



PROFESSIONAL SURVEYORS & MAPPERS  
I N C O R P O R A T E D

Post Office Box 1469    ♦    Palm City, FL 34991  
Martin: 772.286.8083    ♦    Fax: 772.283.6174  
Statewide: 800.386.1066    www.gcyinc.com

---

## **SURVEYOR'S REPORT**

Specific Purpose Survey of the United States  
Geological Survey Well **OSF-84/TH-10**  
in  
Osceola 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

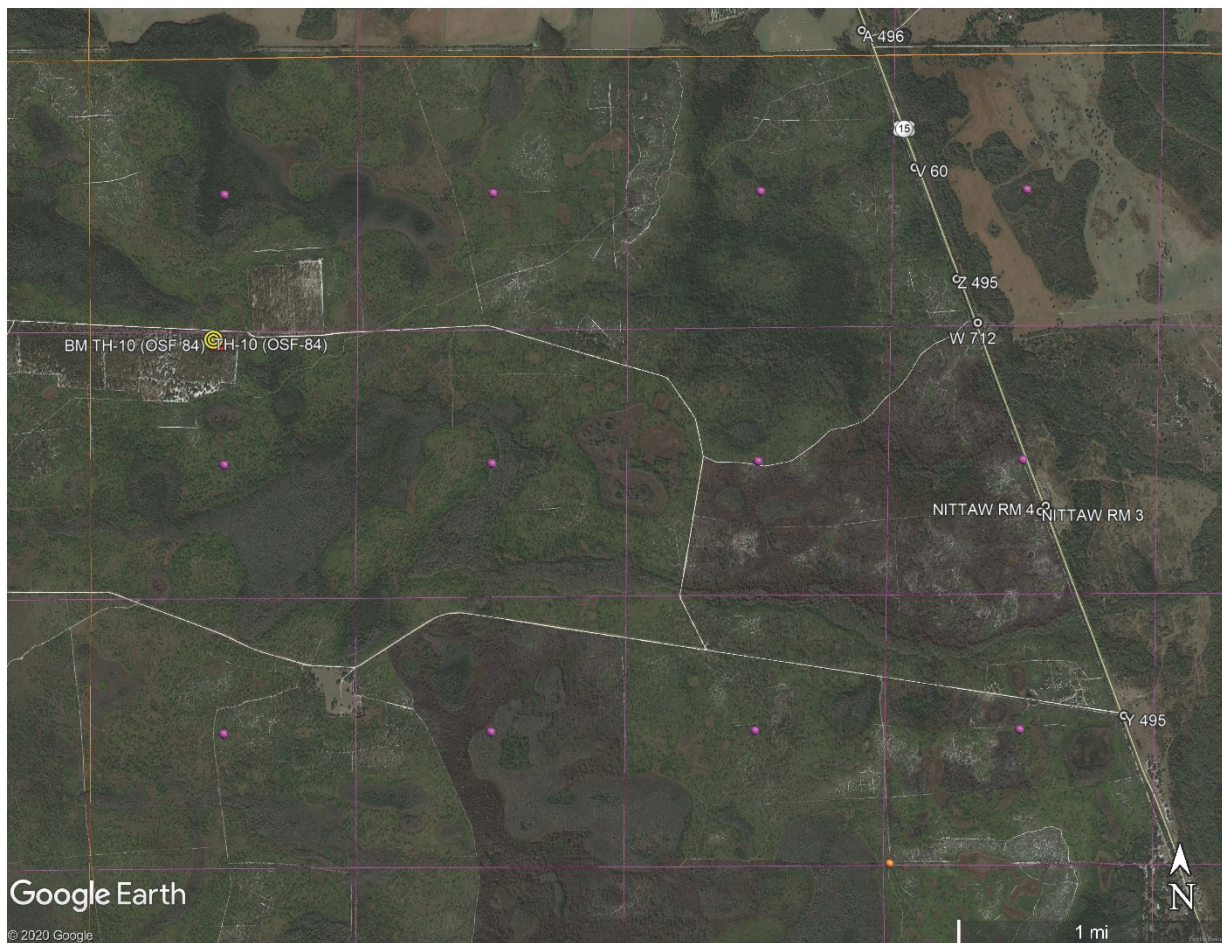
| <u>TITLE</u>                | <u>PAGE</u> |
|-----------------------------|-------------|
| Cover Sheet                 | 1           |
| Table of Contents           | 2           |
| Purpose                     | 3           |
| Project Location            | 3           |
| Surveyor's Report           | 4           |
| Project Datums              |             |
| Leveling and GPS Methods    |             |
| Equipment used              |             |
| Surveyor's Notes            | 5           |
| Surveyor's Certification    | 5           |
| SFWMD Well Site Form        | 6 - 18      |
| SFWMD Benchmark Data Sheet  | 19          |
| Supporting Data             | 20 – 30     |
| OPUS Solution               |             |
| Raw digital level file      |             |
| Corpscon Offset Calculation |             |
| OPUS Sharing Datasheet      |             |

**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 "OSF-84/TH-10".

**LOCATION OF PROJECT**

The United States Geological Survey Well "OSF-84/TH-10" is located in the Section 7, Township 29 South, Range 33 East, Osceola 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 OSC-84/TH-10 add 1.211**. 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 v miles).

Leveling was run from National Geodetic Survey (NGS) monument "Y 495" (NGSPID AJ7642) to the site benchmark. Because of the run distance being 4.39 miles in length, a 6+ hour OPUS session was used to check the run from the NGS benchmark. The difference between the digital bench run and the OPUS elevations was found to be 0.012', well within the required parameters. Leveling was done using a Leica DNA 10 digital level S/N 331745.

## **GPS METHODS**

Latitude and longitude for the New Benchmark "OSF-28" were established by observing a 6+ hour Static Session on July 16, 2020 using a Trimble 5700 dual frequency receiver S/N 0220381397. The data from this session was sent to the NGS "OPUS" site for post processing on July 21, 2020 and a report was received from the "OPUS" site the same day. The data was also sent to "OPUS Shared" and accepted on August 17, 2020, (NGSPID BBGX01).





**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 1.211 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: August 26, 2020, GCY Job No. 20-1017-02-01.
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: 1869 pages 12-16, 26.

**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.

August 26, 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.





# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

|   |   |                             |   |
|---|---|-----------------------------|---|
| U.S.G.S. Station Name:<br><b>OSF-84/TH-10</b> | U.S.G.S. Station Number:<br>275852081030501 | Agency:<br><b>GCY, INC.</b> | Date of Field Work:<br><b>7/13/2020</b> |
| Party Chief:<br><b>LAPOLLA</b>                | Field Book:<br><b>GCY 1869</b>              | Page(s):<br><b>21-24</b>    | Report Prepared by:<br><b>ANDERSEN</b>  |

**SITE SPECIFIC DATA**

|   |   |   |                                       |
|---|---|---|---------------------------------------|
| Site Benchmark:<br><b>TH-10</b>           | Benchmark Elevation(s) (NAVD88):<br><b>73.784</b> | Corpscon 6.0.1 Conversion Factor (NAVD88 to NGVD29)<br><b>+ 1.211</b> |                                       |
| Well Reference Elevation (NAVD88): 78.411 | DTW: <b>35.50</b><br>07/13/2020 5:30 PM           | Ground Elevation (NAVD88):<br><b>74.6</b>                             | Pad Elevation (NAVD88):<br><b>N/A</b> |

**GEOGRAPHIC DATA**

|  |   |                                    |
|--|---|------------------------------------|
| Section <b>7</b>                           | Township <b>29 S</b>                        | Range <b>33 E</b>                  |
| Well Latitude:<br><b>27° 58' 54.268" N</b> | Well Longitude:<br><b>81° 03' 34.780" W</b> | Location Source:<br><b>RTK GPS</b> |
| State Plane Coordinates:                   | Northing (Y) = 1326070.46                   | Easting (X) = 636911.40            |

**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**

**Well Site**  
Latitude: **27° 58' 54.268" N**  
Longitude: **81° 3' 34.780" W**

Benchmark "TH-10"  
Latitude: **27° 58' 54.07223" N**  
Longitude: **81° 3' 33.59610" W**  
El. = **73.784 feet NAVD88**

Google Earth  
© 2020 Google

1 mi

Not to scale (GoogleEarth product)





**Well Site and Well Head**



Well: "OSF-84/TH-10"  
Reference Point: MAGIC MARKER BOX

Reference Point El. = **78.411 feet NAVD88**

Distance to Water = **35.50 feet** from reference point  
7/13/2020 @17:30





# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## New Aluminum Tag





# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

USGS RMs- NONE





**Site Benchmark**

**Site Benchmark Overall Photo**



**Site BM: TH-10**



Latitude: 27° 58' 54.07223" N  
Longitude: 81° 3' 33.59610" W  
NAVD88 EL = 73.784





**Source Benchmarks**



Y 495 (NGSPID AJ7642)





"Y 495" Benchmark Datasheet (1 OF 2)

7/7/2020

DATASHEETS

The NGS Data Sheet

See file [dsdata.pdf](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.12.5.9

Starting Datasheet Retrieval...

