PROFESSIONAL SURVEYORS & MAPPERS
INCORPORATED

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SURVEYOR'S REPORT

Specific Purpose Survey of the United States
Geological Survey Well **STL 42**
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

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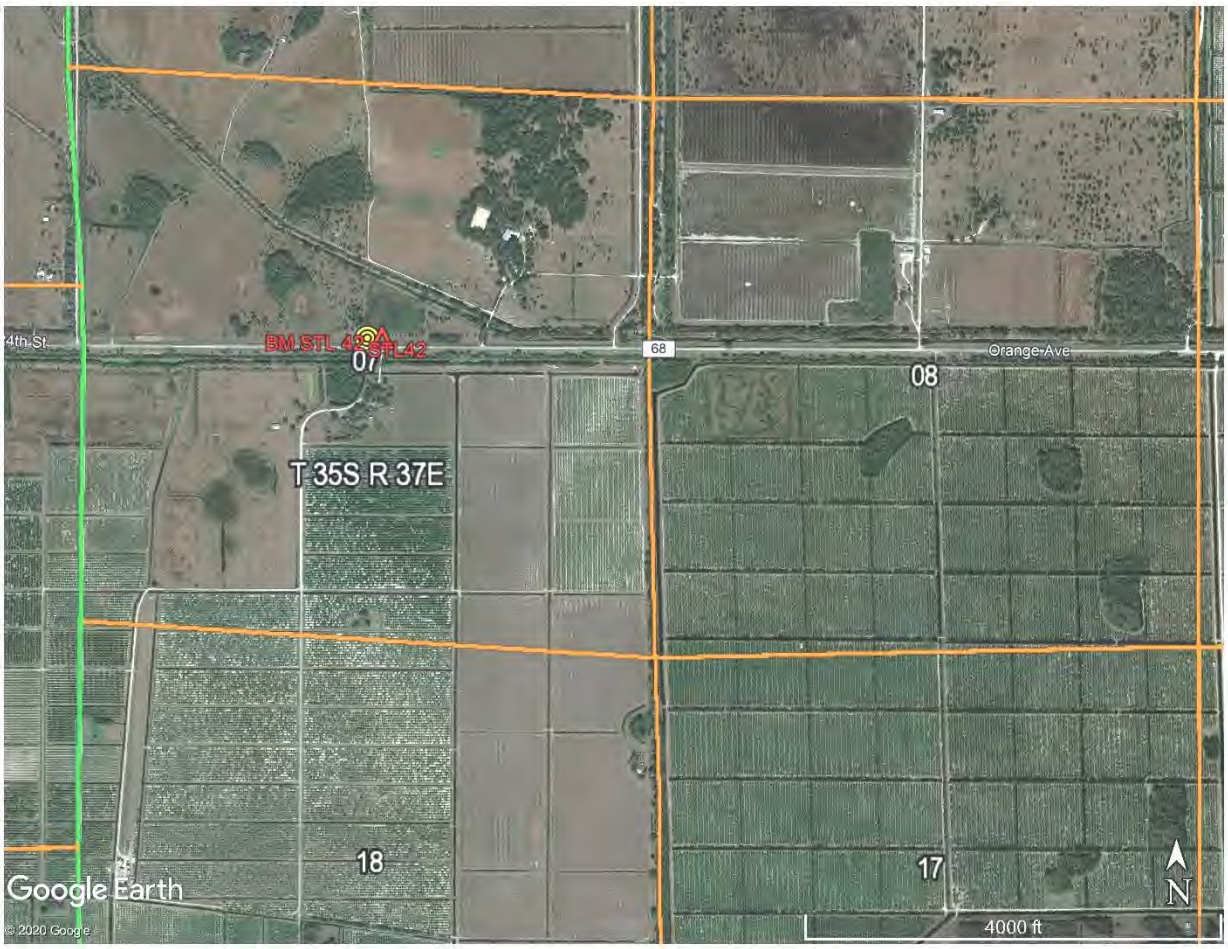
PURPOSE

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 42"**.

LOCATION OF PROJECT

The United States Geological Survey Well **"STL 42"** is located in the Section 7, Township 35 South, Range 37 East, St Lucie County, Florida.



General Location (Not to Scale)

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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 42 add 1.293.** 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 National Geodetic Survey (NGS) monument "D 484" (NGS PID AJ3260) through the site benchmark and closing on the National Geodetic Survey (NGS) monument "FLGPS 54" (NGS PID AF7415). Leveling was done using a Leica DNA 10 digital level S/N 331745

GPS METHODS

Latitude and longitude for the New Benchmark "STL 42" were established by observing a 4.5-hour Static Sessions on February 20, 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 April 28, 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 1.293 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 20, 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 46-50

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 20, 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 42**	U.S.G.S. Station Number: 272655080401601	Agency: **GCY, INC.**	Date of Field Work: **2/20/2020**
Party Chief: LAPOLLA	Field Book: **GCY 1862**	Page(s): **46-50**	Report Prepared by: ANDERSEN

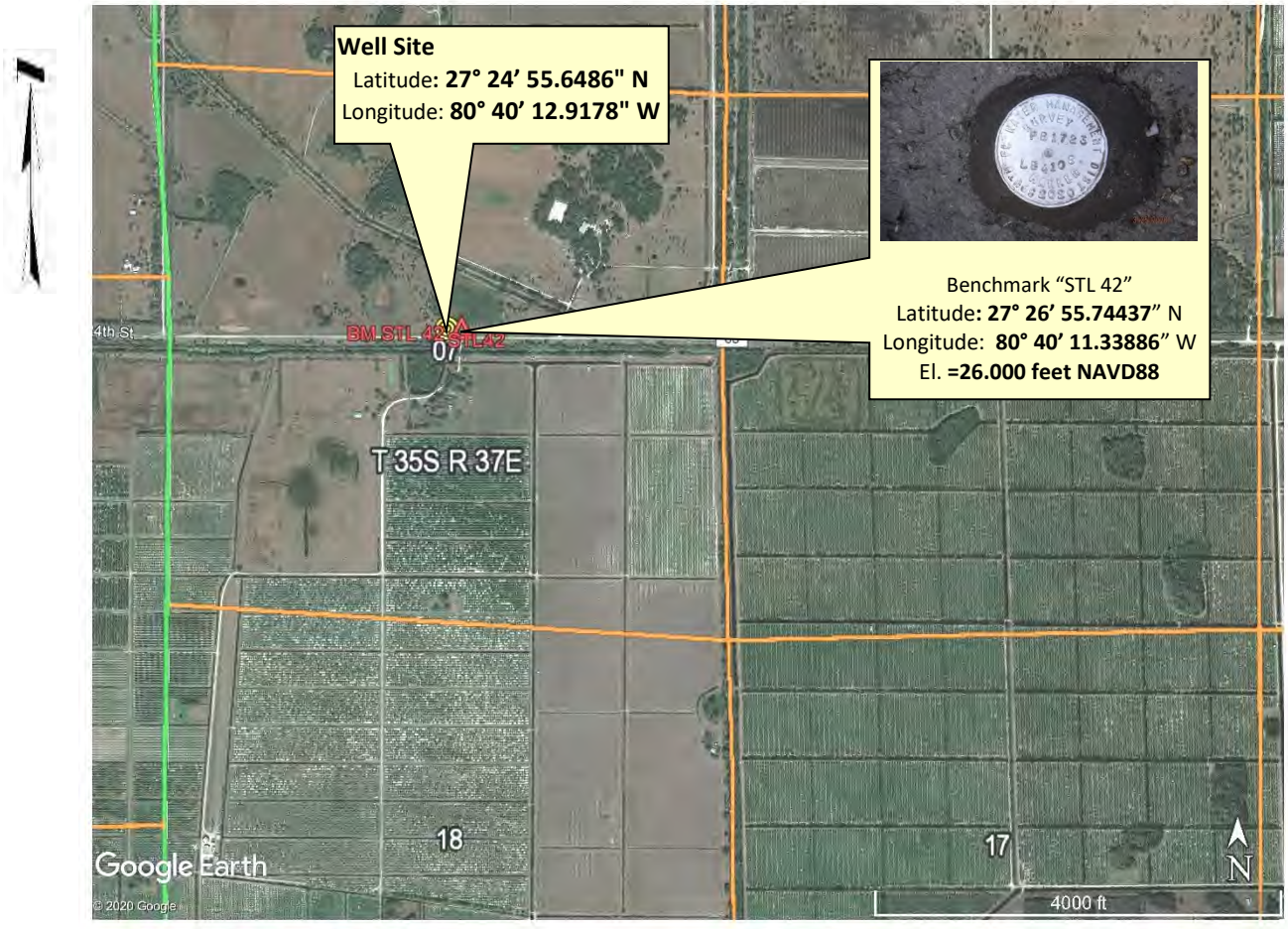
SITE SPECIFIC DATA			
Site Benchmark: **STL 42**	Benchmark Elevation(s) *(NAVD88)*: **26.000**	Corpscon 6.0.1 Conversion Factor (*NAVD88 to NGVD29*) **+ 1.293**	
Well Reference Elevation (*NAVD88*): 29.446	DTW: **5.30** (02/ 20/ 2020 at 1:36 PM)	Ground Elevation *(NAVD88)*: HCO	Pad Elevation (*NAVD88*): **N/A**

