Surveyor's Report

Specific Purpose Survey Well Site ACME WWTP

SFWMD Work Order Number: 4500016343 Contractors Project No. 07050.07 Report Date: 7/08/08 Submittal: Final

Prepared for:

South Florida Water Management District



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OVERVIEW OF THE PROJECT

PURPOSE

This survey request consists of the establishment of elevations via GPS to third order National Geodetic Survey (NGS) Standards at the existing well site in Section 23, Township 44 South, Range 41 East, Palm Beach County, Florida:

The objective of this Work Order is to:

- 1. Establish elevations on the wells.
- 2. Establish a third-order benchmark at the well site.

The services listed in this report were performed under the direction of a Professional Surveyor and Mapper (PSM) registered in the State of Florida in accordance with Chapter 472 of the Florida Statutes.

LOCATION OF PROJECT

The project is located in Palm Beach County, Florida.



ITEMS DELIVERED TO THE DISTRICT

The following items were delivered to the District with this report.

Two signed and sealed paper copies of the surveyor's report.

A CD containing the following:

- The survey report in Microsoft Word format.
- Digital photos.
- Scanned copies of field notes.
- Any other digital files associated with the survey.
- Completed District benchmark description sheet for all set marks.
- Completed Excel benchmark spread sheet
- Completed Excel well activation sheet
- CorpsMet 95 Meta Data files

DATUM FOR THE PROJECT

The vertical datum for the project is National Geodetic Vertical Datum of 1929 (NGVD 29) and North American Vertical Datum of 1988 (NAVD 88). NGVD 1929 elevations and offset were derived using Vertcon version 6.0.1. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90).

GPS PROCEDURES AND EQUIPMENT

Horizontal and Vertical data on the site benchmark was established using the following methods.

A 3/1/2" SFWMD brass disk was set on the concrete slab and stamped ACME WWTP 2007. Site benchmark ACME WWTP 2007 was occupied a total of three times consisting of fourhour GPS static sessions each time. The observed GPS baselines were from benchmark ACME WWTP 2007 to The National Geodetic Survey monuments G-413, N-233 and Z-537. Those National Geodetic Survey monuments were also connected to each other by four-hour static sessions. Trimble 5700 receivers and Zephyr model number 39105.00 antennas (without ground plane) were used for all static sessions.

DATA PROCESSING

The baseline files were processed and adjusted using Trimble Geomatics Office version 1.62 holding the published elevations of NGS monuments G-413, N-233 and Z-537. Two of the three observed adjusted values were averaged to obtain the final elevation of benchmark ACME WWTP 2007. The third one had a value difference of -0.3' from the other two with the remaining two being within 0.068' of each other. All the baselines passed the Chi Square Test at 95% confidence level. The expected accuracy for the final elevation of site benchmark "ACME WWTP 2007" is \pm 0.10'. In addition the three GPS observations of site benchmark ACME WWTP 2007 were processed through the National Geodetic Survey's OPUS program. The difference between the highest and lowest processed orthometric heights was 0.076'.

G-413	Elevation:	NAVD 1988	18.064'	NGVD 1929	19.554'
PID AD8195	Latitude	26° 40' 56" (Scaled)	From NGS Data Sheet		Superseded Value from NGS Data Sheet
State/County FL/Palm Beach	Longitude	-80° 15' 52" (Scaled)			
USGS QUAD Loxahatchee (1984)					
Vertical Order First Class II		The orthometric height v and adjusted by the NA September 1992. 19.4 k	was determir TIONAL GE m (12.05 mi	ned by differen ODETIC SUF) westerly alo	ntial leveling RVEY in ng U.S.
		Highway 98 from the jur Palm Beach, 231.0 m (7 (39.7 ft) south of the cer highway, 2.0 m (6.6 ft) s 1.3 m (4.3 ft) south-sout ft) below the level of the point is through a 5-inch	nction of Inte 757.9 ft) easi interline of the southeast of thwest of a v highway. N logo cap.	erstate Highw center of the e westbound the center of vitness post, loteaccess t	ay 95 in West e road, 12.1 m lanes of the a storm drain, and 0.5 m (1.6 o the datum

N-233	Eleva	ation:	NAVD 1988	15.020'	NGVD 1929	16.535'
PID AD2794	Latitude		26° 37' 52" (Scaled)	From NGS Data Sheet		Superseded Value from NGS Data Sheet
State/County FL/Palm Beach	Longitude		-80° 03' 33" (Scaled)			
USGS QUAD Palm Beach (1983)						
Vertical Order Class First II Vertical Order Class II			The orthometric height in and adjusted in June 11 In Lake Worth, at the init Florida East Coast Rail rail, 10.0 m (32.8 ft) non north of a sidewalk, 1.3 0.4 m (1.3 ft) east of a witness post, 0.3 m (1.0 1016 with a guy wire, 0 avenue, and the monun ground surface.	was determin 991. tersection of road, 14.4 m th of the ave o m (4.3 ft) so witness post 0 ft) northeas .3 m (1.0 ft) nent is reces	hed by differen 13th Avenue (47.2 ft) wes enue center, 1 putheast of a f , 0.3 m (1.0 ft) st of utility pole below the leve ssed 0.1 m (0.	ntial leveling North and the t of the near .4 m (4.6 ft) ence corner, west of a e number 1- el of the 3 ft) below the

Z-536	Elevation:	NAVD 1988	24.252'	NGVD 1929	None
PID AJ8761	Latitude	26° 35' 26.17839"	From NGS Data Sheet		
State/County FL/Palm Beach	Longitude	-80° 16' 12.12537"			
USGS QUAD Loxahatchee SE (1984)					
Vertical Order First Class II Horizontal Order First		The orthometric height v and adjusted by the NA 2002. About 21.4 km (1 Beach, about 10.4 km (1 Beach, about 10.4 km (1 Loxahatchee in section reach the station from th (Boynton Beach Blvd.) on State Road 7 / U.S. 4 intersection of Lee Road and go west on Lee Road and go west on Lee Road the Arthur R. Marshall I and go north on L-40 lev for 11.7 km (7.25 miles around area. The mark south end of the turn ar south of the north end of feet) east of a carsonite northwest of a metal w (top of a stainless steel note a magnet was pla	was determin TIONAL GE 3.3 miles) w (6.4 miles) s 40, township he intersection and State F 441 for 3.2 H d and State I ad for 1.6 k Loxahatchee vee, passing b) to the mar is 17.4 meter oound area, f f the turnarco witness post. rod) is had icced inside the second and the second inside the second cond area for the second inside the second cond area for the second inside the second second area for the second second second second area for the second second second second second second second second second second second second second second second second second second second se	hed by differen DDETIC SUR est northwest bouth southea of 44.S, range on of State Ro coad 7 / U.S. 4 (m (2.0 miles) Road 7 / U.S. m (1.0 miles) Wildlife Refut through acces k on the right ers (57.0 feet) 11.6 meters (und area, 4.7 st and 3.4 me Access to the through a 5 in the pvc encase	ntial leveling VEY in May of Boynton st of 41 E. To bad 804 441, go south to the 441, turn right to the end at ge, turn right ess gate, in a turn north of the 38.0 feet) meters (15.5 ters (11.0 feet) datum point nch logo cap. ement.

