

DEGROVE

SURVEYORS, INC

**Surveyor's Report
For
8.5 SMA Additional Benchmarks
Control Survey
Dade County, Florida**

Survey 09-137

Prepared For:

U.S. Army Corps of Engineers, Jacksonville District

Jacksonville, Florida

Survey No. 09-137

Contract No. W912EP-05-D-0001

Prepared By:

Degrove Surveyors, Inc.

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Note: This report and digital files are not full and complete without the other and are not valid without the signature and original raised seal of a Florida Licensed Surveyor and Mapper.

Degrove Surveyors Inc. project No.: 2009091

Jacksonville District Survey No. : 09-137

Project Title: 8.5 SMA Additional Benchmarks Control Survey

Type of Survey: Control and Topographic Survey

Location: Dade County, Florida

Date of Field Survey: September 28, 2009 through October 2, 2009

Date of Report: October 21, 2009

Report:

The purpose of this survey was to set 5 new control points, verify existing project control and obtain elevations of well Reference and Measuring points and determine coordinate values for existing project control and for the 5 new control points.

Scope of Survey:

Set 5 new control points near the existing monitoring wells, Las Palmas DC1, G2, G3, G7, and G8. Perform a Digital Level Run through all existing and new project control points. Perform a Static GPS survey on all existing and new project control points. Locate the Monitoring Well Platform at Las Palmas DC1. Compute coordinates for all points in NAD 83(07), the 5 new control points in NAD 83(90), compute elevations for all points in NAVD 88 and NGVD 29.

Control:

The following Horizontal and Vertical Control Points were used:

Control Point PID	X(Feet) NAD83(07)	Y(Feet) NAD83(07)	X(Feet) NAD83(90)	Y(Feet) NAD83(90)	Elevation NAVD 88 (feet)	Elevation NGVD29 (feet)
MIAMI HOMESTEAD	424603.041	804549.335				
MIAMI RICHMOND	465790.414	859175.158				
ZMA1	542523.434	880114.715				
AC3931 Krome			474644.38	821718.90	13.350	14.90
AJ8378 W 503			482392.49	821502.69	6.555	8.11
AJ8384 A 504					9.921	
AJ8383 Z 503					9.780	
AJ8382 PR 32					10.561	
AJ7772 Krome RM2					13.478	
FCE4292						8.38
FCE4291						8.36
SNAKE 27						14.18
FCE3682						15.33
FCE4359			474220.54	805961.51		
FCE4895			456889.63	811569.93		

The horizontal coordinates are referenced to the State Plane Coordinate System, Florida East Zone, U.S. Survey Feet, datum as indicated. The Elevations on NGVD 1929 are as provided by ACOE.

Instrumentation Used:

Trimble 5800, 4000, & 4800 GPS Units and Leica Digital Level NA2002 and NA 3003.

Methodology:

Topographic Survey

- 1) Five new control points were set using stainless steel rods driven to refusal.
- 2) Digital level runs were run through all existing undisturbed and new control points tied to NGS benchmarks.
- 3) Static GPS Sessions were performed on all new and existing control points.
- 4) All base lines were processed in Trimble Geomatics Office (TGO).
- 5) An adjustment was performed with TGO using only CORS stations as control to establish coordinates in NAD 83(07).
- 6) An adjustment was performed with TGO using W503, Krome, FCE4359, and FCE4895 to establish coordinates in the existing datum, NAD 83(90).
- 7) The vertical adjustment was performed with StarLev to determine elevations in both NGVD 29 and NAVD 88.
- 8) Monitoring well platform was located utilizing RTK GPS.
- 9) A spreadsheet was created displaying the results.