GEOGRAPHIC DATA		
Section **7**	Township **35 S**	Range **37 E**
Well Latitude: **27° 24’ 55.6486" N**	Well Longitude: **80° 40’ 12.9178" W**	Location Source: **RTK GPS**
State Plane Coordinates:	Northing (Y) = 1132457.08	Easting (X) = 763108.93

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.

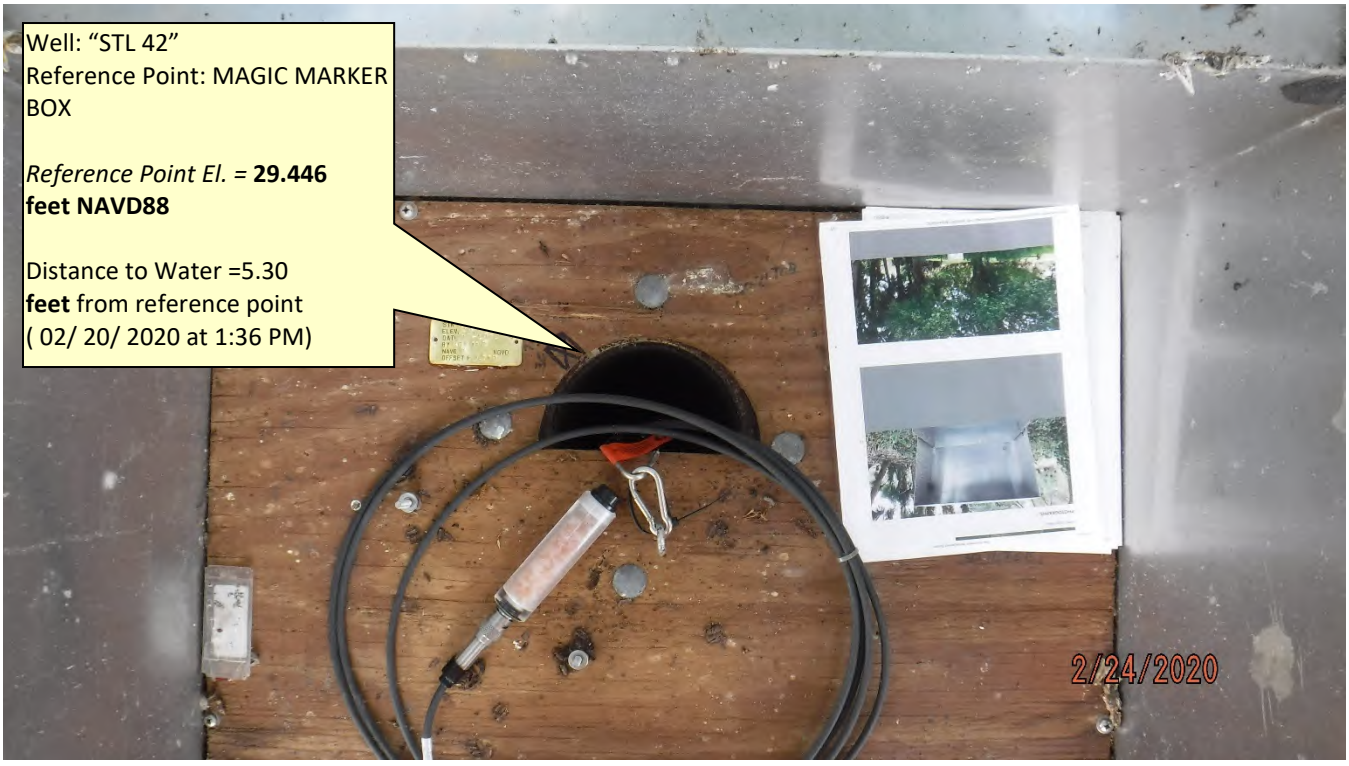
PICTURES

Aerial of Overall Well Site



Not to scale (GoogleEarth product)

Well Site and Well Head



New Aluminum Tag

USGS RMs - NONE

Site Benchmark

Site Benchmark Overall Photo

Site BM:

Latitude: **26° 36' 35.15504**" N
Longitude: **80° 03' 13.52225**" W
NAVD88 EL = 26.000

Source Benchmarks

D 484, AJ3260, 3N, 20200419

Source BM – "D 484"

Latitude**: 27° 26' 56.0**" N
Longitude: **80° 39' 46.7**" W
NAVD88 EL = 33.051

"FLGPS 54" Benchmark Datasheet (1 OF 3)