SITE BENCHMARK	Elevation:	NAVD 1988	17.7'	NGVD	19.1'
"ACME WWTP 2007"	Latitude	26° 38' 05.2"	Derived from the GPS observations described above		Derived from the GPS observations described above
State/County FL/Palm Beach	Longitude	-80° 13' 57.3"			
USGS QUAD Palm Beach Farms					
Vertical Order Third Horizontal Order Third BENCHMARK ACME WWTP 2007		From the junction o Worth Road (State Road (State Road & Avenue South on the and proceed north a Road, turn right ont 800' to the entrance right, turn right into corner of the plant a SFWMD brass disk corner of the concre pad and 2' S.W. of	f Stae Road 7 (L Road 802) proce 302) approx. 2.0 he right, turn righ approx. 1.0 mile o Pierson Road a e of a waste wate the plant and pro and the well site, stamped ACME ete pad, 2.5' S.W the N.E. corner of	J.S. Highway 4 eed west on La miles to the ju t onto 120 Ave to the junction and proceed e er treatment pl oceed to the s the mark is a WWTP 2007 7. of the N.E. o of a 2' concret	441) and Lake ake Worth inction of 120 enue South of Pierson east approx. ant on the outheast 3-1/2" at the N.E. corner of the e block wall.

PROJECT RESULTS

Upper Zone	Lower Zone
Reference mark: <u>Set mark on brass fitting</u> New Information at the site: Mark El. <u>22.1' NGVD 29</u> Mark El. <u>20.7' NAVD 88</u> Initials: <u>K&A</u> Date: <u>7/07/08</u> Offset: <u>-1.4</u> Previous Information at the site: Reference Mark Elevation(s) El. <u>None</u> Date: <u>None</u> Initials: <u>None</u> Reference Mark location: <u>Same as noted above.</u>	Reference mark: <u>Set mark on brass fitting</u> New Information at the site: Mark El. <u>22.2' NGVD 29</u> Mark El. <u>20.8' NAVD 88</u> Initials: <u>K&A</u> Date: <u>7/07/08</u> Offset: <u>-1.4</u> Previous Information at the site: Reference Mark Elevation(s) El. <u>None</u> Date: <u>None</u> Initials: <u>None</u> Reference Mark location: <u>Same as noted above</u>
$\frac{DTW}{(Distance to water inside well)}$ $\frac{DTW}{(Distance to obtain, well sealed.}$ Reference mark: $\underline{N/A}$ El. $\underline{N/A}$ (NGVD 29) Measurement to water: $\underline{N/A}$ Date: $\underline{N/A}$ Time: $\underline{N/A}$ Ground Elevation next to Well: $\underline{18.7'}$ (NGVD 1929) (on concrete pad). $\underline{NAD 1983/90 \text{ Florida East Zone}}$ Latitude: $\underline{26^{\circ} 38' 05.2''}$ Longitude: $-\underline{80^{\circ} 13' 57.3''}$ Northing:(Y) $\underline{837164}$ Easting:(X) $\underline{906864}$	DTW (Distance to water inside well) <u>Unable to obtain, well sealed.</u> Reference mark: <u>N/A</u> El. <u>N/A</u> (NGVD 29) Measurement to water: <u>N/A</u> Date: <u>N/A</u> Time: <u>N/A</u> Ground Elevation next to Well: <u>18.7' (NGVD 1929) (on concrete pad).</u> <u>NAD 1983/90 Florida East Zone</u> Latitude: <u>26° 38' 05.2"</u> Longitude: <u>- 80° 13' 57.3"</u> Northing:(Y) <u>837164</u> Easting:(X) <u>906864</u>



Upper Zone Well Measure Point and Information 7/07/08 Keith and Associates



Lower Zone Well Measure Point and Information 7/07/08 Keith and Associates

Comments

Elevations shown hereon are NGVD 1929 datum unless noted otherwise. Party Chief: <u>D. Ferels, A. McKinney</u> Field Book: <u>278</u> Page Pages 70-72, 74, 76-77 Bench Mark: "<u>ACME WWTP 2007</u>" El. <u>17.7</u>', Vertical Datum: <u>NAVD1988</u> El. <u>19.1</u>', Vertical Datum: <u>NGVD1929</u> SFWMD Offset: <u>1.4</u>' SFWMD VALUE (subtract this value from NGVD 1929 to convert to NAVD 1988) NGS Offset: <u>1.4</u>' NGS VALUE (subtract this value from NGVD 1929 to convert to NAVD 1988) The offset values referred to as "SFWMD VALUE" and "NGS VALUE" were derived by subtracting the NAVD 1988 value from the NGVD 1929 value at SFWMD benchmark ACME WWTP 2007. The NGVD 1929 value for benchmark was established using Vertcon version 6.0.1. the NAVD 1988 value was established using GPS methods as described above. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90).

NAVD 88 - North American Vertical Datum of 1988 NGVD29 -National Geodetic Vertical Datum of 1929 NAD 83 -99 (Horizontal Datum) North American Datum NGS - National Geodetic Survey SFWMD - South Florida Water Management District PVC - Polyvinyl Chloride L.B. - Licensed Business RTK – Real Time Kinematic K&A – Keith and Associates PSM – Professional Surveyor & Mapper USGS – United States Geological Survey QUAD – Quadrangle Map PID - Permanent Identifier OPUS- Online Positioning User Service

SURVEYOR'S CERTIFICATION

I hereby certify that this Specific Purpose Survey meets applicable portions of the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 61-G17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.

Keith and Associates, Inc. L.B. number 6860

By:

Michael M. Mossey, PSM Professional Surveyor and Mapper State of Florida Certificate No. 5660

Date of Survey July 7, 2008

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31															1			
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54	Item/Parm	Lat	Long	X-Coord	Y-Coord	Sec	Township	Range	Quad	Basin		(County					Description
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28	B.M	. Elevation:	19.1' (NGV	(D 1929) E				Date:	7/8/2008				5	Stamp:	ACME	ww	TP 2007	
29																		
30		Agency:	ORG					Type:	BRASS				Γ	Datum:		NG	VD29	
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	Benchmark L	ocation/ De	scription	From the j	unction of	of Stae Ro	ad 7 (U.S.	Highway	(441) and La	ke Worth Road	(State Road	802) proceed	west o	n Lake	Worth	Road	(State Road 80	2) approx.
				2.0 miles t	to the jun	ction of 1	120 Avenue	e South o	on the right, tu	rn right onto 12	0 Avenue So	outh and proce	ed no	rth appi	ox. 1.0	mile	to the junction	of Pierson
				Road, turn	n right on	to Pierson	Road and	proceed	east approx. 8	300' to the entrai	nce of a was	te water treatm	nent p	lant on	the righ	it, turi	n right into the	plant and
32				proceed to	the cout	heast corr	er of the pl	ant and t	he well site t	ha mark is a 3-1	/?" SEW/MI) brace diek et	mner	ACM	F WWT	חר סי	7 at the N.E. o	orner of the
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54	Item/Parm	Lat	Long	X-Coord	Y-Coord	Sec	Township	Range	Quad	Basin		(County	•				Description
55																		

