.57094(N) 080 24 13.83196(W)   ADJUSTED
 AF7699* NAD 83(2011) ELLIP HT-   -22.284 (meters)        (06/27/12)   ADJUSTED
 AF7699* NAD 83(2011) EPOCH    -  2010.00
 AF7699* NAVD 88 ORTHO HEIGHT -     5.074 (meters)       16.65  (feet) ADJUSTED
 AF7699  ______________________________________________________________________
 AF7699  GEOID HEIGHT    -        -27.360 (meters)                     GEOID18
 AF7699  NAD 83(2011) X  -    944,544.770 (meters)                     COMP
 AF7699  NAD 83(2011) Y  - -5,586,762.382 (meters)                     COMP
 AF7699  NAD 83(2011) Z  -  2,918,707.865 (meters)                     COMP
 AF7699  LAPLACE CORR    -         -1.69  (seconds)                    DEFLEC18
 AF7699  DYNAMIC HEIGHT  -          5.066 (meters)       16.62  (feet) COMP
 AF7699  MODELED GRAVITY -    979,141.0   (mgal)                       NAVD 88
 AF7699
 AF7699  VERT ORDER      -  FIRST     CLASS II
 AF7699
 AF7699  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AF7699  Standards:
 AF7699         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AF7699            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AF7699  ------------------------------------------------------------------------
 AF7699  NETWORK    0.65   1.08          0.27   0.26   0.55     -0.00919398
 AF7699  ------------------------------------------------------------------------
 AF7699  Click here for local accuracies and other accuracy information.
 AF7699
 AF7699
 AF7699.The horizontal coordinates were established by GPS observations
 AF7699.and adjusted by the National Geodetic Survey in June 2012.
 AF7699
 AF7699.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AF7699.been affixed to the stable North American tectonic plate. See
 AF7699.NA2011 for more information.
 AF7699
 AF7699.The horizontal coordinates are valid at the epoch date displayed above
 AF7699.which is a decimal equivalence of Year/Month/Day.
 AF7699
 AF7699.The orthometric height was determined by differential leveling and
 AF7699.adjusted by the NATIONAL GEODETIC SURVEY
 AF7699.in November 2001.
 AF7699
 AF7699.Significant digits in the geoid height do not necessarily reflect accuracy.
 AF7699.GEOID18 height accuracy estimate available here.
 AF7699
 AF7699.Click photographs - Photos may exist for this station.
 AF7699
```

"DUCK" Benchmark Datasheet (2 OF 3)


```
AF7699.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AF7699
AF7699.The Laplace correction was computed from DEFLEC18 derived deflections.
AF7699
AF7699.The ellipsoidal height was determined by GPS observations
AF7699.and is referenced to NAD 83.
AF7699
AF7699.The dynamic height is computed by dividing the NAVD 88
AF7699.geopotential number by the normal gravity value computed on the
AF7699.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AF7699.degrees latitude (g = 980.6199 gals.).
AF7699
AF7699.The modeled gravity was interpolated from observed gravity values.
AF7699
AF7699. The following values were computed from the NAD 83(2011) position.
AF7699
AF7699;                    North         East      Units Scale Factor Converg.
AF7699;SPC FL E     -   341,083.255   258,952.091   MT  0.99998406   +0 16 28.1
AF7699;SPC FL E     - 1,119,037.31    849,578.65    sFT  0.99998406   +0 16 28.1
AF7699;UTM  17      - 3,032,098.861   558,931.977   MT  0.99964287   +0 16 28.1
AF7699
AF7699!             -  Elev Factor  x  Scale Factor =   Combined Factor
AF7699!SPC FL E     -   1.00000350  x   0.99998406  =   0.99998756
AF7699!UTM  17      -   1.00000350  x   0.99964287  =   0.99964637
AF7699
AF7699_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNL5893132098(NAD 83)
AF7699
AF7699|-----------------------------------------------------------------------|
AF7699| PID    Reference Object                    Distance      Geod. Az   |
AF7699|                                                          dddmmss.s  |
AF7699| AF6653 BOUFFORD                          112.289 METERS 34449      |
AF7699|-----------------------------------------------------------------------|
AF7699
AF7699                          SUPERSEDED SURVEY CONTROL
AF7699
AF7699  NAD 83(2007)-  27 24 39.57093(N)    080 24 13.83274(W) AD(2002.00) 0
AF7699  ELLIP H (02/10/07)  -22.267  (m)                       GP(2002.00)
AF7699  NAD 83(1999)-  27 24 39.57117(N)    080 24 13.83319(W) AD(       ) A
AF7699  ELLIP H (12/09/02)  -22.235  (m)                       GP(       ) 4 1
AF7699  NAD 83(1999)-  27 24 39.57117(N)    080 24 13.83319(W) AD(       ) B
AF7699  ELLIP H (05/31/01)  -22.235  (m)                       GP(       ) 5 1
AF7699  NAD 83(1990)-  27 24 39.56989(N)    080 24 13.83211(W) AD(       ) B
AF7699  ELLIP H (06/02/94)  -22.249  (m)                       GP(       ) 3 1
AF7699  NAVD 88              5.07   (m)          16.6    (f) LEVELING    3
AF7699  NAVD 88 (06/02/94)   5.1    (m)  GEOID93 model used   GPS OBS
AF7699
AF7699.Superseded values are not recommended for survey control.
AF7699
AF7699.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AF7699.See file dsdata.pdf to determine how the superseded data were derived.