5/8/2020 DATASHEETS

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  8, 2020
 AF7415 ***********************************************************************
 AF7415  CBN         -  This is a Cooperative Base Network Control Station.
 AF7415  DESIGNATION -  FLGPS 54
 AF7415  PID         -  AF7415
 AF7415  STATE/COUNTY-  FL/OKEECHOBEE
 AF7415  COUNTRY     -  US
 AF7415  USGS QUAD   -  JERNIGANS POND (2018)
 AF7415
 AF7415                          *CURRENT SURVEY CONTROL
 AF7415  ______________________________________________________________________
 AF7415* NAD 83(2011) POSITION- 27 26 56.26469(N) 080 40 51.64951(W)   ADJUSTED
 AF7415* NAD 83(2011) ELLIP HT-   -17.071 (meters)        (06/27/12)   ADJUSTED
 AF7415* NAD 83(2011) EPOCH    -  2010.00
 AF7415* NAVD 88 ORTHO HEIGHT -     9.900 (meters)       32.48  (feet) ADJUSTED
 AF7415  ______________________________________________________________________
 AF7415  GEOID HEIGHT    -        -26.990 (meters)                     GEOID18
 AF7415  NAD 83(2011) X  -    917,194.434 (meters)                     COMP
 AF7415  NAD 83(2011) Y  - -5,589,358.179 (meters)                     COMP
 AF7415  NAD 83(2011) Z  -  2,922,444.743 (meters)                     COMP
 AF7415  LAPLACE CORR    -         -2.51  (seconds)                    DEFLEC18
 AF7415  DYNAMIC HEIGHT  -          9.885 (meters)       32.43  (feet) COMP
 AF7415  MODELED GRAVITY -    979,134.4   (mgal)                       NAVD 88
 AF7415
 AF7415  VERT ORDER      -  SECOND    CLASS I
 AF7415
 AF7415  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AF7415  Standards:
 AF7415         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AF7415            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AF7415  ------------------------------------------------------------------
 AF7415  NETWORK    0.55   1.04          0.24   0.21   0.53     -0.01797720
 AF7415  ------------------------------------------------------------------
 AF7415  Click here for local accuracies and other accuracy information.
 AF7415
 AF7415
 AF7415.The horizontal coordinates were established by GPS observations
 AF7415.and adjusted by the National Geodetic Survey in June 2012.
 AF7415
 AF7415.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AF7415.been affixed to the stable North American tectonic plate. See
 AF7415.NA2011 for more information.
 AF7415
 AF7415.The horizontal coordinates are valid at the epoch date displayed above
 AF7415.which is a decimal equivalence of Year/Month/Day.
 AF7415
 AF7415.The orthometric height was determined by differential leveling and
 AF7415.adjusted by the NATIONAL GEODETIC SURVEY
 AF7415.in October 2001.
 AF7415
 AF7415.Significant digits in the geoid height do not necessarily reflect accuracy.
 AF7415.GEOID18 height accuracy estimate available here.
 AF7415
 AF7415.Click photographs - Photos may exist for this station.
```

"FLGPS 54" Benchmark Datasheet (2 OF 3)