Deliverables:

Spreadsheet
Surveyor's Report
Metadata
Raw Data
Adjustment reports

FIELD BOOKS

=====
FB 09-137-1.pdf
FB 09-137-2.pdf

META

=====
09-137.gen
09-137.met

SURVEY REPORT

=====
REPORT OF SURVEY 09-137.DOC
09-137 8.5 SQ MILE BENCHMARK SPREADSHEET.xlsx

Certification:

I Certify that this survey meets the requirements of the Minimum Technical Standards pursuant to Chapter 61G17-6, F.A.C.

Randy L. Tompkins, P.S.M. #6503
L.B. #4603

THE COORDINATE SYSTEM IS FLORIDA STATE PLANE EAST,
 ZONE 901, U.S. SURVEY FEET. ELEVATIONS ARE AS INDICATED.

	NAD83(90)	NAD83(90)	NAD83(07)	NAD83(07)	NAVD 88	NGVD 29
STATION	NORTHING	EASTING	NORTHING	EASTING	ELEVATION	ELEVATION
FCE3682	482470.815	821450.464	482470.963	821450.435	13.766	15.33
FCE4278					Disturbed	Disturbed
FCE4285					Destroyed	Destroyed
FCE4291	463700.575	809380.537	463700.729	809380.509	6.803	8.36
FCE4292	463740.441	814656.178	463740.597	814656.150	6.827	8.38
FCE4359	474220.540	805961.510	474220.696	805961.477	5.389	6.951
FCE4520	464817.162	817725.734	464817.317	817725.707	10.062	11.57
FCE4524	466586.355	819439.442	466586.506	819439.412	6.562	8.1
FCE4886	479642.309	821557.860	479642.458	821557.830	13.68	15.239
FCE4888					Disturbed	Disturbed
FCE4890					Destroyed	Destroyed
FCE4893					Disturbed	Disturbed
FCE4894					Destroyed	Destroyed
FCE4895	456889.630	811569.930	456889.746	811569.890	9.518	11.065
FCE4896	459961.718	812953.674	459961.871	812953.647	9.733	11.285
HARRY					Destroyed	Destroyed
KROME	474644.380	821718.900	474644.568	821718.890	13.35	14.9
SNAKE	474370.685	821756.971	474370.833	821756.941	12.615	14.18
W503	482392.490	821502.690	482392.647	821502.677	6.555	8.11
Y503	469239.237	821873.254	469239.382	821873.224	12.697	14.27
FCE5109	458842.461	809247.610	458842.594	809247.582	10.675	12.225
FCE5110	463731.770	808614.229	463731.910	808614.193	5.884	7.441
FCE5111	464004.779	804740.607	464004.913	804740.578	5.312	6.87
FCE5112	478009.003	818079.579	478009.149	818079.552	5.495	7.058
FCE5113	477749.140	821518.284	477749.286	821518.262	5.541	7.097
MIAMI HOMESTEAD			424603.041	804549.335		NGS/DOT CORS
MIAMI RICHMOND			465790.414	859175.158		NGS/DOT CORS
ZMA1			542523.434	880114.715		NGS CORS

POINT	NORTHING	EASTING	ELEVATION	
			N.G.V.D. 1929	STATION
1	482470.80	821450.45	15.33	FCE 3682
2	474313.63	818900.60	7.72	FCE 4278
3	484835.56	816526.28	6.95	FCE 4285
4	463700.54	809380.54	8.36	FCE 4291
5	463740.46	814656.17	8.38	FCE 4292
6	474220.54	805961.51	6.84	FCE 4359
7	464817.10	817725.76	11.57	FCE 4520
8	466586.35	819439.43	8.10	FCE 4524
9	479642.26	821557.84	15.15	FCE 4886
10	479539.32	814075.16	6.19	FCE 4888
11	469042.38	817129.33	8.68	FCE 4890
12	468953.90	807209.29	7.12	FCE 4893
13	474288.88	811635.30	7.79	FCE 4894
14	456889.63	811569.93	11.00	FCE 4895
15	459961.73	812953.67	11.21	FCE 4896
16	474229.12	806360.19	7.10	HARRY
17	474644.38	821718.90	14.90	KROME
18	474370.67	821756.94	14.18	SNAKE 27
19	482392.49	821502.69	8.11	W 503
20	469239.22	821873.24	14.27	Y 503

ELEVATIONS ARE N.A.V.D. 1988, U.S. SURVEY FEET.