The NGS Data Sheet

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DATABASE = Sybase , PROGRAM = datasheet, VERSION = 7.48
       National Geodetic Survey, Retrieval Date = JULY 3, 2007
1
AD8195 DESIGNATION - G 413
AD8195 PID - AD8195
AD8195 STATE/COUNTY- FL/PALM BEACH
AD8195 USGS QUAD - LOXAHATCHEE (1984)
AD8195
AD8195
                              *CURRENT SURVEY CONTROL
AD8195
AD8195* NAD 83(1986)- 26 40 56.
                                    (N)
                                          080 15 52.
                                                         (W)
                                                                SCALED
AD8195* NAVD 88 -
                            5.506 (meters) 18.06 (feet) ADJUSTED
AD8195
AD8195 GEOID HEIGHT-
                             -25.78 (meters)
                                                                GEOID03
AD8195 DYNAMIC HT -
                              5.497 (meters)
                                                18.03 (feet) COMP
AD8195 MODELED GRAV-
                     979,113.6 (mgal)
                                                                NAVD 88
AD8195
                              CLASS II
AD8195 VERT ORDER - FIRST
AD8195
AD8195. The horizontal coordinates were scaled from a topographic map and have
AD8195.an estimated accuracy of +/- 6 seconds.
AD8195
AD8195. The orthometric height was determined by differential leveling
AD8195.and adjusted by the NATIONAL GEODETIC SURVEY in September 1992.
AD8195
AD8195. The geoid height was determined by GEOID03.
AD8195
AD8195. The dynamic height is computed by dividing the NAVD 88
AD8195.geopotential number by the normal gravity value computed on the
AD8195.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AD8195.degrees latitude (g = 980.6199 \text{ gals.}).
AD8195
AD8195. The modeled gravity was interpolated from observed gravity values.
AD8195
                          North
                                      East Units Estimated Accuracy
AD8195:
AD8195;SPC FL E - 260,410.
                                     273,210. MT (+/- 180 meters Scaled)
AD8195
AD8195
                               SUPERSEDED SURVEY CONTROL
AD8195
AD8195 NGVD 29 (09/01/92)
                            5.960 (m)
                                                19.55 (f) ADJUSTED 1 2
AD8195
AD8195.Superseded values are not recommended for survey control.
AD8195.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AD8195.See file dsdata.txt to determine how the superseded data were derived.
AD8195
AD8195 U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK731514 (NAD 83)
AD8195 MARKER: I = METAL ROD
AD8195 SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AD8195 SP SET: STAINLESS STEEL ROD IN SLEEVE
AD8195 STAMPING: G 413 1992
AD8195 MARK LOGO: NGS
AD8195 PROJECTION: FLUSH
AD8195 MAGNETIC: I = MARKER IS A STEEL ROD
AD8195 STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AD8195 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AD8195+SATELLITE: SATELLITE OBSERVATIONS - February 04, 2005
AD8195 ROD/PIPE-DEPTH: 48.4 meters
```

AD8195 SLEEVE-DEPTH : 0.9 meters AD8195 AD8195 HISTORY - Date Condition Report By - 1992 MONUMENTED AD8195 HISTORY NGS AD8195 HISTORY - 20021111 GOOD USPSQD AD8195 HISTORY - 20040115 GOOD AD8195 HISTORY - 20050204 GOOD USPSQD USPSOD AD8195 STATION DESCRIPTION AD8195 AD8195 AD8195'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992 AD8195'19.4 KM (12.05 MI) WESTERLY ALONG U.S. HIGHWAY 98 FROM THE JUNCTION AD8195'OF INTERSTATE HIGHWAY 95 IN WEST PALM BEACH, 231.0 M (757.9 FT) EAST AD8195'CENTER OF E ROAD, 12.1 M (39.7 FT) SOUTH OF THE CENTERLINE OF THE AD8195'WESTBOUND LANES OF THE HIGHWAY, 2.0 M (6.6 FT) SOUTHEAST OF THE AD8195'CENTER OF A STORM DRAIN, 1.3 M (4.3 FT) SOUTH-SOUTHWEST OF A WITNESS AD8195'POST, AND 0.5 M (1.6 FT) BELOW THE LEVEL OF THE HIGHWAY. AD8195'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP. AD8195 AD8195 STATION RECOVERY (2002) AD8195 AD8195'RECOVERY NOTE BY US POWER SQUADRON 2002 (AAS) AD8195'CAP BROKEN OFF. AD8195 STATION RECOVERY (2004) AD8195 AD8195 AD8195'RECOVERY NOTE BY US POWER SOUADRON 2004 (AAS) AD8195'RECOVERED IN GOOD CONDITION. AD8195 AD8195 STATION RECOVERY (2005) AD8195 AD8195'RECOVERY NOTE BY US POWER SQUADRON 2005 (AAS) AD8195'RECOVERED IN GOOD CONDITION. *** retrieval complete. Elapsed Time = 00:00:00

The NGS Data Sheet

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DATABASE = Sybase , PROGRAM = datasheet, VERSION = 7.57
       National Geodetic Survey, Retrieval Date = DECEMBER 26, 2007
1
AD2794 DESIGNATION - N 233
AD2794 PID - AD2794
AD2794 STATE/COUNTY- FL/PALM BEACH
AD2794 USGS QUAD - PALM BEACH (1983)
AD2794
AD2794
                              *CURRENT SURVEY CONTROL
AD2794
AD2794* NAD 83(1986) - 26 37 52.
                                    (N)
                                          080 03 33.
                                                         (W)
                                                                SCALED
AD2794* NAVD 88 -
                            4.578 (meters) 15.02
                                                        (feet) ADJUSTED
AD2794
AD2794 GEOID HEIGHT-
                             -26.29 (meters)
                                                                GEOID03
AD2794 DYNAMIC HT -
                              4.571 (meters)
                                                 15.00 (feet) COMP
AD2794 MODELED GRAV-
                        979,113.6
                                    (mgal)
                                                                NAVD 88
AD2794
AD2794 VERT ORDER - FIRST
                              CLASS I
AD2794
AD2794. The horizontal coordinates were scaled from a topographic map and have
AD2794.an estimated accuracy of +/- 6 seconds.
AD2794
AD2794. The orthometric height was determined by differential leveling
AD2794.and adjusted in June 1991.
AD2794
AD2794. The geoid height was determined by GEOID03.
AD2794
AD2794. The dynamic height is computed by dividing the NAVD 88
AD2794.geopotential number by the normal gravity value computed on the
AD2794.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AD2794.degrees latitude (g = 980.6199 \text{ gals.}).
AD2794
AD2794. The modeled gravity was interpolated from observed gravity values.
AD2794
                                              Units Estimated Accuracy
AD2794:
                          North
                                      East
                                     293,680.
                                               MT (+/- 180 meters Scaled)
AD2794; SPC FL E - 254,880.
AD2794
AD2794
                               SUPERSEDED SURVEY CONTROL
AD2794
AD2794 NGVD 29 (09/01/92)
                            5.040 (m)
                                                16.54 (f) ADJUSTED 11
AD2794
AD2794.Superseded values are not recommended for survey control.
AD2794.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AD2794.See file dsdata.txt to determine how the superseded data were derived.
AD2794
AD2794 U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK936459(NAD 83)
AD2794 MARKER: DB = BENCH MARK DISK
AD2794 SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AD2794 SP SET: CONCRETE POST
AD2794 STAMPING: N 233 1965
AD2794 MARK LOGO: CGS
AD2794 MAGNETIC: N = NO MAGNETIC MATERIAL
AD2794 STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AD2794+STABILITY: SURFACE MOTION
AD2794 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AD2794+SATELLITE: SATELLITE OBSERVATIONS - April 21, 2006
AD2794
```

mhtml:file://Z:\Recorder wells\ACME WWTP\Contractors Well Data 2008\AID-MW A... 11/30/2016