AF7699
AF7699_MARKER: F = FLANGE-ENCASED ROD
AF7699_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AF7699_STAMPING: DUCK 1993
AF7699_MARK LOGO: NGS
AF7699_PROJECTION: RECESSED 3 CENTIMETERS
AF7699_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
AF7699_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AF7699_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AF7699+SATELLITE: SATELLITE OBSERVATIONS - April 11, 2015
AF7699_ROD/PIPE-DEPTH: 14   meters
AF7699_SLEEVE-DEPTH  : 1 meters
AF7699
AF7699  HISTORY     - Date     Condition        Report By
AF7699  HISTORY     - 1993     MONUMENTED       NGS
```

"DUCK" Benchmark Datasheet (3 OF 3)

5/14/2020 DATASHEETS

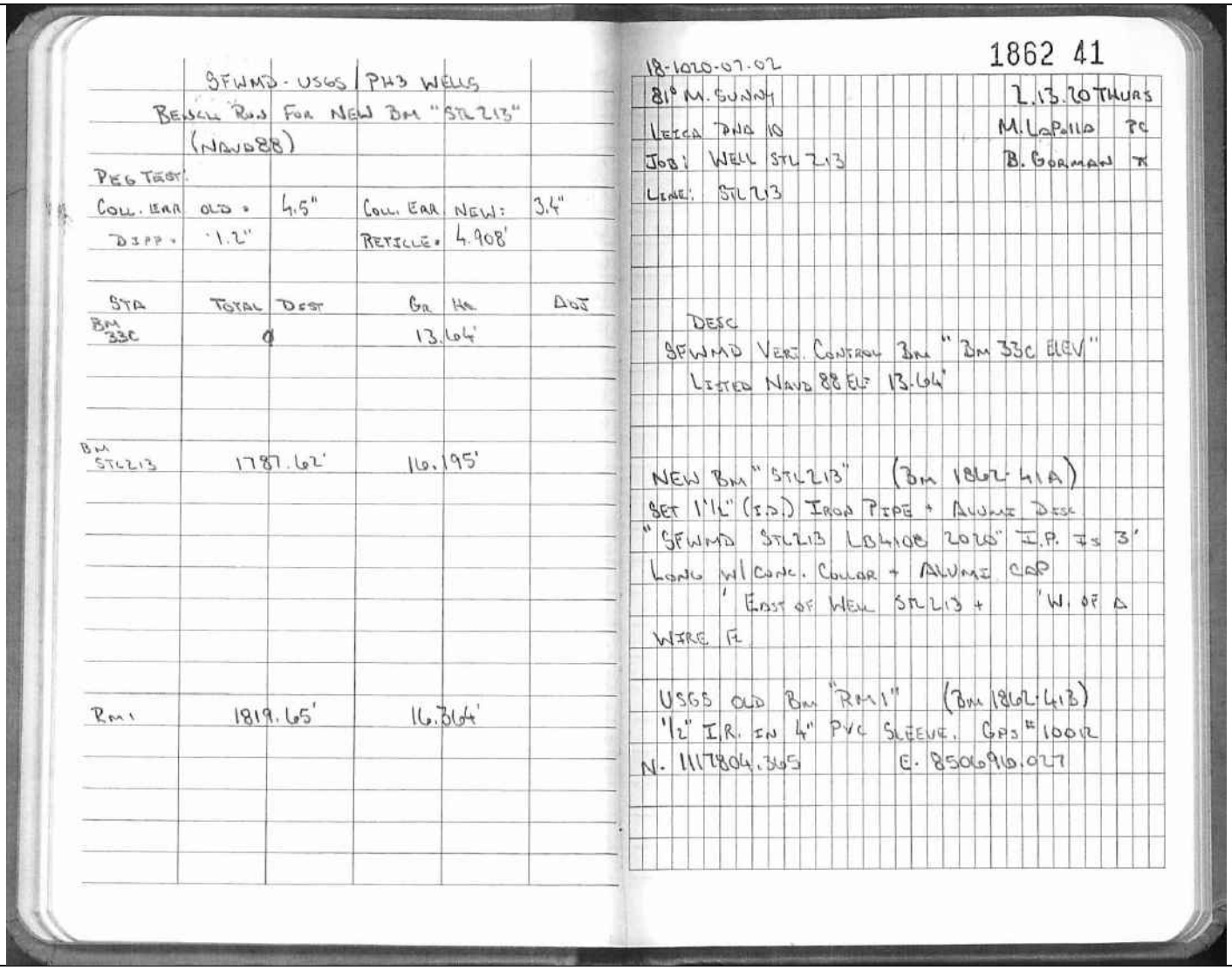
```
AF7699  HISTORY     - 19950214 GOOD            SFLWMD
AF7699  HISTORY     - 20010524 GOOD            EMCINC
AF7699  HISTORY     - 20020226 GOOD            MAPTEC
AF7699  HISTORY     - 20020415 GOOD            MAPTEC
AF7699  HISTORY     - 20150411 GOOD            GEOCAC
AF7699
AF7699                          STATION DESCRIPTION
AF7699
AF7699'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993
AF7699'THE STATION IS LOCATED ABOUT 19.3 KM (12.00 MI) NORTHWEST OF PORT ST
AF7699'LUCIE, 8.05 KM (5.00 MI) SOUTHWEST OF FORT PIERCE, 0.16 KM (0.10 MI)
AF7699'WEST OF THE FLORIDA TURNPIKE 0.16 KM (0.10 MI) SOUTH OF STATE ROAD 70
AF7699'IN THE NORTHEAST CORNER OF LUCIE COUNTY AND ALONG THE WEST SIDE OF
AF7699'GORDY ROAD. OWNERSHIP--HIGHWAY RIGHT OF WAY.
AF7699'TO REACH THE STATION FROM THE JUNCTION OF STATE ROAD 70 AND THE
AF7699'FLORIDA TURNPIKE, GO WEST ON STATE ROAD 70 FOR 0.16 KM (0.10 MI) TO A
AF7699'SIDE ROAD LEFT.  TURN LEFT AND GO SOUTH ON GORDY ROAD 0.16 KM
AF7699'(0.10 MI) TO THE STATION ON THE RIGHT.
AF7699'LOCATED 92.7 M (304.1 FT) NORTH OF A PRIVATE DRIVEWAY (ADDRESS 3075
AF7699'GORDY ROAD), 9.7 M (31.8 FT) EAST OF A POWER POLE WITH WITNESS POST,
AF7699'6.8 M (22.3 FT) SOUTH OF A 35 MPH SIGN AND 5.2 M (17.1 FT) WEST OF
AF7699'THE CENTERLINE OF GORDY ROAD.
