

**CITRUS COUNTY CENTRAL LANDFILL  
PHASE 1/1A LEACHATE COLLECTION SYSTEM  
ISSUES**

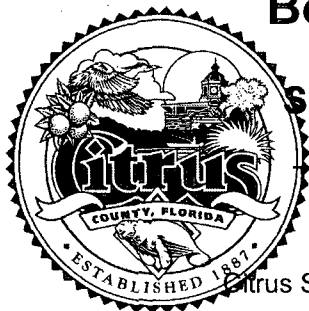
**230 W. GULF TO LAKE HIGHWAY  
LECANTO, FLORIDA**

**DEPARTMENT OF PUBLIC WORKS  
DIVISION OF SOLID WASTE MANAGEMENT**

**SUSAN J. METCALFE, DIRECTOR**

**352/527-7670**

**JULY 2009**



# Board of County Commissioners

## DEPARTMENT OF PUBLIC WORKS

### SOLID WASTE MANAGEMENT DIVISION

P.O. Box 340, Lecanto, Florida 34460

Telephone: (352) 527-7670 FAX: (352) 527-7672

email: [landfillinfo@boecc.citrus.fl.us](mailto:landfillinfo@boecc.citrus.fl.us)

TDD Telephone: (352) 527-5303

Citrus Springs/Dunnellon/Inglis/Yankeetown area Toll Free (352) 489-2120

July 15, 2009

Susan J. Pelz, P.E.  
Solid Waste Section  
Florida Department of Environmental Protection  
13051 N. Telecom Parkway  
Temple Terrace, FL 33637-0926

Re: Citrus County Central Landfill  
Permit No. 21375-008-SO/01  
Leachate Collection System, Phase 1/1A

Dear Ms. Pelz:

The attached report summarizes the investigation to date related to the leachate collection system for Phase 1/1A, which was previously reported to you and discussed at a meeting in April. The report includes DVDs of all video inspections, caliper and gamma ray logs and piezocone soundings. The County is in the process of hiring CH2M Hill to assist in further phases of this project. We will be glad to discuss this issue further, either via telephone or in person. We are particularly interested in your feelings on whether to do a piezocone sounding through the impacted section of collection pipes and liner to more closely define whether there is any loose soil or void below the liner.

Yours truly,

Susan Metcalfe, P.G.  
Director

SM

Attachment

CC: Glenn W. McCracken, Director, Public Works Department (report text only)  
Bo Bruner, CH2M Hill, Gainesville  
John Wood, CH2M Hill, Lancaster PA (report text only)

Dept. Of Environmental Protection

JUL 16 2009

Southwest District



**CITRUS COUNTY CENTRAL LANDFILL  
PHASE 1/1A LEACHATE COLLECTION SYSTEM  
ISSUES**

**230 W. GULF TO LAKE HIGHWAY  
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**FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION**

**JUL 16 2009**

**SOUTHWEST DISTRICT  
TAMPA**

# **CITRUS COUNTY LANDFILL PHASE 1/1A LEACHATE COLLECTION SYSTEM ISSUES**

## **LOCATION/ DESCRIPTION**

On the west side of the active Citrus County Central Landfill, there are seven pipes that lay on the side slope of Phase 1/1A. They are located in a notch in the 2:1 side slope and are bedded in polyurethane foam. The location of those pipes is shown on Figure 1. Details of the arrangement are shown in Figure 2, a reduced size excerpt from the as-built drawings prepared by CH2M Hill, the engineer for the project.

There are four different functions represented in this series of pipes:

One pipe is the leachate collection/cleanout pipe for Phase 1A. (a)

Two pipes are the carriers for the pumps that remove leachate from the secondary leachate collection sump for Phase 1A. (b)

Two pipes are the carriers for the pumps that remove leachate from the primary leachate collection sump for Phase 1A. (c)

Two pipes serve as inspection/cleanout access points, connected to the leachate collection pipes that exit the Phase 1 leachate sump through the berm/liner penetration between Phase 1 and 1A. (d)

Listing the pipes from north to south, the functions are as follows: a, b, c, c, b, d, d. The b and c pipes are designated for FDEP reporting from north to south as Secondary #1, Primary #1, Primary #2 and Secondary #2.

All pipes are HDPE. Dimensions of the pipes are as follows.

(a) 8-inch diameter solid on the side slope (approximately 185 feet long in plan view on the west slope), perforated along the bottom of the cell (approximately 800 feet) and solid on the east slope (approximately 155 feet long).

(b) 18-inch diameter solid on the side slope, turning the corner to horizontal and perforated in the sump, measured at a total of 215 feet.

(c) 18-inch diameter solid on the side slope (approximately 180 feet long in plan view or about 200 feet measured in the pipe), turning the corner to horizontal and increasing to 24-inch diameter perforated in the collection sump (approximately 24 feet long). The total length measured with inspection instruments from top of pipe to the sealed end was about 230 feet.

(d) 8-inch on the side slopes, turning south and horizontal to connect to the Phase 1 pipes, all solid. Total length is over 240 feet in Phase 1A.

## **SEQUENCE OF EVENTS**

The Phase 1/1A leachate pipes were installed in 1996-97. They were video inspected and found to be in good condition in 2001. Phase 2 of the landfill was constructed in 2004-05 at the same time that the operating permit was renewed. Video inspection of the leachate pipes was conducted in November 2004 with no changes noted.

On July 20, 2007 it was determined that all of the Phase 1/1A leachate pumps had "tripped out" probably due to a power surge/lightning strike. Controls and meters were also impacted. On August 8 it was determined that Secondary pump #2 had again been impacted by a lightning strike (perhaps as early as July 31, the last date flow was registered) and was no longer functioning.

The #2 Secondary pump was removed for repairs and Secondary pump #1 continued in service. The operator reported that there seemed to be "slime" on the pump when it was removed. There were no spares onsite; the pump had to be shipped out of state and was not received back until early December.

At that time, the other secondary pump was also removed, the piping to the sump was jetted and a camera inspection of the secondary pipes was performed. Attachment A is a DVD of this inspection. Attachment B is the written report from Florida JetClean, the contractor who performed that work. No "slime" was noted in the pipes. This was the first observation of reduced vertical dimension of pipes. Both pumps were reinstalled and were functioning properly following this inspection.

On July 3, 2008, transducers on both primary pumps failed, probably due to a power surge. However since the pumps still operated in manual, they were pumped daily in that mode until July 26 when the #1 Primary pump was removed and the transducer was replaced. Operators noted that it was difficult to reinstall. On August 1 the same pump was removed for repairs again and Primary #2 was used exclusively to keep the sump pumped down. On August 26, a spare secondary pump was installed in the #1 Primary pipe and began operating in the automatic mode. On the same date, operators attempted to remove the Primary #2 pump; the lift cable broke when the pump was about 50 feet from the far end of the pipe. That information was reported to Solid Waste on September 5.

## **INVESTIGATION**

Solid Waste contacted several of our engineering consultants to determine if there was a way to retrieve the pump; their suggestion was first to retrieve the broken cable. It was not known whether the pump was wedged because of not being parallel to the pipe or if the pipe was out of round. We also contacted the design engineer (CH2M Hill).

After removing the pump, Primary #1 pipe was video inspected on September 11, 2008 by TNT Sewer. Ovaling of the pipe was noted from about 100 feet below the top to about 195 feet. The camera was able to enter the sump and reached a total distance of 207 feet. Attachment C is the written report of that video inspection.

On November 6, the Primary #2 pipe was video inspected. Noticeable crushing was observed from about 100 feet down to 173 feet, where the top of the pump was observed to be stuck in the pipe. The cable was retrieved.

On December 12, the 8-inch diameter pipes at the north and south end of the array (functions a and d) were video inspected as well. The Phase 1 cleanouts function d)

showed no deformation, however the Phase 1A cleanout at the north end showed deformation starting at 119 feet below the top with the pipe diameter too small to pass at 137 feet. DVDs of the November-December 2008 video records (Attachment D) are attached and a summary of observations are shown in Table 1.

Borehole geophysical methods (caliper, gamma ray and inclinometer) were attempted next to better define the geometry of the pipes. The first attempt, performed February 13, 2009, was not successful due to interference between the pump discharge lines and the investigative tools. The tools were modified with a skate block and a second attempt was made on February 26. This time, the pump was removed from Secondary #1 for clear access and the two northernmost pipes were measured, i.e. the 8-inch Phase 1A leachate collection/cleanout line (vent) and the #1 Secondary sump pipe. The logs are attached as Attachment D and E. Inclinometer logs were unsuccessful because the pipe inclinations exceeded the capability of the tool.

The caliper tool was modified to use only two of the three arms, with the third arm being removed for the attachment to the skate. The total thickness of the tool plus the skate modification was 5.7 inches. The total length of the tool was 9.75 feet. The skate may have run down the low point of the pipe, or may have moved around somewhat in the lower side of the pipe, with the remaining two arms positioned at 120 degrees separated from the skate in both directions.

The caliper logs show that the #1 secondary pipe has an interior diameter of 15.6 inches to a depth of 95 feet below the top; it shows uneven deformation from that depth to 195 feet, where the instrument would not pass. The minimum measured diameter was 9 inches at a depth of 173 feet. Advanced Borehole Services, the contractor performing this work, indicated that the measurements indicated on the log may not reflect actual dimensions.

The gamma ray log measures radiation from the surrounding soil. Clays generally exhibit higher radiation levels than sand. Also, if the tool is closer to the soil, the radiation levels should increase. The log of #1 secondary shows slight variations from surface to 130 feet deep, gradually increasing to 175 feet then dropping dramatically to zero from 176 feet to 182 feet, remaining at that level to the end of the log.

The caliper log of the 8-inch diameter Phase 1A leachate collection/cleanout pipe shows that the diameter is consistently 7.5 inches from the top to the 140 foot depth, at which point the tool would not pass, indicating a diameter of less than 5.7 inches. The gamma ray log for that pipe shows a similar pattern with slight variations from the surface to about 130 feet, then dropping dramatically in the last 10 feet.

This information was reported to the Tampa office of FDEP on April 20<sup>th</sup>. A meeting was held on April 27<sup>th</sup> to discuss the status and further investigation techniques.