AD2794 HISTORY - Date Condition Report By AD2794 HISTORY - 1965 MONUMENTED CGS AD2794 HISTORY - 1973 GOOD NGS AD2794 HISTORY - 1987 POOR USPSQD - 1987 GOOD - 1988 GOOD AD2794 HISTORY USPSQD AD2794 HISTORY USPSQD

 AD2794
 HISTORY
 - 1988
 GOOD

 AD2794
 HISTORY
 - 19910114
 GOOD

 AD2794
 HISTORY
 - 20011222
 GOOD

 AD2794
 HISTORY
 - 20020221
 GOOD

 AD2794
 HISTORY
 - 20040126
 GOOD

 AD2794
 HISTORY
 - 20050126
 GOOD

 AD2794
 HISTORY
 - 20050126
 GOOD

 AD2794
 HISTORY
 - 20060421
 GOOD

 NGS USPSQD FLDEP USPSQD USPSQD USPSQD AD2794 AD2794 STATION DESCRIPTION AD2794 AD2794 DESCRIBED BY COAST AND GEODETIC SURVEY 1965 AD2794'AT LAKE WORTH. AD2794'AT LAKE WORTH, ABOUT 1.2 MILES NORTH ALONG FLORIDA EAST COAST AD2794'RAILWAY FROM THE STATION, AT THE CROSSING OF 13TH AVENUE NORTH, AD2794'NEAR MILEPOST 305, 31.0 FEET NORTH OF THE CENTER LINE OF THE AD2794'AVENUE, 34.0 FEET WEST OF THE WEST RAIL OF THE SOUTHBOUND MAIN AD2794'TRACK, 55.0 FEET NORTHWEST OF THE CENTER OF THE CROSSING, 21 AD2794 FEET SOUTHWEST OF THE FIRST TELEPHONE POLE NORTH OF THE CROSSING, AD2794'95.5 FEET NORTH-NORTHWEST OF AND ACROSS TRACK FROM THE MILEPOST, AD2794'1.5 FEET EAST OF A METAL WITNESS POST, ABOUT 2 FEET BELOW THE AD2794'LEVEL OF THE TRACK AND SET IN THE TOP OF A CONCRETE POST AD2794'PROJECTING 0.3 FOOT. NOTE-- THE RAILWAY STATION HAS BEEN AD2794'REMOVED. AD2794 AD2794 STATION RECOVERY (1973) AD2794 AD2794'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1973 AD2794'RECOVERED IN GOOD CONDITION. AD2794 AD2794 STATION RECOVERY (1987) AD2794 AD2794'RECOVERY NOTE BY US POWER SQUADRON 1987 (RG) AD2794'MARK RECOVERED IN POOR CONDITION. AD2794 AD2794 STATION RECOVERY (1987) AD2794 AD2794'RECOVERY NOTE BY US POWER SQUADRON 1987 (JRM) AD2794'RECOVERED IN GOOD CONDITION. AD2794 AD2794 STATION RECOVERY (1988) AD2794 AD2794'RECOVERY NOTE BY US POWER SQUADRON 1988 (BJS) AD2794'RECOVERED IN GOOD CONDITION. AD2794 AD2794 STATION RECOVERY (1991) AD2794 AD2794'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991 AD2794'IN LAKE WORTH, AT THE INTERSECTION OF 13TH AVENUE NORTH AND THE AD2794'FLORIDA EAST COAST RAILROAD, 14.4 M (47.2 FT) WEST OF THE NEAR RAIL, AD2794'10.0 M (32.8 FT) NORTH OF THE AVENUE CENTER, 1.4 M (4.6 FT) NORTH OF AD2794'A SIDEWALK, 1.3 M (4.3 FT) SOUTHEAST OF A FENCE CORNER, 0.4 M (1.3 AD2794'FT) EAST OF A WITNESS POST, 0.3 M (1.0 FT) WEST OF A WITNESS POST, AD2794'0.3 M (1.0 FT) NORTHEAST OF UTILITY POLE NUMBER 1-1016 WITH A GUY AD2794'WIRE, 0.3 M (1.0 FT) BELOW THE LEVEL OF THE AVENUE, AND THE MONUMENT AD2794'IS RECESSED 0.1 M (0.3 FT) BELOW THE GROUND SURFACE.

AD2794 AD2794 STATION RECOVERY (2001) AD2794 AD2794'RECOVERY NOTE BY US POWER SQUADRON 2001 (AAS) AD2794'RECOVERED IN GOOD CONDITION. AD2794 AD2794 STATION RECOVERY (2002) AD2794 AD2794'RECOVERY NOTE BY FL DEPT OF ENV PRO 2002 (JLM) AD2794'RECOVERED IN GOOD CONDITION. AD2794' AD2794' AD2794' AD2794 AD2794 STATION RECOVERY (2004) AD2794 AD2794'RECOVERY NOTE BY US POWER SQUADRON 2004 (AAS) AD2794'RECOVERED IN GOOD CONDITION. AD2794 STATION RECOVERY (2005) AD2794 AD2794 AD2794'RECOVERY NOTE BY US POWER SQUADRON 2005 (AAS) AD2794'RECOVERED IN GOOD CONDITION. AD2794 AD2794 STATION RECOVERY (2006) AD2794 AD2794'RECOVERY NOTE BY US POWER SOUADRON 2006 (AAS) AD2794'RECOVERED IN GOOD CONDITION. *** retrieval complete.

Elapsed Time = 00:00:00

The NGS Data Sheet

DATABASE = Sybase , PROGRAM = datasheet, VERSION = 7.48 National Geodetic Survey, Retrieval Date = JULY 3, 2007 1 AJ8761 DESIGNATION - Z 536 AJ8761 PID - AJ8761 AJ8761 STATE/COUNTY- FL/PALM BEACH AJ8761 USGS QUAD - LOXAHATCHEE SE (1984) AJ8761 *CURRENT SURVEY CONTROL AJ8761 AJ8761 AJ8761* NAD 83(1999) - 26 35 26.17839(N) 080 16 12.12537(W) ADJUSTED AJ8761* NAVD 88 -7.392 (meters) 24.25 (feet) ADJUSTED AJ8761 - 964,564.698 (meters) AJ8761 X COMP AJ8761 Y - -5,625,220.387 (meters) COMP AJ8761 Z - 2,837,717.170 (meters) COMP AJ8761 LAPLACE CORR-AJ8761 ELLIP HEIGHT--2.30 (seconds) DEFLEC99 -18.227 (meters) (12/12/02) GPS OBS AJ8761 GEOID HEIGHT--25.59 (meters) GEOID03 24.22 (feet) COMP AJ8761 DYNAMIC HT -7.381 (meters) AJ8761 MODELED GRAV- 979,106.6 (mgal) NAVD 88 AJ8761 AJ8761 HORZ ORDER - FIRST AJ8761 VERT ORDER - FIRST CLASS II AJ8761 ELLP ORDER - THIRD CLASS I AJ8761 AJ8761. The horizontal coordinates were established by GPS observations AJ8761.and adjusted by the National Geodetic Survey in December 2002. AJT8761 AJ8761. The orthometric height was determined by differential leveling AJ8761.and adjusted by the NATIONAL GEODETIC SURVEY in May 2002. AJ8761 AJ8761. The X, Y, and Z were computed from the position and the ellipsoidal ht. AJ8761 AJ8761. The Laplace correction was computed from DEFLEC99 derived deflections. AJ8761 AJ8761. The ellipsoidal height was determined by GPS observations AJ8761.and is referenced to NAD 83. AJ8761 AJ8761. The geoid height was determined by GEOID03. AJ8761 AJ8761. The dynamic height is computed by dividing the NAVD 88 AJ8761.geopotential number by the normal gravity value computed on the AJ8761.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45 AJ8761.degrees latitude (g = 980.6199 gals.). AJ8761 AJ8761. The modeled gravity was interpolated from observed gravity values. AJ8761 AJ8761; North East Units Scale Factor Converg. AJ8761;SPC FL E-250,252.968272,710.049MT1.00000642AJ8761;SPC FL E-821,038.28894,716.22sFT1.00000642AJ8761;UTM17-2,941,299.564572,685.240MT0.99966522 272,710.049 MT 1.00000642 +0 19 36.3 +0 19 36.3 +0 19 36.3 AJ8761 AJ8761! - Elev Factor x Scale Factor = Combined Factor AJ8761!SPC FL E - 1.00000286 x 1.00000642 = 1.00000928 AJ8761!UTM 17 - 1.00000286 x 0.99966522 = 0.99966808 AJ8761