AF7699
AF7699                          STATION RECOVERY (1995)
AF7699
AF7699'RECOVERY NOTE BY S FL WATER MGMT DIST 1995 (MEH)
AF7699'THE STATION IS LOCATED IN FORT PIERCE ON STATE ROAD 70 NEAR THE
AF7699'FLORIDA TURNPIKE IN SECTION 26, TOWNSHIP 35 SOUTH, RANGE 39 EAST.  TO
AF7699'REACH THE STATION FROM THE INTERSECTION OF STATE ROAD 70 (OKEECHOBEE
AF7699'ROAD) AND STATE ROAD 713 (KINGS HIGHWAY) IN FORT PIERCE, GO SOUTHWEST
AF7699'ON STATE ROAD 70 (OKEECHOBEE ROAD) FOR 0.3 MI (0.5 KM) TO THE JUNCTION
AF7699'OF GORDY ROAD ON THE LEFT, TURN LEFT ON GORDY ROAD AND GO SOUTH FOR
AF7699'0.05 MI (0.08 KM) TO THE STATION ON THE RIGHT.  LOCATED 39.4 FT (12.0
AF7699'M) SOUTH OF A METAL POST FOR A SPEED LIMIT SIGN, 31.6 FT (9.6 M) EAST
AF7699'OF A CARSONITE WITNESS POST, 31.6 FT (9.6 M) EAST OF A POWER POLE,
AF7699'17.1 FT (5.2 M) WEST OF THE APPROXIMATE CENTERLINE OF GORDY ROAD AND
AF7699'9.6 FT (2.9 M) WEST OF THE WEST EDGE OF THE PAVEMENT. NOTE ACCESS TO
AF7699'DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.
AF7699
AF7699                          STATION RECOVERY (2001)
AF7699
AF7699'RECOVERY NOTE BY EMC INCORPORATED 2001 (WJB)
AF7699'RECOVERED IN GOOD CONDITION.  NOTE--DESCRIBED IN SEC 26, T-35
AF7699'SOUTH, R-39-E.
AF7699
AF7699                          STATION RECOVERY (2002)
AF7699