```
AF7415
AF7415.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AF7415
AF7415.The Laplace correction was computed from DEFLEC18 derived deflections.
AF7415
AF7415.The ellipsoidal height was determined by GPS observations
AF7415.and is referenced to NAD 83.
AF7415
AF7415.The dynamic height is computed by dividing the NAVD 88
AF7415.geopotential number by the normal gravity value computed on the
AF7415.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AF7415.degrees latitude (g = 980.6199 gals.).
AF7415
AF7415.The modeled gravity was interpolated from observed gravity values.
AF7415
AF7415. The following values were computed from the NAD 83(2011) position.
AF7415
AF7415;                    North         East     Units Scale Factor Converg.
AF7415;SPC FL E     -   345,189.794   231,532.479   MT  0.99995345   +0 08 49.3
AF7415;SPC FL E     - 1,132,510.18    759,619.47    sFT  0.99995345   +0 08 49.3
AF7415;UTM  17      - 3,036,203.998   531,521.720   MT  0.99961226   +0 08 49.3
AF7415
AF7415!             -  Elev Factor  x  Scale Factor =   Combined Factor
AF7415!SPC FL E     -   1.00000268  x   0.99995345  =   0.99995613
AF7415!UTM  17      -   1.00000268  x   0.99961226  =   0.99961494
AF7415
AF7415:                Primary Azimuth Mark                    Grid Az
AF7415:SPC FL E     -  FLGPS 54 AZ MK                          279 51 20.2
AF7415:UTM  17      -  FLGPS 54 AZ MK                          279 51 20.2
AF7415
AF7415_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNL3152136203(NAD 83)
AF7415
AF7415|----------------------------------------------------------------------|
AF7415| PID    Reference Object                    Distance      Geod. Az   |
AF7415|                                                          dddmmss.s  |
AF7415| AF7445 FLGPS 54 AZ MK                     APPROX. 0.9 KM 2800009.5  |
AF7415|----------------------------------------------------------------------|
AF7415
AF7415                          SUPERSEDED SURVEY CONTROL
AF7415
AF7415  NAD 83(2007)-  27 26 56.26485(N)    080 40 51.65048(W) AD(2002.00) 0
AF7415  ELLIP H (02/10/07)  -17.054  (m)                       GP(2002.00)
AF7415  NAD 83(1999)-  27 26 56.26449(N)    080 40 51.65097(W) AD(       ) B
AF7415  ELLIP H (05/31/01)  -16.994  (m)                       GP(       ) 5 1
AF7415  NAD 83(1990)-  27 26 56.26360(N)    080 40 51.65062(W) AD(       ) B
AF7415  ELLIP H (09/13/90)  -16.972  (m)                       GP(       ) 4 1
AF7415  NAVD 88 (06/26/95)    9.9    (m)  UNKNOWN model used   GPS OBS
AF7415  NAVD 88 (06/02/94)   10.0    (m)  GEOID93 model used   GPS OBS
AF7415  NGVD 29 (09/13/90)   10.4    (m)  FFT MET model used   GPS OBS
AF7415
AF7415.Superseded values are not recommended for survey control.
AF7415
AF7415.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AF7415.See file dsdata.pdf to determine how the superseded data were derived.
AF7415
AF7415_MARKER: F = FLANGE-ENCASED ROD
AF7415_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AF7415_STAMPING: FLGPS 54 1989
AF7415_MARK LOGO: NGS
AF7415_PROJECTION: FLUSH
AF7415_MAGNETIC: N = NO MAGNETIC MATERIAL
AF7415_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AF7415+STABILITY: POSITION/ELEVATION WELL
AF7415_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AF7415+SATELLITE: SATELLITE OBSERVATIONS - September 14, 1999
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"FLGPS 54" Benchmark Datasheet (3 OF 3)


```
AF7415_ROD/PIPE-DEPTH: 15.4 meters
AF7415_SLEEVE-DEPTH  : 0.91 meters
AF7415
AF7415  HISTORY     - Date     Condition        Report By
AF7415  HISTORY     - 1989     MONUMENTED       NGS
AF7415  HISTORY     - 19930913 GOOD             GENGRP
AF7415  HISTORY     - 19940930 GOOD             GCYI
AF7415  HISTORY     - 19990914 GOOD             FLDEP
AF7415
AF7415                          STATION DESCRIPTION
AF7415
AF7415'DESCRIBED BY NATIONAL GEODETIC SURVEY 1989
AF7415'THE STATION IS LOCATED ABOUT 27.04 KM (16.80 MI) NORTHEAST OF
AF7415'OKEECHOBEE, 14.81 KM (9.20 MI) SOUTHEAST OF FORT DRUM, 0.24 KM
AF7415'(0.15 MI) WEST OF THE ST. LUCIE-OKEECHOBEE COUNTY LINE, IN SECTION 1,
AF7415'T 35 S, R 36 E.
AF7415'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 441 AND COUNTY
AF7415'ROAD 68 NEAR FORT DRUM, GO EAST FOR 12.48 KM (7.75 MI) ON COUNTY ROAD
AF7415'68 TO THE STATION ON LEFT.
AF7415'THE STATION IS RECESSED 12 CM BELOW GROUND.  LOCATED 33.47 M
AF7415'(109.8 FT) NORTH FROM THE APPROXIMATE CENTER OF COUNTY ROAD 68, 0.73 M
AF7415'(2.4 FT) SOUTH FROM A FENCE LINE AND 0.61 M (2.0 FT) SOUTH FROM A
AF7415'CARSONITE WITNESS POST.  NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A
AF7415'5-INCH LOGO CAP.
AF7415'DESCRIBED BY R.L. MALLOY.
AF7415
AF7415                          STATION RECOVERY (1993)
AF7415
AF7415'RECOVERY NOTE BY GENSIS GROUP INCORPORATED SE 1993 (JEL)
AF7415'RECOVERED AS DESCRIBED.
AF7415
AF7415                          STATION RECOVERY (1994)
AF7415
AF7415'RECOVERY NOTE BY G.C.Y., INCORPORATED 1994 (MRL)
AF7415'RECOVERED AS DESCRIBED.
AF7415
AF7415                          STATION RECOVERY (1999)
AF7415
AF7415'RECOVERY NOTE BY FL DEPT OF ENV PRO 1999 (JLM)
AF7415'THE MARK IS ABOUT 22.85 MI (36.77 KM) WEST OF FT PIERCE, 12.6 MI (20.3
AF7415'KM) NORTHEAST OF OKEECHOBEE, ON COUNTY ROAD 68 (ORANGE AVENUE) , IN
AF7415'SECTION 1, TOWNSHIP 35 SOUTH, RANGE 36 EAST. TO REACH THE MARK FROM
AF7415'THE JUNCTION OF U.S. HIGHWAY 1 AND STATE ROAD A1A SOUTH (SEAWAY DRIVE)
AF7415'IN FORT PIERCE, GO SOUTH ON U.S. HIGHWAY 1 FOR 0.6 MI (1.0 KM) TO THE
AF7415'JUNCTION OF COUNTY ROAD 68 WEST (ORANGE AVENUE), TURN RIGHT ON COUNTY
AF7415'ROAD 68 (ORANGE AVENUE) AND GO WEST FOR 12.7 MI (20.4 KM) TO THE
AF7415'JUNCTION OF SNEED ROAD (COUNTY ROAD 613) ON THE LEFT, CONTINUE WEST ON
AF7415'COUNTY ROAD 68 (ORANGE AVENUE) FOR 9.15 MI (14.73 KM) TO THE
AF7415'OKEECHOBEE COUNTY LINE, CONTINUE WEST ON COUNTY ROAD 68 (ORANGE
AF7415'AVENUE) FOR 0.15 MI (0.24 KM) TO THE MARK ON THE RIGHT. THE MARK CAN
AF7415'ALSO BE REACHED FROM THE JUNCTION OF U.S. HIGHWAY 441 AND COUNTY ROAD
AF7415'68 NEAR FORT DRUM, GO EAST ON COUNTY ROAD 68 FOR 8.0 MI (12.9 KM) TO
AF7415'THE MARK ON THE LEFT, A STAINLESS STEEL ROD DRIVEN INTO THE GROUND
AF7415'WITH A NGS LOGO CAP FLUSH WITH THE GROUND AND 4.0 FT (1.2 M) ABOVE THE
AF7415'LEVEL OF COUNTY ROAD 68, THE DATUM POINT IS RECESSED 0.1 FT (3.0 CM)
AF7415'BELOW THE LEVEL OF THE NGS LOGO CAP. LOCATED ABOUT 185.0 FT (56.4 M)
AF7415'NORTHEAST OF AN OAK TREE, 109.8 FT (33.5 M) NORTH OF THE APPROXIMATE
AF7415'CENTERLINE OF COUNTY ROAD 68, 2.4 FT (0.7 M) SOUTH OF A FENCE LINE AND
AF7415'2.0 FT (0.6 M) SOUTH OF A CARSONITE WITNESS POST. NOTE ACCESS TO THE
AF7415'DATUM POINT IS HAD THROUGH A 5-INCH NGS LOGO CAP.

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

"D 484" Benchmark Datasheet (1 OF 2)

The NGS Data Sheet

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

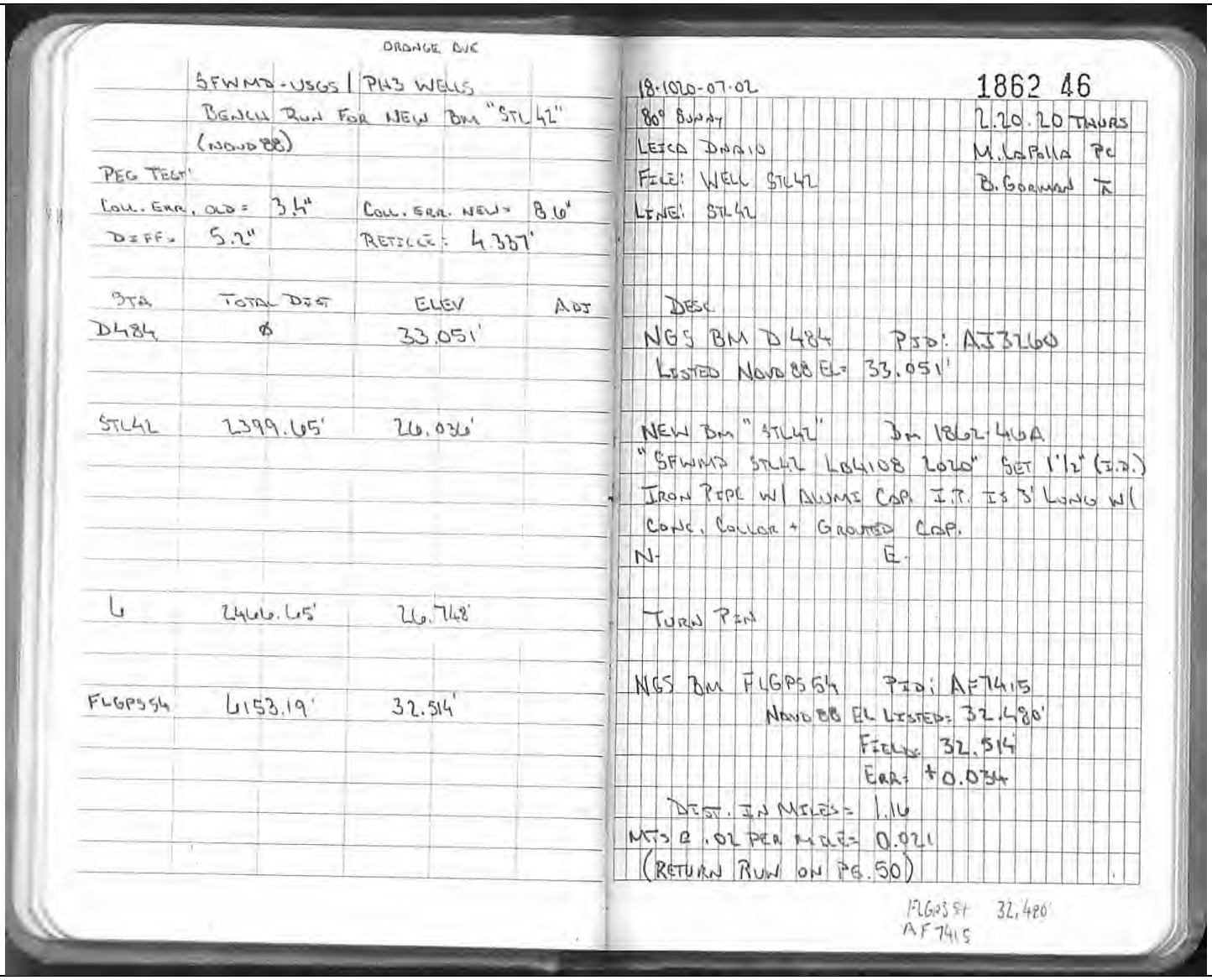
```
PROGRAM = datasheet95, VERSION = 8.12.5.7
Starting Datasheet Retrieval...
1        National Geodetic Survey,   Retrieval Date = MAY  8, 2020
 AJ3260 ***********************************************************************
 AJ3260  DESIGNATION -  D 484
 AJ3260  PID         -  AJ3260
 AJ3260  STATE/COUNTY-  FL/ST LUCIE
 AJ3260  COUNTRY     -  US
 AJ3260  USGS QUAD   -  JERNIGANS POND (2018)
 AJ3260
 AJ3260                        *CURRENT SURVEY CONTROL
 AJ3260  ______________________________________________________________________
 AJ3260* NAD 83(1986) POSITION- 27 26 56.0    (N) 080 39 46.7    (W)   HD_HELD2
 AJ3260* NAVD 88 ORTHO HEIGHT -    10.074 (meters)       33.05  (feet) ADJUSTED
 AJ3260  ______________________________________________________________________
 AJ3260  GEOID HEIGHT    -        -27.031 (meters)                     GEOID18
 AJ3260  DYNAMIC HEIGHT  -         10.059 (meters)       33.00  (feet) COMP
 AJ3260  MODELED GRAVITY -    979,134.2   (mgal)                       NAVD 88
 AJ3260
 AJ3260  VERT ORDER      -  SECOND    CLASS I
 AJ3260
 AJ3260.The horizontal coordinates were established by autonomous hand held GPS
 AJ3260.observations and have an estimated accuracy of +/- 10 meters.
 AJ3260.
 AJ3260.The orthometric height was determined by differential leveling and
 AJ3260.adjusted by the NATIONAL GEODETIC SURVEY
 AJ3260.in October 2001.
 AJ3260
 AJ3260.Significant digits in the geoid height do not necessarily reflect accuracy.
 AJ3260.GEOID18 height accuracy estimate available here.
 AJ3260
 AJ3260.Click photographs - Photos may exist for this station.
 AJ3260
 AJ3260.The dynamic height is computed by dividing the NAVD 88
 AJ3260.geopotential number by the normal gravity value computed on the
 AJ3260.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AJ3260.degrees latitude (g = 980.6199 gals.).
 AJ3260
 AJ3260.The modeled gravity was interpolated from observed gravity values.
 AJ3260
 AJ3260;                   North         East     Units  Estimated Accuracy
 AJ3260;SPC FL E     -   345,186.      233,316.      MT  (+/- 10 meters HH2 GPS)
 AJ3260
 AJ3260_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNL3330436200(NAD 83)
 AJ3260
 AJ3260                            SUPERSEDED SURVEY CONTROL
 AJ3260
 AJ3260.No superseded survey control is available for this station.
 AJ3260
 AJ3260_MARKER: DD = SURVEY DISK
 AJ3260_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AJ3260_STAMPING: D 484 1999
 AJ3260_MARK LOGO: FLDEP
 AJ3260_PROJECTION: FLUSH
 AJ3260_MAGNETIC: N = NO MAGNETIC MATERIAL
 AJ3260_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
```

"D 484" Benchmark Datasheet (2 OF 2)