Cone penetrometer tests were conducted on May 1, 2009. The locations of the two borings are shown on Figure 3, with Attachments G and H. presenting the log of each

boring. These investigations suggest that there is no loose soil or evidence of karst activity beneath the outside edge of the liner in the vicinity of the Phase 1/1A leachate pipes or in a similar position related to the proposed Phase 3 liner.

Later in May 2009, video inspections of all of the leachate pipes in the active landfill were conducted. DVDs of the video are attached (Attachment I) with a summary of observations shown in Table 2. The location of the top end of these pipes is shown on Figure 4 with the designations matching those in Table 2.

## **SUMMARY**

Some condition has occurred that caused all the leachate pipes on the side slope associated with Phase 1A to deform in the section between about 90 feet and 190 feet below the top of the slope. The assumed vertical dimension has been reduced to the point that removal and replacement of one and possibly more leachate pumps is impossible. The deformation of the pipes may be increasing. The leachate collection pumps continue to function, except for Primary Pump #2. The cleanouts for the Phase 1 sump which are located at the south end of the same side-slope section appear to be full diameter to the bottom. None of the other leachate collection pipes at the site show any diameter changes from previous inspections.

## **FURTHER INVESTIGATION**

One additional investigative technique that would reach the area of interest would be to use the cone penetrometer to advance a borehole through the waste and liner on the side slope so that the penetration resistance of the soils directly beneath the deformed pipes could be measured. The small liner penetration made by the instrument could be sealed with bentonite to reduce the very slight potential of leakage. Should very soft soils or a void be found, the remedial action would be different than if the liner and pipes are in fact well supported by the underlying soils.

## **POSSIBLE REMEDIES**

### **Pipes only involved**

Slip-lining the carrier pipes with smaller pipes and grouting between the inner and outer pipes is one possible solution. Pumps that would fit inside the smaller pipes would be used to replace the existing pumps. Sufficient pump capacity should be achievable in the smaller size, running longer at lower pumping rates to keep the level of leachate in the sump at compliant elevations.

Another possibility would be to create a new vertical pump carrier shaft into the primary sump. The next possibility is removing all waste over the side-slope leachate pipes in order to replace them.

### **Pipes and liner support involved**

Removing waste, leachate pipes and liner then grouting or otherwise stabilizing the underlying soils, before replacing the liner, leachate pipes and waste is a possible remedy.

# CITRUS COUNTY CENTRAL LANDFILL

Table 1. SUMMARY OF OBSERVATIONS, LEACHATE LINE VIDEO INSPECTIONS, NOVEMBER-DECEMBER 2008

DESCRIPTION	DIAMETER LENGTH INSPECTED		COMMENTS
	INCHES	FEET	
Phase 1/1A Primary 1 (N)	18	178	first attempt, 106' slightly oval, 146' more oval, 166' more flattened, 177' could not pass
		218	second attempt, start at 149', tight at 166', 186' oval, 190' opens up, 206' water level, murky
Phase 1/1A Primary 2 (S)	18	173	103' slightly oval, 143' more oval, (?) dip at 148', 156' more flattened, 173' top of stuck pump
Phase 1/1A Connection Cleanout ((S)	8	210	162' slightly oval, 202' series of joints to turn corner bottom of slope and turn south
Phase 1/1A Connection Cleanout (N)	8	211	pipe may deflect left-right, 203' series of joints, connection to other pipes, water running
Phase 1A Cleanout Cleanout	8	137	119' slight oval, 137' could not pass

# CITRUS COUNTY CENTRAL LANDFILL

Table 2. SUMMARY OF OBSERVATIONS, LEACHATE LINE VIDEO INSPECTIONS, MAY 2009

VIDEO DESIGNATION	DESCRIPTION OR FUNCTION	DIAMETER LENGTH INSPECTED		COMMENTS
		INCHES	FEET	
W-1	Phase 2 - Primary 1	18	220	Approximates design length
W-2	Phase 2 - Primary 2	18	210	Approximates design length
W-3	Phase 2 Cleanout	8	588	Approximately to center of cell
W-4	Phase 2 - Secondary	18	210	Approximates design length
W-5	Phase 1A Cleanout	8	160	Impassable partway down side slope
W-6	Phase 1/1A Secondary 1	18	160	Impassable partway down side slope
W-7	Phase 1/1A Primary 1	18	165	Impassable partway down side slope
W-8	Phase 1/1A Primary 2	18	160	Impassable partway down side slope
W-9	Phase 1/1A Secondary 2	18	175	Impassable partway down side slope
W-10	Phase 1/1A Connection Cleanout	8	201	Connection with Phase 1 N/S line clear
W-11	Phase 1/1A Connection Cleanout	8	207	Connection with Phase 1 N/S line clear
W-12	Phase 1 Cleanout 1	8	202	Reached bottom of side slope
W-13	Phase 1 NS Cleanout Connection	8	162	Pipe bend joint prevents further inspection
W-14	Phase 1 Cleanout 2	8	95	Matches previous observation, partially crushed
S-15	Phase 1 NS Cleanout	8	130	Matches previous observation, partially crushed
E-16	Phase 1 Cleanout 2	8	210	Reached bottom of side slope
E-17	Phase 1 Cleanout 1	8	193	Reached bottom of side slope
E-18	Phase 1A Cleanout	8	200	Reached bottom of side slope
E-19	Phase 2 Cleanout	8	540	Approximately to center of cell

**ATTACHMENT A**  
**CITRUS COUNTY DECEMBER 10, 2007**  
**SECONDARY PHASE 1A**  
**SUMP 1 AND 2 VIDEO INSPECTION**  
**1 DISK**



**ATTENTION**

**ATTACHMENT A**  
**IS A DISK**  
**CONTAINING A**  
**VIDEO**  
**INSPECTION**

- To view this disk please contact:

**State of Florida**  
Department of Environmental Protection  
Solid Waste Program  
13051 North Telecom Parkway  
Temple Terrace, FL 33637-0926  
Phone: (813) 632-7600

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 18 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT B**  
**CITRUS COUNTY DECEMBER 10, 2007**  
**PHASE 1 & 1A INSPECTION**  
**FLORIDA JETCLEAN REPORT**

# CCTV Surveys List for CITRUS COUNTY

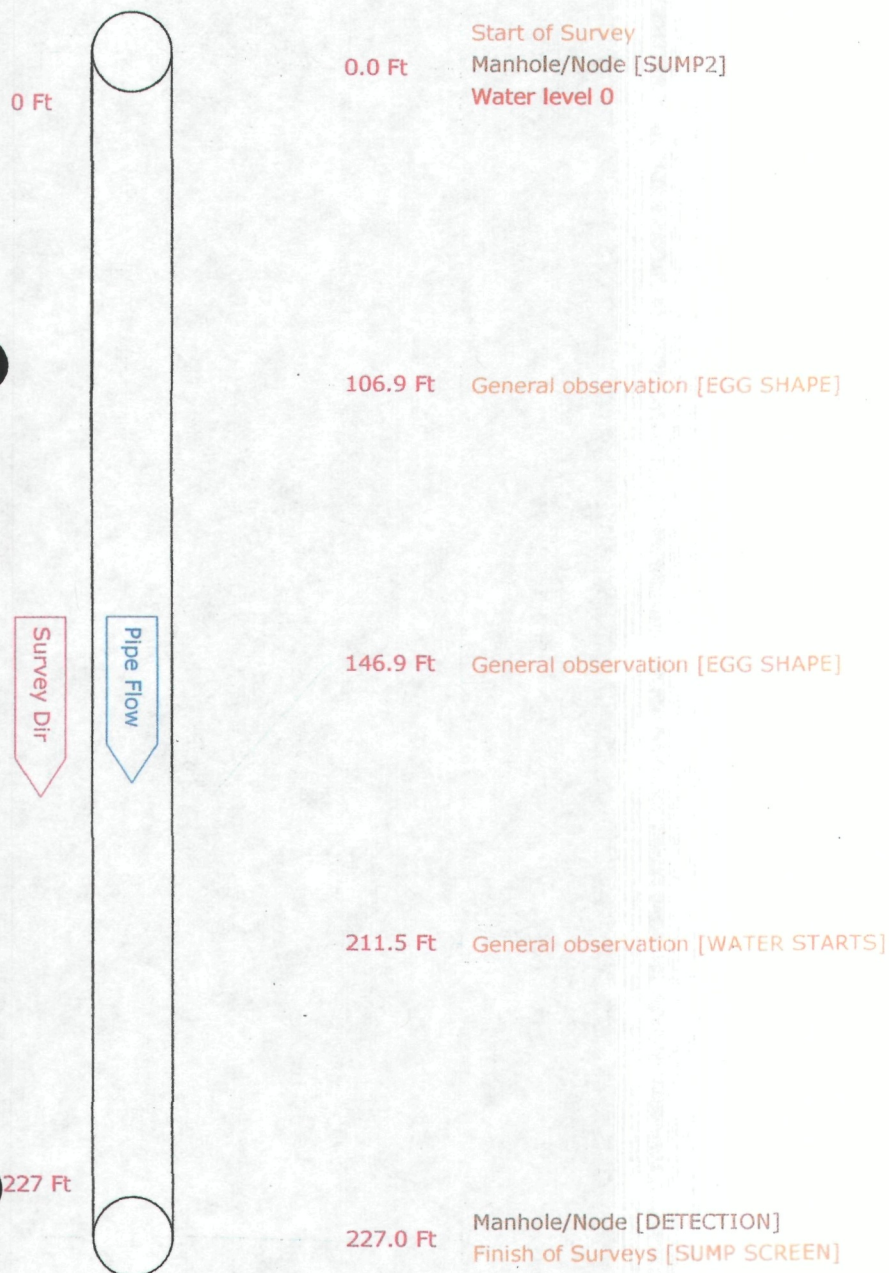
Number of surveys in this list is 4 as of Monday, December 10, 2007