1 National Geodetic Survey, Retrieval Date = JULY 7, 2020

AJ7642 \*\*\*\*\*

AJ7642 DESIGNATION - Y 495
AJ7642 PID - AJ7642
AJ7642 STATE/COUNTY- FL/OSCEOLA
AJ7642 COUNTRY - US
AJ7642 USGS QUAD - LAKE MARIAN NE (2018)

AJ7642 \*CURRENT SURVEY CONTROL

AJ7642\* NAD 83(1986) POSITION- 27 57 41.4 (N) 081 00 13.8 (W) HD\_HELD2
AJ7642\* NAVD 88 ORTHO HEIGHT - 17.631 (meters) 57.84 (feet) ADJUSTED

AJ7642 GEOID HEIGHT - -27.612 (meters) GEOID18
AJ7642 DYNAMIC HEIGHT - 17.605 (meters) 57.76 (feet) COMP
AJ7642 MODELED GRAVITY - 979,157.2 (mgal) NAVD 88

AJ7642 VERT ORDER - SECOND CLASS I

AJ7642.The horizontal coordinates were established by autonomous hand held GPS
AJ7642.observations and have an estimated accuracy of +/- 10 meters.

AJ7642.The orthometric height was determined by differential leveling and
AJ7642.adjusted by the NATIONAL GEODETIC SURVEY
AJ7642.in March 2002.

AJ7642.Significant digits in the geoid height do not necessarily reflect accuracy.
AJ7642.GEOID18 height accuracy estimate available [here](#).

AJ7642.Click [photographs](#) - Photos may exist for this station.

AJ7642.The dynamic height is computed by dividing the NAVD 88
AJ7642.geopotential number by the normal gravity value computed on the
AJ7642.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AJ7642.degrees latitude (g = 980.6199 gals.).

AJ7642.The modeled gravity was interpolated from observed gravity values.

AJ7642; North East Units Estimated Accuracy
AJ7642;SPC FL E - 401,943. 199,623. MT (+/- 10 meters HH2 GPS)

AJ7642\_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RML9962292937(NAD 83)

AJ7642 SUPERSEDED SURVEY CONTROL

AJ7642.No superseded survey control is available for this station.

AJ7642\_MARKER: F = FLANGE-ENCASED ROD
AJ7642\_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
AJ7642\_STAMPING: Y 495 2000
AJ7642\_MARK LOGO: NGS
AJ7642\_PROJECTION: FLUSH
AJ7642\_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
AJ7642\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

https://www.ngs.noaa.gov/cgi-bin/ds\_mark.pr?PidBox=AJ7642



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## "Y 495" Benchmark Datasheet (2 OF 2)

7/7/2020

DATASHEETS

AJ7642\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AJ7642+SATELLITE: SATELLITE OBSERVATIONS - March 18, 2008

AJ7642\_ROD/PIPE-DEPTH: 24.3 meters

AJ7642

| AJ7642 | HISTORY | - Date     | Condition  | Report By |
|--------|---------|------------|------------|-----------|
| AJ7642 | HISTORY | - 2000     | MONUMENTED | FLDEP     |
| AJ7642 | HISTORY | - 20080318 | GOOD       | FLDEP     |

### STATION DESCRIPTION

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

AJ7642

\*\*\* retrieval complete.

Elapsed Time = 00:00:02

[https://www.ngs.noaa.gov/cgi-bin/ds\\_mark.pr?PidBox=AJ7642](https://www.ngs.noaa.gov/cgi-bin/ds_mark.pr?PidBox=AJ7642)

2/2



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## Field Notes (1 of 5)

3 Lines

SFWD - USGS / PILL WELLS

REDUCED TO NEW BM TH-10 (IND. 1082)

PAC TEST OSP # 84

|                       |                        |         |     |
|-----------------------|------------------------|---------|-----|
| Coll. Era OLD = 7.7"  | Coll. Era NEW = 9.1"   |         |     |
| DIFF = 1.4"           | RETICLE = 5.432        |         |     |
| Sta                   | TOTAL DIST             | ELEV    | ADJ |
| Y 495                 | 0                      | 57.844' |     |
|                       |                        |         |     |
| 6                     | 2888.66                | 60.775' |     |
|                       |                        |         |     |
| 11                    | 5478.57                | 62.477' |     |
| (CONT. 7.13.20 MON)   |                        |         |     |
| PAC TEST:             |                        |         |     |
| Coll. Era. OLD = 5.1" | Coll. Era. NEW = 4.0"  |         |     |
| DIFF = -1.1"          | RETICLE = 4.958'       |         |     |
|                       |                        |         |     |
| 17                    | 2877.83<br>(8356.4')   | 69.777' |     |
|                       |                        |         |     |
| 23                    | 5577.94<br>(11056.51') | 69.213' |     |

1869 12

20-1017-02-01

9<sup>00</sup> M. Clovis

DNA 0

Job: PILL WELLS

LINE: TH-10

Desk

NGS BM Y 495 PLO: A57642

IND. 1082 EL = 57.844'

Bm 1809-12A SIRC "TRAV. PT"

150' N. OF THE RANGER STATION

N. SIDE OF DIST RD. #10007

Bm 1809-12B SIRC "TRAV. PT"

N. SIDE OF DIST RD. #10006

Bm 1809-12C SIRC "TRAV. PT"

N. SIDE OF DIST RD. #10005

Bm 1809-12D SIRC "TRAV. PT"

E. SIDE OF RD #10004





# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## Field Notes (2 of 5)

SFWMD-USGS | PAH WELLS

CONT. BENCH RUN FOR NEW  
BM TH-10 (NAVD 88) ~~OSF 84~~ 84

| STA      | TOTAL DIST               | ELEV    | ANT |
|----------|--------------------------|---------|-----|
| 33       | 10784.18'<br>(10260.75') | 71.107' |     |
| 45       | 17063.62'<br>(22521.99') | 70.625' |     |
| BM TH-10 | 17702.56<br>(23181.13')  | 73.784' |     |

20-1017-02-01 1869 13

90° Sounding  
LEICA DWA 10  
JOB: PAH WELLS  
FILE: TH 10

7.13.20 MUN  
M. LaBella P  
D. Guzman A  
P. McLoone P

| DESC               | #          |
|--------------------|------------|
| Bm 1809-13A Side   | "TRAV. PT" |
| N. SIDE OF DIST RD | #10003     |
| Bm 1809-13B Side   | "TRAV PT"  |
| S. SIDE OF RD.     | #10001     |

NEW BM TH-10 Bm 1809-13C  
SET 1 1/2" (I.P.) IRON PIPE w/ CONC COLLAR -  
GRAVELL DESC. 3' LONG I.P. "SFWMD  
TH-10 LB4108 2010"