AF7699'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (RLT)
AF7699'RECOVERED AS DESCRIBED
AF7699
AF7699                          STATION RECOVERY (2002)
AF7699
AF7699'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP)
AF7699'RECOVERED AS DESCRIBED
AF7699
AF7699                          STATION RECOVERY (2015)
AF7699
AF7699'RECOVERY NOTE BY GEOCACHING 2015 (KEN)
AF7699'THE CAP IS MISSING.

*** retrieval complete.
Elapsed Time = 00:00:02
```

"33C" Benchmark Datasheet (1 OF 1)

SFWMD Vertical Control: Vertical
TYPE Vertical
DESIGNATION 33C
NAVD_ELEV 13.64
NGVD_ELEV 15.15
LONG_DD_83 -80.40
LAT_DD_83 27.40
HOW_TO_REACH Old SFWMD El. 15.07 NGVD 1929
********* Recovery Note**********
10/4/2004 TC with Keith & Schnars, STRIVE program, Structure s-71-1 (Gordy Road) aluminum cap in concrete end wall SFWMD BM 33C El. 13.645 NAVD 1988, El. 15.154 NGVD 1929.
3/24/1999 Robbie Browning, field book St. Lucie county wells 38, pages 5-7 BM 33C, (FB37, p10) el. 15.07 NGVD 1929.
8/29/1989 Rick Barnes, field book St Lucie county wells 19, page 22, South Florida Water Management District (SFWMD) aluminum cap set in the north end of the radial lift gate structure at ten mile creek and Gordy Road just west of the turnpike, stamped "BM 33C."