WELL	REFERENCE POINT	MEASURING POINT
LAS PALMAS DC1	5.526	13.516
LAS PALMAS G2	5.506	8.279
LAS PALMAS G3	5.453	8.417
LAS PALMAS G7	6.638	9.242
LAS PALMAS G8	6.606	9.248

***NOTE: ALL REFERENCE POINTS ARE FOUND "X"
CUT IN CONCRETE BASE OF RESPECTIVE MONITORING WELL**

***NOTE: ALL MEASURING POINTS ARE TOP OF RESPECTIVE
WELL CASING AT FOUND PERMANENT MARKER MARK**

ELEVATIONS ARE N.G.V.D. 1929, U.S. SURVEY FEET.

WELL	REFERENCE POINT	MEASURING POINT
LAS PALMAS DC1	7.075	15.065
LAS PALMAS G2	7.064	9.836
LAS PALMAS G3	7.011	9.975
LAS PALMAS G7	8.201	10.806
LAS PALMAS G8	8.162	10.804

***NOTE: ALL REFERENCE POINTS ARE FOUND "X"
CUT IN CONCRETE BASE OF RESPECTIVE MONITORING WELL**

***NOTE: ALL MEASURING POINTS ARE TOP OF RESPECTIVE
WELL CASING AT FOUND PERMANENT MARKER MARK**

differences from Survey minus Corps Provided Project Control

STATION	NAD83(90) dN	NAD83(90) dE	NGVD29 dZ
FCE 3682	0.015	0.014	0.000
FCE 4278			
FCE 4285			
FCE 4291	0.035	-0.003	0.000
FCE 4292	-0.019	0.008	0.000
FCE 4359	0.000	0.000	0.111
FCE 4520	0.062	-0.026	0.000
FCE 4524	0.005	0.012	0.000
FCE 4886	0.049	0.020	0.089
FCE 4888			
FCE 4890			
FCE 4893			
FCE 4894			
FCE 4895	0.000	0.000	0.065
FCE 4896	-0.012	0.004	0.075
HARRY			
KROME	0.000	0.000	0.000
SNAKE 27	0.015	0.031	0.000
W 503	0.000	0.000	0.000
Y 503	0.017	0.014	0.000

STATE	COUNTY	TYPE OF MARK	STATION	STAMPING
Florida	DADE	B	FCE5109	FCE5109
SURVEY NUMBER (XX-XXX)		AGENCY	ELEVATION <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	VERTICAL DATUM
09-137		USACE	10.675	NAVD88
LATITUDE (dd mm ss.sssss)		LONGITUDE (ddd mm ss.sssss)	HORIZONTAL ORDER	HORIZONTAL DATUM
25°35'42.78627"		080°32'07.84710"	Third	NAD83(2007)
CONVERGENCE ANGLE <input type="checkbox"/> (-) <input checked="" type="checkbox"/> (+) Choose One		SCALE FACTOR	COMBINED SCALE FACTOR	AE FIRM
00°12'02.04805"		0.999968049	0.999971400	DEGROVE
<input checked="" type="checkbox"/> (X) <input type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)		<input type="checkbox"/> (X) <input checked="" type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID AND ZONE	DATE SET (yyyy-mm-dd)
809247.582		458842.594	0901 FL-EAST	2009-10-06

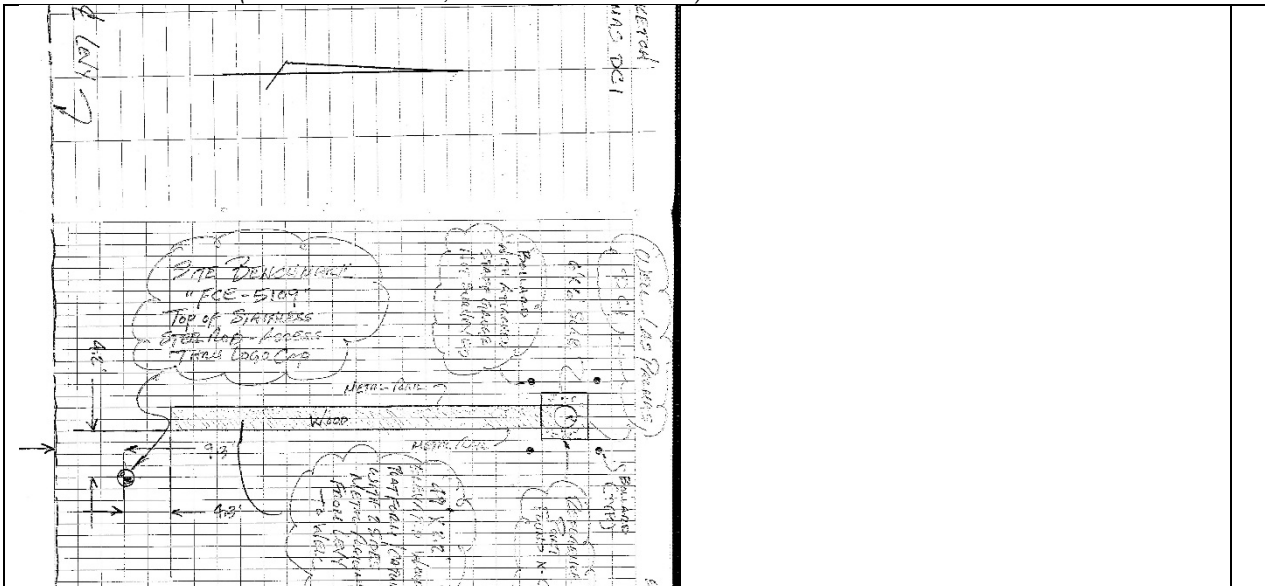
REFERENCE OBJECTS	<input type="checkbox"/> AZ. BACK DIREC. <input type="checkbox"/> (GEOD) <input type="checkbox"/> (GRID) <input type="checkbox"/> (MAG)	BACK AZ	GEOD. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)

DESCRIPTION

POINT SET ON THE SOUTH LEVEE OF THE 8.5 SQ MILE STA BETWEEN THE 2 CONCRETE WEIRS

DESCRIPTION RECORDED BY	PROJECT	DATE DESCRIBED (yyyy-mm-dd)	FIELDBOOK
RLT	09-137	2009-10-22	09-137-1

SKETCH/PHOTOGRAPH (INSERT FROM FILE, SCANNER OR CAMERA)



STATE	COUNTY	TYPE OF MARK	STATION	STAMPING
Florida	DADE	B	FCE5110	FCE5110
SURVEY NUMBER (XX-XXX)		AGENCY	ELEVATION <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	VERTICAL DATUM
09-137		USACE	5.884	NAVD88
LATITUDE (dd mm ss.sssss)		LONGITUDE (ddd mm ss.sssss)	HORIZONTAL ORDER	HORIZONTAL DATUM
25°36'31.23758"		080°32'14.57930"	Third	NAD83(2007)
CONVERGENCE ANGLE <input type="checkbox"/> (-) <input checked="" type="checkbox"/> (+) Choose One		SCALE FACTOR	COMBINED SCALE FACTOR	AE FIRM
00°12'00.00000"		0.999967827	0.999971410	DEGROVE
<input checked="" type="checkbox"/> (X) <input type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)		<input type="checkbox"/> (X) <input checked="" type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID AND ZONE	DATE SET (yyyy-mm-dd)
808614.193		463731.910	0901 FL-EAST	2009-10-06

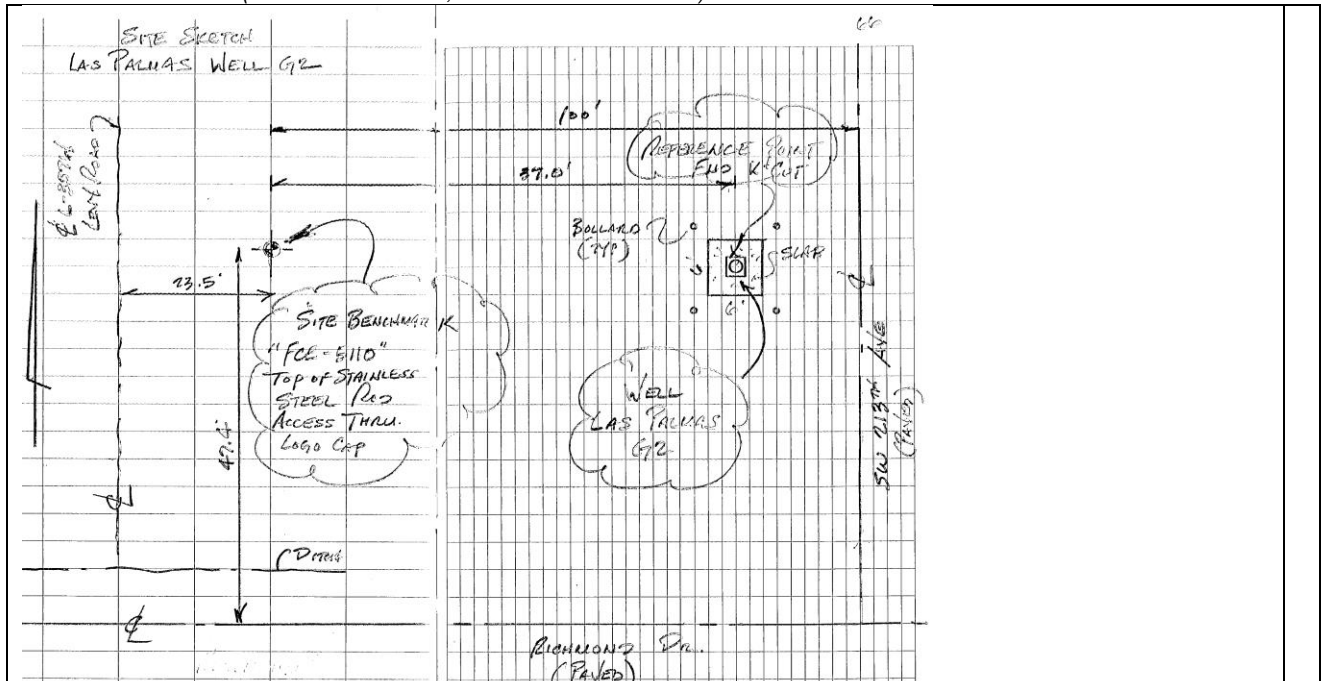
REFERENCE OBJECTS	<input type="checkbox"/> AZ. BACK DIREC. <input type="checkbox"/> (GEOD) <input type="checkbox"/> (GRID) <input type="checkbox"/> (MAG)	BACK AZ	GEOD. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)

DESCRIPTION

POINT SET IN THE NORTH WEST INTERSECTION OF RICHMOND DRIVE AND SW 213TH AVE, WITHIN THE 8.5 SQ MILE PROJECT

DESCRIPTION RECORDED BY	PROJECT	DATE DESCRIBED (yyyy-mm-dd)	FIELDBOOK
RLT	09-137	2009-10-22	09-137-1

SKETCH/PHOTOGRAPH (INSERT FROM FILE, SCANNER OR CAMERA)