Unit of measure: ft

Setup	Date	Street	Start MH	Finish MH	Dir	Size inch	Pre Clean	Vid Cassette	Scheduled Length	Surveyed Length
1	12/10/2007	CITRUS COUNTY LANDFILL SUMPS	SUMP2	DETECTION	D	18		1	227.0	227.0
2	12/10/2007	CITRUS COUNTY LANDFILL SUMPS	SCREEN CLEAN	SUMP 2 <b>SOUTH</b>	D	18		1	226.6	226.6
3	12/10/2007	CITRUS COUNTY LANDFILL SUMPS	SUMP 1	DETECTION	D	18		1	230.5	230.5
4	12/10/2007	CITRUS COUNTY LANDFILL SUMPS	SCREEN CLEAN	SUMP 1 <b>NORTH</b>	D	18		1	230.0	230.0
Total Scheduled Length									914.1	
Total Length Surveyed										914.1

# Pipe Graphic Report of PLR SUMP2 A for CITRUS COUNTY

<b>Work Order</b>	<b>Contract</b>	<b>Video</b> 1	<b>Setup</b> 1
<b>Facility</b>	<b>Operator</b> BMN	<b>Van Ref</b> 2	<b>Surveyed On</b> 12/10/2007
<b>Street Name</b>	CITRUS COUNTY LANDFILL SUMPS	<b>City</b>	CITRUS COUNTY
<b>Location type</b>	Berm		
<b>Surface</b>			
<b>Survey purpose</b>	Random survey of pipes and things		<b>Weather</b> Dry
<b>Pipe Use</b>	Other (state in comments)	<b>Schedule length</b> 227.0 Ft	<b>From</b> SUMP2 <b>Depth</b> Ft
<b>Shape</b>	Circular	<b>Size</b> 18 <b>by</b> ins	<b>To</b> DETECTION <b>Depth</b> Ft
<b>Material</b>	Other (state in comments)	<b>Joint spacing</b> Ft	<b>Direction</b> Downstream
<b>Lining</b>		<b>Year laid</b>	<b>Pre-clean</b> <b>Last cleaned</b>
<b>General note</b>	LEACHATE SECONDARY SUMP 2		<b>Structural</b> <b>Service</b> <b>Constructional</b>
<b>Location note</b>			<b>Miscellaneous</b> <b>Hydraulic</b>



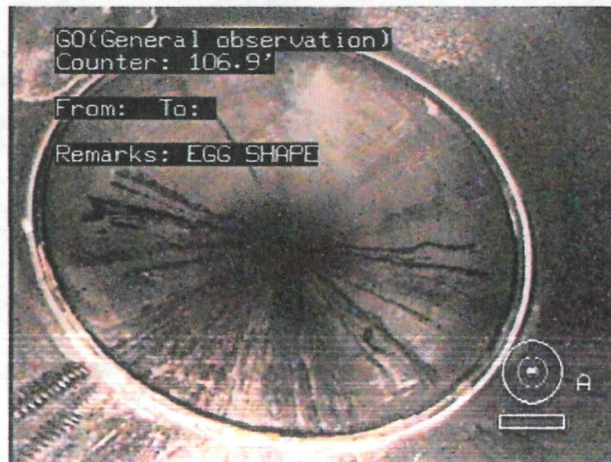


Work Order	Video 1	Surveyed On 12/10/2007	Direction Downstream	Setup 1
Street Name CITRUS COUNTY LANDFILL SUMPS	City Name CITRUS COUNTY	Weather Dry		
Location Berm	From Manhole SUMP2		To Manhole DETECTION	

Date: 12/10/2007

Distance: 106.9 Ft

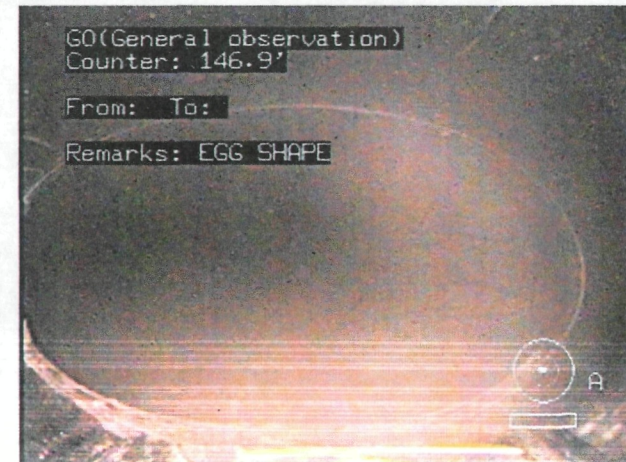
Obs: General observation

Comments:  
EGG SHAPE

Date: 12/10/2007

Distance: 146.9 Ft

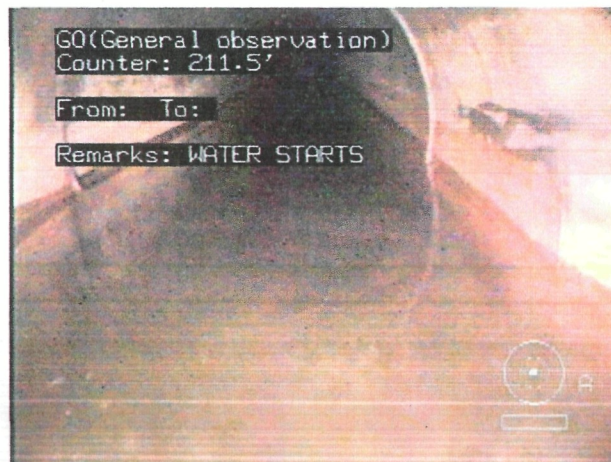
Obs: General observation

Comments:  
EGG SHAPE

Date: 12/10/2007

Distance: 211.5 Ft

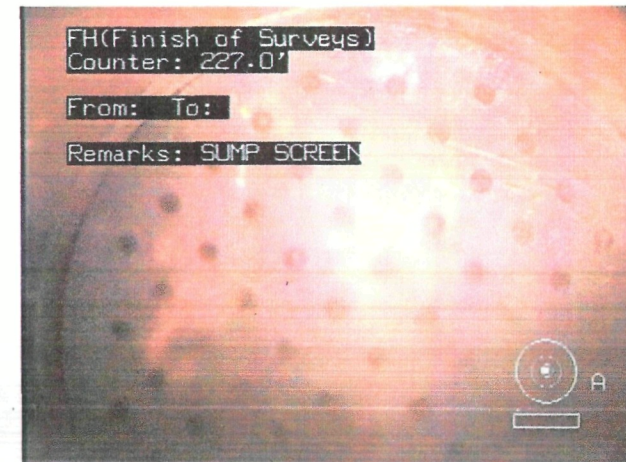
Obs: General observation

Comments:  
WATER STARTS

Date: 12/10/2007

Distance: 227.0 Ft

Obs: Finish of Surveys

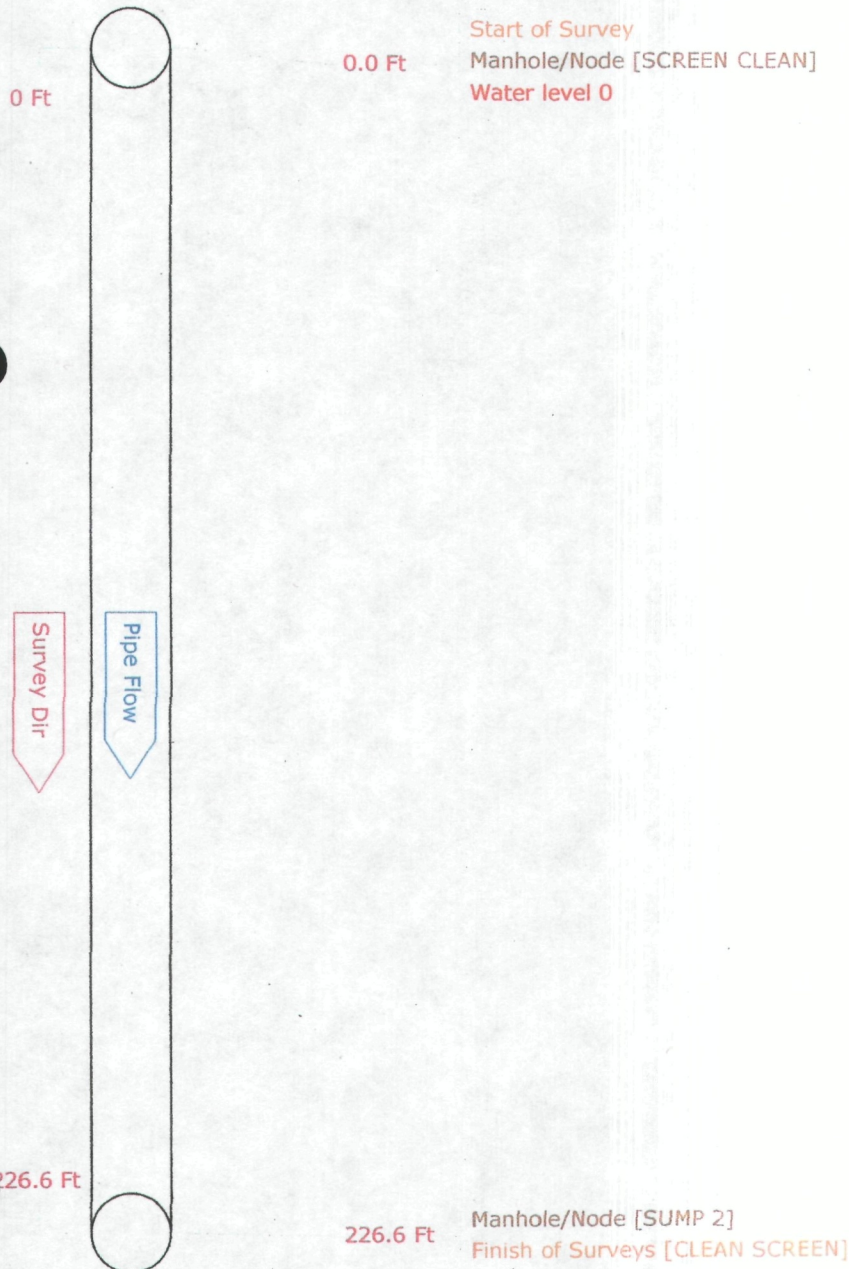
Comments:  
SUMP SCREEN



# Pipe Graphic Report of PLR SCREEN CLEAN A

for CITRUS COUNTY

<b>Work Order</b>	<b>Contract</b>	<b>Video</b> 1	<b>Setup</b> 2
<b>Facility</b>	<b>Operator</b> BMN	<b>Van Ref</b> 2	<b>Surveyed On</b> 12/10/2007
<b>Street Name</b>	CITRUS COUNTY LANDFILL SUMPS	<b>City</b>	CITRUS COUNTY
<b>Location type</b>	Berm		
<b>Surface</b>			
<b>Survey purpose</b>	Random survey of pipes and things	<b>Weather</b>	Dry
<b>Pipe Use</b>	Other (state in comments)	<b>Schedule length</b>	226.6 Ft
<b>Shape</b>	Circular	<b>Size</b> 18 <b>by</b>	ins
<b>Material</b>	Other (state in comments)	<b>Joint spacing</b>	Ft
<b>Lining</b>		<b>Year laid</b>	
<b>General note</b>	LEACHATE SECONDARY SUMP 2	<b>From</b>	SCREEN CLEAN
<b>Location note</b>		<b>To</b>	SUMP 2
		<b>Direction</b>	Downstream
		<b>Pre-clean</b>	<b>Last cleaned</b>
		<b>Structural</b>	<b>Service</b> Constructional
		<b>Miscellaneous</b>	<b>Hydraulic</b>