Distance Geod. Az | AJ8761 | PID Reference Object AJ8761| dddmmss.s | 289.008 METERS 32056 | AJ8761| AJ8799 PB 37 AJ8761 | ------ | AJ8761 AJ8761 SUPERSEDED SURVEY CONTROL AJ8761 AJ8761 NAVD 88 (12/12/02) 7.39 (m) 24.2 (f) LEVELING 3 AJ8761 AJ8761.Superseded values are not recommended for survey control. AJ8761.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums. AJ8761.See file dsdata.txt to determine how the superseded data were derived. AJ8761 AJ8761 U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK7268541300 (NAD 83) AJ8761 MARKER: F = FLANGE-ENCASED RODAJ8761 SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+) AJ8761 STAMPING: Z 536 2001 CERP AJ8761 MARK LOGO: NONE AJ8761 PROJECTION: RECESSED 8 CENTIMETERS AJ8761 MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET AJ8761 STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL AJ8761 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR AJ8761+SATELLITE: SATELLITE OBSERVATIONS - February 05, 2004 AJ8761 HISTORY - Date Condition Report By AJ8761 HISTORY - 20010919 MONUMENTED SFLWMD AJ8761 HISTORY - 20020423 GOOD MAPTEC AJ8761 HISTORY - 20021207 GOOD AJ8761 HISTORY AJ8761 ROD/PIPE-DEPTH: 6.5 meters AJ8761 AJ8761 STATION DESCRIPTION AJ8761 AJ8761'DESCRIBED BY S FL WATER MGMT DIST 2001 (MAB) AJ8761'THE STATION IS LOCATED ABOUT 34.9 KM (21.7 MILES) NORTH NORTHWEST OF AJ8761'DEERFIELD BEACH, AJ8761'ABOUT 21.4 KM (13.3 MILES) WEST NORTHWEST OF BOYNTON BEACH, ABOUT 10.4 AJ8761'KM (6.4 MILES) AJ8761'SOUTH SOUTHEAST OF LOXAHATCHEE IN SECTION 40, TOWNSHIP 44.5, RANGE 41 AJ8761'EAST. AJ8761' AJ8761'OWNERSHIP SOUTH FLORIDA WATER MANAGEMENT DISTRICT. AJ8761' AJ8761'TO REACH THE STATION FROM THE INTERSECTION OF STATE ROAD 804 (BOYNTON AJ8761'BEACH BLVD.) AND AJ8761'STATE ROAD 7 / U.S. 441, GO SOUTH ON STATE ROAD 7 / U.S. 441 FOR 3.2 AJ8761'KM (2.0 MILES) TO THE AJ8761'INTERSECTION OF LEE ROAD AND STATE ROAD 7 / U.S. 441, TURN RIGHT AND AJ8761'GO WEST ON LEE ROAD AJ8761'FOR 1.6 KM (1.0 MILES) TO THE END AT THE ARTHUR R. MARSHALL AJ8761'LOXAHATCHEE WILDLIFE REFUGE, AJ8761'TURN RIGHT AND GO NORTH ON L-40 LEVEE, PASSING THROUGH ACCESS GATE, AJ8761'FOR 11.7 KM (7.25 AJ8761'MILES) TO THE MARK ON THE RIGHT IN A TURN AROUND AREA. AJ8761' AJ8761'THE MARK IS 17.4 METERS (57.0 FEET) NORTH OF THE SOUTH END OF THE TURN AJ8761'AROUND AREA, 11.6 AJ8761'METERS (38.0 FEET) SOUTH OF THE NORTH END OF THE TURNAROUND AREA, 4.7 AJ8761'METERS (15.5 FEET)

AJ8761'EAST OF A CARSONITE WITNESS POST AND 3.4 METERS (11.0 FEET) NORTHWEST AJ8761'OF A METAL AJ8761'WITNESS POST. ACCESS TO THE DATUM POINT (TOP OF A STAINLESS STEEL ROD) AJ8761'IS HAD THROUGH A AJ8761'5 INCH LOGO CAP. AJ8761' AJ8761'NOTE A MAGNET WAS PLACED INSIDE THE PVC ENCASEMENT. AJ8761' AJ8761' AJ8761' AJ8761' AJ8761 STATION RECOVERY (2002) AJ8761 A.T8761 AJ8761'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP) AJ8761'THE STATION IS LOCATED ABOUT 34.9 KM (21.7 MILES) NORTH NORTHWEST OF AJ8761'DEERFIELD BEACH, AJ8761'ABOUT 21.4 KM (13.3 MILES) WEST NORTHWEST OF BOYNTON BEACH, ABOUT 10.4 AJ8761'KM (6.4 MILES) AJ8761'SOUTH SOUTHEAST OF LOXAHATCHEE IN SECTION 40, TOWNSHIP 44.5, RANGE 41 AJ8761'EAST. AJ8761' AJ8761'OWNERSHIP SOUTH FLORIDA WATER MANAGEMENT DISTRICT. AJ8761' AJ8761'TO REACH THE STATION FROM THE INTERSECTION OF STATE ROAD 804 (BOYNTON AJ8761'BEACH BLVD.) AND AJ8761'STATE ROAD 7 / U.S. 441, GO SOUTH ON STATE ROAD 7 / U.S. 441 FOR 3.2 AJ8761'KM (2.0 MILES) TO THE AJ8761'INTERSECTION OF LEE ROAD AND STATE ROAD 7 / U.S. 441, TURN RIGHT AND AJ8761'GO WEST ON LEE ROAD AJ8761'FOR 1.6 KM (1.0 MILES) TO THE END AT THE ARTHUR R. MARSHALL AJ8761'LOXAHATCHEE WILDLIFE REFUGE, AJ8761'TURN RIGHT AND GO NORTH ON L-40 LEVEE, PASSING THROUGH ACCESS GATE, AJ8761'FOR 11.7 KM (7.25 AJ8761'MILES) TO THE MARK ON THE RIGHT IN A TURN AROUND AREA. AJ8761' AJ8761'THE MARK IS 17.4 METERS (57.0 FEET) NORTH OF THE SOUTH END OF THE TURN AJ8761'AROUND AREA, 11.6 AJ8761'METERS (38.0 FEET) SOUTH OF THE NORTH END OF THE TURNAROUND AREA, 4.7 AJ8761'METERS (15.5 FEET) AJ8761'EAST OF A CARSONITE WITNESS POST AND 3.4 METERS (11.0 FEET) NORTHWEST AJ8761'OF A METAL AJ8761'WITNESS POST. ACCESS TO THE DATUM POINT (TOP OF A STAINLESS STEEL ROD) AJ8761'IS HAD THROUGH A AJ8761'5 INCH LOGO CAP. AJ8761' AJ8761'NOTE A MAGNET WAS PLACED INSIDE THE PVC ENCASEMENT. AJ8761' AJ8761' AJ8761'STATION RECOVERY (2002) AJ8761'RECOVERY NOTE BY MAPTECH, INCORPORATED 2002 (CDP). AJ8761'RECOVERED AS DESCRIBED. AJ8761' AJ8761' AJ8761' AJ8761 AJ8761 STATION RECOVERY (2002) AJ8761 AJ8761'RECOVERY NOTE BY FL DEPT OF ENV PRO 2002 (BPJ) AJ8761'RECOVERED AS DESCRIBED.