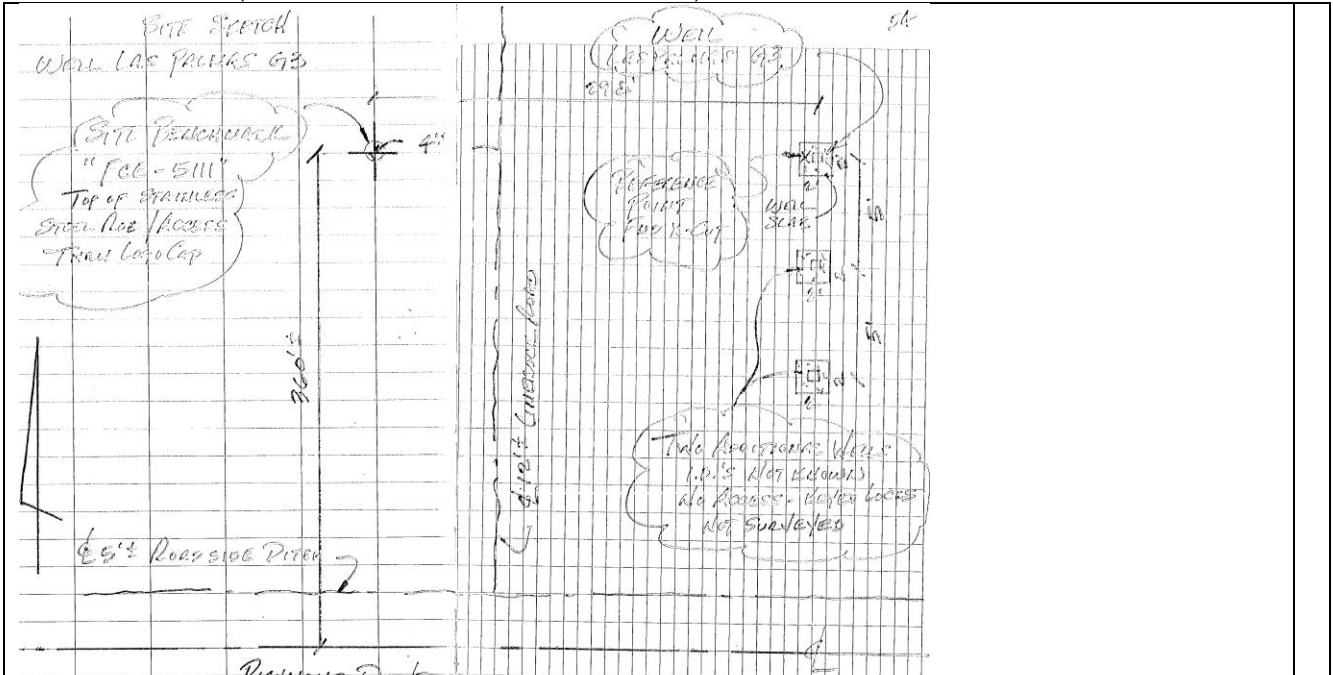
STATE	COUNTY	TYPE OF MARK	STATION	STAMPING
Florida	DADE	B	FCE5111	FCE5111
SURVEY NUMBER (XX-XXX)		AGENCY	ELEVATION <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	VERTICAL DATUM
09-137		USACE	5.312	NAVD88
LATITUDE (dd mm ss.sssss)		LONGITUDE (ddd mm ss.sssss)	HORIZONTAL ORDER	HORIZONTAL DATUM
25°36'34.07392"		080°32'56.88560"	Third	NAD83(2007)
CONVERGENCE ANGLE <input type="checkbox"/> (-) <input checked="" type="checkbox"/> (+) Choose One		SCALE FACTOR	COMBINED SCALE FACTOR	AE FIRM
00°11'42.00000"		0.999966490	0.999970090	DEGROVE
<input checked="" type="checkbox"/> (X) <input type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)		<input type="checkbox"/> (X) <input checked="" type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID AND ZONE	DATE SET (yyyy-mm-dd)
804740.578		464004.913	0901 FL-EAST	2009-10-06
REFERENCE OBJECTS	<input type="checkbox"/> AZ. BACK DIREC. <input type="checkbox"/> (GEOD) <input type="checkbox"/> (GRID) <input type="checkbox"/> (MAG)	BACK AZ	GEOD. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)