****
From the intersection of State Roads 70 and 713 (Kings Highway) go West on State Road 70 for 0.3 of a miles to the junction of Gordy Road; Turn left and continue south along Gordy Road for 0.7 of a mile to a wood bridge across Ten Mile Creek at Gordy Road structure, and station location on the left.
BM is a SFWMD aluminum disc set in the top of the North wingwall at the Northeast corner of the structure and is stamped "BM-33E Elev."
DESCRIPTION Aluminum disk
Zoom to

Field Notes (1 of 5)



SFWMD - USGS / PH3 WELLS
BENCH RUN FOR NEW BM "STL213"
(NAVD88)

PEG TEST:
COLL. EAR OLD = 4.5" COLL. EAR NEW: 3.4"
DIFF = 1.2" RETICLE = 4.908'

STA	TOTAL DIST	GR HT	ADJ
BM 33C	0	13.64'	
BM STL213	1787.62'	16.195'	
RM1	1819.65'	16.364'	

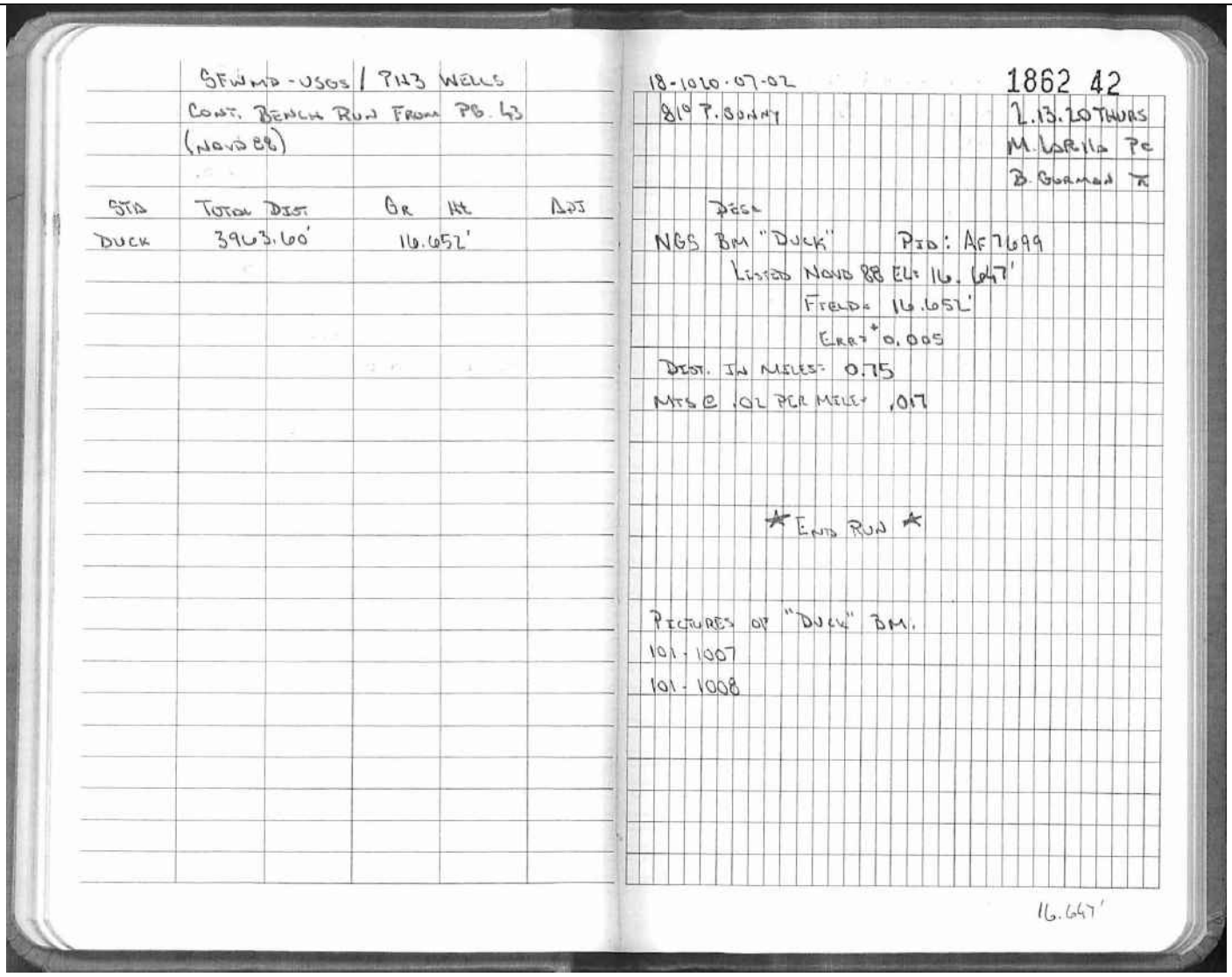
18-1020-07.02 1862 41
81° M. SUNNY 2.13.20 THURS
LEICA TNA 10 M. LaPOLLA PC
JOB: WELL STL 2.13 B. GORMAN R
LINE: STL213

DESC
SFWMD VERT. CONTROL BM "BM 33C ELEV"
LISTED NAVD 88 ELEV 13.64'

NEW BM "STL213" (BM 1862-41A)
SET 1 1/2" (I.D.) IRON PIPE + ALUMI DISC
"SFWMD STL213 LOWICE 2020" I.P. IS 3'
LONG W/ CONC. COLLAR + ALUMI CAP
' EAST OF WELL STL213 + ' W. OF Δ
WIRE FE

USGS OLD BM "RM1" (BM 1862-413)
1/2" I.R. IN 4" PVC SLEEVE. GPS "100R
N. 1117804.365 E. 850690.027

Field Notes (2 of 5)



SFWMD - USGS / PH3 WELLS
CONT. BENCH RUN FROM PG. 43
(NAVD 88)

STA	TOTAL DIST.	GR HT	ADJ