Elapsed Time = 00:00:01

AJ8761' AJ8761 AJ8761 AJ8761 AJ8761 AJ8761'RECOVERY NOTE BY FL DEPT OF ENV PRO 2004 (JLM) AJ8761'RECOVERED AS DESCRIBED. *** retrieval complete.

ACME WWTP well.met Identification_Information: Citation: Citation_Information: Originator: Michael M. Mossey, P.S.M. (ed.) Publication_Date: 20080713 Publication_Time: Unknown Title: ACME WWTP Edition: 1 Publication_Information: Publication_Place: Not Published Publisher: None Online_Linkage: mmossey@keith-associates.com Description: Abstract: Well site ACME WWTP Upper and Lower Zones. Purpose: To establish reference elevations in NAVD 1988 and NGVD 1929 datum at the site on the existing wells and set a site benchmark. The benchmark and well elevations were derived using GPS and are shown to the nearest tenth. Time_Period_of_Content: Time_Period_Information: Range_of_Dates/Times: Beginning_Date: 20071226 Endi ng_Date: 20080708 Currentness_Reference: Publication Date Status: Progress: Complete Maintenance_and_Update_Frequency: Unknown Spatial _Domain: Boundi ng_Coordi nates: West_Bounding_Coordinate: 80°13'57.3" East_Bounding_Coordinate: 80°13'57.3" North_Boundi ng_Coordi nate: 26°38'05.2" South_Boundi ng_Coordi nate: 26°38'05.2" Keywords: Theme: Theme_Keyword_Thesaurus: Specific Purpose Survey Theme_Keyword: Well Site PI ace: Place_Keyword_Thesaurus: Palm Beach County, Florida Place_Keyword: Well Site ACME WWTP Place_Keyword: Sections 23 Township 44 S - Range 41 E Access_Constraints: None Use_Constraints: None Point_of_Contact: Contact_Information: Contact_Person_Primary: Contact_Person: Steve Krupa Contact_Organization: South Florida Water Management District Contact_Position: Senior Supervisor Contact_Address: Address_Type: mailing and physical address Address: 3301 Gun Club Road MS 4330 City: West Palm Beach State_or_Province: Florida Postal_Code: 33406 Country: USA Contact_Voice_Telephone: Office (561) 682-6923 Contact_Electronic_Mail_Address: skrupa@sfwmd.gov Hours_of_Service: 8:00 am to 5:00 pm EST Data_Quality_Information: Attribute_Accuracy: Attribute_Accuracy_Report: Horizontal_locations were obtained using a Trimble 5700 receiver. Coordinates are based on the Florida State Plane Coordinate System, East Zone, NAD 1983/90. Elevations are based on NGVD 1929 with an offset supplied to convert to NAVD 1988. Logi cal _Consi stency_Report:

ACME WWTP well.met The vertical datum for the project is National Geodetic Vertical Datum of 1929 (NGVD 29) and North American Vertical Datum of 1988 (NAVD 88). NGVD 1929 elevations and offset were derived using Vertcon version 6.0.1. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90). Completeness_Report: Upper Zone Well (NGVD1929) El ev. 22.1 Upper Zone Well (NAVD1988) El ev. 20.7 (NGVD1929) Lower Zone Well El ev. 22.2' Lower Zone Well (NAVD1988) El ev. 20.8 Site Benchmark ACME WWTP 2007, From the junction of Stae Road 7 (U.S. Highway 441) and Lake Worth Road (State Road 802) proceed west on Lake Worth Road (State Road 802) approx. 2.0 miles to the junction of 120 Avenue South on the right, turn right onto 120 Avenue South and proceed north approx. 1.0 mile to the junction of Pierson Road, turn right onto Pierson Road and proceed east approx. 800' to the entrance of a waste water treatment plant on the right, turn right into the plant and proceed to the southeast corner of the plant and the well site, the mark is a 3-1/2" SFWMD brass disk stamped ACME WWTP 2007 at the N.E. corner of the concrete pad, 2.5' S.W. of the N.E. corner of the pad and 2' S.W. of the N.E. corner of a 2' concrete block wall. NAVD 1988 elevation 17.7' (field derived) NAVD 1988 el evation 17.7' (field derived) NGVD 1929 el evation 19.1' (field derived) Benchmark Z-536, The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in May 2002. About 21.4 km (13.3 miles) west northwest of Boynton Beach, about 10.4 km (6.4 miles) south southeast of Loxahatchee in section 40, township 44.S, range 41 E. To reach the station from the intersection of State Road 804 (Boynton Beach Blvd.) and State Road 7 / U.S. 441, go south on State Road 7 / U.S. 441 for 3.2 km (2.0 miles) to the intersection of Lee Road and State Road 7 / U.S. 441, turn right and go west on Lee Road for 1.6 km (1.0 miles) to the end at the Arthur R. Marshall Loxahatchee Wildlife Refuge, turn right and go porth on L 40 Loveo passing through access gate go north on L-40 levee, passing through access gate, for 11.7 km (7.25 miles) to the mark on the right in a turn pround area. The mark is 17.4 meters (57.0 feet) north of around area. the south end of the turn around area, 11.6 meters (38.0 feet) south of the north end of the turnaround area, 4.7meters (15.5 feet) east of a carsonite witness post and 3.4 meters (11.0 feet) northwest of a metal witness post. Access to the datum point (top of a stainless steel rod) is had through a 5 inch logo cap. Note a magnet was placed inside the pvc encasement. NAVD 1988 elevation 24.252 (NGS Data sheet) NGVD 1929 elevation (None) Benchmark G-413, The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in September 1992. 19.4 km (12.05 mi) westerly along U.S. Highway 98 from the junction of Interstate Highway 95 in West Palm Beach, 231.0 m (757.9 ft) east center of the road, 12.1 m (39.7 ft) south of the centerline of the westbound lanes of the highway, 2.0 m (6.6 ft) southeast of the center of a storm drain, 1.3 m (4.3 ft) south-southwest of a witness post, and 0.5 m (1.6 ft) below the level of the highway. Note--access to the datum point is through a 5-inch logo cap. NAVD 1988 elevation 18.064' (NGS Data sheet) NGVD 1929 elevation None Benchmark N-233, The orthometric height was determined by differential leveling and adjusted in June 1991. In Lake Worth, at the intersection of 13th Avenue North Page 2