## CCTV pictures of SCREEN CLEAN A

for CITRUS COUNTY

Work Order	Surveyed On 12/10/2007	Setup 2
Street Name CITRUS COUNTY LANDFILL SUMPS		Video 1
City Name CITRUS COUNTY	Weather Dry	
Location Berm		
From Manhole SCREEN CLEAN	To Manhole SUMP 2	Direction Downstream



Date: 12/10/2007

Distance: 226.6 Ft

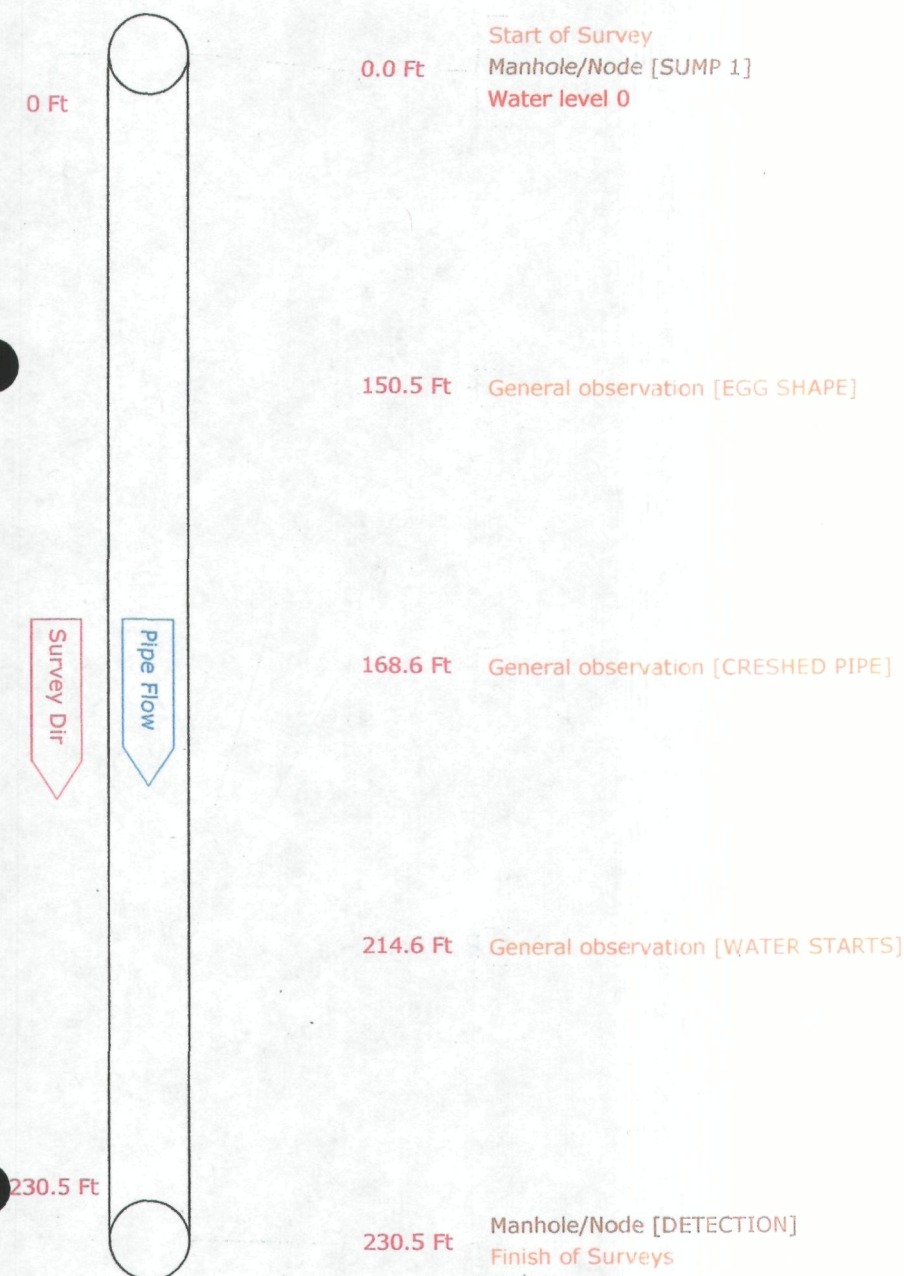
Obs: Manhole/Node

Comments: SUMP 2



Pipe Graphic Report of PLR SUMP 1 B for CITRUS COUNTY

<b>Work Order</b>	<b>Contract</b>	<b>Video</b> 1	<b>Setup</b> 3
<b>Facility</b>	<b>Operator</b> BMN	<b>Van Ref</b> 2	<b>Surveyed On</b> 12/10/2007
<b>Street Name</b>	CITRUS COUNTY LANDFILL SUMPS	<b>City</b>	CITRUS COUNTY
<b>Location type</b>	Berm		
<b>Surface</b>			
<b>Survey purpose</b>	Random survey of pipes and things	<b>Weather</b>	Dry
<b>Pipe Use</b>	Other (state in comments)	<b>Schedule length</b>	230.5 Ft
<b>Shape</b>	Circular	<b>Size</b> 18 <b>by</b>	ins
<b>Material</b>	Other (state in comments)	<b>Joint spacing</b>	Ft
<b>Lining</b>		<b>Year laid</b>	
<b>From</b>	SUMP 1	<b>Depth</b>	Ft
<b>To</b>	DETECTION	<b>Depth</b>	Ft
<b>Direction</b>	Downstream		
<b>Pre-clean</b>		<b>Last cleaned</b>	
<b>General note</b>	LEACHATE SECONDARY SUMP 1	<b>Structural</b>	Service Constructional
<b>Location note</b>		<b>Miscellaneous</b>	Hydraulic

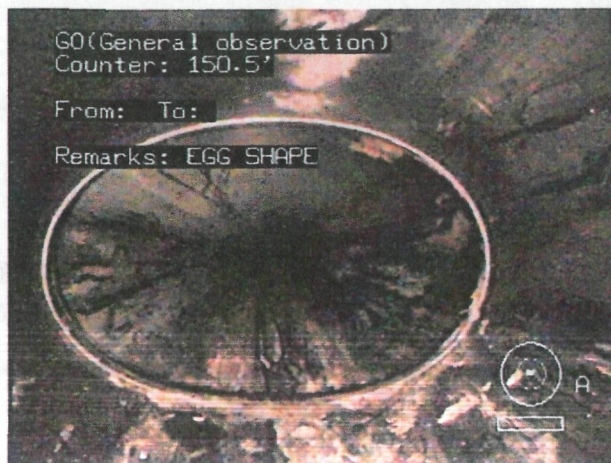




Work Order	Video 1	Surveyed On 12/10/2007	Direction Downstream	Setup 3
Street Name CITRUS COUNTY LANDFILL SUMPS	City Name CITRUS COUNTY	Weather Dry		
Location Berm	From Manhole SUMP 1		To Manhole DETECTION	

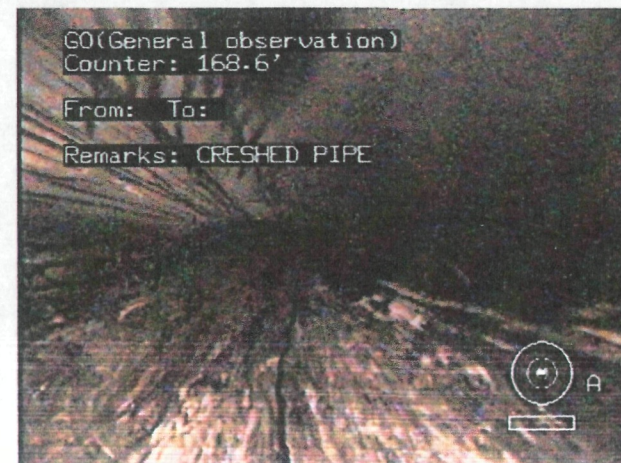
Date: 12/10/2007  
Distance: 150.5 Ft  
Obs: General observation

Comments:  
EGG SHAPE



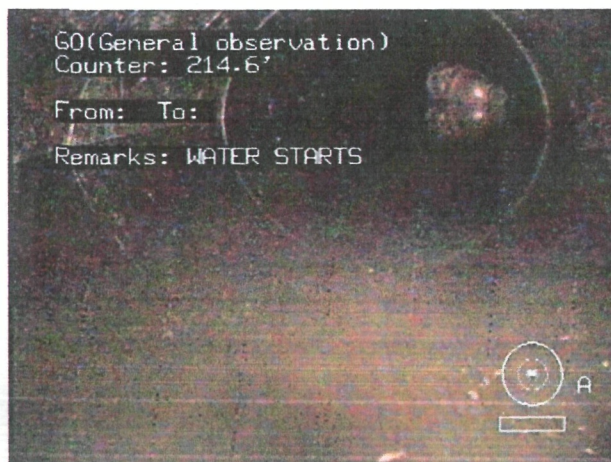
Date: 12/10/2007  
Distance: 168.6 Ft  
Obs: General observation

Comments:  
CRISHED PIPE



Date: 12/10/2007  
Distance: 214.6 Ft  
Obs: General observation

Comments:  
WATER STARTS



Date: 12/10/2007  
Distance: 230.5 Ft  
Obs: Manhole/Node

Comments:  
DETECTION

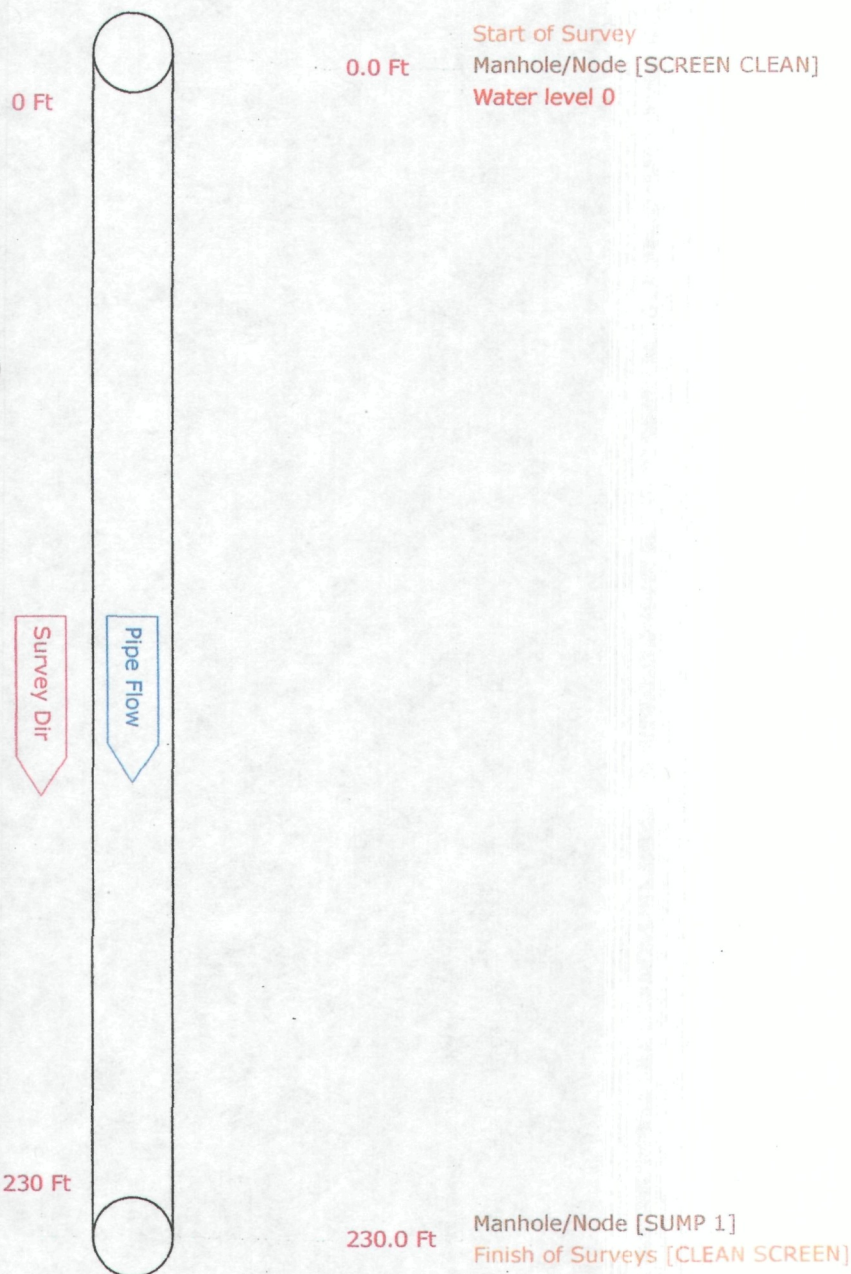




# Pipe Graphic Report of PLR SCREEN CLEAN B

for CITRUS COUNTY

<b>Work Order</b>	<b>Contract</b>	<b>Video</b> 1	<b>Setup</b> 4
<b>Facility</b>	<b>Operator</b> BMN	<b>Van Ref</b> 2	<b>Surveyed On</b> 12/10/2007
<b>Street Name</b>	CITRUS COUNTY LANDFILL SUMPS	<b>City</b>	CITRUS COUNTY
<b>Location type</b>	Berm		
<b>Surface</b>			
<b>Survey purpose</b>	Random survey of pipes and things	<b>Weather</b>	Dry
<b>Pipe Use</b> Other (state in comments)	<b>Schedule length</b> 230.0 Ft	<b>From</b> SCREEN CLEAN	<b>Depth</b> Ft
<b>Shape</b> Circular	<b>Size</b> 18 <b>by</b> ins	<b>To</b> SUMP 1	<b>Depth</b> Ft
<b>Material</b> Other (state in comments)	<b>Joint spacing</b> Ft	<b>Direction</b>	Downstream
<b>Lining</b>	<b>Year laid</b>	<b>Pre-clean</b>	<b>Last cleaned</b>
<b>General note</b>	LEACHATE SECONDARY SUMP 1	<b>Structural</b>	<b>Service</b> Constructional
<b>Location note</b>		<b>Miscellaneous</b>	<b>Hydraulic</b>



FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 16 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT C**  
**CITRUS COUNTY SEPTEMBER 11, 2008**  
**REPORT OF VIDEO INSPECTION OF**  
**PHASE 1 & 1A PRIMARY 1 LEACHATE PIPE**  
**BY**  
**TNT SEWER**



Tel:  
Fax:  
Email:

## Table of contents

Project Name:  
Citrus County Landfill

Project number:

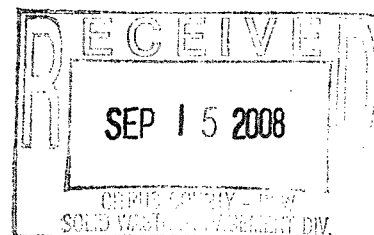
Date:  
9/11/2008

Contact:

Inspection Summary ..... 1

**Inspection: 1**

Section: 1 ..... 3





Tel.:  
Fax:  
Email

## Inspection summary / Inspection: 1

Project Name:  
Citrus County Landfill

Project number:

Date:  
9/11/2008

Contact:

Please find per enclosure the inspection report

Total Length of sewer network \_\_\_\_\_ 207.20 ft

Inspected Length of sewer network \_\_\_\_\_ 207.20 ft

Not inspected Length of sewer network \_\_\_\_\_ 0.00 ft

\_\_\_\_\_ 0.00 ft

\_\_\_\_\_ 0.00 ft

\_\_\_\_\_ 0.00 ft

Total Length of house connections (satellite) \_\_\_\_\_ 0.00 ft

Inspected Length of house connections (satellite) \_\_\_\_\_ 0.00 ft

Not inspected Length of house connections (satellite) \_\_\_\_\_ 0.00 ft

Number of Sections \_\_\_\_\_ 1

\_\_\_\_\_ 0

Number of house connections \_\_\_\_\_ 0

Number of Photos \_\_\_\_\_ 6



## Inspection Summary / Inspection: 1

Date:  
9/11/2008

Responsible:

Sewer Reference:

Section Number: 1

Start node:








End node:

Section length: 207.20 ft

Pipe length:

Material: Polypropylen

Shape:

	<u>0.00</u>	inspection begins
	<u>103.15</u>	pipe deformed vertically
	<u>144.50</u>	pipe deformed vertically
	<u>174.30</u>	pipe deformed vertically
	<u>177.75</u>	inspection ends
	<u>196.30</u>	sag ends
	<u>207.20</u>	Infiltration Running from 12 to 12 o'clock



Street :  
Tel :  
Fax :  
Email :

## Inspection Report / Inspection: 1

Date: 9/11/2008	Job # :	Weather : sunny, dry	Operator : Rusty	Section # : 1	Section name :
Present :	Vehicle :	Camera : Rover 125	Preset :	Cleaned : no	Rate :

Street 1 :	Map # 1 :	From MH :
Street 2 :	Map # 2 :	To MH :
City : Inverness	VCR # : 1	Section length : 207.20 ft
Insp. method :	Media # :	Joint length :

Reason of inspection : gen. condition control	Pipe shape :
Section type :	Pipe size : 16 inch
Area :	Pipe material : Polypropylen
	Lining :

Remarks :

1:500	Position	Code	Observation	Photo
	0.00	0	inspection begins	
	103.15	0	pipe deformed vertically	S_StartNode_S_EndNode_091 108_094235_A.JPG
	144.50	0	pipe deformed vertically	S_StartNode_S_EndNode_091 108_094408_A.JPG
	174.30	0	pipe deformed vertically	S_StartNode_S_EndNode_091 108_094536_A.JPG
	177.75	0	inspection ends	S_StartNode_S_EndNode_091 108_094618_A.JPG
	196.30	0	sag ends	S_StartNode_S_EndNode_091 108_095918_A.JPG
	207.20	150	Infiltration Running from 12 to 12 o'clock	S_StartNode_S_EndNode_091 108_100027_A.JPG



## Inspection Pictures / Inspection: 1

City : <b>Inverness</b>	Street :	Date : <b>9/11/2008</b>	Section # : <b>1</b>	Section name :
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Photo: S\_StartNode\_S\_EndNode\_091108\_094235\_A.JPG,  
VCR #: 1  
103.15FT, pipe deformed vertically



Photo: S\_StartNode\_S\_EndNode\_091108\_094408\_A.JPG,  
VCR #: 1  
144.5FT, pipe deformed vertically



Photo: S\_StartNode\_S\_EndNode\_091108\_094536\_A.JPG,  
VCR #: 1  
174.3FT, pipe deformed vertically



Photo: S\_StartNode\_S\_EndNode\_091108\_094618\_A.JPG,  
VCR #: 1  
177.75FT, inspection ends



## Inspection Pictures / Inspection: 1

City : <b>Inverness</b>	Street :	Date : <b>9/11/2008</b>	Section # : <b>1</b>	Section name :
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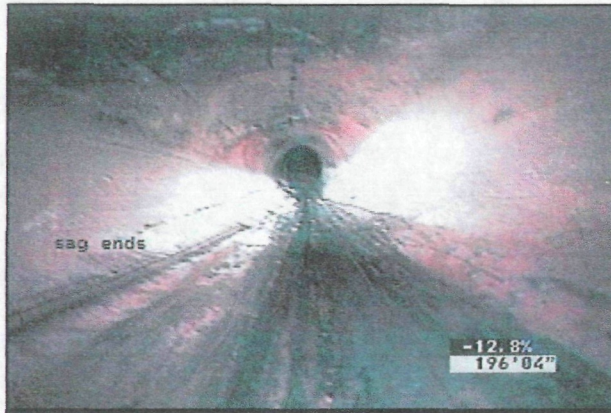


Photo: S\_StartNode\_S\_EndNode\_091108\_095918\_A.JPG,  
VCR #: 1  
196.3FT, sag ends



Photo: S\_StartNode\_S\_EndNode\_091108\_100027\_A.JPG,  
VCR #: 1  
207.2FT, Infiltration Running from 12 to 12 o'clock

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 16 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT D**  
**CITRUS COUNTY DECEMBER 2008**  
**PHASE 1 & 1A LEACHATE LINE VIDEO INSPECTION**  
**3 DISKS BY TNT SEWER**

**ATTENTION**

**ATTACHMENT D**  
**IS A DISK**  
**CONTAINING A**  
**VIDEO**  
**INSPECTION**

- To view this disk please contact:

**State of Florida**  
Department of Environmental Protection  
Solid Waste Program  
13051 North Telecom Parkway  
Temple Terrace, FL 33637-0926  
Phone: (813) 632-7600

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 16 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT E**  
**CITRUS COUNTY FEBRUARY 26, 2009**  
**CALIPER / GAMMA LOG OF**  
**PHASE 1A LEACHATE COLLECTION CLEAN LINE**



ABS

Advanced Borehole Services

CALIPER-GRAY

VENT

COMPANY : CITRUS COUNTY SOLID WASTE

WELL : VENT

FIELD : LECANTO

COUNTY : CITRUS

STATE : FLORIDA

OTHER SERVICES:

LOCATION :

SECTION :

TOWNSHIP :

RANGE :

API NO. :

UNIQUE WELL ID. :

PERMANENT DATUM : MSL

ELEVATION KB: NA

LOG MEASURED FROM: PIPE

ELEVATION DF: NA

DRL MEASURED FROM: NA

ELEVATION GL: NA

DATE : 02/26/09

DEPTH DRILLER : 170

BIT SIZE : 6

LOG TOP : 4.25

LOG BOTTOM : 141.25

CASING OD :

CASING BOTTOM : ALL

CASING TYPE : PVC

BOREHOLE FLUID : FOR

RM TEMPERATURE : NA

MUD RES : NA

MUD WEIGHT :

WITNESSED BY :

RECORDED BY : AFB

REMARKS 1 :

REMARKS 2 :

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

10-INCH LOG CAL GRAY VENT 02/26/09

MATRIX DENSITY : 2.71

MAGNETIC DECL : 0

PRESENTATION NAME/DATE = 9065rpt.0 02/26/2009

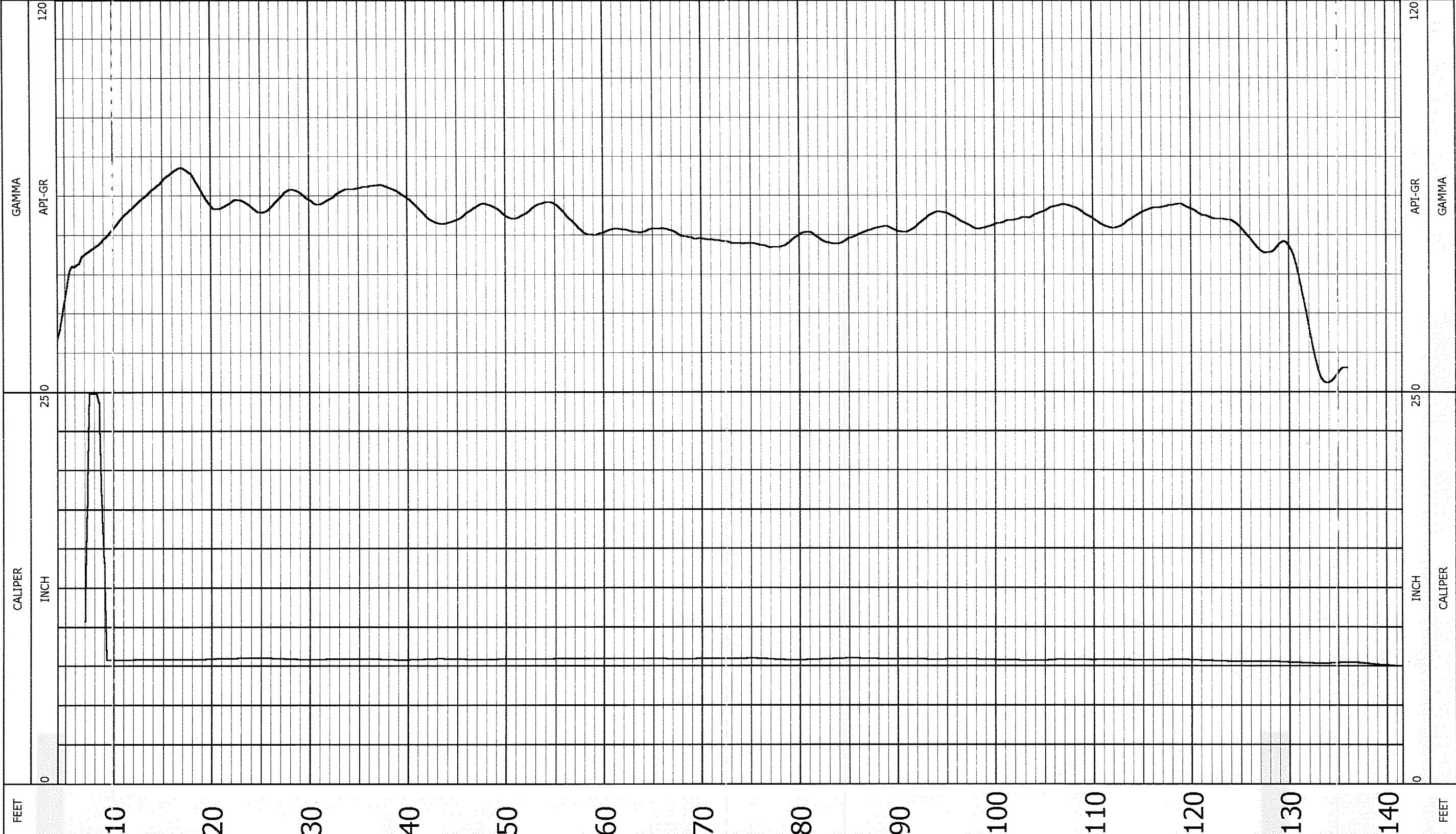
LOG PARAMETERS

NEUTRON MATRIX : Dolomite

ELECT. CUTOFF : 10000

MATRIX DELTA T : 140

BIT SIZE : 6



10-INCH LOG CAL GRAY VENT 02/26/09

MATRIX DENSITY : 2.71

MAGNETIC DECL : 0

PRESENTATION NAME/DATE = 9065rpt.0 02/26/2009

LOG PARAMETERS

NEUTRON MATRIX : Dolomite

ELECT. CUTOFF : 10000

MATRIX DELTA T : 140

BIT SIZE : 6

TOOL CALIBRATION VENT 02/26/09 14:51

TOOL 9065A TM VERSION 0

SERIAL NUMBER 718

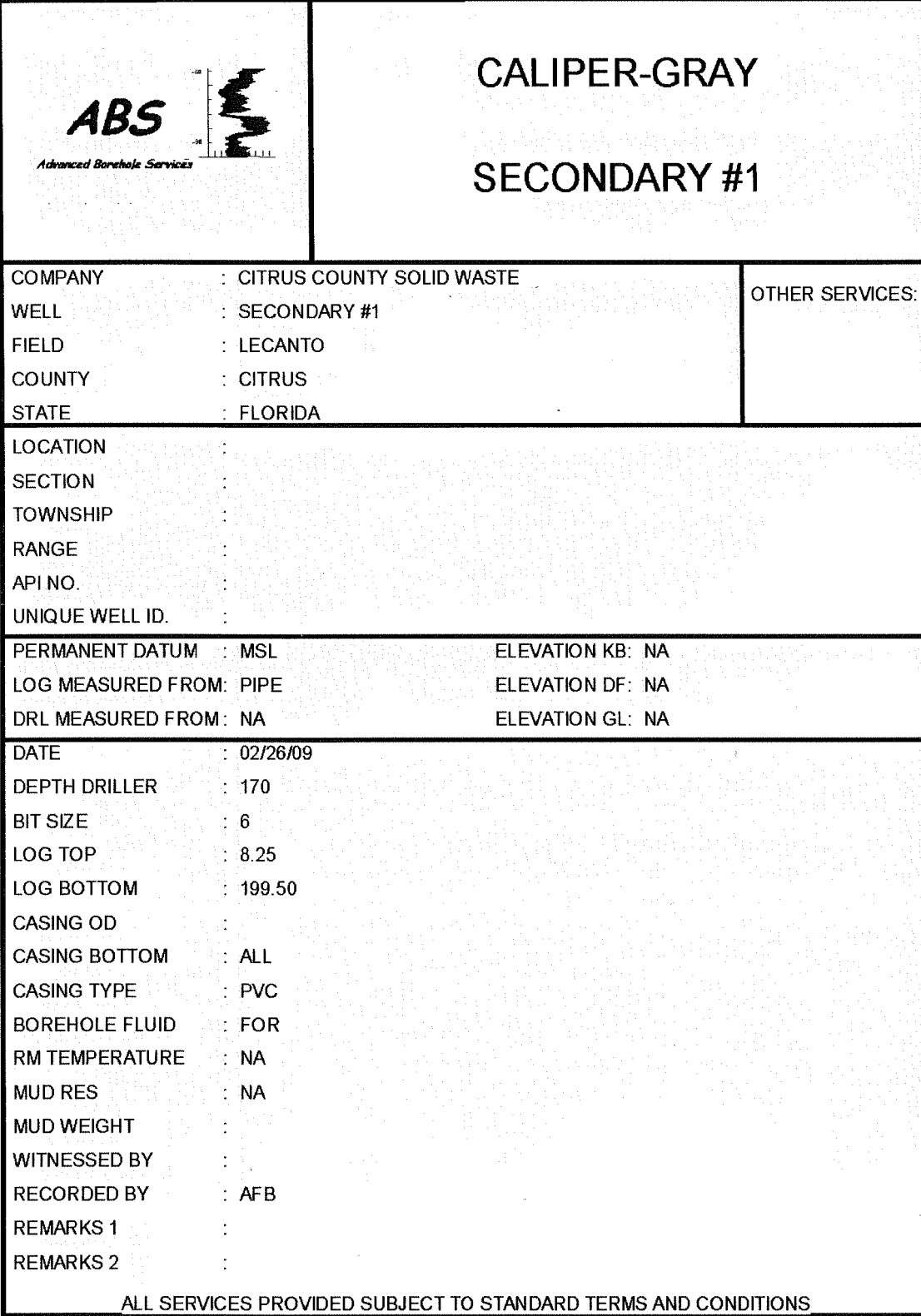
	DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Feb26,09	19:43:34	CALIPER	6.000	54979.00 [CPS]
2	Feb26,09	19:43:34	CALIPER	8.000	82546.00 [CPS]
	Feb26,09	14:05:48	CALIPERL	4.750	73039.00 [CPS]
	Feb26,09	14:05:48	CALIPERL	15.500	88153.00 [CPS]
3	Sep19,07	16:03:29	CALIPERX	10.000	59630.00 [CPS]
	Sep19,07	16:03:29	CALIPERX	29.000	83320.00 [CPS]

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION

JUL 16 2009

SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT F**  
**CITRUS COUNTY FEBRUARY 26, 2009**  
**CALIPER / GAMMA LOG OF**  
**PHASE 1A SECTION #1 PIPE**



## OTHER SERVICES

COMPANY	: CITRUS COUNTY SOLID WASTE
WELL	: SECONDARY #1
FIELD	: LECANTO
COUNTY	: CITRUS
STATE	: FLORIDA

LOCATION  
SECTION  
TOWNSHIP  
RANGE  
API NO.  
UNIQUE WELL ID.

PERMANENT DATUM : MSL	ELEVATION KB: NA
LOG MEASURED FROM: PIPE	ELEVATION DF: NA
DRL MEASURED FROM: NA	ELEVATION GL: NA

DATE	:	02/26/01
DEPTH DRILLER	:	170
BIT SIZE	:	6
LOG TOP	:	8.25
LOG BOTTOM	:	199.50
CASING OD	:	
CASING BOTTOM	:	ALL
CASING TYPE	:	PVC
BOREHOLE FLUID	:	FOR
RM TEMPERATURE	:	NA
MUD RES	:	NA
MUD WEIGHT	:	
WITNESSED BY	:	
RECORDED BY	:	AFB
REMARKS 1	:	
REMARKS 2	:	

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

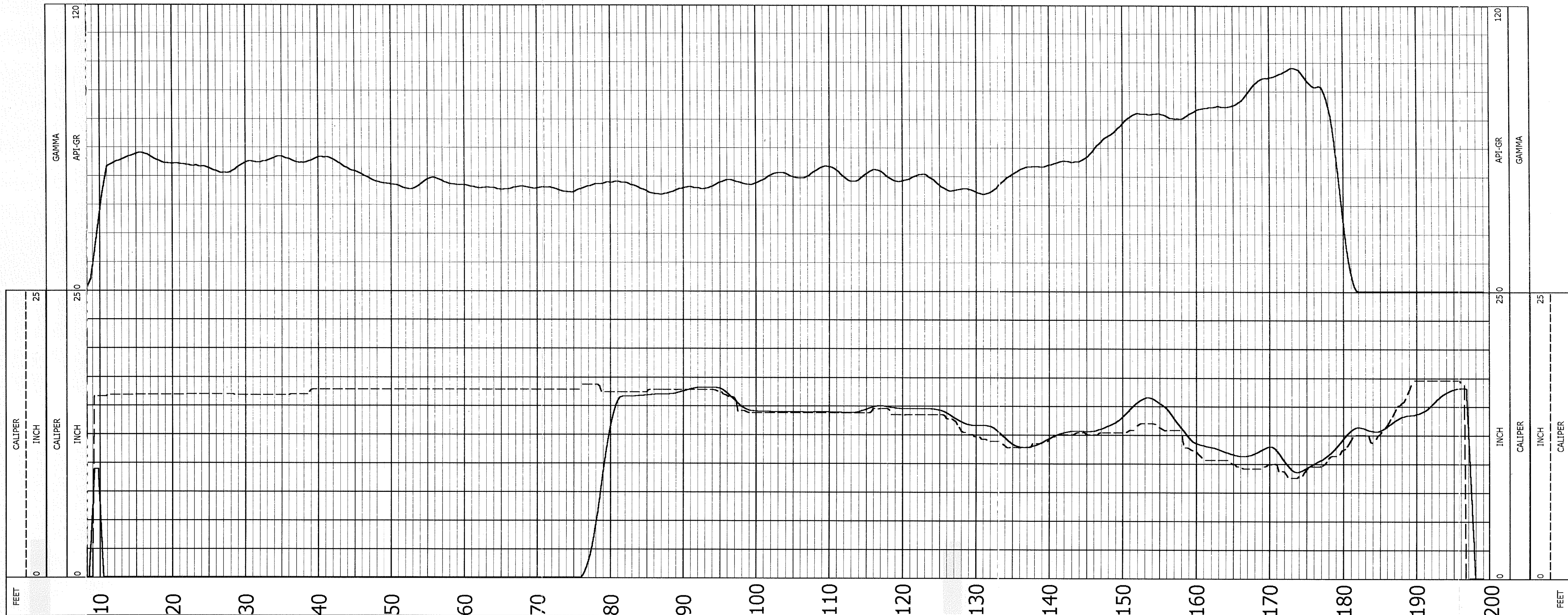
10 INCH LOG CAL GRAY SECONDARY #1 02/26/09

## LOG PARAMETERS

MATRIX DELTA T : 140  
BIT SIZE : 6

NEUTRON MATRIX : Dolomite  
ELECT CUTOFF : 10000

PRESENTATION NAME/DATE = 9065gray.0 02/26/2009



10 INCH LOG CAL GRAY SECONDARY #1 02/26/09

## LOG PARAMETERS

MATRIX DELTA T : 140  
BIT SIZE : 6

NEUTRON MATRIX : Dolomite  
ELECT. CUTOFF : 10000

PRESENTATION NAME/DATE = 9065gray.0 02/26/2009

TOOL CALIBRATION SECONDARY #1 02/26/09 10:32  
TOOL 9065A1 TM VERSION 0

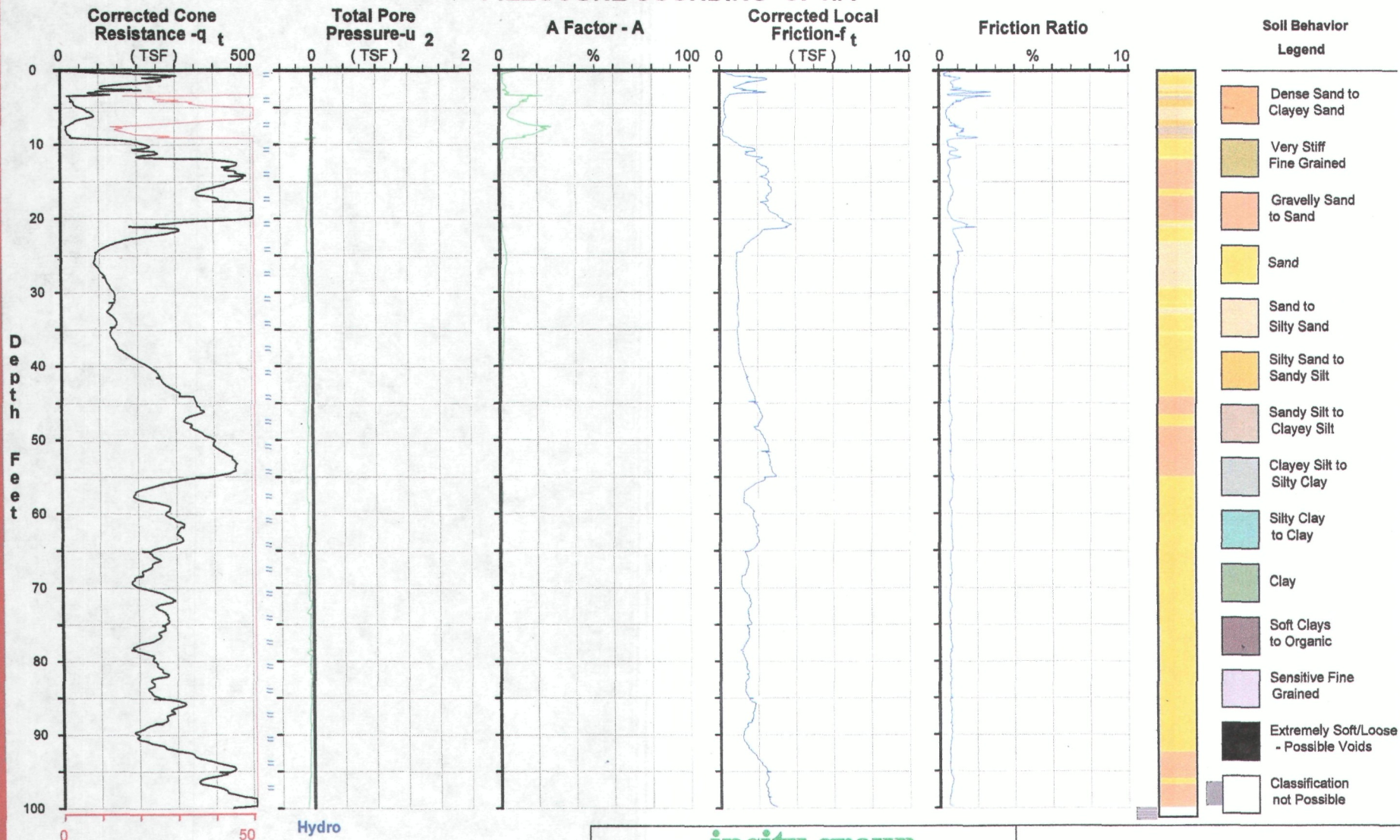
SERIAL NUMBER	DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Sep26.08	18:02:32	CALPER	5.000	85730.00
	Sep26.08	15:02:32	CALPER	5.000	89840.00
2	Feb26.09	14:05:48	CALPERL	4.750	73039.00
	Feb26.09	14:05:48	CALPERL	15.500	88153.00
3	Sep19.07	16:03:29	CALPERX	10.000	59630.00
	Sep19.07	16:03:29	CALPERX	29.000	83320.00