DUCK	3963.60'	16.652'	

18-1020-07-02 1862 42
8/9 T. SONNY 1.13.20 THURS
M. LORILLA PE
B. GORMAN TK

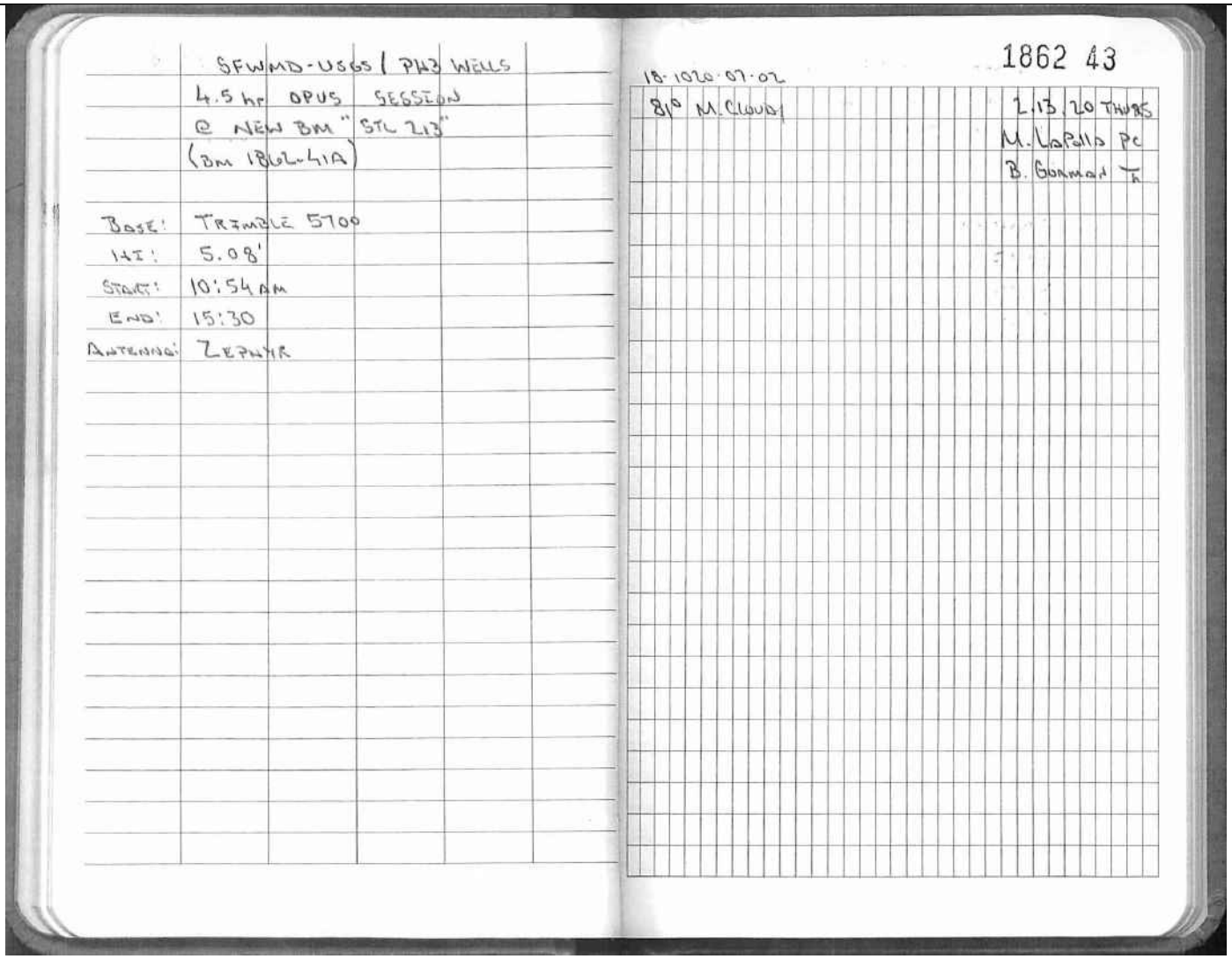
DESC
NGS BM "DUCK" PID: AF7699
LISTED NAVD 88 EL: 16.647'
FIELD: 16.652'
ERR: +0.005
DIST. IN MILES: 0.75
MTS @ .02 PER MILE: .017

★ END RUN ★

PICTURES OF "DUCK" BM.
101-1007
101-1008

16.647'

Field Notes (3 of 5)



SFWMD-USGS | PH3 WELLS
4.5 hr OPUS SESSION
@ NEW BM "STL 213"
(BM 1862-41A)

BASE: TRIMBLE 5700
HI: 5.08'
START: 10:54 AM
END: 15:30
ANTENNA: ZEPHYR

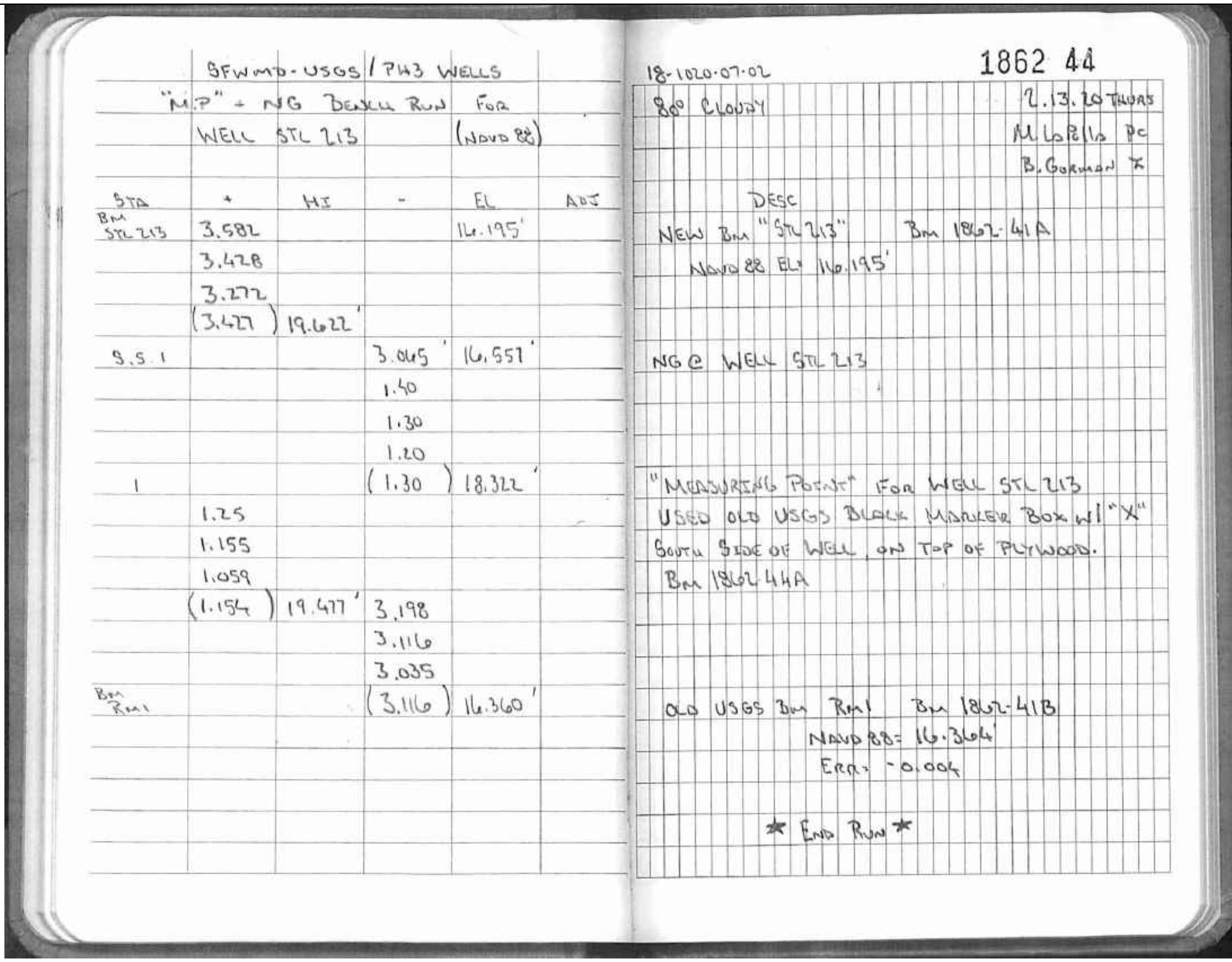
18-1020-07-02

1862 43

8/0 M. CLOUD

2.13.20 THURS
M. LaPolla PC
B. Gunman Tr

Field Notes (4 of 5)



SFWMD-USGS / PH3 WELLS
"M.P" + NG BENCH RUN FOR
WELL STL 213 (NAVD 88)

STA	+	HI	-	EL	ADJ
BM STL 213	3.582			16.195'	
	3.428				
	3.272				
	(3.427)	19.622'			
S.S.1			3.065'	16.557'	
			1.40		
			1.30		
			1.20		
1			(1.30)	18.322'	
	1.25				
	1.155				
	1.059				
	(1.154)	19.477'	3.198		
			3.116		
			3.035		
BM RM1			(3.116)	16.360'	

18-1020-07-02

1862 44

80° CLOUDY

2.13.20 THURS

M. LoPello PC

B. Gorman X

DESC

NEW BM "STL 213" BM 1862-41A
NAVD 88 EL= 16.195'

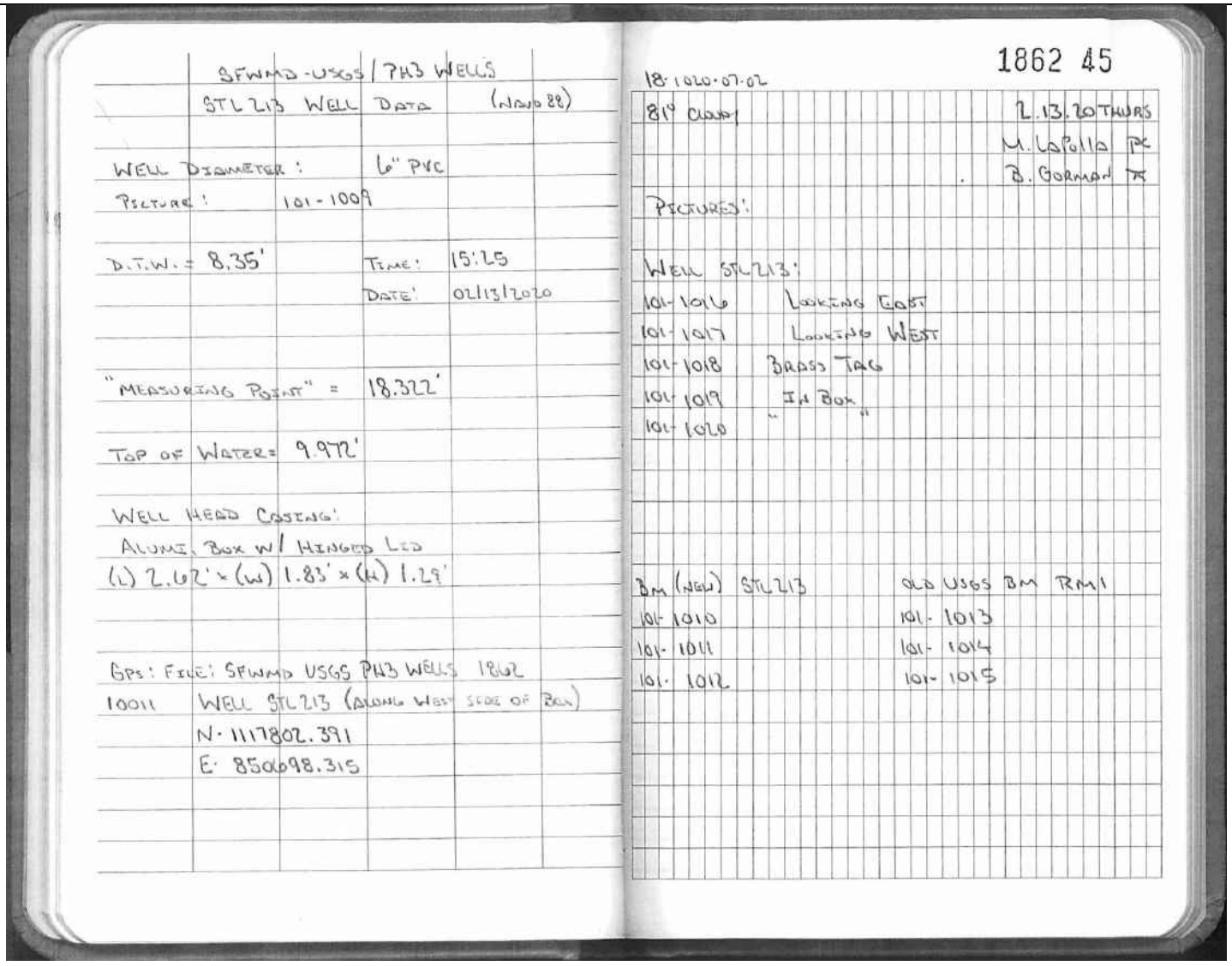
NG @ WELL STL 213

"MEASURING POINT" FOR WELL STL 213
USED OLD USGS BLACK MARKER BOX w/ "X"
SOUTH SIDE OF WELL, ON TOP OF PLYWOOD.