```
AJ3260+STABILITY: SURFACE MOTION
AJ3260_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AJ3260+SATELLITE: SATELLITE OBSERVATIONS - April 19, 2020
AJ3260
AJ3260  HISTORY     - Date     Condition        Report By
AJ3260  HISTORY     - 1999     MONUMENTED       FLDEP
AJ3260  HISTORY     - 20200419 GOOD             GEOCAC
AJ3260
AJ3260                          STATION DESCRIPTION
AJ3260
AJ3260'DESCRIBED BY FL DEPT OF ENV PRO 1999 (JLM)
AJ3260'THE MARK IS ABOUT 21.75 MI (35.00 KM) WEST OF FT PIERCE, 13.65 MI
AJ3260'(21.97 KM) NORTHEAST OF OKEECHOBEE, ON THE NORTH SIDE OF COUNTY ROAD
AJ3260'68 (ORANGE AVENUE), IN SECTION 7, TOWNSHIP 35 SOUTH, RANGE 37 EAST. TO
AJ3260'REACH THE MARK FROM THE JUNCTION OF U.S. HIGHWAY 1 AND STATE ROAD A1A
AJ3260'SOUTH (SEAWAY DRIVE) IN FORT PIERCE, GO SOUTH ON U.S. HIGHWAY 1 FOR
AJ3260'0.6 MI (1.0 KM) TO THE JUNCTION OF COUNTY ROAD 68 WEST (ORANGE
AJ3260'AVENUE), TURN RIGHT ON COUNTY ROAD 68 (ORANGE AVENUE) AND GO WEST FOR
AJ3260'12.7 MI (20.4 KM) TO THE JUNCTION OF SNEED ROAD (COUNTY ROAD 613) ON
AJ3260'THE LEFT, CONTINUE WEST ON COUNTY ROAD 68 (ORANGE AVENUE) FOR 8.2 MI
AJ3260'(13.2 KM) TO THE JUNCTION OF DALE CASSENS ROAD ON THE RIGHT (WYNNE
AJ3260'RANCH) AND THE MARK ON THE RIGHT, SET IN THE TOP OF A ROUND CONCRETE
AJ3260'MONUMENT RECESSED 0.1 FT (3.0 CM) BELOW THE LEVEL OF THE GROUND AND
AJ3260'ABOUT LEVEL WITH COUNTY ROAD 68. LOCATED 128.5 FT (39.2 M) NORTH OF
AJ3260'THE CENTERLINE OF COUNTY ROAD 68, 37.0 FT (11.3 M) NORTH OF THE CANAL,
AJ3260'13.0 FT (4.0 M) WEST OF THE APPROXIMATE CENTERLINE OF A GATE AND DALE
AJ3260'CASSENS ROAD, 2.2 FT (0.7 M) EAST OF A GUARDRAIL AND 1.2 FT (0.4 M)
AJ3260'SOUTH OF A WOODEN FENCE.
AJ3260
AJ3260                          STATION RECOVERY (2020)
AJ3260
AJ3260'RECOVERY NOTE BY GEOCACHING 2020 (RLM)
AJ3260'RECOVERED IN GOOD CONDITION.

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

Field Notes (1 of 5)



ORANGE BK

SFWMD-USGS | PH3 WELLS
BENCH RUN FOR NEW BM "STL42"
(NAVD88)

PEG TEST

COLL. ERR. OLD = 3.4" | COLL. ERR. NEW = 8.6"
DIFF. = 5.2" | RETICLE = 4.337'

STA	TOTAL DIST	ELEV	ADJ
D484	0	33.051'	
STL42	2399.65'	26.036'	
L	2466.65'	26.748'	
FLGPS54	6153.19'	32.514'	

18-1010-07-02 | 1862 46
80° SUNNY | 2.20.20 TAURS
LEICA DNA10 | M. LaPOLLA PC
FILE: WELL STL42 | B. GOODWARD TA
LINE: STL42

DESC
NGS BM D 484 PID: AJ3260
LISTED NAVD 88 EL = 33.051'

NEW BM "STL42" BM 1862-46A
"SFWMD STL42 LB4108 2020" SET 1'12" (I.P.)
IRON PIPE W/ ALUMI CAP. I.P. IS 3' LONG W/
CONC. COLLAR + GROUTED CAP.
N. E.