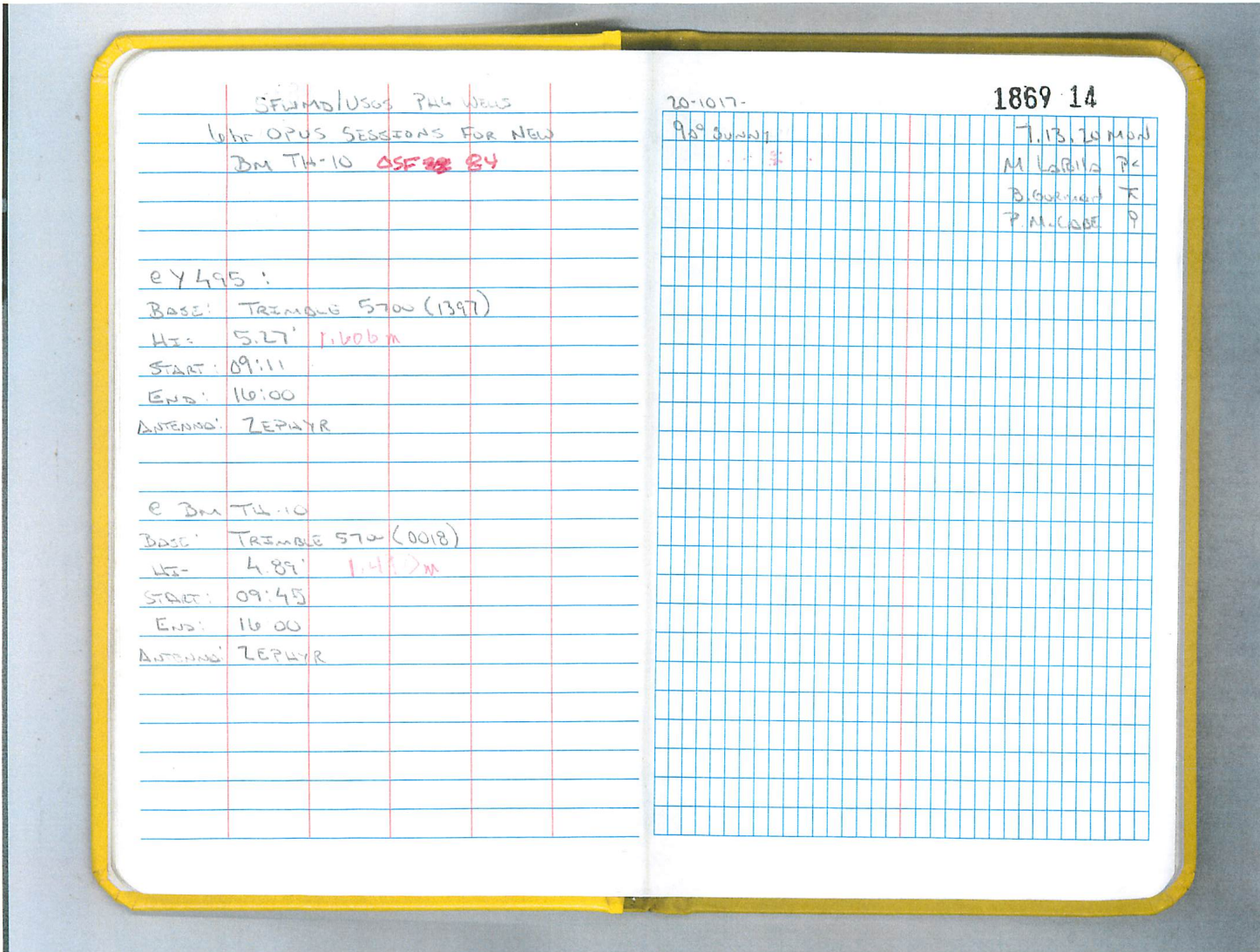
TOTAL DIST: 23181.13'



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## Field Notes (3 of 5)



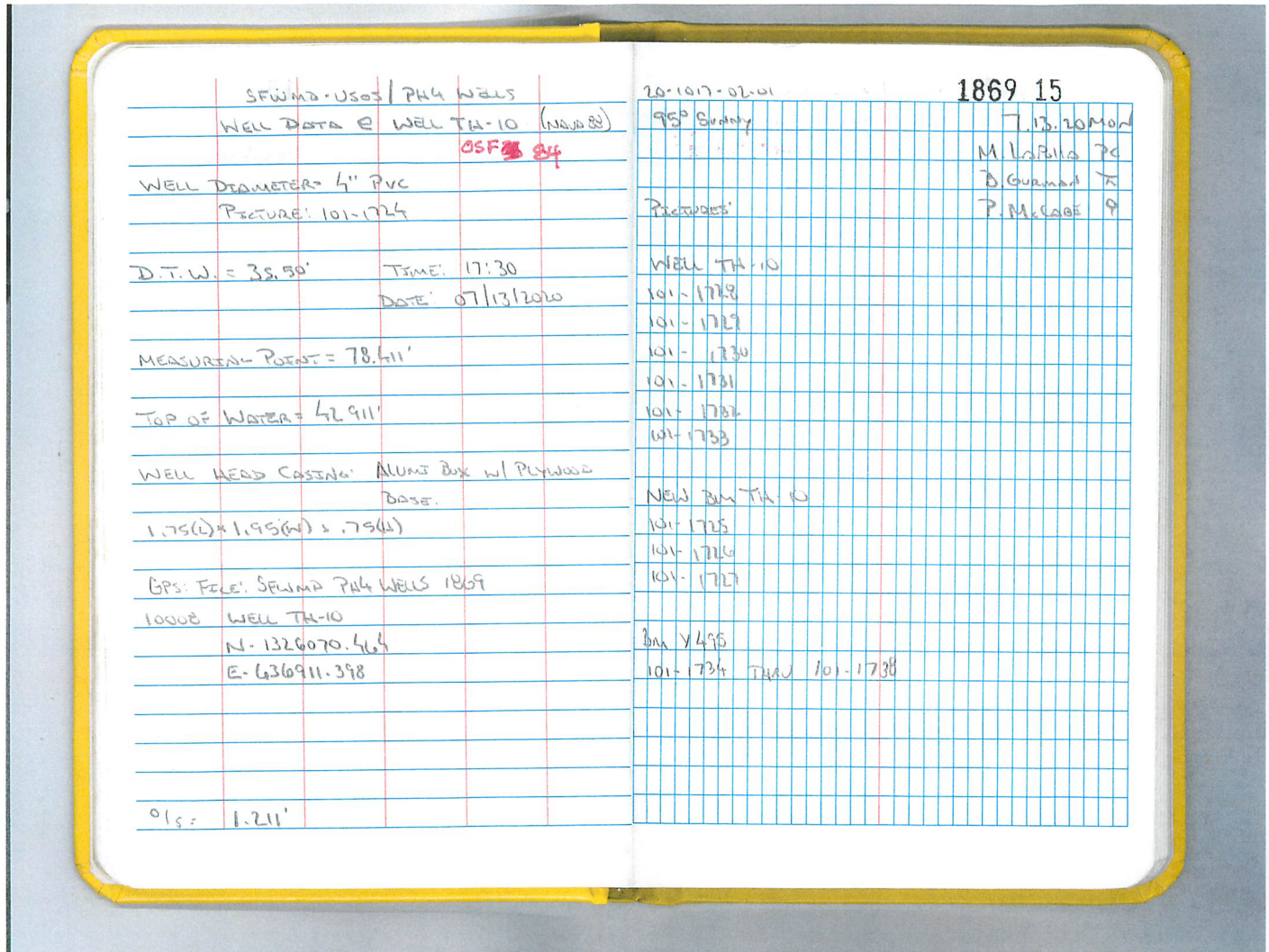




# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## Field Notes (4 of 5)





# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

## Field Notes (5 of 5)

(3 Lines)

STWMP USGS / PA4 WELLS

"M.P." + NG BENCH ROD @ WELL

TH-10 (NOV 28) OFF USE 28<sup>84</sup>

| STA      | +       | LT      | -     | EL      | ADT |
|----------|---------|---------|-------|---------|-----|
| BM TH-10 | 6.041   |         |       | 73.784  |     |
|          | 5.769   |         |       |         |     |
|          | 5.498   |         |       |         |     |
|          | (5.769) | 79.553' |       |         |     |
| S.S. 1   |         |         | 4.96  | 74.593' |     |
|          |         |         | 1.409 |         |     |
|          |         |         | 1.142 |         |     |
|          |         |         | 0.88  |         |     |
| M.P.     |         | (1.142) |       | 78.411' |     |
|          | 1.523   |         |       |         |     |
|          | 1.262   |         |       |         |     |
|          | 1.002   |         |       |         |     |
|          | (1.262) | 79.673' | 6.116 |         |     |
|          |         |         | 5.885 |         |     |
|          |         |         | 5.61  |         |     |
| 1        |         | (5.885) |       | 73.788' |     |

20-1017-01-01 1869 16

95° Sunny

7.13.20 Mon  
M. LoPinto PC  
D. Guand  
P. McCabe 9

DESC

BM TH-10 NOV 28 = 73.784'

NG @ WELL TH 10

MEASURING POINT @ WELL TH-10  
EAST SIDE OF GREY RING ON TOP OF 4" PVC.

