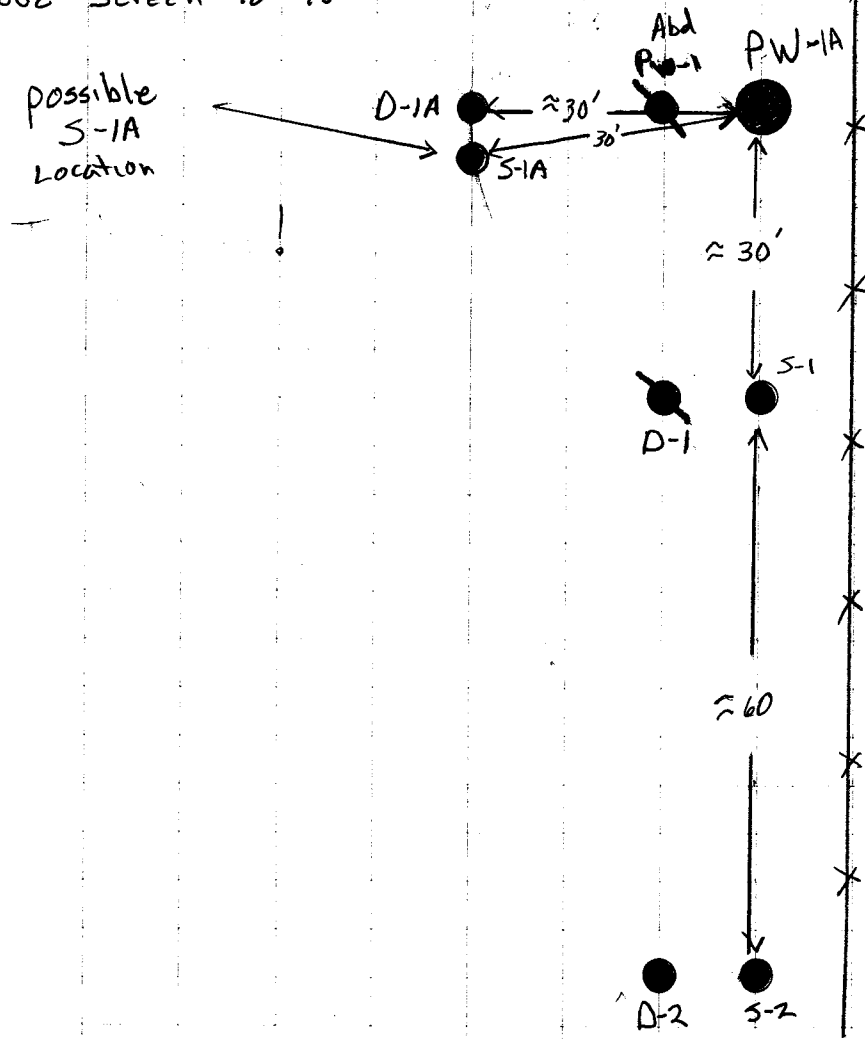


Morikami Park



- TW - Drilled with mud to 186', hole collapsed w/ 75' pipe in hole. abd.
- PW-1 - Cased to 100', open hole to 115', abd + cemented to surface
- PW-1A - Cased to 116', Drilled with air to 200'
Open hole to 200', collapsed to 185'
- S-1 - 2" pvc screen 40'-45'
- D-1 - mud drilled to 140', hole collapsed @ 15' abandoned.
- D-2 - 6" casing to ~85', air drilled from 115'-123'
2" screen 113'-123', cement from 110'-80(?)
hole plug to surface
- S-2 - 2' pvc screen 40'-45'
- D-1A - 6" csg to 113', air drilled to 157'
2" screen 140'-150', gravel packed
up into casing. cemented to surface
- S-1A - 2' pvc screen 40'-45'



Mary Jo Shine,

The following is the sad saga of Morikami park.

2/10/87 began drilling the first deep monitor well closest to the production well. TD 140' then lost the hole. No drill pipe was lost but 10+ bags of mud went into the formation! You may have to pump the production + observation wells for awhile to clean out all the mud.

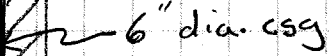
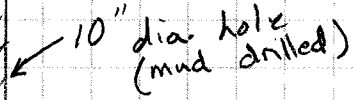
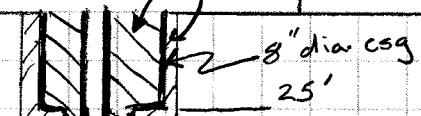
2/11/87 Regroup! The only guaranteed way to install the monitor wells is to case 6" to 110', drill out the bottom to 155', then set a 2" screen from 145'-155' and seal the formation above with an expandable clay plug (see diagram) Marty and Tony concud.

I called Larry "X" and filled him in on what is going on. He requested we have our equipment removed and the site dressed up by Friday the 20th in preparation for the Festival to be held at the park on the 21 + 22. Marty is aware of this, and he said to remind him and he would have all pits + holes filled in and the site raked.

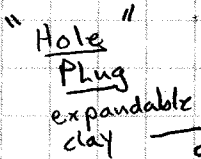
OVER ↓ ↓

Morikami Park
Deep Observation
Well

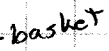
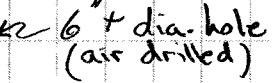
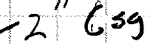
Sand



110'



LS



145'



155'



MEMORANDUM

TO: Mary-Jo Shine
FROM: Don Padgett
DATE: March 2, 1987
SUBJECT: Morikami Park Drilling Update (the saga continues!)

The Morikami Festival held February 21-22 was unaffected by the drilling activities of the South Florida Water Management District. Site restoration looked good and did not appear to cause any major parking problems even though parking spaces were limited on Sunday afternoon. Sacrifices were made at the festival in order to appease the drilling gods.

Drilling at the Morikami park site did not commence until Thursday, February 26. Monday, February 23 found the drilling crew dismantling the pump test site in Hendry County. Funeral services for Pete Dauenhauer's mother and modifications of the Kelly kept the drilling crew occupied the rest of the week.

On Thursday, deep monitor well two was deepened by drilling a 5 7/8" diameter hole to a depth of 123 feet. This final depth was slightly deeper than originally proposed in order to expose a fresh section of the formation. (The hole had previously been drilled to approximately 115 feet.)