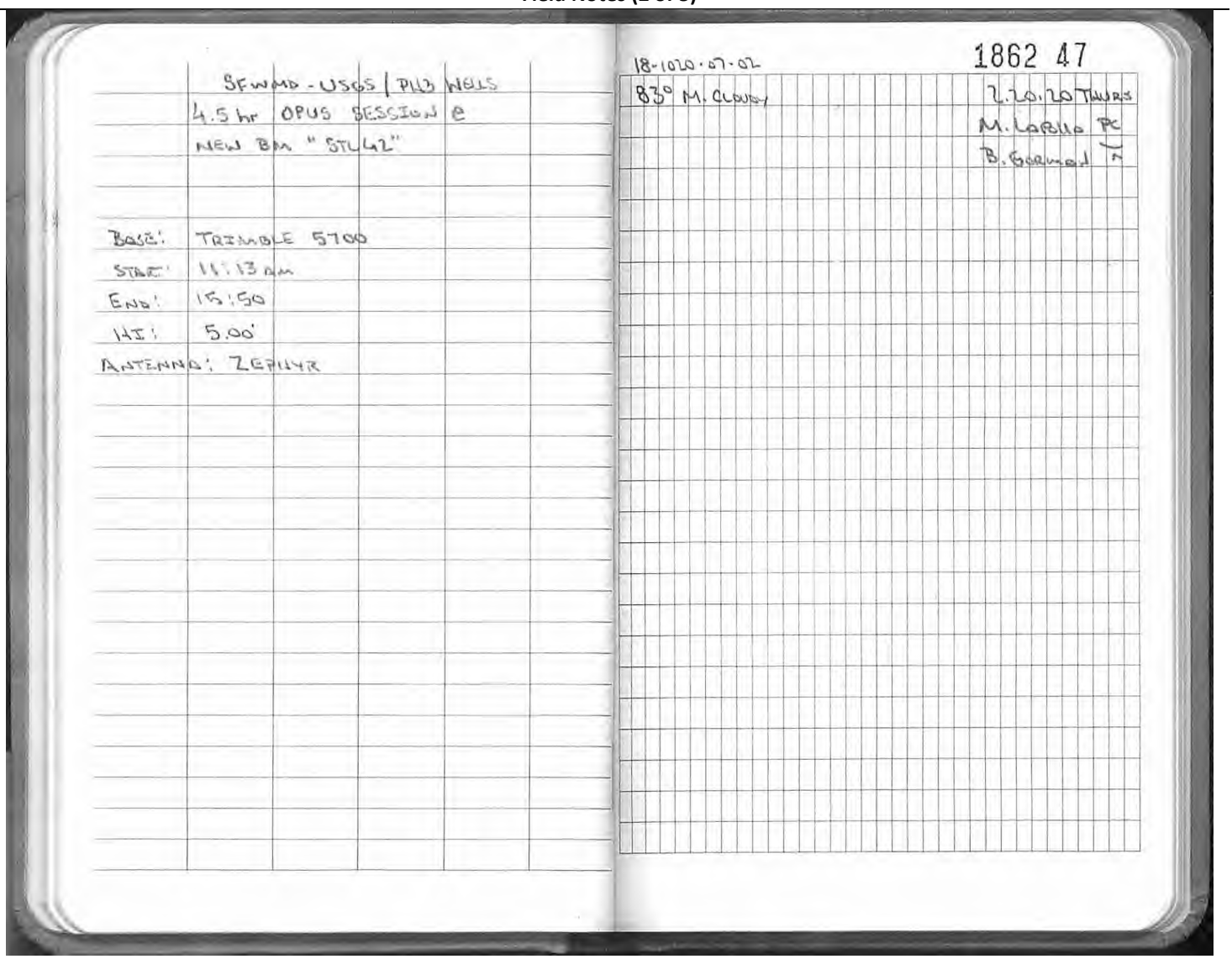
TURN PIN

NGS BM FLGPS54 PID: AF7415
NAVD 88 EL LISTED: 32.480'
FIELD: 32.514'
ERR: +0.034

DIST. IN MILES = 1.16
MTS @ .02 PER MILE = 0.021
(RETURN RUN ON PG. 50)

FLGPS54 32.480'
AF7415

Field Notes (2 of 5)

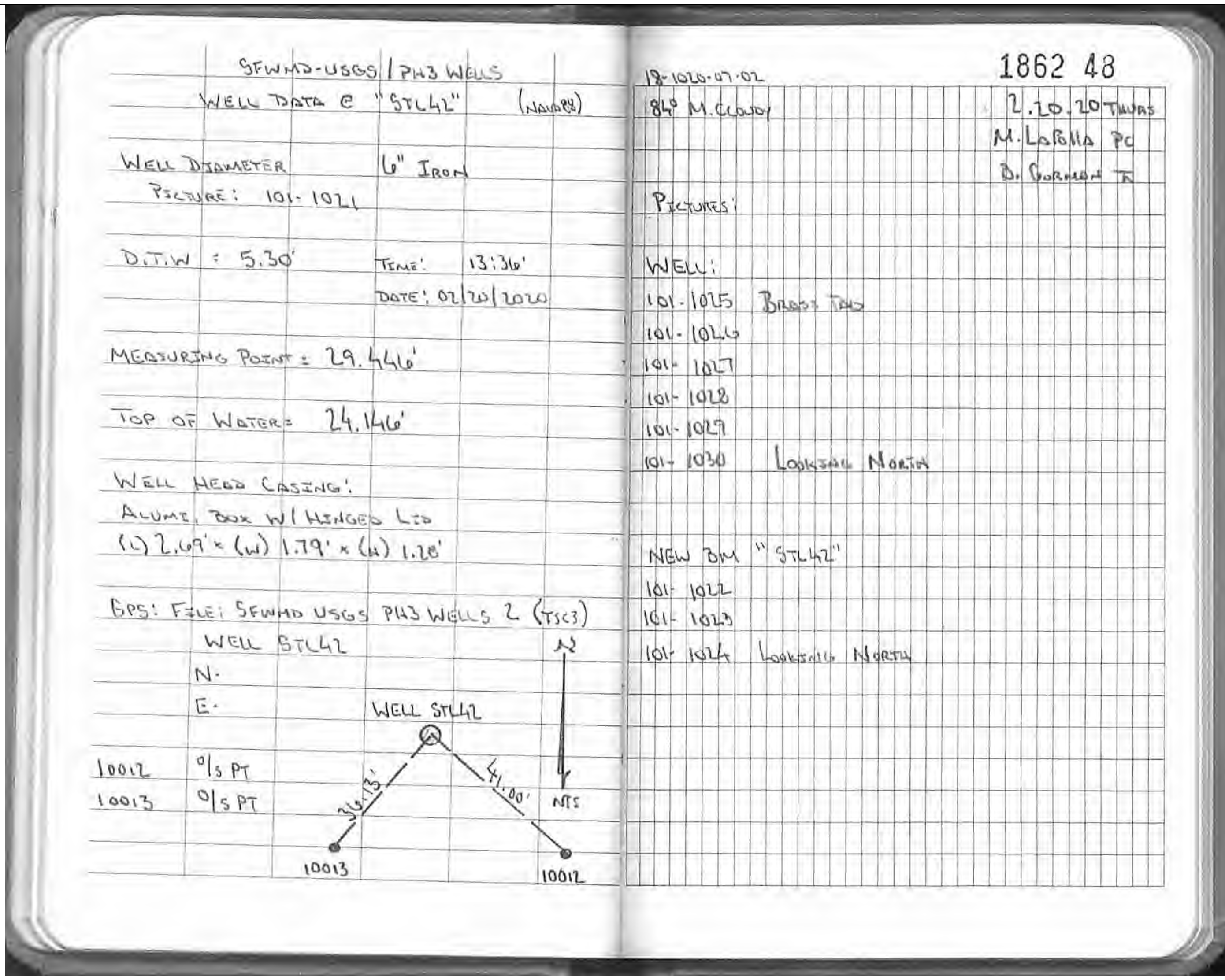


SFWMD - USGS | PLD WELLS
4.5 hr OPUS SESSION @
NEW BM "STL42"