✓ Back to BM TH-10  
ERR = +.004

\* END RUN \*





South Florida Water Management District Benchmark Datasheet

Designation: TH-10 Project Name: USGS PHASE 4 WELLS Type: V State Plane Zone: FL East
Stamping: TH-10 LB4108 2020 Field Book Name: GCY 1869 Field Book Page: 12-16, 26
Established By: GCY INC Recovered By: Recovery Date:
Surveyor: ANDERSEN Established Date: 07/13/20 Status: New

GEOGRAPHIC POSITION INFORMATION

Section: 7 Township: 29 SOUTH Range: 33 EAST
County: OSCEOLA Quadrangle: LAKE MARION NE Quad Index: NGS Source BM(s): Y 495
NAD83 Adj. Year: 2011 Vertical Datum: NAVD1988 Horizontal Datum: NAD1983 NGS PID(s): AJ7642
NAVD88 Elevation (feet): 73.784 NGVD29 Elevation (feet): 75.005 2022 Elevation: NGS NAVD88 Elev (ft): 57.844
NAVD88 Class: 3rd Other Elevation: NGS NAVD88 Elev (m): 17.631
NAVD88 Order: NGVD29 Order: 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: + 1.221 Actual NGS Elevation or ngvd29.txt file: OPUS Ortho Height: 73.796
Northing (Y) (feet): 1326050.691 Easting (X) (feet): 637017.509 Source of Latitude & Longitude: OPUS SOLUTION
Latitude: 27 58 54.07223 Longitude: -81 3 33.5961
Latitude (Decimal Degrees): 27.98168673 Longitude (Decimal Degrees): 80.94066775

RECOVERY DATA

How to Reach: FROM INTX OF US 192 AND US 441 IN HOLOPAW GO SLY ON US 441 FOR 13.8 MILES TO WILLIAMS ROAD ON THE RIGHT. THENCE ON WILLIAMS ROAD GO 1.57 MILES TO ROAD SPLIT ON RIGHT. GO NORTH ON ROAD SPLIT TO NORTH 2.79 MILES TO MARK ON LEFT. MARK IS 200 FT SOUTH OF CL OF ROAD, 363 FT WEST OF A 2 TRACK ROAD AND 74.3 EASTERLY OF USGS WELL TH-10.

Description/Notes:

Notable Landmarks:
Other Source Benchmarks:

PICTURES

Aerial View of Overall Site



PICTURES

Site Sketch





**From:** opus  
**To:** Pete Andersen  
**Subject:** OPUS solution : 13972393.t01 OP1598612985949  
**Date:** Friday, August 28, 2020 7:10:56 AM

---

FILE: 13972393.t01 OP1598612985949

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: August 28, 2020  
RINEX FILE: 1397239n.20o                    TIME: 11:10:41 UTC

SOFTWARE: page5 1801.18 master71.pl 160321    START: 2020/08/26 13:48:00  
EPHEMERIS: igr21203.eph [rapid]            STOP: 2020/08/26 20:23:00  
NAV FILE: brdc2390.20n                    OBS USED: 12917 / 14741 : 88%  
ANT NAME: TRM39105.00    NONE            # FIXED AMB: 110 / 135 : 81%  
ARP HEIGHT: 1.585                        OVERALL RMS: 0.024(m)

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000)      ITRF2014 (EPOCH:2020.6522)

X: 876003.498(m) 0.009(m)      876002.655(m) 0.009(m)  
Y: -5568181.233(m) 0.032(m)    -5568179.668(m) 0.032(m)  
Z: 2974710.800(m) 0.006(m)      2974710.641(m) 0.006(m)

LAT: 27 58 54.07223    0.019(m)    27 58 54.09325    0.019(m)  
E LON: 278 56 26.40390    0.014(m)    278 56 26.38234    0.014(m)  
W LON: 81 3 33.59610    0.014(m)    81 3 33.61766    0.014(m)  
EL HGT: -5.148(m) 0.024(m)      -6.703(m) 0.024(m)  
ORTHO HGT: 22.493(m) 0.061(m) [NAVD88 (Computed using GEOID18)]

UTM COORDINATES    STATE PLANE COORDINATES

UTM (Zone 17)      SPC (0901 FL E)  
Northing (Y) [meters]    3095175.136      404181.059  
Easting (X) [meters]    494165.317      194163.325  
Convergence [degrees]    -0.02783889      -0.02783889  
Point Scale            0.99960042      0.99994160  
Combined Factor        0.99960123      0.99994241

US NATIONAL GRID DESIGNATOR: 17RML9416595175(NAD 83)

BASE STATIONS USED

| PID    | DESIGNATION               | LATITUDE    | LONGITUDE    | DISTANCE(m) |
|--------|---------------------------|-------------|--------------|-------------|
| DE9138 | OKCB OKEECHOBEE CORS ARP  | N271557.715 | W0805119.181 | 81819.7     |
| DF7990 | ZEFR ZEPHYRHILLS CORS ARP | N281339.322 | W0820952.671 | 111978.5    |
| DH3757 | WACH WAUCHULA CORS ARP    | N273051.042 | W0815256.615 | 96272.0     |

NEAREST NGS PUBLISHED CONTROL POINT

AJ7644    A 496                      N2759000054 W08101000011    4305.6

BASE STATION INFORMATION

STATION NAME: okcb a 4 (Okeechobee; Okeechobee, Florida, U.S.A.)

MONUMENT: 49587S001

XYZ 901665.5395 -5601320.7260 2904442.8976 MON @ 2010.0000 (M)  
 XYZ -0.0116 0.0012 0.0016 VEL (M/YR)  
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)  
 NEU 0.0001 -0.0008 0.1242 ARP TO L1 PHASE CENTER (M)  
 NEU -0.0000 -0.0008 0.1337 ARP TO L2 PHASE CENTER (M)  
 XYZ -0.1236 0.0124 0.0173 VEL TIMES 10.6524 YRS  
 XYZ 0.0000 0.0000 0.0000 MON TO ARP  
 XYZ 0.0168 -0.1091 0.0570 ARP TO L1 PHASE CENTER  
 XYZ 901665.4327 -5601320.8227 2904442.9719 L1 PHS CEN @ 2020.6522  
 XYZ -0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS  
 XYZ 901665.4327 -5601320.8227 2904442.9719 NEW L1 PHS CEN @ 2020.6522  
 XYZ 901665.4159 -5601320.7136 2904442.9149 NEW ARP @ 2020.6522  
 XYZ 901665.4159 -5601320.7136 2904442.9149 NEW MON @ 2020.6522  
 LLH 27 15 57.73632 279 8 40.79740 -15.2077 NEW L1 PHS CEN @ 2020.6522  
 LLH 27 15 57.73631 279 8 40.79742 -15.3320 NEW ARP @ 2020.6522  
 LLH 27 15 57.73631 279 8 40.79742 -15.3320 NEW MON @ 2020.6522

STATION NAME: zefr a 4 (ZEPHYRHILLS; Zephyrhills, Florida, U.S.A.)

MONUMENT: 49526S001

XYZ 766680.6041 -5571328.4431 2998751.0393 MON @ 2010.0000 (M)  
 XYZ -0.0119 -0.0001 0.0017 VEL (M/YR)  
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)  
 NEU 0.0001 -0.0008 0.1242 ARP TO L1 PHASE CENTER (M)  
 NEU -0.0000 -0.0008 0.1337 ARP TO L2 PHASE CENTER (M)  
 XYZ -0.1265 -0.0006 0.0186 VEL TIMES 10.6524 YRS  
 XYZ 0.0000 0.0000 0.0000 MON TO ARP  
 XYZ 0.0142 -0.1085 0.0589 ARP TO L1 PHASE CENTER  
 XYZ 766680.4917 -5571328.5521 2998751.1168 L1 PHS CEN @ 2020.6522  
 XYZ 0.0000 0.0000 0.0000 + XYZ ADJUSTMENTS  
 XYZ 766680.4917 -5571328.5521 2998751.1168 NEW L1 PHS CEN @ 2020.6522  
 XYZ 766680.4776 -5571328.4436 2998751.0579 NEW ARP @ 2020.6522  
 XYZ 766680.4776 -5571328.4436 2998751.0579 NEW MON @ 2020.6522  
 LLH 28 13 39.34326 277 50 7.30547 -1.3738 NEW L1 PHS CEN @ 2020.6522  
 LLH 28 13 39.34326 277 50 7.30550 -1.4980 NEW ARP @ 2020.6522  
 LLH 28 13 39.34326 277 50 7.30550 -1.4980 NEW MON @ 2020.6522

STATION NAME: wach a 2 (Wauchula; Wauchula, Florida, U.S.A.)

MONUMENT: NO DOMES NUMBER

XYZ 799335.4500 -5604081.2975 2928868.5949 MON @ 2010.0000 (M)  
 XYZ -0.0116 0.0017 0.0012 VEL (M/YR)  
 NEU 0.0000 0.0000 0.0000 MON TO ARP (M)  
 NEU 0.0001 -0.0008 0.1242 ARP TO L1 PHASE CENTER (M)  
 NEU -0.0000 -0.0008 0.1337 ARP TO L2 PHASE CENTER (M)  
 XYZ -0.1239 0.0180 0.0124 VEL TIMES 10.6524 YRS  
 XYZ 0.0000 0.0000 0.0000 MON TO ARP  
 XYZ 0.0148 -0.1091 0.0575 ARP TO L1 PHASE CENTER  
 XYZ 799335.3409 -5604081.3886 2928868.6648 L1 PHS CEN @ 2020.6522  
 XYZ 0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS  
 XYZ 799335.3409 -5604081.3886 2928868.6648 NEW L1 PHS CEN @ 2020.6522

XYZ 799335.3262 -5604081.2795 2928868.6073 NEW ARP @ 2020.6522  
XYZ 799335.3262 -5604081.2795 2928868.6073 NEW MON @ 2020.6522  
LLH 27 30 51.06303 278 7 3.36194 9.2826 NEW L1 PHS CEN @ 2020.6522  
LLH 27 30 51.06303 278 7 3.36197 9.1584 NEW ARP @ 2020.6522  
LLH 27 30 51.06303 278 7 3.36197 9.1584 NEW MON @ 2020.6522

REMOTE STATION INFORMATION

STATION NAME: 1397 1

MONUMENT: NO DOMES NUMBER

XYZ 876002.6482 -5568179.6997 2974710.5711 MON @ 2020.6518 (M)  
NEU 0.0003 -0.0005 1.5850 MON TO ARP (M)  
NEU -0.0003 0.0005 0.0559 ARP TO L1 PHASE CENTER (M)  
NEU -0.0006 0.0016 0.0526 ARP TO L2 PHASE CENTER (M)  
XYZ 0.2170 -1.3827 0.7439 MON TO ARP  
XYZ 0.0082 -0.0488 0.0259 ARP TO L1 PHASE CENTER  
XYZ 876002.8734 -5568181.1312 2974711.3410 L1 PHS CEN @ 2020.6522

BASELINE NAME: okcb 1397

XYZ 0.0047 0.0266 0.0697 + XYZ ADJUSTMENTS  
XYZ 876002.8781 -5568181.1045 2974711.4107 NEW L1 PHS CEN @ 2020.6522  
XYZ 876002.8700 -5568181.0557 2974711.3848 NEW ARP @ 2020.6522  
XYZ 876002.6529 -5568179.6731 2974710.6408 NEW MON @ 2020.6522  
LLH 27 58 54.09316 278 56 26.38224 -5.0582 NEW L1 PHS CEN @ 2020.6522  
LLH 27 58 54.09318 278 56 26.38222 -5.1141 NEW ARP @ 2020.6522  
LLH 27 58 54.09316 278 56 26.38224 -6.6991 NEW MON @ 2020.6522

BASELINE NAME: zefr 1397

XYZ 0.0032 0.0178 0.0663 + XYZ ADJUSTMENTS  
XYZ 876002.8766 -5568181.1134 2974711.4073 NEW L1 PHS CEN @ 2020.6522  
XYZ 876002.8684 -5568181.0646 2974711.3813 NEW ARP @ 2020.6522  
XYZ 876002.6514 -5568179.6819 2974710.6374 NEW MON @ 2020.6522  
LLH 27 58 54.09294 278 56 26.38213 -5.0523 NEW L1 PHS CEN @ 2020.6522  
LLH 27 58 54.09295 278 56 26.38211 -5.1082 NEW ARP @ 2020.6522  
LLH 27 58 54.09294 278 56 26.38213 -6.6932 NEW MON @ 2020.6522

BASELINE NAME: wach 1397

XYZ 0.0126 0.0498 0.0723 + XYZ ADJUSTMENTS  
XYZ 876002.8860 -5568181.0814 2974711.4133 NEW L1 PHS CEN @ 2020.6522  
XYZ 876002.8778 -5568181.0326 2974711.3873 NEW ARP @ 2020.6522  
XYZ 876002.6608 -5568179.6499 2974710.6434 NEW MON @ 2020.6522  
LLH 27 58 54.09357 278 56 26.38265 -5.0761 NEW L1 PHS CEN @ 2020.6522  
LLH 27 58 54.09358 278 56 26.38264 -5.1320 NEW ARP @ 2020.6522  
LLH 27 58 54.09357 278 56 26.38265 -6.7170 NEW MON @ 2020.6522

G-FILES

Axx2020 826 20 826

B2020 8261347 20 8262022 1 page5 v1801.18IGS 132 1 2 27NGS 2020 828IFDDPX  
IITRF2014\_2114 IGS 20200712  
C00090005 256627630 11 -331410405 48 -702677260 26 X2390A1397X2390AOKCB  
D 1 2 -7646615 1 3 5522322 2 3 -8616828

Axx2020 826 20 826

B2020 8261347 20 8262022 1 page5 v1801.18IGS 132 1 2 27NGS 2020 828IFDDPX  
IITRF2014\_2114 IGS 20200712  
C00090001-1093221738 13 -31487617 42 240404205 22 X2390A1397X2390AZEFR

D 1 2 -7438234 1 3 6630448 2 3 -9535362

Axx2020 826 20 826

B2020 8261347 20 8262022 1 page5 v1801.18IGS 132 1 2 27NGS 2020 828IFDDPX

IITRF2014\_2114 IGS 20200712

C00090002 -766673346 14 -359016296 59 -458420361 31 X2390A1397X2390AWACH

D 1 2 -4491700 1 3 6323261 2 3 -9368415

POST-FIT RMS BY SATELLITE VS. BASELINE

|           |       |       |       |       |       |       |       |       |       |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| OVERALL   | 02    | 03    | 05    | 06    | 09    | 10    | 12    | 13    |       |
| okcb-1397 | 0.027 | 0.021 | ...   | 0.024 | 0.024 | 0.024 | ...   | 0.026 | 0.039 |
|           | 15    | 17    | 18    | 19    | 20    | 24    | 25    | 28    | 29    |
| okcb-1397 | 0.028 | 0.018 | 0.023 | 0.023 | 0.027 | 0.020 | 0.036 | 0.018 | 0.029 |

|           |       |       |       |       |       |       |       |       |       |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| OVERALL   | 02    | 05    | 06    | 09    | 10    | 12    | 13    | 15    |       |
| zefr-1397 | 0.020 | 0.024 | 0.018 | 0.016 | 0.020 | ...   | 0.016 | 0.025 | 0.022 |
|           | 17    | 18    | 19    | 20    | 24    | 25    | 28    | 29    |       |
| zefr-1397 | 0.016 | 0.023 | 0.015 | 0.024 | 0.033 | 0.017 | 0.017 | 0.023 |       |

|           |       |       |       |       |       |       |       |       |       |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| OVERALL   | 02    | 05    | 06    | 09    | 10    | 12    | 13    | 15    |       |
| wach-1397 | 0.025 | 0.045 | 0.024 | 0.019 | 0.019 | ...   | 0.019 | 0.026 | 0.026 |
|           | 17    | 18    | 19    | 20    | 24    | 25    | 28    | 29    |       |
| wach-1397 | 0.021 | 0.024 | 0.021 | 0.023 | 0.029 | 0.031 | 0.017 | 0.031 |       |

OBS BY SATELLITE VS. BASELINE

|           |      |     |     |     |     |     |     |     |     |
|-----------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| OVERALL   | 02   | 03  | 05  | 06  | 09  | 10  | 12  | 13  |     |
| okcb-1397 | 4362 | 43  | ... | 683 | 428 | 109 | ... | 464 | 304 |
|           | 15   | 17  | 18  | 19  | 20  | 24  | 25  | 28  | 29  |
| okcb-1397 | 385  | 298 | 227 | 373 | 120 | 61  | 349 | 126 | 392 |

|           |      |     |     |     |     |     |     |     |     |
|-----------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| OVERALL   | 02   | 05  | 06  | 09  | 10  | 12  | 13  | 15  |     |
| zefr-1397 | 4434 | 53  | 699 | 428 | 134 | ... | 480 | 301 | 394 |
|           | 17   | 18  | 19  | 20  | 24  | 25  | 28  | 29  |     |
| zefr-1397 | 298  | 180 | 392 | 119 | 82  | 315 | 130 | 429 |     |

|           |      |     |     |     |    |     |     |     |     |
|-----------|------|-----|-----|-----|----|-----|-----|-----|-----|
| OVERALL   | 02   | 05  | 06  | 09  | 10 | 12  | 13  | 15  |     |
| wach-1397 | 4121 | 52  | 689 | 342 | 21 | ... | 471 | 310 | 378 |
|           | 17   | 18  | 19  | 20  | 24 | 25  | 28  | 29  |     |
| wach-1397 | 250  | 202 | 381 | 92  | 74 | 293 | 119 | 447 |     |

ITRF position of 1397 as determined by individual baselines

|      |            |              |             |  |
|------|------------|--------------|-------------|--|
|      | X          | Y            | Z           |  |
| okcb | 876002.653 | -5568179.673 | 2974710.641 |  |
| zefr | 876002.651 | -5568179.682 | 2974710.637 |  |
| wach | 876002.661 | -5568179.650 | 2974710.643 |  |

Residuals of position determined by individual baselines from the final position

|      |        |        |        |        |        |        |  |
|------|--------|--------|--------|--------|--------|--------|--|
|      | X      | Y      | Z      | East   | North  | Up     |  |
| okcb | -0.002 | -0.005 | 0.000  | -0.003 | -0.002 | 0.004  |  |
| zefr | -0.004 | -0.014 | -0.003 | -0.006 | -0.009 | 0.010  |  |
| wach | 0.006  | 0.018  | 0.003  | 0.009  | 0.011  | -0.014 |  |

Covariance Matrix for the xyz OPUS Position (meters^2).

|               |               |               |
|---------------|---------------|---------------|
| 0.0000009533  | -0.0000002229 | 0.0000001226  |
| -0.0000002229 | 0.0000145356  | -0.0000007056 |
| 0.0000001226  | -0.0000007056 | 0.0000040133  |

Covariance Matrix for the enu OPUS Position (meters<sup>2</sup>).

|               |               |               |
|---------------|---------------|---------------|
| 0.0000012129  | 0.0000008844  | -0.0000016512 |
| 0.0000008844  | 0.0000056578  | -0.0000038321 |
| -0.0000016512 | -0.0000038321 | 0.0000126315  |

Horizontal network accuracy = 0.00485 meters.

Vertical network accuracy = 0.00697 meters.

#### Derivation of NAD 83 vector components

Position of reference station ARP in NAD\_83(2011)(EPOCH:2010.0000).

|      | Xa(m)        | Ya(m)          | Za(m)         |         |
|------|--------------|----------------|---------------|---------|
| OKCB | 901666.25422 | -5601322.30851 | 2904443.08260 | 2010.00 |
| ZEFR | 766681.32066 | -5571330.00595 | 2998751.22097 | 2010.00 |
| WACH | 799336.16445 | -5604082.87126 | 2928868.78053 | 2010.00 |

Position of reference station monument in NAD\_83(2011)(EPOCH:2010.0000).

|      | Xr(m)        | Yr(m)          | Zr(m)         |         |
|------|--------------|----------------|---------------|---------|
| OKCB | 901666.25422 | -5601322.30851 | 2904443.08260 | 2010.00 |
| ZEFR | 766681.32066 | -5571330.00595 | 2998751.22097 | 2010.00 |
| WACH | 799336.16445 | -5604082.87126 | 2928868.78053 | 2010.00 |

Velocity of reference station monument in NAD\_83(2011)(EPOCH:2010.0000).

|      | Vx (m/yr) | Vy (m/yr) | Vz (m/yr) |
|------|-----------|-----------|-----------|
| OKCB | 0.00118   | 0.00217   | -0.00155  |
| ZEFR | 0.00123   | 0.00086   | -0.00097  |
| WACH | 0.00128   | 0.00265   | -0.00157  |

Vectors from unknown station monument to reference station monument in NAD\_83(2011)(EPOCH:2010.0000).

|      | Xr-X= DX(m)   | Yr-Y= DY(m)  | Zr-Z= DZ(m)  |         |
|------|---------------|--------------|--------------|---------|
| OKCB | 25662.75622   | -33141.07551 | -70267.71740 | 2010.00 |
| ZEFR | -109322.17734 | -3148.77295  | 24040.42097  | 2010.00 |
| WACH | -76667.33355  | -35901.63826 | -45842.01947 | 2010.00 |

#### STATE PLANE COORDINATES - U.S. Survey Foot

SPC (0901 FL E)

|                       |             |
|-----------------------|-------------|
| Northing (Y) [feet]   | 1326050.691 |
| Easting (X) [feet]    | 637017.509  |
| Convergence [degrees] | -0.02783889 |
| Point Scale           | 0.99994160  |
| Combined Factor       | 0.99994241  |

\*\*\*\*\* New Reference Frame Preview \*\*\*\*\*

We are replacing the nation's NAD 83 and NAVD 88 datums, to improve access and accuracy of the National Spatial Reference System. More at <https://geodesy.noaa.gov/datums/newdatums/>

Below are approximate coordinates for this solution in the new frames:

APPROX ORTHO HGT: 22.538 (m) [PROTOTYPE (Computed using xGeoid19B,GRS80,ITRF2014)]



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.