ACME WWTP well.met and the Florida East Coast Railroad, 14.4 m (47.2 ft) west of the near rail, 10.0 m (32.8 ft) north of the avenue center, 1.4 m (4.6 ft) north of a sidewalk, 1.3 m (4.3 ft) southeast of a fence corner, 0.4 m (1.3 ft) east of a witness post, 0.3 m (1.0 ft) west of a witness post, 0.3 m (1.0 ft) northeast of utility pole number 1-1016 with a guy wire, 0.3 m (1.0 ft) below the level of the avenue, and the monument is recessed 0.1 m (0.3 ft) below the ground surface. NAVD 1988 elevation 15.020' (NGS Data sheet) NGVD 1929 elevation 16.535' Superseded Value from NGS Data Sheet Posi ti onal _Accuracy: Hori zontal _Posi ti onal _Accuracy: Horizontal_Positional_Accuracy_Report: The horizontal location of the benchmark was obtained using Trimble 5700 receiver and four-hour static sessions. The results of the static sessions were processed through the NGS wesite OPUS program . Quanti tati ve_Hori zontal _Posi ti onal _Accuracy_Assessment: Horizontal_Positional_Accuracy_Value: +/- 0.1' Hori zontal _Posi ti onal _Accuracy_Expl anati on: Val ue deri ved usi ng Trimble 5700 receiver/celluar RTK link. Verti cal _Posi ti onal _Accuracy: Verti cal _Posi ti onal _Accuracy_Report: NGS benchmarks Z-536, G-413 and N-233 were used to establish the elevations on site benchmark ACME WWTP. Site benchmark ACME WWTP 2007 was used to establish the elevations at the site. Quantitative_Vertical_Positional_Accuracy_Assessment: Vertical_Positional_Accuracy_Value: 0.10' Vertical_Positional_Accuracy_Explanation: Elevations were determined usin GPS Quanti tati ve_Verti cal _Posi ti onal _Accuracy_Assessment: Verti cal _Posi ti onal _Accuracy_Val ue: 0.10' Vertical_Positional_Accuracy_Explanation: Elevations were determined usin GPS Li neage: Process_Step: Process_Description: Horizontal and Vertical data on the site benchmark was established using the following methods. A 3/1/2" SFWMD brass disk was set on the concrete slab and stamped ACME WWTP 2007. Site benchmark ACME WWTP 2007 was occupied a total of three times consisting of four-hour GPS static sessions each time. The observed ĞPS baselines were from benchmark ACME WWTP 2007 to The National Geodetic Survey monuments G-413, N-233 and Z-537. Those National Geodetic Survey monuments were also connected to each other by four-hour static sessions. Trimble 5700 receivers and Zephyr model number 39105.00 antennas (without ground plane) were used for all static sessions. The baseline files were processed and adjusted using Trimble Geomatics Office version 1.62 holding the published elevations of NGS monuments G-413, N-233 and Z-537. Two of the three observed adjusted values were averaged to obtain the final elevation of benchmark ACME WWTP 2007. The third one had a value difference of -0.3' from the other two with the remaining two being within 0.068' of each other. All the baselines passed the Chi Square Test at 95% confidence level. The expected accuracy for the final elevation of site benchmark "ACME WWTP 2007" is \pm 0.10'. In addition the three GPS observations of site benchmark ACME WWTP 2007 were processed through the National Geodetic Survey's OPUS program. The difference between the highest and lowest processed orthometric heights was 0.076'. Process_Date: 20071226 Spatial_Reference_Information: Hori zontal _Coordi nate_System_Definition: Page 3

ACME WWTP well.met Geographic: Latitude_Resolution: 26°38'05.2" Longi tude_Resol uti on: -80°13' 57.3" Geographic_Coordinate_Units: Degrees, minutes, and decimal seconds Distribution_Information: Distributor: Contact_Information: Contact_Organization_Primary: Contact_Organization: Keith and Associates Contact_Person: Michael Mossey Contact_Position: Project Surveyor Contact_Address: Address_Type: mailing and physical address Address: 301 East Atlantic Boulevard City: Pompano Beach State_or_Province: Florida Postal_Code: 33060-6643 Country: Broward Contact_Voice_Ťelephone: 954 788-3400 Contact_Facsimile_Telephone: 954 788-3500 Contact_Electronic_Mail_Address: mmossey@keith-associates.com Hours_of_Service: 8:00-5:00 est. Distribution_Liability: None Metadata_Reference_Information: Metadata_Date: 20080713 Metadata_Review_Date: 20050721 Metadata_Contact: Contact_Information: Contact_Person_Primary: Contact_Person: Michael M. Mossey, P. S. M. Contact_Organization: Keith and Associates Contact_Position: Project Surveyor Contact_Address: Address_Type: mailing and physical address Address: 301 East Atlantic Boulevard City: Pompano Beach State_or_Province: FL Postal_Code: 33060-6643 Country: USA Contact_Voi ce_Tel ephone: 954 788-3400 Contact_Facsi mi l e_Tel ephone: 954 788-3500 Contact_El ectroni c_Mai l_Address: mmossey@kei th-associ ates.com Hours_of_Servi ce: 8:00 am to 5:00 pm EST Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata Metadata_Standard_Version: 19940608

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	-47590	
	<u>╷╶╶╴</u> ╗╴╄╏┊┼╫╏┝┽╡╎╎╧┝┨╅┽┼┼┼┼┼╊╪╷┝┊┍┊┊┊┼┼┼┨╎╷╷┾┽┼┼┼┼┼	

Network Adjustment Report

Project : ACME FINAL

User name	mmossey	Date & Time	4:51:21 PM 6/20/2008
Coordinate System	US State Plane 1983	Zone	Florida East 0901
Project Datum	NAD 1983 (Conus)		
Vertical Datum		Geoid Model	sub0307(2)
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Adjustment Style Settings - 99% Confidence Limits

Residual Tolerances

To End Iterations: 0.000033sftFinal Convergence Cutoff: 0.016404sft

Covariance Display

Horizontal Propagated Linear Error [E] : U.S. Constant Term [C] : 0.00000000sft Scale on Linear Error [S] : 2.58

Three-DimensionalPropagated Linear Error [E] : U.S.Constant Term [C]: 0.00000000sftScale on Linear Error [S]: 2.58

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS Error in Height of Antenna : 0.000sft Centering Error : 0.000sft

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Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 1	.00
Chi Square Test (α =95%) : P	PASS
Degrees of Freedom : 0	.00
Sub-Network 1	
Statistics	
Reference Factor	: 1.00
Chi Square Test (α=95%)	: PASS
Degrees of Freedom	: 0.00
Sub-Network 2	
Statistics	
Reference Factor	: 1.00
Chi Square Test (α=95%)	: PASS
Degrees of Freedom	: 0.00
Sub-Network 3	
Statistics	
Reference Factor	: 1.00
Chi Square Test (α=95%)	: PASS
Degrees of Freedom	: 0.00
Sub-Network 4	
Statistics	

Reference Factor	: 1.00
Chi Square Test (α=95%)	: PASS
Degrees of Freedom	: 0.00

GPS Observation Statistics

Reference Factor: 1.00Redundancy Number (r) : 0.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B1	1.00	0.00
B2	1.00	0.00
B3	1.00	0.00
B4	1.00	0.00
B5	1.00	0.00
B6	1.00	0.00

Weighting Strategies

GPS Observations

Default Scalar Applied to All Observations

Scalar : 1.00

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Sub-Network 1 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2 Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98693610	836300.607sft	0.010sft	963490.754sft	0.020sft	N/A	N/A	
02283610	837191.233sft	0.010sft	906878.001sft	0.020sft	N/A	N/A	