BASE: TRIMBLE 5700
START: 11:13 AM
END: 15:50
HI: 5.00'
ANTENNA: ZEPHYR

18-1020-07-02
1862 47
83° M. CLOUDY
7.20.20 THURS
M. LaBillo PC
B. Brainard

Field Notes (3 of 5)



SFWMD-USGS / PH3 WELLS
WELL DATA @ "STL42" (NAVD88)

WELL DIAMETER 6" IRON
PICTURE: 101-1021

D.T.W = 5.30' TIME: 13:36'
DATE: 02/20/2020

MEASURING POINT = 29.446'

TOP OF WATER = 24.146'

WELL HEAD CASING:
ALUMI. BOX W/ HINGED LID
(L) 2.69' × (W) 1.79' × (H) 1.28'

GPS: FILE: SFWMD USGS PH3 WELLS 2 (TSC3)
WELL STL42
N.
E.

10012 O/S PT
10013 O/S PT

18-2020-07-02
84° M.CLOUDY

1862 48
2.20.20 THURS
M. LaBella PC
D. Gorman TI

PICTURES:

WELL:
101-1025 BRASS TAG
101-1026
101-1027
101-1028
101-1029
101-1030 LOOKING NORTH

NEW BM "STL42"
101-1022
101-1023
101-1024 LOOKING NORTH

Field Notes (4 of 5)

SFWMD-USGS (PLB WELLS
"M.P." + NG BENCH RUN @
WELL STL42 (NGVD 88)

STA	+	HI	-	EL	ADJ
BM STL42	5.934			26.00'	
	5.534				
	5.134				
	(5.534)	31.534'			
S.S. 1			4.79'	26.744'	
			2.463		
			2.083		
			1.711		
1			(2.087)	29.446'	
	2.22				
	1.845				
	1.47				
	(1.845)	31.291'	5.69		
			5.29		
			4.89		
BM STL42			(5.29)	26.001'	

18-1020-07-02 1862 49

81° M. CLOUDY 2.20.20 THURS

M. LaPolla PC

B. Gorman ⊼

DESK

NEW BM "STL42" BM 1862-46A

LISTED NAVD 88 EL= 26.00'

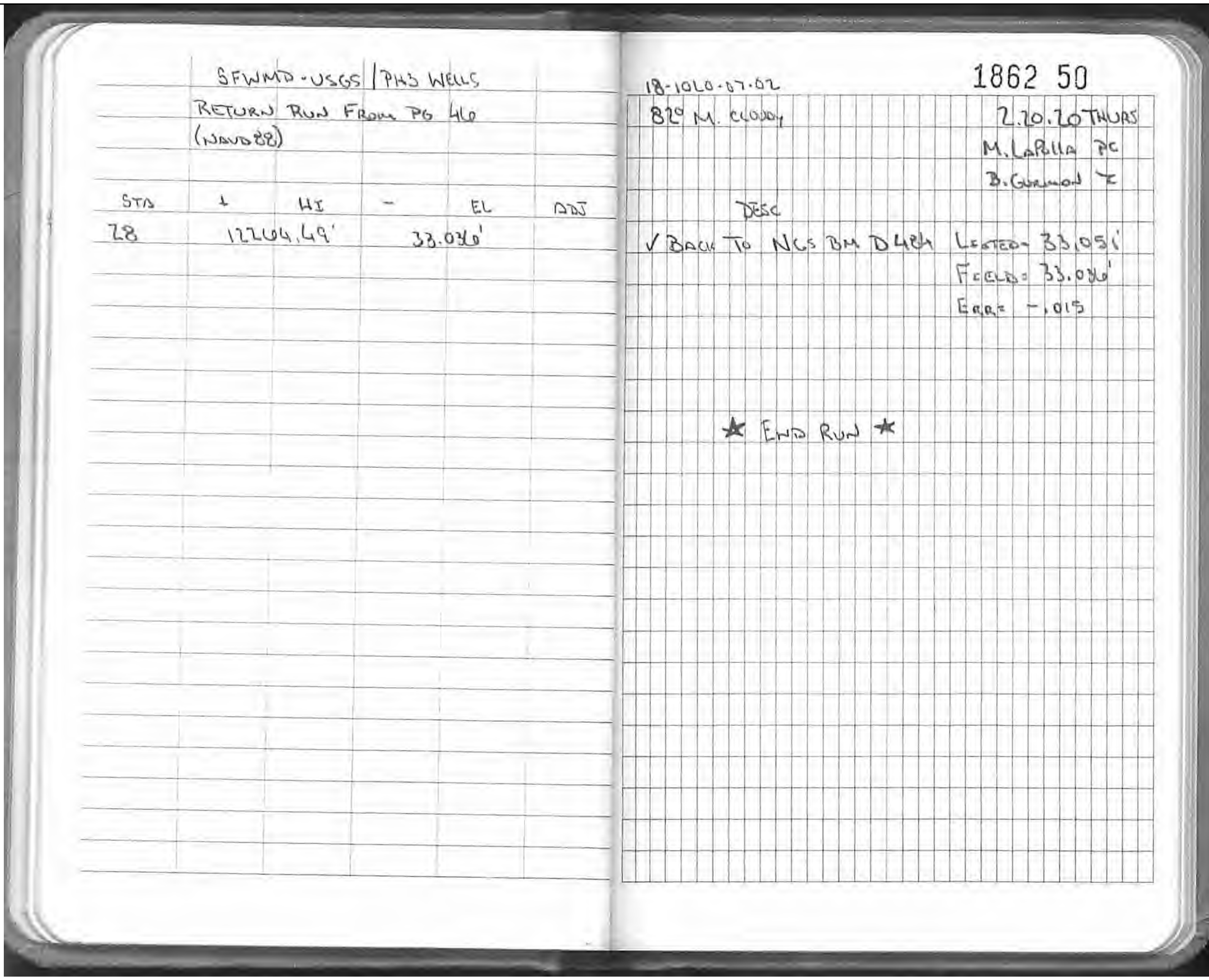
NG @ WELL STL42

"MENSURING POINT" FOR WELL "STL42"
USED OLD USGS BLOCK MARKER BOX W/ "X" ON TOP
OF PLYWOOD @ NW SIDE OF HALF MOON SHAPED
OPENING TO WELL. BM 1862-49A

✓ BACK TO BM "STL42" BM 1862-46A
ERR: +0.001

* END RUN *

Field Notes (5 of 5)