410101+?.....1  
110102+0000Y495 83..51+00057844  
110103+0000Y495 32...1+00185991 331.21+00006044 390...+00000005 391.21+00000000  
110104+00000001 32...1+00186628 332.21+00004599 390...+00000005 391.21+00000000  
110105+00000001 573..1-00000637 574..1+00372619 83..21+00059289  
110106+00000001 32...1+00249636 331.21+00005614 390...+00000005 391.21+00000000  
110107+00000002 32...1+00248610 332.21+00004371 390...+00000005 391.21+00000000  
110108+00000002 573..1+00000389 574..1+00870865 83..21+00060532  
110109+00000002 32...1+00247952 331.21+00005697 390...+00000005 391.21+00000001  
110110+00000003 32...1+00249517 332.21+00005209 390...+00000005 391.21+00000000  
110111+00000003 573..1-00001176 574..1+01368334 83..21+00061021  
110112+00000003 32...1+00245579 331.21+00004940 390...+00000005 391.21+00000001  
110113+00000004 32...1+00244835 332.21+00005273 390...+00000005 391.21+00000000  
110114+00000004 573..1-00000432 574..1+01858749 83..21+00060688  
110115+00000004 32...1+00261508 331.21+00004921 390...+00000005 391.21+00000000  
110116+00000005 32...1+00262044 332.21+00004970 390...+00000005 391.21+00000001  
110117+00000005 573..1-00000968 574..1+02382302 83..21+00060639  
110118+00000005 32...1+00253085 331.21+00005731 390...+00000005 391.21+00000000  
110119+00000006 32...1+00253273 332.21+00005595 390...+00000005 391.21+00000001 71....+BM  
1869  
110120+00000006 573..1-00001156 574..1+02888660 83..21+00060775  
110121+00000006 32...1+00262169 331.21+00004818 390...+00000005 391.21+00000001  
110122+00000007 32...1+00261459 332.21+00005414 390...+00000005 391.21+00000001  
110123+00000007 573..1-00000446 574..1+03412289 83..21+00060180  
110124+00000007 32...1+00262293 331.21+00004412 390...+00000005 391.21+00000001  
110125+00000008 32...1+00263340 332.21+00004491 390...+00000005 391.21+00000001  
110126+00000008 573..1-00001493 574..1+03937921 83..21+00060101  
110127+00000008 32...1+00256429 331.21+00005263 390...+00000005 391.21+00000000  
110128+00000009 32...1+00255412 332.21+00004349 390...+00000005 391.21+00000000  
110129+00000009 573..1-00000476 574..1+04449762 83..21+00061015  
110130+00000009 32...1+00255858 331.21+00004969 390...+00000005 391.21+00000002  
110131+00000010 32...1+00254861 332.21+00004068 390...+00000005 391.21+00000001  
110132+00000010 573..1+00000521 574..1+04960481 83..21+00061915  
110133+00000010 32...1+00258776 331.21+00004964 390...+00000005 391.21+00000001  
110134+00000011 32...1+00259312 332.21+00004402 390...+00000005 391.21+00000000  
110135+00000011 573..1-00000014 574..1+05478569 83..21+00062477  
110136+000000A1 32...1+00050040 331.21+00004877 390...+00000005 391.21+00000000  
110137+000000B1 32...1+00099990 332.21+00004840 390...+00000005 391.21+00000000  
110138+000000B2 32...1+00050270 336.21+00004920 390...+00000005 391.21+00000000  
110139+000000A2 32...1+00099697 335.21+00004957 390...+00000005 391.21+00000000  
410140+?.....1  
110141+00000011 83..21+00062477  
110142+00000011 32...1+00197545 331.21+00004618 390...+00000005 391.21+00000002  
110143+00000012 32...1+00197812 332.21+00004588 390...+00000005 391.21+00000000  
110144+00000012 573..1-00000268 574..1+00395357 83..21+00062507  
110145+00000012 32...1+00251713 331.21+00004996 390...+00000005 391.21+00000000  
110146+00000013 32...1+00253304 332.21+00004442 390...+00000005 391.21+00000000  
110147+00000013 573..1-00001859 574..1+00900374 83..21+00063061  
110148+00000013 32...1+00243603 331.21+00005437 390...+00000005 391.21+00000000  
110149+00000014 32...1+00242926 332.21+00003910 390...+00000005 391.21+00000000  
110150+00000014 573..1-00001181 574..1+01386902 83..21+00064588  
110151+00000014 32...1+00266077 331.21+00006227 390...+00000005 391.21+00000001  
110152+00000015 32...1+00264404 332.21+00003654 390...+00000005 391.21+00000001  
110153+00000015 573..1+00000492 574..1+01917383 83..21+00067161  
110154+00000015 32...1+00261459 331.21+00005851 390...+00000005 391.21+00000001  
110155+00000016 32...1+00262351 332.21+00004850 390...+00000005 391.21+00000000

110156+00000016 573..1-00000401 574..1+02441193 83..21+00068162  
110157+00000016 32...1+00217550 331.21+00006015 390...+00000005 391.21+00000000  
110158+00000017 32...1+00219089 332.21+00004400 390...+00000005 391.21+00000001 71....+BM  
1869  
110159+00000017 573..1-00001939 574..1+02877832 83..21+00069777  
110160+00000017 32...1+00081263 331.21+00004950 390...+00000005 391.21+00000000  
110161+00000018 32...1+00080568 332.21+00005222 390...+00000005 391.21+00000000  
110162+00000018 573..1-00001245 574..1+03039664 83..21+00069506  
110163+00000018 32...1+00257602 331.21+00004534 390...+00000005 391.21+00000000  
110164+00000019 32...1+00257335 332.21+00004808 390...+00000005 391.21+00000001  
110165+00000019 573..1-00000977 574..1+03554602 83..21+00069232  
110166+00000019 32...1+00235692 331.21+00004099 390...+00000005 391.21+00000000  
110167+00000020 32...1+00237719 332.21+00005068 390...+00000005 391.21+00000002  
110168+00000020 573..1-00003005 574..1+04028013 83..21+00068263  
110169+00000020 32...1+00261699 331.21+00003438 390...+00000005 391.21+00000001  
110170+00000021 32...1+00264974 332.21+00003315 390...+00000005 391.21+00000002  
110171+00000021 573..1-00006279 574..1+04554686 83..21+00068386  
110172+00000021 32...1+00251009 331.21+00006091 390...+00000005 391.21+00000001  
110173+00000022 32...1+00245728 332.21+00005146 390...+00000005 391.21+00000001  
110174+00000022 573..1-00000999 574..1+05051423 83..21+00069331  
110175+00000022 32...1+00264047 331.21+00005472 390...+00000005 391.21+00000000  
110176+00000023 32...1+00262471 332.21+00005589 390...+00000005 391.21+00000001 71....+BM  
1869  
110177+00000023 573..1+00000577 574..1+05577940 83..21+00069213  
110178+00000023 32...1+00257146 331.21+00003964 390...+00000005 391.21+00000001  
110179+00000024 32...1+00259175 332.21+00004913 390...+00000005 391.21+00000001  
110180+00000024 573..1-00001452 574..1+06094261 83..21+00068265  
110181+00000024 32...1+00261921 331.21+00004995 390...+00000005 391.21+00000000  
110182+00000025 32...1+00261696 332.21+00004571 390...+00000005 391.21+00000002  
110183+00000025 573..1-00001227 574..1+06617877 83..21+00068688  
110184+00000025 32...1+00261651 331.21+00005106 390...+00000005 391.21+00000001  
110185+00000026 32...1+00260969 332.21+00005667 390...+00000005 391.21+00000001  
110186+00000026 573..1-00000545 574..1+07140497 83..21+00068128  
110187+00000026 32...1+00257652 331.21+00004667 390...+00000005 391.21+00000001  
110188+00000027 32...1+00256961 332.21+00004277 390...+00000005 391.21+00000001  
110189+00000027 573..1+00000146 574..1+07655110 83..21+00068517  
110190+00000027 32...1+00254503 331.21+00005058 390...+00000005 391.21+00000001  
110191+00000028 32...1+00256629 332.21+00004808 390...+00000005 391.21+00000001  
110192+00000028 573..1-00001980 574..1+08166243 83..21+00068767  
110193+00000028 32...1+00261299 331.21+00003920 390...+00000005 391.21+00000001  
110194+00000029 32...1+00258706 332.21+00004019 390...+00000005 391.21+00000001  
110195+00000029 573..1+00000613 574..1+08686248 83..21+00068669  
110196+00000029 32...1+00267376 331.21+00004989 390...+00000005 391.21+00000001  
110197+00000030 32...1+00257062 332.21+00004155 390...+00000005 391.21+00000001  
110198+00000030 573..1+00010927 574..1+09210686 83..21+00069503  
110199+00000030 32...1+00266094 331.21+00004981 390...+00000005 391.21+00000001  
110200+00000031 32...1+00276401 332.21+00004261 390...+00000005 391.21+00000001  
110201+00000031 573..1+00000620 574..1+09753181 83..21+00070223  
110202+00000031 32...1+00249368 331.21+00005936 390...+00000005 391.21+00000001  
110203+00000032 32...1+00250205 332.21+00004573 390...+00000005 391.21+00000001  
110204+00000032 573..1-00000217 574..1+10252753 83..21+00071587  
110205+00000032 32...1+00264717 331.21+00004671 390...+00000005 391.21+00000001  
110206+00000033 32...1+00264708 332.21+00005090 390...+00000005 391.21+00000001 71....+BM  
1869  
110207+00000033 573..1-00000208 574..1+10782178 83..21+00071167  
110208+00000033 32...1+00270453 331.21+00005308 390...+00000005 391.21+00000002  
110209+00000034 32...1+00270143 332.21+00004105 390...+00000005 391.21+00000001