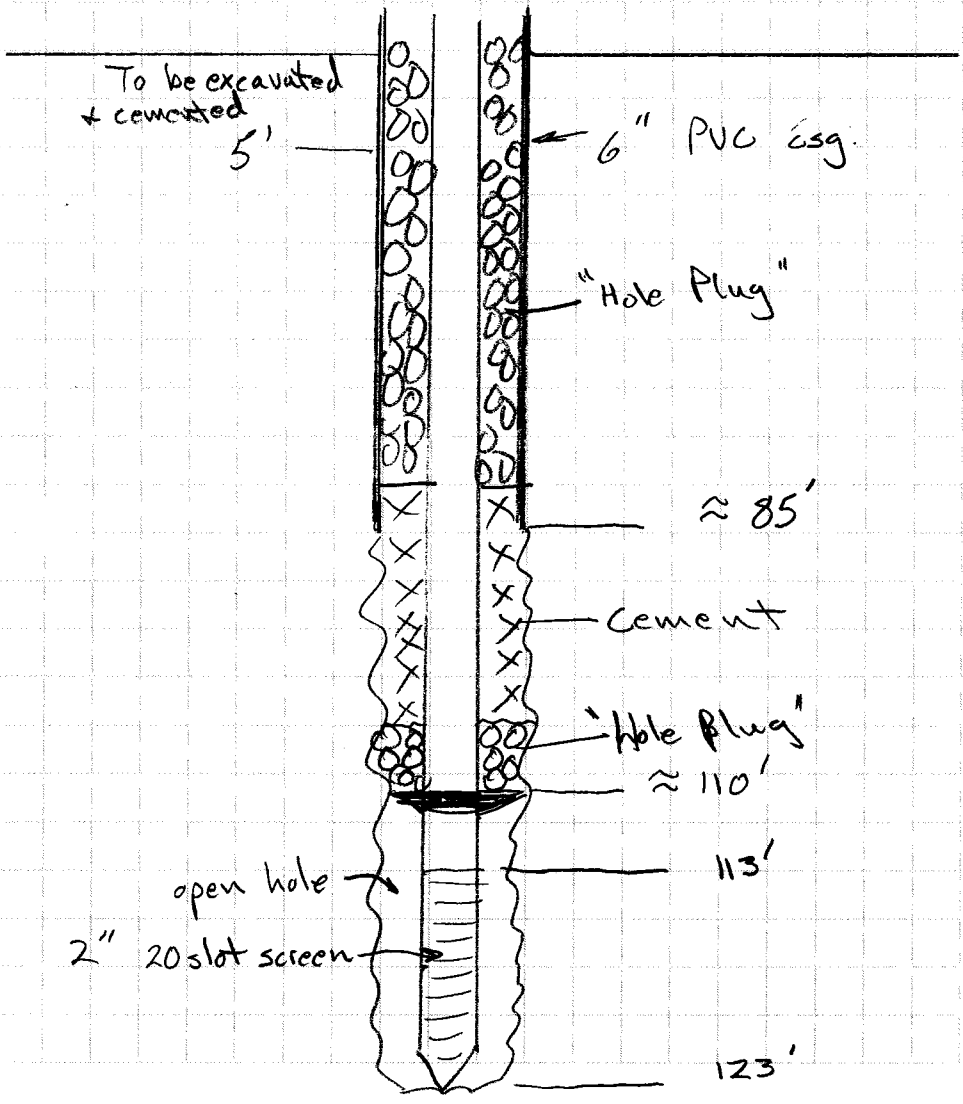
After the hole was completed a 2" X 10' section of 20 slot PVC screen was set from 113' to 123'. A rubber packer was set at approximately 110' on a string of 2" PVC tubing which extended to the surface.

One bag of "Hole Plug" was dumped down the hole on top of the packer and was allowed to sit for 25 minutes. Afterward, 40 gallons of cement were pumped down the annulus, cementing the 2" PVC pipe to the formation and up into the previously installed 6" PVC casing. The cement was allowed to cure for several hours, and the rest of the annulus was filled to the surface with "Hole Plug".

Marty Braun and myself are in agreement in that the upper 5+ feet of the annulus should be excavated and cemented to the surface to better stabilize the 2" pipe. I do not know if he has discussed this with the drilling crew.

The rig has been set up over the location for deep monitor well #1 which I placed 30 feet west of the production well. The drilling crew is currently digging a new mud pit, and I believe they intend to set the casing for this well on Tuesday, March 3.

Deep monitoring well
Morikami Park

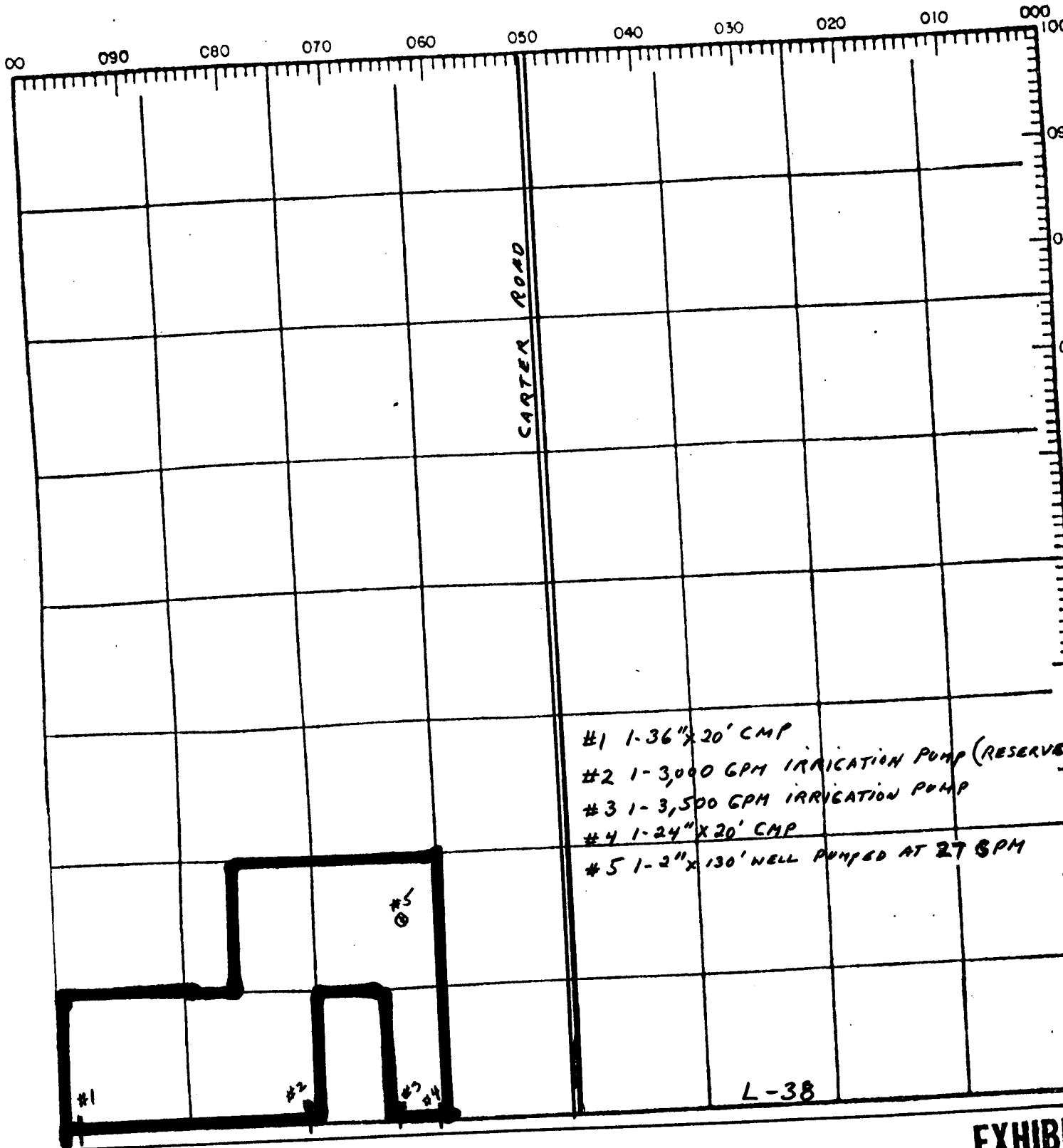


Univ of Fla.

50-00960 Morikami Farm

COUNTY OF PALM BEACH

SEC. 27; TWP. 46 S; RGE. 42 E



EXHIBIT

main drain 11/10/77

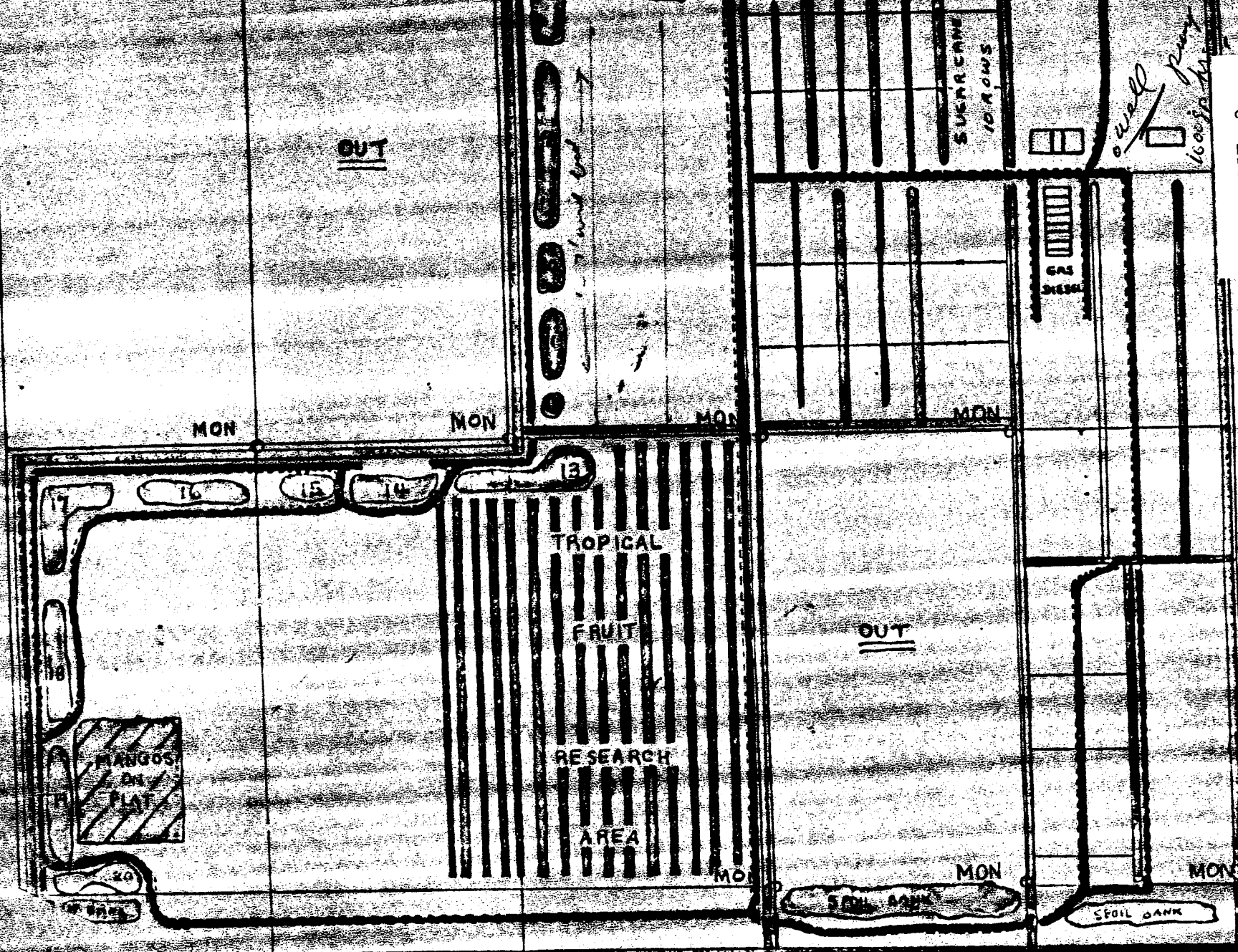


EXHIBIT 3

Old mill west of Carley Park
Canal

Culvert

4 DRAINAGE DISTRICT

Scale: 1" = 200'

Revised (Pump) 12" 3000 gpm

Redrawn by T.A. ZITTER

OCT 1977 3500 gpm

Culvert 150

MORIKAMI PARK SITE

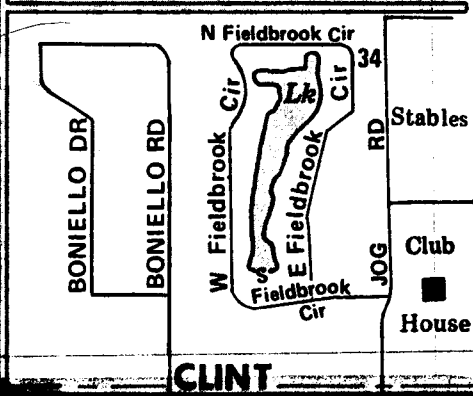
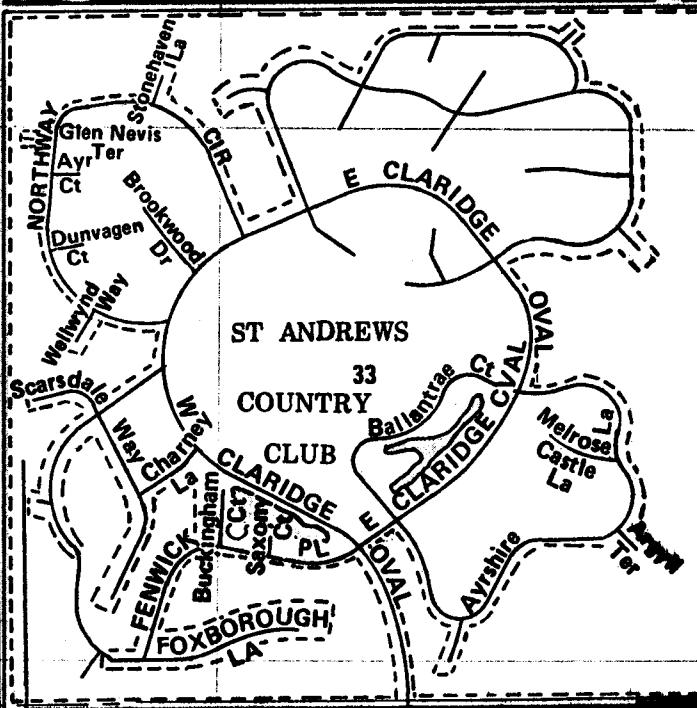
TURNPIKE

28

MORIKAMI PARK

Test Site → MORIKAMI PARK RD
SW 167 PL

Museum and Gardens



FLORIDA'S

SAUNDERS RD

RD



MORIKAMI PARK SITE

354

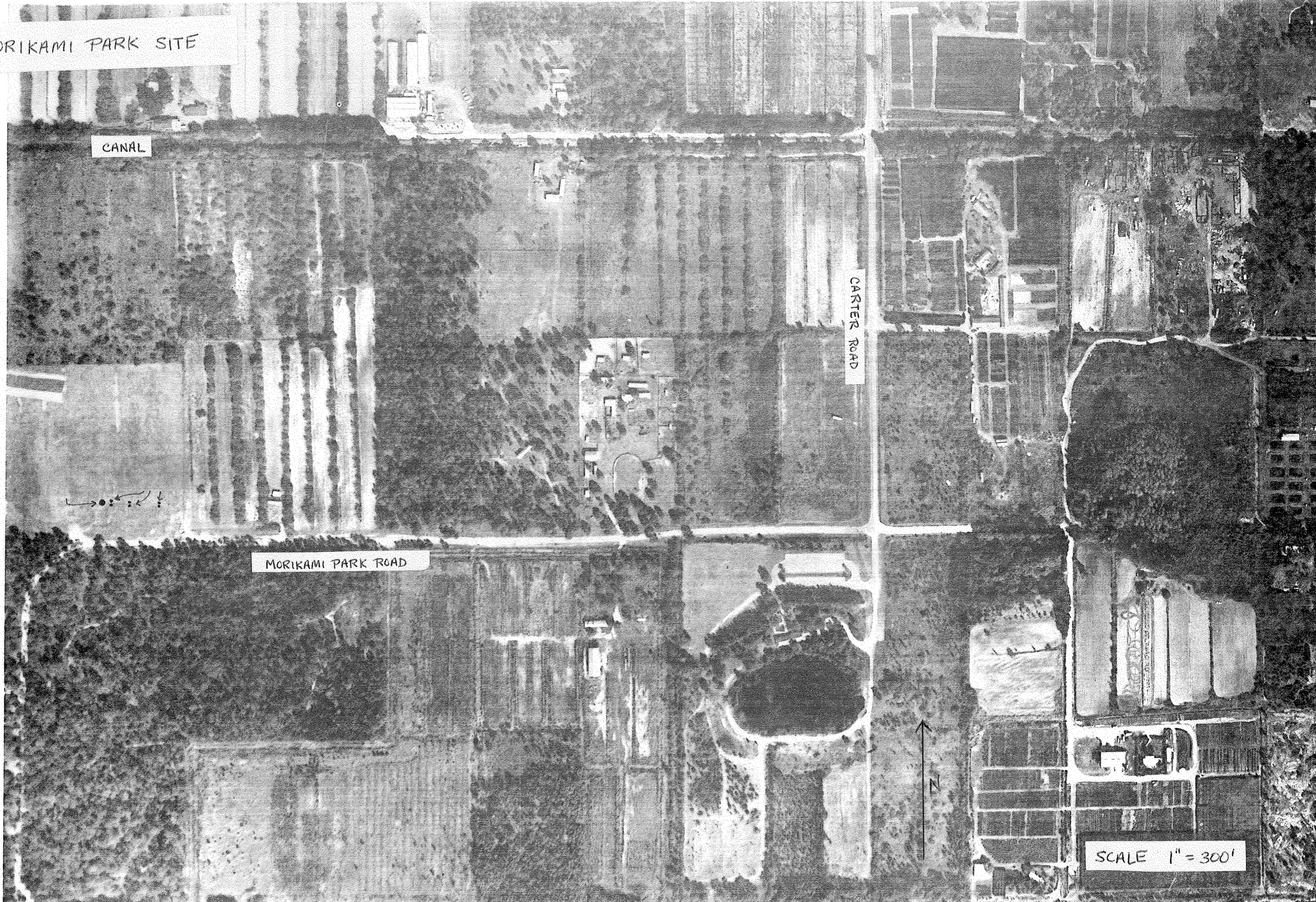
CANAL

CARTER ROAD

MORIKAMI PARK ROAD

N

SCALE 1" = 300'



CANAL

MORIKAMI PARK SITE



WELL M-1

WELL PW



SCALE 1" = 900'

✓

LEVELS TO ESTABLISH ELEVATIONS ON PVC GROUND WATER MONITORING WELLS LOCATED @ MORIKAMI PARK INSIDE THE EAST BOUNDARY OF PARK AND JUST NORTH OF MAIN ENTRANCE GATE TO PALM BEACH Co. MORIKAMI PARK, MUSEUM AND GARDENS

STA.	+	H.I.	-	ELEV.
B.M.				20.90
	3.92	24.82		
	3.35			
T.B.M.			5.10	19.72
			2.17	
T.B.M.			5.27	19.55
			2.00	
T.B.M.			5.33	19.49
			1.94	
T.B.M.			5.48	19.34
			1.79	
T.B.M.			5.06	19.76
			2.21	
T.B.M.			5.35	19.47
			1.92	
T.B.M.			5.12	19.70
			3.15	

5-20-87

✓ CHARLTON
 T GRAHAM
 ♀ SWANSON
 ♀ MORRIS

← BENCH MARK "MORIKAMI-2" WHICH IS A LARGE SPIKE W/S.F.W.M.D. AS PER PG. 24

TOP OF 2" PVC GROUND WATER MONITORING WELL "S-3"

TOP OF 2" PVC GROUND WATER MONITORING WELL "S-2"

TOP OF 2" PVC GROUND WATER MONITORING WELL "D-2"

TOP OF 2" PVC GROUND WATER MONITORING WELL "S-1"

TOP OF 6" PVC GROUND WATER MONITORING WELL "PW-1A"

TOP OF 2" PVC GROUND WATER MONITORING WELL "D-1A"

TOP OF 2" PVC GROUND WATER MONITORING WELL "S-1A"

v

STA.	+	H.I.	-	ELEV.
		24.82		
TP			5.62 1.65	19.20
	5.14 2.13	24.34		
TP			4.66 2.61	19.68
	3.99 3.28	23.67		
TP			4.15 3.12	19.52
	4.61 2.66	24.13		
TP			4.38 2.89	19.75
	4.06 3.21	23.81		
T.B.M.			4.77 2.50	19.04
	4.68 2.59	23.72		
TP			3.97 3.30	19.75
	4.52 2.75	24.27		

TOP OF 2" PVC GROUND WATER MONITORING WELL "M-1"
LOCATED NEAR THE N.W. CORNER OF MORIKAMI PARK

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT 3509 WELL NO. MP TW (i) DATE 12-10-86

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
T 1022	on site, ready to drill, sampling w/ #40 sieve
T 1024	Drilling 6" bit; sd to 7'; 7'-12' sd w/ small amt shell; 12'-20' Fe stained sd + shell
T 1040	KD @ 21'
T 1046	add DP #1, DS = 46'
T 1057	KD @ 41', lots of Fe stain sd 20'-30' slightly Fe stained sd 30'-40'
T 1101	add DP #2, DS = 66'
T 1110	KD @ 61', Fe stained sd 40'-50', sd 50'-60', org + clay layer < 1" thick @ 59'
T 1113	add DP #3, DS = 86'
T 1118	KD @ 81', '60'-70' sd w/ trace of clay + organics; 70'-80' sd w/ trace of clay + organics
T 1125	add DP #4, DS = 106'
T 1135	KD @ 101' 80'-95' sd, @ 95' hit sdy Limestone, Probably the "Turnpike aquifer"
T 1139	add DP #5, DS = 126' 100'-105' as above, Formation taking lots of fluid even w/ thick mud. taking samples w/ strainer. 107' bit chatter 109' increase rpm slw drilling Formation taking mud @ 118'
T 1155	KD @ 121'
T 1202	reworking 110'-120' w/ drillbit + building up mud wt + visc.
T 1209	add DP #6, DS = 146'
T 1220	Fm taking lots of fluid @ 125'-128'
T 1232	Lost circ @ 136'

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT 3509 WELL NO. MP TW(1) DATE 12-10-86

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
T 1240	Building up mud level + wt
T 1245	drilling @ 138', poor circulation
T 1249	KD @ 141', increasing circ pump rate after KD brings a surge in cuttings, probably to contaminate samples from 136'-138'
T 1254	add D.P. #7 DS=166'
T 1300	140'-145' formation taking fluid slowly
T 1304	stop drilling @ 145' to build up mud,
T 1330	KD @ 161', increase in P.R. @ 159'
T 1338	add DP #8, DS=186'
T 1347	lost circulation @ 173'
T 1355	Stop drilling to build mud up @ 176' formation still taking fluid too fast to drill continuously
T 1402	Formation has taken \approx 2 pits of mud, adding "Clear Mud" polymer
T 1405	regained circulation drilling
T 1409	KD @ 181' circulating
T 1428	add D.P. #9, DS=206'
T 1434	Lost circulation @ 184'
T 1435	built more mud, regained circulation + drilling
T 1438	Lost circulation @ 187'
T 1500	Have emptied mud pit + all reserve water and have not regained circulation Trying to get more water to mud pit by connecting second pump to monitor well
T 1510	drill string stuck, formation caving in
T 1525	Break off kelly, pulling on DS to remove from hole, ground around rig beginning to collapse
T 1557	Cutting off DS @ \approx 170' (pit level), removing

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT P.B.Co 3509 WELL NO. MP DMW1 DATE 2/10/87

DEPTH/Time	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
0900	Arrived @ Marikami Park. Attempted to contact park administrator Larry "??". Informed he would return 2/11/87
0940	Sat up complete, building mud M.W. = 8.45
	50 gal reserve of 8.7 lb/gal mud
1021	Drilling 6" hole in surface sands
1044	KD @ 20'
1055	add D.P. #1, DS = 46', D.P. #1 has 1" centralizer @ 120°, 240°, 360°. Rebuilding MW to 8.5 lb/gal
1058	Drilling @ 20', formation taking fluid @ 25'
1107	KD @ 40'
1111	add D.P. #2, Rebuilding MW to 8.5 lb/gal
1128	drilling @ 40'
1137	KD @ 60', building up MW.
1139	add D.P. #3, DS = 36'
1147	drilling @ 60'
1153	KD @ 80'
1157	add D.P. #4, DS = 106'; Build MW to 8.4 100 gal reserve
1220	Hit top of "turnpike aquifer" @ 95', Formation took >100 gal mud from 95'-100'
1225	KD @ 100'
1233	add D.P. #5, DS = 126', building MW 100 gal reserve
1301	drilling @ 100'
1308	Formation took >100 gal mud @ 105'. Begin Drilling w/ low circ rates to work cuttings into formation to restrict fluid loss.
1332	Lost circulation @ 118'

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT PB Co 3509 WELL NO. MP DMW 1 DATE 2/10/87

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
1354	KD @ 120, getting returns of fine sd and ground limestone. Formation has taken
	over 300 gallons of mud and water
1430	Add D.P. #6 DS = 146', 100 gal of 8.6 lb/gal mud in reserve.
1456	Loosing Circulation: @ 125' begin using "Quick Tool" for mud mix
1550	Drilling @ 132'. Formation has taken over 1200 gallons of mud and water.
	Bit chatter @ 132'
1601	Lost circ @ 135'
1614	3 cups of drilling polymer added into the drill stem. Slowing down fluid loss.
1625	TD @ 140' still losing fluid but slowly strings white globules in returns. Bentonite is flocculating out - getting returns from brown surface sands. Mud cake @ surface must be breaking down.
	Tony feels the hole. It will not stay open if we try for 140'
1650	coming out of hole after brief circulation.
1658	Last DP. (D.P. #1) is sticking in hole. Hole is collapsing @ 15'
1705	D.P. out of hole but 2" casing will not go in
1710	Abd. location

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT P.B.Co. 3509 WELL NO. MP PW #2 DATE / 86

DEPTH/Time	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
β	Well cased w/ 10" pvc to 116'
T 1010	drilling 6" hole w/ air drilled out cement plug. Sandy limestone. Well produces lots of water and lots of sand. 116-120'; very difficult interval to clean up.
T 1046	add D.P. #6; DS=146'
T 1109	Easy drilling 127'-188' lot of sand in returns, still in highly solutioned sandy limestone
T 1114	bit chatter @ 130'
T 1122	very soft @ 137'-139'
T 1129	KD @ 142' and circulating
T 1150	add D.P. #7, DS=166'
T 1154	Removing D.P. #7. Obstruction in hole @ ≈ 135'. Redrilling interval
T 1222	Hole caves + blocks off when circulation stops
T 1254	add DP #7 twisted D.S. around obstruction (base rock?) after redrilling the interval 5-6 times
T 1405	KD @ 162' circulating, redrilling 150'-162' to remove obstructions
T 1446	add D.P. #8, DS=186'
T 1550	KD @ 182'; Last 4 ft ¹⁷⁸ easily drilled. very high % of fine back sand.
T 1606	Add D.P. #9, 182'-185' drilled very fast w/ increase in back sand as above.
T 1624	Samples from 185'-190' have lots of fines from 180'-185' zone. Use rock as sample for 185'-190' interval since drilling was hard w/ bit chatter
T 1630	190'-193' very soft w/ lots of VF. sand. stop drilling to circulate + clean hole.
T D	195', well caved back in to ≈ 185'

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT 3509 WELL NO. MP TW(1) DATE 12-10-86

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
T 1022	on site, ready to drill, sampling w/ #40 sieve
T 1024	Drilling 6" bit; sd to 7'; 7'-12' sd w/ small amt shell; 12'-20' Fe stained sd + shell
T 1040	KD @ 21'
T 1046	add DP #1, DS = 46'
T 1057	KD @ 41', lots of Fe stain sd 20'-30' slightly Fe stained sd 30'-40'
T 1101	add DP #2, DS = 66'
T 1110	KD @ 61', Fe stained sd 40'-50' sd 50'-60', org + clay layer < 1" thick @ 59'
T 1113	add DP #3, DS = 86'
T 1118	KD @ 81', 60'-70' sd w/ trace of clay + organics; 70'-80' sd w/ trace of clay + organics
T 1125	add DP #4, DS = 106'
T 1135	KD @ 101', 80'-95' sd, @ 95' hit sdy Limestone, Probably the "Turnpike aquifer"
T 1139	add DP #5, DS = 126'
	100'-105' as above, Formation taking lots of fluid even w/ thick mud. taking samples w/ strainer.
	107' bit chatter
	109' increase rpm sbw drilling
	Formation taking mud @ 118'
T 1155	KD @ 121'
T 1202	reworking 110'-120' w/ drillbit + building up mud wt + visc
T 1209	add DP #6, DS = 146'
T 1220	Fm taking lots of fluid @ 125'-128'
T 1232	Lost circ @ 136'

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT 3509 WELL NO. MP TW(1) DATE 12-10-86

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
T 1240	Building up mud level + wt
T 1245	drilling @ 138', poor circulation
T 1249	KD @ 141', increasing circ pump rate after KD brings a surge in cuttings, probably contaminate contaminate samples from 136'-138'
T 1254	add D.P. #7 DS=166'
T 1300	140'-145' formation taking fluid slowly
T 1304	stop drilling @ 145' to build up mud.
T 1330	KD @ 161', increase in P.R. @ 159'
T 1338	add DP #8, DS=186'
T 1347	lost circulation @ 173'
	Stop drilling to build mud up
T 1355	@ 176' formation still taking fluid too fast to drill continuously
T 1402	Formation has taken \approx 2 pits of mud, adding "Clear Mud" polymer
T 1405	regained circulation drilling
T 1409	KD @ 181' circulating
T 1428	add D.P. #9, DS=206'
T 1434	Lost circulation @ 184'
T 1435	built more mud, regained circulation + drilling
T 1438	Lost circulation @ 187'
T 1500	Have emptied mud pit + all reserve water and have not regained circulation
	Trying to get more water to mud pit by connecting second pump to monitor well
T 1510	drill string stuck, formation caving in
T 1525	Break off kelly, pulling on DS to remove from hole, ground around rig beginning to collapse
T 1557	Cutting off DS @ \approx 170' (pit level), removing rig from location, abandoning DS + well

WELL DRILLER'S LOG

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT P.B. Co 3509 WELL NO. PW #1 DATE 86
Morikami Park

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
	10" Casin installed to ≈ 95 feet
	(only two feet below the top of the "Turnpike
	aquifer)
0925	Drilled out bottom of csg. (cement plug)
0950	Drilling w/ air @ 100'; lots of sand.
1010	Washed out a huge amount of sand
	@ 100' well abandoned.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT PB Co 3509 WELL NO. MP DMW 1 DATE 2/10/87

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
1354	KD @ 120, getting returns of fine sd and ground limestone. Formation has taken
	over 800 gallons of mud and water
1430	Add D.P. #6 DS = 146', 100 gal of 8.6 lb/gal
	mud in reserve.
1456	Loosing Circulation; @ 125' begin using
	"Quick Tool" for mud mix
1550	Drilling @ 132'. Formation has taken
	over 1200 gallons of mud and water.
	Bit chatter @ 132'
1601	Lost circ @ 135'
1614	3 cups of drilling polymer added into
	the drill stem. Slowing down fluid
	loss.
1625	TD @ 140' still losing fluid but slowly.
	stringy white globules in returns. Bentonite
	is flocculating out - getting returns
	from brown surface, sands. Mud cake
	@ surface must be breaking down.
	Tony feels the hole will not stay
	open if we try for 140'
1650	coming out of hole after brief
	circulation.
1658	Last D.P. (D.P. #1) is sticking in
	hole. Hole is collapsing @ 15'
1705	D.P. out of hole but 2" casing
	will not go in
1710	Abd. location

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT PBCo 3509 WELL NO. MP DMW1 DATE 2/10/87

DEPTH/Time	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
0900	Arrived @ Morikami Park. Attempted to contact park administrator Larry "??". I was informed he would return 2/11/87
0940	Set up complete, building mud M.W. = 8.45
	50 gal reserve of 8.7 lb/gal mud
1021	Drilling 6" hole in surface sands
1044	KD @ 20'
1055	add D.P. #1, DS = 46', D.P. #1 has 1" centralizer @ 120°, 240°, 360°. Rebuilding MW to 8.5 lb/gal
1058	Drilling @ 20', formation taking fluid @ 25'
1107	KD @ 40'
1111	add D.P. #2, Rebuilding MW to 8.5 lb/gal
1128	drilling @ 40'
1137	KD @ 60', building up MW.
1139	add D.P. #3, DS = 86'
1147	drilling @ 60'
1153	KD @ 80'
1157	add D.P. #4, DS = 106'; Build MW to 8.4 100 gal reserve
1220	Hit top of "turnpike aquifer" @ 95', Formation took >100 gal mud from 95'-100'
1225	KD @ 100'
1233	add D.P. #5, DS = 126', building MW 100 gal reserve
1301	drilling @ 100'
1308	Formation took >100 gal mud @ 105'. Begin Drilling w/ low circ rate to work cuttings into formation to restrict fluid loss.
1332	Lost circulation @ 118'

WELL DRILLER'S LOG

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT P.B. Co 3509 WELL NO. PW #1 DATE 86
Morikami Park

DEPTH	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
	10" Casin installed to ≈ 95 feet
	(only two feet below the top of the "turnpike
	aquifer)
0925	Drilled out bottom of csg. (cement plug)
0950	Drilling w/ air @ 100'; lots of sand!
1010	Washed out a huge amount of sand
	@ 100' well abandoned.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PROJECT P.B.C. 3509 WELL NO. MP. PW #2 DATE 1/86

DEPTH / Time	DESCRIPTION - ROCK TYPE, COLOR, HARDNESS, OTHER
β	Well cased w/ 10" pvc to 116'
T 1010	drilling 6" hole w/ air. drilled out Cement plug. Sandy limestone. Well produces lots of water and lots of sand. 116-120'; very difficult interval to clean up.
T 1046	add D.P. #6; DS = 146'
T 1109	Easy drilling 127'-188' lot of sand in returns, still in highly solutioned sandy limestone.
T 1114	bit chatter @ 130'
T 1122	very soft @ 137'-139'
T 1129	KD @ 142' and circulating
T 1150	add D.P. #7, DS = 166'
T 1154	Removing D.P. #7. Obstruction in hole @ ≈ 135'. Redrilling interval
T 1222	Hole caves + blocks off when circulation stops.
T 1254	add DP #7, twisted D.S. around obstruction (loose rock?) after redrilling the interval 5-6 times
T 1405	KD @ 162' circulating, redrilling 150'-162' to remove obstructions
T 1446	add D.P. #8, DS = 186'
T 1550	KD @ 182'; Last 4 ft easily drilled. very high % of fine back sand.
T 1606	Add D.P. #9, 182'-185' drilled very fast w/ increase in black sand as above.
T 1624	Samples from 185'-190' have lots of fines from 180'-185' zone. Use rock as sample for 185'-190' interval since drilling was hard w/ bit chatter
T 1630	190'-193' very soft w/ lots of U.F. sand. stop drilling to circulate + clean hole.
T D	195', well caved back in to ≈ 185'.

Morikami Park

D-1A ●

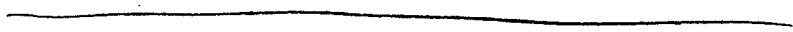
S-1A ●

PW ●

S-1 ●

● ●
D-2 S-2

●
S-3



MEMORANDUM

TO: Mary-Jo Shine, Project Manager, Palm Beach County Resource Assessment.

FROM: Don G. J. Fadgett, Staff Hydrogeologist

DATE: June 12, 1987

SUBJECT: Description of shallow aquifer pump test activities at Morikami Park test site on June 11, 1987.

A short duration, low flow rate pump test was performed on well S-1 at the Morikami Park APT site. Background water levels were taken on all wells prior to the start of the test and every hour during the duration of the drawdown and recovery periods using a hand held chalked tape. Water levels of wells PW-1, S-3, S-2, D-2, S1-A, and D1-A were continually monitored during all phases of the test using the In-Situ, SE200 Hydrologic Analysis System.

Test setup began at approximately 0900. A two inch pump with a 1.25 inch diameter drop hose was placed approximately five feet from well S-1. A twenty foot long section of two inch diameter, semi-rigid hose was attached to the discharge end of the pump and a two inch diameter, continuous rate, propeller type flow meter was attached to the discharge end of this hose. Water leaving the flow meter went directly into 300 feet of two inch diameter, collapsible hose. This hose discharged into the ground surfaced approximately 350 north of well S-1. A longer discharge hose was not used due to adverse pressure effects on maximum achievable pump rates.

Prior to the start of the pump test the discharge network was filled with water pumped from PW-1. During this process, the two inch pump was throttled to produce a discharge of 30 gpm. Water levels in PW-1 were allowed to fully recover prior to the starting the pump test.

The pump test began at 1035. At 1034 the pump was started and primed by sucking water through the 1.25 inch hose placed in a full barrel. As the water level in the barrel approached the bottom the suction hose was quickly removed and inserted approximately 20 feet down into well S-1. This process took about four seconds during which time the pump lost part of its prime. Once the suction hose was fully inserted into the well an additional three seconds were allowed to elapse before the Hydrologic Analysis System began recording drawdowns.

The pump did not regain its full prime until four seconds after the start of automatic recording of drawdowns. Although some withdrawal of water from the well must have been occurring as the pump reprimed itself, the rate of flow from the well was probably erratic. Observed flow rates at the flow meter were 19.54 gpm during the repriming process, jumping to a maximum of 33.37gpm when the pump regained its full prime. Pump rates declined rapidly to 27.57 gpm

over the next 6 minutes as the well drew down and as a resistive pressure head built up in the discharge line.