SFWMD-USGS / PH3 WELLS
RETURN RUN FROM PG 46
(NAVD88)

STA	+	HI	-	EL	ADJ
28		12264.49'		33.036'	

18-1060-07-02
82° M. CLOUDY

1862 50
2.20.20 THURS
M. LaPolla PC
B. Gorman ⊼

DESC
✓ BACK TO NGS BM D484 LISTED= 33.051'
FIELD= 33.036'
ERR= -.015

★ END RUN ★

South Florida Water Management District Benchmark Datasheet

Designation: **STL 42**	Project Name: **USGS PHASE 3 WELLS**	Type: **V**	State Plane Zone: **FL East**
Stamping: **STL 42 LB4108 2020**	Field Book Name: **GCY 1862**	Field Book Page: **46-50**	
Established By: **GCY, INC.**	Recovered By:	Recovery Date:	
Surveyor: **ANDERSEN**	Established Date: **03/30/20**	Status: **New**	

GEOGRAPHIC POSITION INFORMATION

Section: **7**	Township: **35 SOUTH**	Range: **37 EAST**	
County: **ST LUCIE**	Quadrangle: **OKEECHOBEE 1 NW**	Quad Index: **1734**	NGS Source BM(s): **FLGPS 54**
NAD83 Adj. Year: **2011**	Vertical Datum: **NAVD1988**	Horizontal Datum: **NAD1983**	NGS PID(s): **AF7415**
NAVD88 Elevation (feet): **26.000**	NGVD29 Elevation (feet): **27.293**	2022 Elevation:	NGS NAVD88 Elev (ft): **32.480**
NAVD88 Class:	NGVD29 Class:	Other Elevation:	NGS NAVD88 Elev (m): **9.900**
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: + **1.293**	Actual NGS Elevation or ngvd29.txt file:	OPUS Ortho Height: **9.692**	
Northing (Y) (feet): **1132467.125**	Easting (X) (feet): **763251.151**	Source of Latitude & Longitude: **OPUS SOLUTION**	

Latitude:	**27**	**26**	**55.74437**	Longitude:	**80**	**40**	**11.33886**
	DD°	MM'	SS"		DD°	MM'	SS"

Latitude (Decimal Degrees): **27.44881788** Longitude (Decimal Degrees): **-80.66981635**

RECOVERY DATA

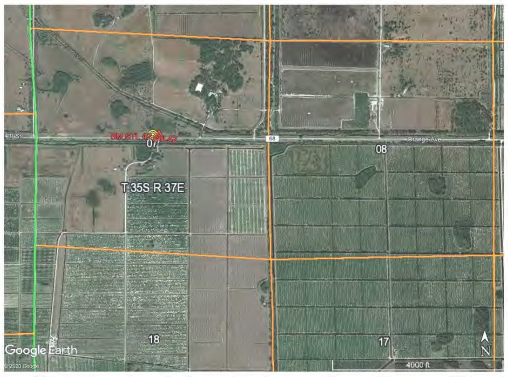
How to Reach:	**STATION IS LOCATED 0.56 MILES EAST OF THE ST LUCIE-OKEECHOBEE COUNTY LINE ON COUNTY ROAD 68. STATION IS 80' +/- NORTH OF THE NORTH EDGE OF PAVEMENT OF COUNTY ROAD 68, 9' +/- SOUTH OF A BARBED WIRE FENCE AND 142' +/- EAST OF THE USGS WELL STL 42. MARK IS A STANDARD SFWMD DISK SET IN A 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 : 13970510.t01 OP1588072790921
Date: Tuesday, April 28, 2020 7:34:31 AM

FILE: 13970510.t01 OP1588072790921

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: April 28, 2020
RINEX FILE: 1397051q.20o TIME: 11:24:11 UTC

SOFTWARE: page5 1801.18 master53.pl 160321 START: 2020/02/20 16:14:00
EPHEMERIS: igs20934.eph [precise] STOP: 2020/02/20 20:50:00
NAV FILE: brdc0510.20n OBS USED: 12041 / 12586 : 96%
ANT NAME: TRM39105.00 NONE # FIXED AMB: 62 / 64 : 97%
ARP HEIGHT: 1.524 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2020.1387)

X:	918287.654(m)	0.005(m)	918286.820(m)	0.005(m)
Y:	-5589184.304(m)	0.012(m)	-5589182.730(m)	0.012(m)
Z:	2922429.580(m)	0.005(m)	2922429.419(m)	0.005(m)

LAT:	27 26 55.74437	0.002(m)	27 26 55.76500	0.002(m)
E LON:	279 19 48.66114	0.003(m)	279 19 48.64048	0.003(m)
W LON:	80 40 11.33886	0.003(m)	80 40 11.35952	0.003(m)
EL HGT:	-19.132(m)	0.014(m)	-20.705(m)	0.014(m)
ORTHO HGT:	7.884(m)	0.052(m) [NAVD88 (Computed using GEOID18)]		

	UTM COORDINATES UTM (Zone 17)	STATE PLANE COORDINATES SPC (0901 FL E)
Northing (Y) [meters]	3036190.878	345176.670
Easting (X) [meters]	532628.279	232639.416
Convergence [degrees]	0.15220278	0.15220278
Point Scale	0.99961314	0.99995432
Combined Factor	0.99961614	0.99995733

US NATIONAL GRID DESIGNATOR: 17RNL3262836190(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DR4402	LBLL LBLL LABELLE CORS ARP	N264451.324	W0812712.291	109887.6
DQ7965	FLWE WEDGEFIELD FL CORS ARP	N282626.477	W0810533.176	117524.8
DG9798	PBCH WEST PALM CORS ARP	N265046.638	W0801309.300	80324.2

NEAREST NGS PUBLISHED CONTROL POINT

AF0249	TT 70 BBS	N272655.719	W0803958.888	341.9

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+0000000000049651 331.21+0000000000004249
390...+0000000000000005 391.21+0000000000000000
*110002+00000000000000B1 32...1+0000000000100539 332.21+0000000000004454
390...+0000000000000005 391.21+0000000000000000
*110003+00000000000000B2 32...1+0000000000050028 336.21+0000000000004542
390...+0000000000000005 391.21+0000000000000000
*110004+00000000000000A2 32...1+0000000000100186 335.21+0000000000004340
390...+0000000000000005 391.21+0000000000000000
*410005+00000000?.....1
*110006+000000000000D484 83..51+0000000000033051
*110007+000000000000D484 32...1+0000000000144580 331.21+0000000000004688
390...+0000000000000005 391.21+0000000000000000
*110008+0000000000000001 32...1+0000000000144419 332.21+0000000000004783
390...+0000000000000005 391.21+0000000000000000
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390...+0000000000000005 391.21+0000000000000000 71....+00000BM 1862 46A
*110024+00000000BM STL42 573..1+0000000000004269 574..1+0000000002399646
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390...+0000000000000005 391.21+0000000000000000

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390...+0000000000000005 391.21+0000000000000000
*110096+0000000000000028 573..1+0000000000000525 574..1+0000000012264489
83..21+0000000000033036

Palm City

11 May 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 42

1/1

Latitude: 27 26 55.74437	**Northing/Y:** 1132467.124
Longitude: 80 40 11.33886	**Easting/X:** 763251.150
Elevation/Z: 0	**Elevation/Z:** 1.293
	Convergence: 0 09 07.92542
	Scale Factor: 0.999954322
	Combined Factor: 0.999958495

Remark: