

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

## **SURVEYOR'S REPORT**

Specific Purpose Survey of the United States
Geological Survey Well **M 1234**in

Martin 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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Palm City, Florida 33491/33490
772-286-8083

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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 "M 1234".

# **LOCATION OF PROJECT**

The United States Geological Survey Well **"M 1234"** is located in the Section 34, Township 40 South, Range 41 East, Martin 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 M-1234 add 1.447.** 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) per executed SOW for 4600003703 WO07.

Leveling was run from Martin County Benchmark "Cul-P" to the site benchmarks and closing on Martin County Benchmark "RC-1A" using a Leica DNA 10 digital level S/N 331745

## **GPS METHODS**

Latitude and longitude for the New Benchmark "M 1234" were established by observing a 4.5 hour Static Session on February 6, 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 April 24, 2020 and a report was 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 1.447 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 6, 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 26-29

### **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 6, 2020

Last date of Survey

Peter Andersen, PSM, Vice President Florida Professional Surveyor and Map 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.



NO. 5199

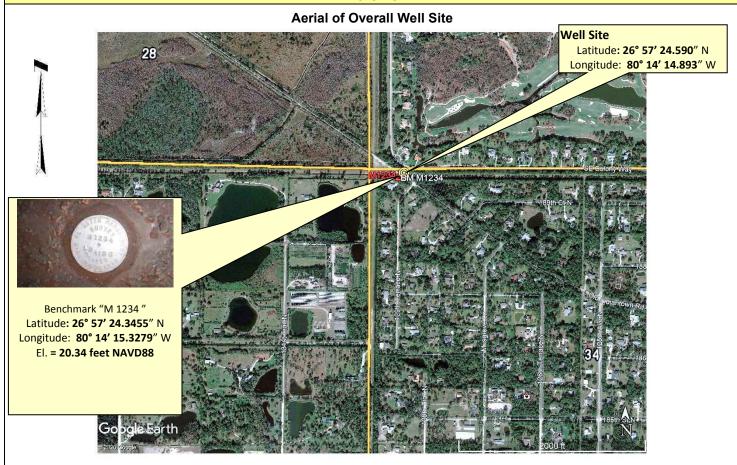


Rev. 1/19

U.S.G.S. Station Name: M-1234			Date of Field Work: 2/06/2020						
Party Chief: LAPOLLA	Field Book: GCY 1862	Page(s): 26 - 29			Report Prepared by: ANDESEN				
SITE SPECIFIC DATA									
Site Benchmark: M 1234	Benchmark Elevation(s) (NAVD88): 20.34	Corpscon 6.0.1 Conversion Factor (NAVD88 to NGVD29) + 1.447							
Well Reference Elevation (NAVD88): 22.16	DTW: <b>8.08</b> ( 2/ 6/ 2020 at 1:55 PM)	·		A <i>VD88)</i> :	Pad Elevation ( <i>NAVD88</i> ): <b>N/A</b>				
	GEOGRAP	HIC DAT	A						
Section 34	Township <b>40 S</b>			Range <b>41 E</b>					
Well Latitude: 26° 57' 24.5901" N	Well Longitude: 80° 14' 14.8929" W	Location Source: RTK/GPS							
State Plane Coordinates:	Northing (Y) = 954228.46	Easting (X) = 904560.39							

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**



Not to scale (GoogleEarth product)



Rev. 1/19

#### Well Site and Well Head



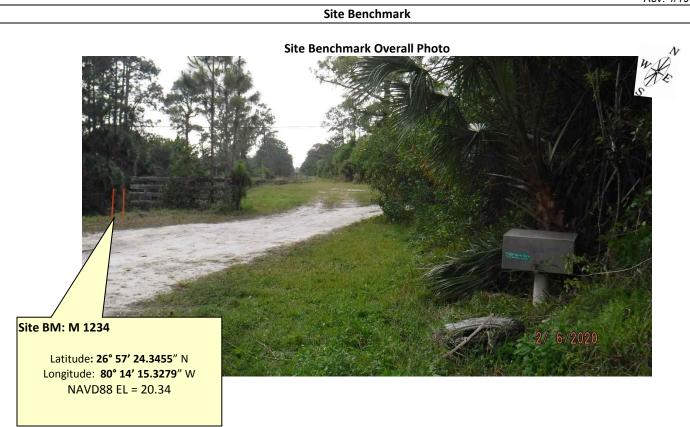






	Rev. 1/19
USGS RMs N/A	
UJUJ RIVIS IV/A	









Rev. 1/19

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#### MARTIN COUNTY "CUL-P" Benchmark Datasheet

4/26/2020 BM Details



Martin County Benchmark Database **BM Details** 

Benchmark Details Print

Benchmark Name CUL-P

Elevation 21.12'

Datum NAVD88

2 INCH ALUMINUM DISK IN Bm Material CONCRETE MONUMENT STAMPED "CUL-P"

Set Found 08/05/14

Northing 954364'

Easting 904227'

Begin Bench LAINHART

Close Bench 195 89 A16

Firm NORTHSTAR GEOMATICS, INC

Neighborhood Name RANCH COLONY

LOCATED IN A CONCRETE MONUMENT 40 FEET +/-SOUTH OF THE CENTERLINE OF OLD INDIANTOWN ROAD AT THE INTERSECTION WITH A NORTH-SOUTH MAINTENANCE ROAD RUNNING NORTH-SOUTH

AND ADJACENT TO THE

Benchmark Location WEST LINE OF SECT 27/T40/R41E, 30 FEET +/-SOUTH OF THE NORTHEAST CORNER OF AN OLD 4 FOOT HIGH WOODEN FENCE, 135 FEET +/- NORTH OF THE NORTH TOP OF BANK OF A DITCH, 3 FEET +/- EAST OF AN OLD 4 FOOT HIGH WOODEN FENCE RUNNING NORTH/SOUTH

#### Benchmark Map



#### Disclaimer

By accessing information, data and materials contained in the Martin County Survey Control Web pages, you hereby agree to accept the following terms and conditions:

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The user hereby recognizes that the information, data, apparatus, products, processes and materials are dynamic and are subject to change over time without notice. However, the COUNTY makes no commitment to update the information, data, apparatus, products,

https://benchmarks.martin.fl.us/app/f?p=500:10:::NO:10:P10\_BENCHMARK\_NAME:CUL-P

1/2



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#### MARTIN COUNTY "RC-1A" Benchmark Datasheet

4/26/2020 BM Details



Martin County Benchmark Database **BM Details** 

Benchmark Details

Benchmark Name RC-1A

Elevation 19.84'

Datum NAVD88

Bm Material 2 INCH ALUMINUM DISK STAMPED "RC-1A"

Set Found 08/21/14

Northing 955862'

Easting 904191'

Begin Bench LAINHART

Close Bench 195 89 A16

Firm NORTHSTAR GEOMATICS, INC

Neighborhood Name RANCH COLONY

LOCATED ALONG A MAINTENCE ROAD AT THE TOP OF A BERM RUNNING NORTH-SOUTH ALONG THE WEST SIDE OF A CANAL AND BEING ADJACENT TO THE WEST LINE OF SECT 27/T40S/R41E AND APPROXIMATELY 0.27 MILES NORTH OF THE

INTERSECTION OF SAID

Benchmark Location MAINTENANCE ROAD WITH OLD INDIANTOWN ROAD. LOCATED IN THE NE CORNER OF A CONCRETE DRAINAGE STRUCTURE, 40 FEET WEST OF THE WEST TOB OF LARGE DRAINAGE DITCH RUNNING NORTH-SOUTH, 12 FEET EAST OF A BARB-WIRE FENCE RUNNING NORTH-SOUTH

#### Benchmark Map



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The user hereby recognizes that the information, data, apparatus, products, processes and materials are dynamic and are subject to

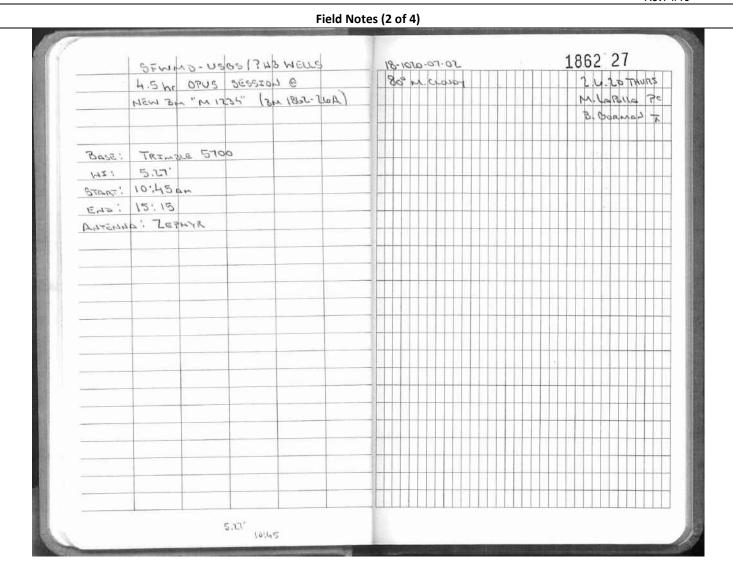
https://benchmarks.martin.fl.us/app/f?p=500:10:::NO:10:P10\_BENCHMARK\_NAME:RC-1A

1/2



OF CHALOTONY ED	
SEWMD -USDA PH3 WELLS	18-1020-07-02 1862 26
BENCH RUN FOR NEW DWG C	80° CLOUDY 7. 10-20 THUR
WELL "M1234" (NBUDER)	Lesta Duoio Milabilla ?
PEG TEST!	FELE WELL MIZZE B. GORMAN .
COU. EAR. OLD= 2.1" COLL. EAR. NEW- 40"	1545: M1234
DI44 = 1.9" RETCCLE : 4.858'	
STA TOTAL DEST GRIPL AST	DESC
CUL-7 0 21.12'	MC BM CUL. ? LESTED WAID 88 ELT 21.12!
338.45' 20.342'	MEN Bon "MIZZE" Bon 1862- ZLOA
	SET I'M' (IS) IRON PERE TOWNE CAP
	"SKND WITH LOUISE JOSO" IR TS 5"
	Lone WI Come Courage + GrowTD COR. LOCATED SURW (LURO) FROM & WELL MISSE.
	19.5' = East or Ord 12:8; Power F. Lord MISSE
	FENCE. 1 - South of N. End of L' WOOD F
	N. E.
RC-1A 2195.75' 19.85'	1 TO MC BM RC-1A LESTED : 19.84
	ERA + 6.01
	DIS. IN MILES : 0.41
	110. = 315m AST 50. 9 274M
	* END RIJ *







	SEWM	0505	1743 W	eccs.		1862 28
×	'M. P. "	H NG B	ENCY R	an For	191	780 CLOVEY 1.10. 70 THURS
		"M123		Segual)	)	M. Lapolia Pe
	5					B. Gorman X
472	4	Hπ	-	EL	704	Desc
W152H	4.229	1		20.342		NEW 3m "M 1234" BM 1862-2UA
	3,99					- Man 88 EL 20.342'
	3,751					
	(3,99	24.332				
5.5.1			4.51	19.822		MG SHOT C SOUTH STOE OF WELL MIZZY
			2.312			
			2.171			
			2.03			
- 1			(2.171	122.161		"MEDSURING POINT" & WELL MITSY
	ا.٩١٠					"X" I was standed out and and all "X"
	1.82					TO GOT NO. SHEEL OF SHEEL ON TO SET WANDER
	1.08					Purusos. (Bm 1842-284)
	(1,85	13.981	3.873			
			3.638			
Bin			3,408			
M1234			15.639	50.341		V DDGK TO BAN "MIZZGG" LEDGED= 20.342'
						Freud 2 20,341
						ERR: -0.001
	1					* END RUD *



	Field Notes (4 OF 4)	•
SEWIND USUS   PHS WELL	20-50-0201-81	1862 29
WELL DATE @ M 1234	1000 28) 78° CLOUDY	2. 4. 20 THURS
7,3,3,3,5		M. Laralla PC
WELL DEAMETER: L' PVC	Premate:	B. Gorman T
PELTURES 100.0960, 100.0961,1	0-0405	
	WELL: 5 140-4967 BROTS TAG	
D.T.W. = 8.08' TEME! 13:		
Dare: Ozlo	12020 100-49U8 Box "	
"MENSURING POINT" = 22.161'	00.0 9.70	
MENSURING PAINT = LECTOR	100.0971	
TOP OF WATER : 14.081'	100-0972 LOSKERU MOR	74
101 06 41000	100-0073 LOOKENG WES	
WELL HEDO CASENO!		
ALUME BOX WI HENGED LES		
(C) 2.02: (W) 1.75: × (H) 1.30'	Bn "M 1234" (Bm 1862	
		14014)
GRS: FELE! SEWIND USOS PUB WELLS		
10008 WELL"MIZZY" (ALONG E STO)	100-09US LAUKENG MESTER	RY
E: 904560.391	100-0966 LOOKENG SOFTE	
2, 10, 300, 0, 1		
	2	