110210+00000034 573..1+00000102 574..1+11322775 83..21+00072371  
110211+00000034 32...1+00266267 331.21+00004227 390...+00000005 391.21+00000001  
110212+00000035 32...1+00266458 332.21+00004561 390...+00000005 391.21+00000001  
110213+00000035 573..1-00000088 574..1+11855500 83..21+00072037  
110214+00000035 32...1+00260528 331.21+00004820 390...+00000005 391.21+00000001  
110215+00000036 32...1+00260360 332.21+00005192 390...+00000005 391.21+00000001  
110216+00000036 573..1+00000079 574..1+12376387 83..21+00071664  
110217+00000036 32...1+00269395 331.21+00004858 390...+00000005 391.21+00000001  
110218+00000037 32...1+00271481 332.21+00004900 390...+00000005 391.21+00000001  
110219+00000037 573..1-00002006 574..1+12917263 83..21+00071622  
110220+00000037 32...1+00265743 331.21+00004772 390...+00000005 391.21+00000001  
110221+00000038 32...1+00265288 332.21+00004420 390...+00000005 391.21+00000001  
110222+00000038 573..1-00001552 574..1+13448294 83..21+00071974  
110223+00000038 32...1+00270576 331.21+00004577 390...+00000005 391.21+00000000  
110224+00000039 32...1+00270803 332.21+00004921 390...+00000005 391.21+00000002  
110225+00000039 573..1-00001779 574..1+13989673 83..21+00071630  
110226+00000039 32...1+00272227 331.21+00003738 390...+00000005 391.21+00000001  
110227+00000040 32...1+00261609 332.21+00003907 390...+00000005 391.21+00000001  
110228+00000040 573..1+00008839 574..1+14523509 83..21+00071461  
110229+00000040 32...1+00267040 331.21+00003998 390...+00000005 391.21+00000000  
110230+00000041 32...1+00275190 332.21+00004477 390...+00000005 391.21+00000001  
110231+00000041 573..1+00000689 574..1+15065739 83..21+00070982  
110232+00000041 32...1+00262867 331.21+00006237 390...+00000005 391.21+00000001  
110233+00000042 32...1+00265970 332.21+00003597 390...+00000005 391.21+00000001  
110234+00000042 573..1-00002415 574..1+15594576 83..21+00073623  
110235+00000042 32...1+00268464 331.21+00004534 390...+00000005 391.21+00000000  
110236+00000043 32...1+00267549 332.21+00004169 390...+00000005 391.21+00000000  
110237+00000043 573..1-00001499 574..1+16130589 83..21+00073988  
110238+00000043 32...1+00266087 331.21+00003978 390...+00000005 391.21+00000001  
110239+00000044 32...1+00264718 332.21+00004358 390...+00000005 391.21+00000001  
110240+00000044 573..1-00000131 574..1+16661394 83..21+00073608  
110241+00000044 32...1+00191319 331.21+00004856 390...+00000005 391.21+00000000  
110242+00000045 32...1+00190702 332.21+00004839 390...+00000005 391.21+00000001 71....+BM  
1869  
110243+00000045 573..1+00000486 574..1+17043416 83..21+00073625  
110244+00000045 32...1+00092136 331.21+00005157 390...+00000005 391.21+00000000  
110245+00000046 32...1+00093043 332.21+00004892 390...+00000005 391.21+00000000  
110246+00000046 573..1-00000421 574..1+17228594 83..21+00073890  
110247+00000046 32...1+00132472 331.21+00004819 390...+00000005 391.21+00000000  
110248+00000047 32...1+00128660 332.21+00004425 390...+00000005 391.21+00000000  
110249+00000047 573..1+00003392 574..1+17489726 83..21+00074284  
110250+00000047 32...1+00109673 331.21+00004820 390...+00000005 391.21+00000000  
110251+BM TH 10 32...1+00103163 332.21+00005321 390...+00000005 391.21+00000000 71....+BM  
1869  
110252+BM TH 10 573..1+00009903 574..1+17702563 83..21+00073784  
110253+000000A1 32...1+00049587 331.21+00004502 390...+00000005 391.21+00000000  
110254+000000B1 32...1+00100180 332.21+00004443 390...+00000005 391.21+00000000  
110255+000000B2 32...1+00050135 336.21+00004191 390...+00000005 391.21+00000000  
110256+000000A2 32...1+00099611 335.21+00004249 390...+00000005 391.21+00000000



**Office**

**Project**

30 August 2020

**INPUT**

Geographic, fhpgn - Florida HPGN  
Vertical - NAVD88, U.S. Feet

**OUTPUT**

Geographic, fhpgn - Florida HPGN  
Vertical - NGVD29 (Custom), U.S. Feet

---

**OSC-84**

1/1

**Latitude:** 27 58 54.07223  
**Longitude:** 81 3 33.59610  
**Elevation/Z:** 0

**Latitude:** 27 58 54.07223  
**Longitude:** 81 03 33.59610  
**Elevation/Z:** 1.211

---

**Remark:**

# Shared Solution

**PID:** BBGY10

**Designation:** TH 10 LB 4108

**Stamping:** TH-10 LB 4108 2020

**Stability:** Monuments of questionable or unknown reliability

**Setting:** Set into or on top of metal pipe driven into ground

**Description:** FROM INTX OF US 192 AND US 441 IN HOLLOPAW, GO SOUTH ON US 441 FOR 13.8 MILES TO WILLIAMS ROAD ON THE RIGHT. THENCE ON WILLIAMS ROAD GO 1.57 MILES TO ROAD SPLIT ON RIGHT. GO NORTH ON ROAD SPLIT 2.79 MILES TO MARK ON LEFT. MARK IS 200 FT SOUTH OF CL OF ROAD, 363 FT WEST OF A 2 TRACK ROAD, AND 74.3 EASTERLY OF USGS WELL TH-10.

**Observed:** 2020-08-26T13:48:00Z

**Source:** OPUS - page5 1801.18



Close-up View

|   |                            |  |                    |                    |                |
|---|----------------------------|--|--------------------|--------------------|----------------|
| <b>REF_FRAME:</b><br>NAD_83(2011)       | <b>EPOCH:</b><br>2010.0000 | <b>SOURCE:</b> NAVD88 (Computed using GEOID18) | <b>UNITS:</b><br>m | <b>SET PROFILE</b> | <b>DETAILS</b> |
| <b>LAT:</b> 27° 58' 54.07223" ± 0.019 m |                            | <b>UTM 17 SPC 901(FL E)</b>                    |                    |                    |                |
| <b>ELL HT:</b> -5.148 ± 0.024 m         |                            | <b>NORTHING:</b> 3095175.136m 404181.059m      |                    |                    |                |
| <b>X:</b> 876003.498 ± 0.009 m          |                            | <b>EASTING:</b> 494165.317m 194163.325m        |                    |                    |                |
| <b>Y:</b> -5568181.233 ± 0.032 m        |                            | <b>CONVERGENCE:</b> -0.02783889° -0.02783889°  |                    |                    |                |
| <b>Z:</b> 2974710.800 ± 0.006 m         |                            | <b>POINT SCALE:</b> 0.99960042 0.99994160      |                    |                    |                |
| <b>ORTHO HT:</b> 22.493 ± 0.061 m       |                            | <b>COMBINED FACTOR:</b> 0.99960123 0.99994241  |                    |                    |                |

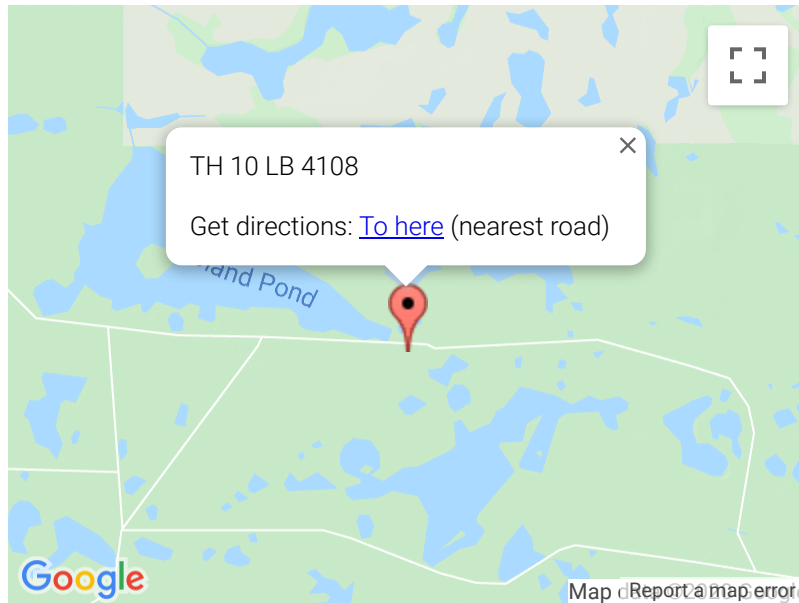
## CONTRIBUTED BY

[petea](#)

[GCY Incorporated](#)



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.