DESCRIPTION

POINT SET IN THE NORTH SIDE OF RICHMOND DRIVE TO THE WEST OF WELL LAS PALMAS G3 AND ACROSS A LIMEROCK ROAD FROM SAID WELL,
WITHIN THE 8.5 SQ MILE PROJECT

DESCRIPTION RECORDED BY	PROJECT	DATE DESCRIBED (yyyy-mm-dd)	FIELDBOOK
RLT	09-137	2009-10-22	09-137-1

SKETCH/PHOTOGRAPH (INSERT FROM FILE, SCANNER OR CAMERA)



STATE	COUNTY	TYPE OF MARK	STATION	STAMPING
Florida	DADE	B	FCE5112	FCE5112
SURVEY NUMBER (XX-XXX)		AGENCY	ELEVATION <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	VERTICAL DATUM
09-137		USACE	5.495	NAVD88
LATITUDE (dd mm ss.sssss)		LONGITUDE (ddd mm ss.sssss)	HORIZONTAL ORDER	HORIZONTAL DATUM
25°38'52.31721"		080°30'30.59873"	Third	NAD83(2007)
CONVERGENCE ANGLE <input type="checkbox"/> (-) <input checked="" type="checkbox"/> (+) Choose One		SCALE FACTOR	COMBINED SCALE FACTOR	AE FIRM
00°12'46.00000"		0.999971239	0.999974860	DEGROVE
<input checked="" type="checkbox"/> (X) <input type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)		<input type="checkbox"/> (X) <input checked="" type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID AND ZONE	DATE SET (yyyy-mm-dd)
818079.552		478009.149	0901 FL-EAST	2009-10-06
REFERENCE OBJECTS	<input type="checkbox"/> AZ. BACK DIREC. <input type="checkbox"/> (GEOD) <input type="checkbox"/> (GRID) <input type="checkbox"/> (MAG)	BACK AZ	GEOD. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)