Errors are reported using 2.58σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fi x
9869361 0	26°37'52.87322" N	0.010sf t	80°03'33.33773" W	0.020sf t	- 71.410sf t	0.061sf t	
0228361 0	26°38'05.43971" N	0.010sf t	80°13'57.09223" W	0.020sf t	- 66.794sf t	0.061sf t	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	∆Height	∆Geoid Separation
98693610	0.000sft	0.000sft	N/A	0.000sft	N/A
02283610	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 2 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 3 Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98690070	854350.678sft	0.006sft	896315.681sft	0.017sft	N/A	N/A	

02280070	837191.243sft	0.007sft	906877.927sft	0.019sft	N/A	N/A	
02280071	836300.616sft	0.012sft	963490.759sft	0.032sft	N/A	N/A	

Errors are reported using 2.58σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fi x
9869007 0	26°40'55.98799" N	0.006sf t	80°15'52.39497" W	0.017sf t	- 66.952sf t	0.035sf t	
0228007 0	26°38'05.43982" N	0.007sf t	80°13'57.09305" W	0.019sf t	- 67.146sf t	0.041sf t	
0228007 1	26°37'52.87332" N	0.012sf t	80°03'33.33768" W	0.032sf t	- 71.595sf t	0.066sf t	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	∆Height	∆Geoid Separation
98690070	0.000sft	0.000sft	N/A	0.000sft	N/A
02280070	0.000sft	0.000sft	N/A	0.000sft	N/A
02280071	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 3 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2 Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98690990	821038.280sft	0.003sft	894716.218sft	0.008sft	N/A	N/A	
02280990	837191.256sft	0.003sft	906877.950sft	0.008sft	N/A	N/A	

Errors are reported using 2.58σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fi x
9869099 0	26°35'26.17839" N	0.003sf t	80°16'12.12537" W	0.008sf t	- 59.780sf t	0.017sf t	
0228099 0	26°38'05.43995" N	0.003sf t	80°13'57.09280" W	0.008sf t	- 66.861sf t	0.017sf t	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	∆Elevation	∆Height	∆Geoid Separation
98690990	0.000sft	0.000sft	N/A	0.000sft	N/A
02280990	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 4 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 3 Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98691000	821038.278sft	0.004sft	894716.235sft	0.013sft	N/A	N/A	

02281000	854350.698sft	0.006sft	896315.718sft	0.017sft	N/A	N/A	
02281001	836300.603sft	0.008sft	963490.694sft	0.023sft	N/A	N/A	

Errors are reported using 2.58σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fi x
9869100 0	26°35'26.17836" N	0.004sf t	80°16'12.12518" W	0.013sf t	- 59.869sf t	0.027sf t	
0228100 0	26°40'55.98819" N	0.006sf t	80°15'52.39457" W	0.017sf t	- 66.803sf t	0.036sf t	
0228100 1	26°37'52.87319" N	0.008sf t	80°03'33.33840" W	0.023sf t	- 71.428sf t	0.048sf t	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	∆Height	∆Geoid Separation
98691000	0.000sft	0.000sft	N/A	0.000sft	N/A
02281000	0.000sft	0.000sft	N/A	0.000sft	N/A
02281001	0.000sft	0.000sft	N/A	0.000sft	N/A

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Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight
98693610	N/A	N/A	N/A	N/A
98690070	N/A	N/A	N/A	N/A
02280071	N/A	N/A	N/A	N/A
98690990	0.000sft	0.000sft	N/A	0.000sft

98691000	0.003sft	-0.017sft	N/A	0.089sft
02281000	N/A	N/A	N/A	N/A
02281001	N/A	N/A	N/A	N/A

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Adjusted Observations

Adjustment performed in WGS-84

GPS Observations

Number of Observations : 6 Number of Outliers : 4

Sub-Network 1

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residua l
B1	9869361 0	0228361 0	Az.	271°19'22.9057 "	0°00'00.0766 "	0°00'00.0000 "	0.00
			ΔHt	4.616sft	0.122sft	0.000sft	0.00
			Dist	56618.018sft	0.040sft	0.000sft	0.00

Sub-Network 2

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residua l
<u>B2</u>	9869007 0	0228007 0	Az.	148°42'58.3334 "	0°00'00.1477 "	0°00'00.0000 "	0.00
			ΔHt	-0.194sft	0.039sft	0.000sft	0.00

			•				
			Dist	20149.415sft	0.010sft	0.000sft	0.00
<u>B3</u>	9869007 0	0228007 1	Az.	105°22'12.6207 "	0°00'00.0583 "	0°00'00.0000 "	0.00
			ΔHt	-4.643sft	0.097sft	0.000sft	0.00
			Dist	69555.945sft	0.046sft	0.000sft	0.00

Sub-Network 3

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residua l
<u>B4</u> ◀	9869099 0	0228099 0	Az.	37°18'12.4413 "	0°00'00.1337 "	0°00'00.0000 "	0.00
			ΔHt	-7.081sft	0.034sft	0.000sft	0.00
			Dist	20219.257sft	0.011sft	0.000sft	0.00

Sub-Network 4

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residua l
<u>B6</u>	9869100 0	0228100 1	Az.	77°48'53.2591 "	0°00'00.0320 "	0°00'00.0000 "	0.00
			ΔHt	-11.559sft	0.069sft	0.000sft	0.00
			Dist	70445.698sft	0.034sft	0.000sft	0.00
B5	9869100 0	0228100 0	Az.	3°04'34.3242"	0°00'00.1164 "	0°00'00.0000 "	0.00

ΔHt	-6.934sft	0.041sft	0.000sft	0.00
Dist	33350.569sft	0.007sft	0.000sft	0.00

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Histograms of Standardized Residuals

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Point Error Ellipses						
98693610	02283610	98690070				

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Covariant Terms

Adjustment performed in WGS-84

From Point	To Point		Components	A-posteriori Error (2.58σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
98693610	02283610	Az.	271°19'22.9057"	0°00'00.0766"	1:1398238	1:1398238
		ΔHt.	4.616sft	0.122sft		
		ΔElev.	?	?		
		Dist.	56618.018sft	0.040sft		
98690070	02280070	Az.	148°42'58.3334"	0°00'00.1477"	1:2025576	1:2025576
		ΔHt.	-0.194sft	0.039sft		
		ΔElev.	?	?		
		Dist.	20149.415sft	0.010sft		
98690070	02280071	Az.	105°22'12.6207"	0°00'00.0583"	1:1504407	1:1504407
		ΔHt.	-4.643sft	0.097sft		
		ΔElev.	?	?		
		Dist.	69555.945sft	0.046sft		
98690990	02280990	Az.	37°18'12.4413"	0°00'00.1337"	1:1897820	1:1897820
		ΔHt.	-7.081sft	0.034sft		
		ΔElev.	?	?		
		Dist.	20219.257sft	0.011sft		
98691000	02281000	Az.	3°04'34.3242"	0°00'00.1164"	1:4547785	1:4547785
		ΔHt.	-6.934sft	0.041sft		
		ΔElev.	?	?		
		Dist.	33350.569sft	0.007sft		
98691000	02281001	Az.	77°48'53.2591"	0°00'00.0320"	1:2086709	1:2086709
		ΔHt.	-11.559sft	0.069sft		
		ΔElev.	?	?		
		Dist.	70445.698sft	0.034sft		

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Lower Zone Measure Point

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Upper Zone Measure Point