BM 1862-44A

OLD USGS BM RM1 BM 1862-41B
NAVD 88= 16.364'
ERR= -0.004

* END RUN *

Field Notes (5 of 5)



SFWMD-USGS / PH3 WELLS

STL 213 WELL DATA (NAVD 88)

WELL DIAMETER : 6" PVC

PICTURE : 101-1009

D.T.W. = 8.35' TIME: 15:25

DATE: 02/13/2020

"MEASURING POINT" = 18.322'

TOP OF WATER = 9.972'

WELL HEAD CASING:

ALUMI. BOX W/ HINGED LID

(L) 2.62' x (W) 1.83' x (H) 1.29'

GPS: FILE: SFWMD USGS PH3 WELLS 1862

10011 WELL STL 213 (ALONG WEST SIDE OF BOX)

N: 1117802.391

E: 850698.315

1862 45

18:1020:07:02

81° CLOUDY

2.13.20 THURS

M. LaPolla PE

B. Gorman PE

PICTURES:

WELL STL 213:

101-1016 LOOKING EAST

101-1017 LOOKING WEST

101-1018 BRASS TAG

101-1019 IN BOX "

101-1020 "

BM (NEW) STL 213	OLD USGS BM RM1
101-1010	101-1013
101-1011	101-1014
101-1012	101-1015

South Florida Water Management District Benchmark Datasheet

Designation:	STL 213	Project Name:	USGS PHASE 3 WELLS	Type:	V	State Plane Zone:	FL East
Stamping:	STL 213 LB4108 2020	Field Book Name:	GCY 1862	Field Book Page:	41-45		
Established By:	GCY, INC.	Recovered By:		Recovery Date:			
Surveyor:	ANDERSEN	Established Date:	02/13/20	Status:	New		

GEOGRAPHIC POSITION INFORMATION

Section:	26	Township:	35 SOUTH	Range:	39 EAST		
County:	ST LUCIE	Quadrangle:	FORT PIERCE NW	Quad Index:	1732	NGS Source BM(s):	DUCK
NAD83 Adj. Year:	2011	Vertical Datum:	NAVD1988	Horizontal Datum:	NAD1983	NGS PID(s):	AF7699
NAVD88 Elevation (feet):	16.195	NGVD29 Elevation (feet):	17.678	2022 Elevation:		NGS NAVD88 Elev (ft):	16.647
NAVD88 Class:		NGVD29 Class:		Other Elevation:		NGS NAVD88 Elev (m):	5.074
NAVD88 Order:	3RD	NGVD29 Order:	3RD	Other Elevation Type:		NGS 2022 Elev (ft):	

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.)

Vertical Datum Offset: +	1.483	Actual NGS Elevation or ngvd29.txt file:		OPUS Ortho Height:	16.063		
Northing (Y) (feet):	1117808.466	Easting (X) (feet):	850710.208	Source of Latitude & Longitude:	OPUS SOLUTION		
Latitude:	27	24	27.34855	Longitude:	80	24	1.34204
	DD°	MM'	SS"		DD°	MM'	SS"
Latitude (Decimal Degrees):	27.40759682			Longitude (Decimal Degrees):	-80.40037279		

RECOVERY DATA

How to Reach:	FROM THE INTERSECTION SR 70 AND THE ENTRANCE TO THE TURNPIKE, GO WEST ON SR 70 FOR 0.3 MILES TO GORDY ROAD ON THE LEFT. GO SOUTHERLY ON GORDY ROAD 0.47 MILES TO THE MID-POINT OF THE SECOND 90° TURN IN GORDY ROAD AND THE STATION ON THE LEFT. mARK IS 63'+/- NORTH EAST OF THE NOTHEASTERLY EDGE OF PAVEMENT OF GORDY ROAD, 3' +/- WEST OF THE TURNPIKE RIGHT OF WAY FENCE AND 13' +/- NORTHEASTERLY OF THE USGS WELL STL 213. MARK IS A STANDARD SFWMD DISK SET IN A 1 1/2" IRON PIPE WITH A CONCRETE COLLAR AND IS RECESSED ABOUT 0.5 FEET BELOW GRADE.
Description/Notes:	

Notable Landmarks:

Other Source Benchmarks:

PICTURES

Aerial View of Overall Site

PICTURES

Site Sketch

From: opus
To: Pete Andersen
Subject: OPUS solution : 13970440.t01 OP1589478831982
Date: Thursday, May 14, 2020 1:58:16 PM

FILE: 13970440.t01 OP1589478831982

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: petea@gcyinc.com DATE: May 14, 2020
RINEX FILE: 1397044p.20o TIME: 17:58:00 UTC

SOFTWARE: page5 1801.18 master90.pl 160321 START: 2020/02/13 15:55:00
EPHEMERIS: igs20924.eph [precise] STOP: 2020/02/13 20:30:00
NAV FILE: brdc0440.20n OBS USED: 10479 / 11532 : 91%
ANT NAME: TRM39105.00 NONE # FIXED AMB: 85 / 89 : 96%
ARP HEIGHT: 1.5484 OVERALL RMS: 0.019(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2020.1196)

X:	944911.916(m)	0.017(m)	944911.082(m)	0.017(m)
Y:	-5586875.778(m)	0.032(m)	-5586874.202(m)	0.032(m)
Z:	2918373.803(m)	0.026(m)	2918373.643(m)	0.026(m)

LAT:	27 24 27.34855	0.016(m)	27 24 27.36925	0.016(m)
E LON:	279 35 58.65796	0.019(m)	279 35 58.63758	0.019(m)
W LON:	80 24 1.34204	0.019(m)	80 24 1.36242	0.019(m)
EL HGT:	-22.466(m)	0.036(m)	-24.043(m)	0.036(m)
ORTHO HGT:	4.896(m)	0.065(m) [NAVD88 (Computed using GEOID18)]		

	UTM COORDINATES UTM (Zone 17)	STATE PLANE COORDINATES SPC (0901 FL E)
Northing (Y) [meters]	3031724.435	340708.702
Easting (X) [meters]	559276.758	259296.990
Convergence [degrees]	0.27602778	0.27602778
Point Scale	0.99964337	0.99998456
Combined Factor	0.99964690	0.99998809

US NATIONAL GRID DESIGNATOR: 17RNL5927631724(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DE9138	OKCB OKEECHOBEE CORS ARP	N271557.715	W0805119.181	47675.5
DG9798	PBCH WEST PALM CORS ARP	N265046.638	W0801309.300	64735.9
DQ7965	FLWE WEDGEFIELD FL CORS ARP	N282626.477	W0810533.176	133220.9

NEAREST NGS PUBLISHED CONTROL POINT

AF7265	I95 85 A35 RM 1	N272442.929	W0802405.415	492.5

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

*110001+00000000000000A1 32...1+0000000000050546 331.21+0000000000005127
390...+0000000000000005 391.21+0000000000000000
*110002+00000000000000B1 32...1+0000000000099673 332.21+0000000000005193
390...+0000000000000005 391.21+0000000000000000
*110003+00000000000000B2 32...1+0000000000050085 336.21+0000000000004974