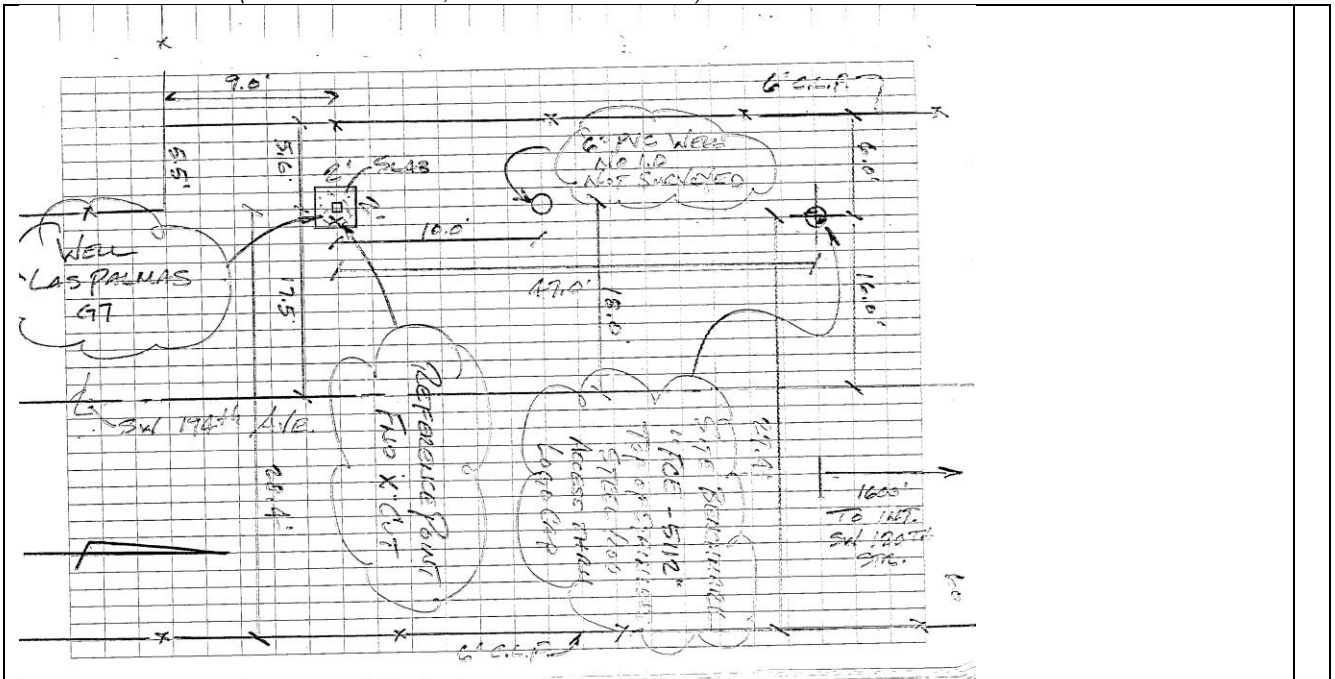
DESCRIPTION

POINT SET IN THE NORTH SIDE OF RICHMOND DRIVE TO THE WEST OF WELL LAS PALMAS G3 AND ACROSS A LIMEROCK ROAD FROM SAID WELL,

WITHIN THE 8.5 SQ MILE PROJECT

DESCRIPTION RECORDED BY	PROJECT	DATE DESCRIBED (yyyy-mm-dd)	FIELDBOOK
RLT	09-137	2009-10-22	09-137-1

SKETCH/PHOTOGRAPH (INSERT FROM FILE, SCANNER OR CAMERA)



STATE	COUNTY	TYPE OF MARK	STATION	STAMPING
Florida	DADE	B	FCE5113	FCE5113
SURVEY NUMBER (XX-XXX)		AGENCY	ELEVATION <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	VERTICAL DATUM
09-137		USACE	5.541	NAVD88
LATITUDE (dd mm ss.sssss)		LONGITUDE (ddd mm ss.sssss)	HORIZONTAL ORDER	HORIZONTAL DATUM
25°38'49.61545"		080°29'53.03204"	Third	NAD83(2007)
CONVERGENCE ANGLE <input type="checkbox"/> (-) <input checked="" type="checkbox"/> (+) Choose One		SCALE FACTOR	COMBINED SCALE FACTOR	AE FIRM
00°13'02.00000"		0.999972530	0.999976130	DEGROVE
<input checked="" type="checkbox"/> (X) <input type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)		<input type="checkbox"/> (X) <input checked="" type="checkbox"/> (Y) <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID AND ZONE	DATE SET (yyyy-mm-dd)
821518.262		477749.286	0901 FL-EAST	2009-10-06

REFERENCE OBJECTS	<input type="checkbox"/> AZ. BACK DIREC. <input type="checkbox"/> (GEOD) <input type="checkbox"/> (GRID) <input type="checkbox"/> (MAG)	BACK AZ	GEOD. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)	GRID. DIST. <input checked="" type="checkbox"/> (FT) <input type="checkbox"/> (M)

DESCRIPTION

POINT SET IN THE WEST SIDE OF THE WEST L31 LEVEE ROAD, +/- 4100' NORTH OF 136TH STREET (A.K.A. HOWARD DRIVE) WITHIN THE 8.5 SQ MILE PROJECT

DESCRIPTION RECORDED BY	PROJECT	DATE DESCRIBED (yyyy-mm-dd)	FIELDBOOK
RLT	09-137	2009-10-22	09-137-1

SKETCH/PHOTOGRAPH (INSERT FROM FILE, SCANNER OR CAMERA)