		South Florida	Water Management Di	strict Benchmark Datashe	eet		
Designation:			USGS PHASE 3 WELLS	Type: N		State Plane Zone: FL	East
	M 1234 LB4108 2020	Field Book Name:		Field Book Page: 2	26-29		
Established By: Survevor:	ANDERSEN	Recovered By: Established Date:		Recovery Date: Status:			
	- THE ENGLIS						
Section:	34	Township:	GEOGRAPHIC POSITION I	40 SOUTH	Range:	41 EA	ST
	MARTIN/PALM BEACH	Quadrangle:		Quad Index: 1	1474	NGS Source BM(s):	
NAD83 Adj. Year:	2011	Vertical Datum:		Horizontal Datum: I	NAD1983	NGS PID(s):	
NAVD88 Elevation (feet):		NGVD29 Elevation (feet):		2022 Elevation: _		NGS NAVD88 Elev (ft):	
NAVD88 Class: NAVD88 Order:		NGVD29 Class: NGVD29 Order:		Other Elevation Type:		NGS NAVD88 Elev (m): NGS 2022 Elev (ft):	
				Topographic Engineering Center Alexandria, Virginia			
vertcon05.05 files supplied by the U.S. Army	Corps of Engineers South Atlantic Division, Jac	cksonville Fl.)	engineering Research and Development Center	opograpnic Engineering Center Alexandria, Virginia	a windows-based program to cor	vert coordinates and elevations between dai	um's using vertconos.txt and
Vertical Datum Offset: +	1.447		NGS Elevation or ngvd29.txt fi		OPUS Ortho Height:		
Northing (Y) (feet): Latitude:		Easting (X) (feet): 57	904521.174 24.34543	Source of L Longitude:	atitude & Longitude: 80	14	15.32792
Latitude.	DD°	MM'	SS"	Longitude.	DD°	MM'	SS"
Latitude (Decimal Degrees):	26.95676262			Longitude (Decimal Degrees):	-80.23759109		
			RECOVERY DA				
				ILY ON OLD INDIANTOWN ROAD E. MARK IS RECESSED 0.5 FEET.	0.48 MILES TO MARI	CON THE LEFT. THE MARK IS	13 FEET +/- SWLY
Description/Notes:							
Notable Landmarks: Other Source Benchmarks:							
Other Source Benchmarks.			PICTURES				
		28 T 405 R 4 1E	Aerial View of Ove	all Site			
	2/ 8	72000	Site Sketch			11 R W 5 U R W 4 123 4 10 410 8	

Page 1 of 1

From: opus

To: Pete Andersen

**Subject:** OPUS solution: 13970370.t01 OP1587752309336

**Date:** Friday, April 24, 2020 2:22:43 PM

FILE: 13970370.t01 OP1587752309336

#### NGS OPUS SOLUTION REPORT

\_\_\_\_\_

All computed coordinate accuracies are listed as peak-to-peak values.

For additional information: <a href="https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy">https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy</a>

USER: petea@gcyinc.com DATE: April 24, 2020 RINEX FILE: 1397037p.20o TIME: 18:22:26 UTC

SOFTWARE: page5 1801.18 master90.pl 160321 START: 2020/02/06 15:42:00

EPHEMERIS: igs20914.eph [precise] STOP: 2020/02/06 20:15:00 NAV FILE: brdc0370.20n OBS USED: 9781 / 11101 : 88%

ANT NAME: TRM39105.00 NONE # FIXED AMB: 77 / 80 : 96%

ARP HEIGHT: 1.606 OVERALL RMS: 0.018(m)

REF FRAME: NAD 83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2020.1004)

X: 964650.588(m) 0.007(m) 964649.759(m) 0.007(m) Y: -5606660.183(m) 0.020(m) -5606658.600(m) 0.020(m) Z: 2873936.658(m) 0.012(m) 2873936.496(m) 0.012(m)

LAT: 26 57 24.34547 0.011(m) 26 57 24.36584 0.011(m) E LON: 279 45 44.67208 0.004(m) 279 45 44.65217 0.004(m) W LON: 80 14 15.32792 0.004(m) 80 14 15.34783 0.004(m) EL HGT: -20.804(m) 0.022(m) -22.393(m) 0.022(m)

ORTHO HGT: 6.112(m) 0.057(m) [NAVD88 (Computed using GEOID18)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 17) SPC (0901 FL E)

Northing (Y) [meters] 2981874.562 290841.815 Easting (X) [meters] 575672.777 275698.605 Convergence [degrees] 0.34563056 0.34563056 Point Scale 0.99967069 1.00001189 Combined Factor 0.99967396 1.00001516