390...+0000000000000005 391.21+0000000000000000
*110004+00000000000000A2 32...1+0000000000100202 335.21+0000000000004907
390...+0000000000000005 391.21+0000000000000000
*410005+00000000?.....1
*110006+0000000000BM 33C 83..51+0000000000013640
*110007+0000000000BM 33C 32...1+0000000000067777 331.21+0000000000006146
390...+0000000000000005 391.21+0000000000000000
*110008+0000000000000001 32...1+0000000000069792 332.21+0000000000005716
390...+0000000000000005 391.21+0000000000000000
*110009+0000000000000001 573..1-0000000000002016 574..1+0000000000137569
83..21+0000000000014070
*110010+0000000000000001 32...1+0000000000239260 331.21+0000000000004743
390...+0000000000000005 391.21+0000000000000000
*110011+0000000000000002 32...1+0000000000237333 332.21+0000000000003638
390...+0000000000000005 391.21+0000000000000001
*110012+0000000000000002 573..1-0000000000000089 574..1+0000000000614162
83..21+0000000000015175
*110013+0000000000000002 32...1+0000000000250485 331.21+0000000000005524
390...+0000000000000005 391.21+0000000000000001
*110014+0000000000000003 32...1+0000000000250222 332.21+0000000000004592
390...+0000000000000005 391.21+0000000000000001
*110015+0000000000000003 573..1+0000000000000173 574..1+0000000001114869
83..21+0000000000016107
*110016+0000000000000003 32...1+0000000000250779 331.21+0000000000004983
390...+0000000000000005 391.21+0000000000000000
*110017+0000000000000004 32...1+0000000000250948 332.21+0000000000003671
390...+0000000000000005 391.21+0000000000000001
*110018+0000000000000004 573..1+0000000000000004 574..1+0000000001616596
83..21+0000000000017419
*110019+0000000000000004 32...1+0000000000082428 331.21+0000000000004585
390...+0000000000000005 391.21+0000000000000000
*110020+0000000BM STL213 32...1+0000000000088592 332.21+0000000000005808
390...+0000000000000005 391.21+0000000000000000 71....+00000BM 1862 41A
*110021+0000000BM STL213 573..1-0000000000006159 574..1+0000000001787616
83..21+0000000000016195
*110022+0000000BM STL213 32...1+0000000000017045 331.21+0000000000005391
390...+0000000000000005 391.21+0000000000000000
*110023+0000000000000RM1 32...1+0000000000014992 332.21+0000000000005222
390...+0000000000000005 391.21+0000000000000000 71....+00000BM 1862 41B
*110024+0000000000000RM1 573..1-0000000000004106 574..1+0000000001819653
83..21+0000000000016364
*110025+0000000000000RM1 32...1+0000000000224938 331.21+0000000000005568
390...+0000000000000005 391.21+0000000000000001
*110026+0000000000000005 32...1+0000000000222760 332.21+0000000000004587
390...+0000000000000005 391.21+0000000000000000
*110027+0000000000000005 573..1-0000000000001929 574..1+0000000002267352
83..21+0000000000017345
*110028+0000000000000005 32...1+0000000000244537 331.21+0000000000003628
390...+0000000000000005 391.21+0000000000000001
*110029+0000000000000006 32...1+0000000000242788 332.21+0000000000003268
390...+0000000000000005 391.21+0000000000000000

*110030+0000000000000006 573..1-0000000000000180 574..1+0000000002754676
83..21+0000000000017705
*110031+0000000000000006 32...1+0000000000237949 331.21+0000000000004466
390...+0000000000000005 391.21+0000000000000001
*110032+0000000000000007 32...1+0000000000237927 332.21+0000000000004808
390...+0000000000000005 391.21+0000000000000001
*110033+0000000000000007 573..1-0000000000000158 574..1+0000000003230552
83..21+0000000000017363
*110034+0000000000000007 32...1+0000000000244065 331.21+0000000000004736
390...+0000000000000005 391.21+0000000000000000
*110035+0000000000000008 32...1+0000000000244119 332.21+0000000000004551
390...+0000000000000005 391.21+0000000000000001
*110036+0000000000000008 573..1-0000000000000211 574..1+0000000003718737
83..21+0000000000017549
*110037+0000000000000008 32...1+0000000000100470 331.21+0000000000004503
390...+0000000000000005 391.21+0000000000000000
*110038+0000000000000009 32...1+0000000000100333 332.21+0000000000004874
390...+0000000000000005 391.21+0000000000000000
*110039+0000000000000009 573..1-0000000000000074 574..1+0000000003919540
83..21+0000000000017178
*110040+0000000000000009 32...1+0000000000023969 331.21+0000000000004931
390...+0000000000000005 391.21+0000000000000000
*110041+000000000000DUCK 32...1+0000000000020092 332.21+0000000000005457
390...+0000000000000005 391.21+0000000000000000 71....+0000000000AF7699
*110042+000000000000DUCK 573..1+0000000000003803 574..1+0000000003963601
83..21+0000000000016652

Palm City

28 April 2020

INPUT	OUTPUT
Geographic, flhpgn - Florida HPGN Vertical - NAVD88, U.S. Feet	State Plane, flhpgn - Florida HPGN 0901 - Florida East, U.S. Feet Vertical - NGVD29 (Custom), U.S. Feet

STL 213

1/1

Latitude:	27 24 27.3	**Northing/Y:**	1117803.321
Longitude:	080 24 01.9	**Easting/X:**	850659.947
Elevation/Z:	0	**Elevation/Z:**	1.483
		Convergence:	0 16 33.43976
		Scale Factor:	0.999984541
		Combined Factor:	0.999988760

Remark:

Corpscon v6.0.1, U.S. Army Corps of Engineers