Most of the pumping rate decline was probably due to drawdown in the well. Within three hours the pump rate had declined to less than 25 gpm and the suction hose had almost totally collapsed in on itself. Increasing the throttle speed on the pump did not resolve this problem.

During the drawdown portion of the test, water levels in wells were manually measured every hour and flow rates were recorded every half hour. Water levels in wells S-1A and D1-A were continuously monitored using both the In-Situ and the Datapod automatic recording systems.

Water levels in the two closest shallow wells responded rapidly to pumping well S-1. The In-Situ recording system showed water levels in well S-3 responding erratically. Rapid water level changes as much as .15 feet in two seconds were electronically recorded suggesting a problem may exist within the In-Situ system.

The pump was shut off at 1330 and the In-Situ system began recording recovery data. The wells were monitored until 1454 at which time the water level in the pumped well (S-1) had returned to within .05 feet of its starting elevation.

The drawdown portion of the test was not very controlled. I believe a slightly greater pump rate could be reached and maintained using a rigid suction line and a pump with a greater capacity. However, the efficiency of well S-1 would probably prevent any pump from achieving a steady withdrawal rate of 50 gpm without collapsing the well screen.

Morikami Park Shallow Pump Test

Notes

- Test started approx 10:30
- estimated 4 second lag between test start and audial sound of pump recatching its prime. Water was still probably flowing up the hose and out of the well during this time lag. Pump was approx 5' from well

used 300 feet of 2" layflat.
Resistance was enough to prevent pump from getting more than 33 gpm.

suction hose in well collapsed slightly. Should use rigid hose.

need bigger pump

In situ needs current buffer
#5 jump as much as ~~.15 feet~~ .05 ft
well #4 Levels affected by PU truck
driving past @ 11:07 may have caused .15' fluctuation

WL readings are erratic WL on #
4 (S-3) vary as much as .15'
WL on S1-A + S-2 seem consistent

Morikami Park

D-1A ●

S-1A ●

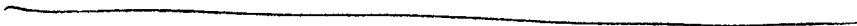
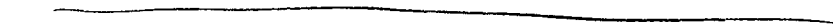
PW ●



S-1 ●

● ●
D-2 S-2

●
S-3



Well	Ser #	Scale factor	Channel #
S3	120	9.94	#4
S2	599	10.06	#3
D-2	718	10.08	#2
PW-1A	137	49.76	#5
S-1A	193	10.11	#1
D-1A	209	10.02	#6

6011/sec

sec/min

Don ~~Shore~~ truck 11:13

	time	held	wet	
S-3	11:17	6.00	1.70	4.24
S-2	11:19	5.00	.725	4.275
D-2	11:20	5.00	.805	4.195
PW	11:25	6.00	1.515	4.485
D-1A	11:23	5.00	.835	4.165
S-1A	11:22	5.00	.49	4.51
S-3	12:25	6.00	1.74	4.26
D-2	12:28	5.00	.79	4.21
S-2	12:27	5.00	.71	4.29
PW	12:29	5.00	.48	4.52
D-1A	12:30	5.00	.79	4.21
S-1A	12:31	5.00	.48	4.52
S-3	1120	5.00	.71	4.29
D-2	1123	5.00	.78	4.22
S-2	1122	5.00	.68	4.32
PW	1127	5.00	.48	4.52
D-1A	1126	5.00	.80	4.20
S-1A	1124	5.00	.45	4.55

	time	held	wet	
S-3	1449	5.00	.77	4.23
D-2	1451	5.00	.83	4.17
S-2	1452	5.00	.95	4.05
PW	1453	5.00	.53	4.47
D-1A	1457	5.00	.84	4.16
S-1A	1456	5.00	.81	4.19
S-1	1454	5.00	1.165	3.835

AQUIFER TEST DATA

Owner _____ Address Marikam Park County _____ State _____
 Date 6/11/87 Company performing test _____ Measured by _____
 Well No. S-1A Distance from pumping well _____ Type of test _____ Test No. _____

Measuring equipment _____

Time Data Pump on: Date _____ Time _____ (t) Pump off: Date _____ Time _____ (t') Duration of aquifer test: Pumping _____ Recovery _____	Water Level Data Static water level _____ Measuring point <u>TOC</u> Elevation of measuring point <u>19.70</u>	Comments on factors affecting test data
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Date	Clock time	Time since pump started		1/R	TAPE HELD AT	TAPE WET TO	Water level measurement	Correction or Conversion	Water level	Water level change s or s'	
		t	t'								
6/11	0952				5.00	.87	4.13		15.57		background S-1A 4-12
6/11	0948				5.00	1.22	3.78		15.56		background S-1A
S-1A											
6/11	1122				5.00	.49	4.51		15.19		
6/11	1231				5.00	.48	4.52		15.18		
6/11	1456				5.00	.81	4.19		15.51		
6/11	1454				5.00	1.165	3.835		15.50		background S-1

Monikam: tank
Shallow Pump
Test 6/11/87

Flow rates
2" flow meter located
20' down stream from
Pump.

1034
4250
Rate

Time	Gallons	Seconds	Rate
1036 1036 ↓	10 pump catching prime	30.70	19.54
	10	19.91	30.18
drawdown in S-1 creating enough vacuum to start the suction hose collapsing	10	18.12	33.11
	10	18.00	33.22
	10	17.98	33.37
	10	20.41	29.39
	10	20.49	29.28
	10	20.99	28.58
	10	21.20	28.30
	10	21.34	28.11
	10	21.61	27.76
	10	21.62	27.75
1042	10	21.83	27.48
	10	21.76	27.57
	10	22.31	26.89
	10	22.7	26.43
	10	21.94	27.34
	10	22.03	27.23
	10	22.18	27.05
1046	10	21.79	27.53
	10	21.88	27.42
1051	10	22.46	26.69
10:56	10	22.59	26.56
10:58	10	22.55	26.1

time	GAI	sec	Rate
12:05	10	22.78	26.33
11:11	10	22.77	26.35
11:28	10	22.9	26.20
	10	22.94	26.15
11:35	10	22.99	26.09
	10	22.98	26.01
12:03	10	23.54	25.44
	10	23.52	25.51
12:33	10	23.77	25.24
	10	23.81	25.20
1:03	10	23.98	25.02
	10	23.99	25.01
1:28	10	24.24	24.75
	10	24.31	24.68