US NATIONAL GRID DESIGNATOR: 17RNK7567281874(NAD 83)

BASE STATIONS USED

PID DESIGNATION LATITUDE LONGITUDE DISTANCE(m)

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.300 12375.6

DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 138094.4

DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 84511.3

NEAREST NGS PUBLISHED CONTROL POINT

AD8433 OLINEND N265724.510 W0801417.991 73.6

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+000000000050185 331.21+000000000004866
390...+00000000000005 391.21+00000000000000
```

- \*110002+0000000000000B1 32...1+000000000099925 332.21+00000000004760 390...+0000000000005 391.21+0000000000000
- \*110003+0000000000000B2 32...1+0000000000049987 336.21+00000000004751 390...+000000000005 391.21+0000000000000
- \*110004+0000000000000A2 32...1+000000000100162 335.21+00000000004859 390...+0000000000005 391.21+0000000000000
- \*410005+00000000?.....1
- \*110006+00000000000CUL P 83..51+000000000021120
- \*110007+0000000000CUL P 32...1+000000000115832 331.21+00000000004449 390...+000000000005 391.21+0000000000000
- \*110008+00000000000001 32...1+000000000115674 332.21+00000000004266 390...+000000000005 391.21+0000000000000
- \*110009+00000000000001 573..1+00000000000158 574..1+000000000231506 83..21+00000000021303
- \*110010+00000000000001 32...1+000000000054213 331.21+00000000004323 390...+000000000005 391.21+0000000000000
- \*110011+00000000BM M1234 32...1+000000000052733 332.21+00000000005284 390...+000000000005 391.21+000000000000 71....+00000BM 1862 26A
- \*110012+00000000BM M1234 573..1+000000000001638 574..1+000000000338452 83..21+000000000020342
- \*110013+00000000BM M1234 32...1+000000000052852 331.21+00000000005102 390...+0000000000005 391.21+0000000000000
- \*110014+00000000000002 32...1+000000000054050 332.21+00000000004259 390...+000000000005 391.21+0000000000000
- \*110015+00000000000000 573..1+000000000000440 574..1+000000000445354 83..21+000000000021185
- \*110016+000000000000002 32...1+0000000000256102 331.21+00000000005948 390...+000000000005 391.21+0000000000001
- \*110017+000000000000003 32...1+000000000256318 332.21+00000000003858 390...+000000000005 391.21+0000000000000
- \*110018+00000000000000 573..1+00000000000224 574..1+000000000957774 83..21+00000000023274
- \*110019+00000000000003 32...1+000000000239484 331.21+00000000004835 390...+000000000005 391.21+0000000000000
- \*110020+000000000000004 32...1+0000000000239619 332.21+000000000004611 390...+000000000005 391.21+0000000000000
- \*110021+000000000000004 573..1+000000000000089 574..1+000000001436877 83..21+00000000023497
- \*110022+000000000000004 32...1+0000000000246770 331.21+00000000004480 390...+000000000005 391.21+0000000000000
- \*110023+00000000000005 32...1+0000000000246525 332.21+00000000004767 390...+000000000005 391.21+0000000000000
- \*110024+0000000000005 573..1+00000000000334 574..1+000000001930172 83..21+00000000023211
- \*110025+00000000000005 32...1+000000000118776 331.21+00000000004818 390...+000000000005 391.21+0000000000000
- \*110026+000000000000006 32...1+000000000119142 332.21+00000000004404 390...+000000000005 391.21+0000000000000
- \*110027+00000000000000 573..1-00000000000032 574..1+0000000002168091 83..21+00000000023625
- \*110028+000000000000006 32...1+000000000013936 331.21+00000000002443 390...+000000000005 391.21+0000000000000
- \*110029+0000000000RC 1A 32...1+00000000013724 332.21+00000000006218 390...+0000000000005 391.21+0000000000000

\*110030+0000000000RC 1A 573..1+00000000000180 574..1+0000000002195751 83..21+000000000019850

# **Palm City**

23 April 2020

### **INPUT**

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

## **OUTPUT**

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

M 1234

1/1

**Latitude:** 26 57 24.34543 **Longitude:** 080 14 15.32792

Northing/Y: 954203.517 Easting/X: 904521.174

Elevation/Z: 0

Elevation/Z: 1.447

Convergence: 0 20 44.26851 Scale Factor: 1.000011891 Combined Factor: 1.000016042