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 16 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT G**  
**CITRUS COUNTY MAY 1, 2009**  
**CPT #1 PIEZOCONE SOUNDING**  
**INSITU GROUP**



## PIEZOCONE SOUNDING CPT#1



insitu group

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding: CPT#1  
Test-Date 05-01-2009 09:54:28

## STANDARD SOIL BEHAVIOR TABLE

Depth	Soil Behavior Type	Qc	Lf	N	Vertical Effective Stress	Relative Density	Friction Angle	Constrained Modulus	Undrained Shear Strength	Sens.	Comp.	OCR
(Feet)		(TSF)	(TSF)	(#)	(TSF)	(%)	(Degrees)	(TSF)	(TSF)			
1	SAND	281.8	1.86	51	.045	>85%	>43	575.9	-	-	-	-
2	SAND	137.66	1.05	27	.091	>85%	>43	302.8	-	-	-	-
3	SAND TO SILTY SAND	98.4	1.16	24	.139	65%-85%	>43	216.4	-	-	-	-
4	SILTY SAND TO SANDY SILT	29.02	0.3	9	.188	50%-58%	37-39	63.7	-	-	-	-
5	SAND TO SILTY SAND	49.97	0.24	12	.236	50%-58%	39-41	109.9	-	-	-	-
6	SAND TO SILTY SAND	78.4	0.29	19	.284	58%-65%	39-41	172.4	-	-	-	-
7	SILTY SAND TO SANDY SILT	33.48	0.2	11	.333	42%-50%	35-37	73.5	-	-	-	-
8	SANDY SILT TO CLAYEY SILT	16.12	0.16	6	.386	35-42%	31-33	35.4	-	-	-	-
9	SAND TO SILTY SAND	73.48	0.51	18	.434	50%-58%	37-39	161.5	-	-	-	-
10	SAND	218	1.29	43	.479	>85%	41-43	479.5	-	-	-	-
11	SAND	230.19	1.55	45	.525	>85%	41-43	506.3	-	-	-	-
12	GRAVELLY SAND TO SAND	365.15	2.09	59	.569	>85%	>43	803.2	-	-	-	-
13	GRAVELLY SAND TO SAND	442.81	2.49	72	.613	>85%	>43	974.1	-	-	-	-
14	GRAVELLY SAND TO SAND	470.44	2.39	77	.657	>85%	>43	1034.9	-	-	-	-
15	GRAVELLY SAND TO SAND	442.02	2.58	72	.701	>85%	>43	972.3	-	-	-	-
16	SAND	372.52	2.67	73	.747	>85%	41-43	819.5	-	-	-	-
17	GRAVELLY SAND TO SAND	393.17	2.49	84	.791	>85%	41-43	864.8	-	-	-	-
18	GRAVELLY SAND TO SAND	504.76	2.4	82	.835	>85%	>43	1110.4	-	-	-	-
19	GRAVELLY SAND TO SAND	568.59	2.84	92	.879	>85%	>43	1246.4	-	-	-	-
20	SAND	409.59	3.35	80	.924	>85%	41-43	901	-	-	-	-
21	SAND	268.81	3.1	53	.97	>85%	39-41	591.2	-	-	-	-
22	SAND	239.89	1.96	47	1.016	>85%	39-41	527.7	-	-	-	-
23	SAND TO SILTY SAND	146.24	1.47	36	1.064	58%-65%	37-39	321.6	-	-	-	-
24	SAND TO SILTY SAND	100.04	1.09	24	1.112	50%-58%	35-37	220	-	-	-	-
25	SAND TO SILTY SAND	88.02	0.87	21	1.16	50%-58%	33-35	193.5	-	-	-	-
26	SAND TO SILTY SAND	90.05	0.87	22	1.209	50%-58%	33-35	198	-	-	-	-
27	SAND TO SILTY SAND	104.91	0.91	26	1.257	50%-58%	35-37	230.7	-	-	-	-
28	SAND TO SILTY SAND	117.37	0.91	29	1.305	50%-58%	35-37	258.1	-	-	-	-
29	SAND	129.57	0.96	25	1.351	50%-58%	35-37	284.9	-	-	-	-
30	SAND	139.51	0.99	27	1.397	50%-58%	35-37	306.8	-	-	-	-
31	SAND	136.54	0.97	27	1.442	50%-58%	35-37	300.4	-	-	-	-
32	SAND TO SILTY SAND	124.8	0.94	30	1.49	50%-58%	35-37	274.5	-	-	-	-
33	SAND	136.58	0.97	27	1.536	50%-58%	35-37	300.4	-	-	-	-
34	SAND	140.75	0.97	28	1.582	50%-58%	35-37	309.6	-	-	-	-
35	SAND	128.92	0.93	25	1.627	50%-58%	33-35	283.6	-	-	-	-
36	SAND	136.95	0.96	27	1.673	50%-58%	35-37	301.2	-	-	-	-
37	SAND	147.96	1	29	1.719	50%-58%	35-37	325.4	-	-	-	-
38	SAND	171.78	1.03	34	1.764	50%-58%	35-37	377.8	-	-	-	-
39	SAND	206.84	1.15	40	1.81	58%-65%	35-37	455.2	-	-	-	-
40	SAND	239.11	1.28	47	1.856	58%-65%	37-39	525.9	-	-	-	-

## insitu group

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding # CPT#1  
Test Date Test-Date 05-01-2009 09:54:28

# STANDARD SOIL BEHAVIOR TABLE

Depth (Feet)	Soil Behavior Type	Qc (TSF)	Lf (TSF)	N (#)	Vertical Effective Stress (TSF)	Relative Density (%)	Friction Angle (Degrees)	Constrained Modulus (TSF)	Undrained Shear Strength (TSF)	Sens.	Comp.	OCR
41	SAND	255.87	1.4	50	1.901	65%-85%	37-39	562.8	-	-	-	-
42	SAND	273.17	1.53	53	1.947	65%-85%	37-39	600.9	-	-	-	-
43	SAND	301.91	1.7	59	1.992	65%-85%	37-39	664.1	-	-	-	-
44	GRAVELLY SAND TO SAND	345.7	1.81	56	2.036	>85%	37-39	760.4	-	-	-	-
45	GRAVELLY SAND TO SAND	358.87	2.02	58	2.08	>85%	37-39	789.4	-	-	-	-
46	GRAVELLY SAND TO SAND	353.87	2.18	58	2.124	>85%	37-39	778.5	-	-	-	-
47	SAND	327.44	2.09	64	2.17	65%-85%	37-39	720.3	-	-	-	-
48	GRAVELLY SAND TO SAND	347.82	1.97	57	2.214	65%-85%	37-39	765.1	-	-	-	-
49	GRAVELLY SAND TO SAND	384.86	2.29	63	2.258	>85%	37-39	846.6	-	-	-	-
50	GRAVELLY SAND TO SAND	399.11	2.47	65	2.302	>85%	37-39	877.9	-	-	-	-
51	GRAVELLY SAND TO SAND	421.34	2.5	69	2.346	>85%	37-39	926.9	-	-	-	-
52	GRAVELLY SAND TO SAND	449.1	2.6	73	2.39	>85%	37-39	988	-	-	-	-
53	GRAVELLY SAND TO SAND	455.83	2.66	74	2.434	>85%	37-39	1002.7	-	-	-	-
54	GRAVELLY SAND TO SAND	411.38	2.69	67	2.478	>85%	37-39	905	-	-	-	-
55	SAND	285.09	2.02	56	2.524	58%-65%	35-37	627.1	-	-	-	-
56	SAND	212.58	1.41	42	2.569	50%-58%	35-37	487.6	-	-	-	-
57	SAND	192.73	1.24	38	2.615	50%-58%	33-35	423.9	-	-	-	-
58	SAND	257.15	1.39	50	2.661	58%-65%	35-37	565.7	-	-	-	-
59	SAND	275.2	1.71	54	2.706	58%-65%	35-37	605.4	-	-	-	-
60	SAND	291.1	1.79	57	2.752	58%-65%	35-37	640.4	-	-	-	-
61	SAND	311.66	1.92	61	2.797	58%-65%	35-37	685.5	-	-	-	-
62	SAND	303.23	1.92	59	2.843	58%-65%	35-37	667	-	-	-	-
63	SAND	302.78	1.98	59	2.889	58%-65%	35-37	666.1	-	-	-	-
64	SAND	242.04	1.59	47	2.934	50%-58%	35-37	532.4	-	-	-	-
65	SAND	241.18	1.4	47	2.98	50%-58%	35-37	530.6	-	-	-	-
66	SAND	240.07	1.46	47	3.026	50%-58%	33-35	528.1	-	-	-	-
67	SAND	215.15	1.35	42	3.071	50%-58%	33-35	473.2	-	-	-	-
68	SAND	190.5	1.1	37	3.117	42%-50%	33-35	419	-	-	-	-
69	SAND	199.88	1.16	39	3.163	42%-50%	33-35	439.7	-	-	-	-
70	SAND	260.9	1.41	51	3.208	50%-58%	35-37	573.8	-	-	-	-
71	SAND	279.33	1.56	55	3.254	50%-58%	35-37	614.5	-	-	-	-
72	SAND	252.99	1.47	49	3.299	50%-58%	33-35	558.4	-	-	-	-
73	SAND	273.19	1.47	53	3.345	50%-58%	35-37	601	-	-	-	-
74	SAND	269.83	1.49	53	3.391	50%-58%	33-35	593.5	-	-	-	-
75	SAND	257.32	1.47	50	3.436	50%-58%	33-35	566	-	-	-	-
76	SAND	245.12	1.43	48	3.482	50%-58%	33-35	539.2	-	-	-	-
77	SAND	192.59	1.19	38	3.528	42%-50%	33-35	423.6	-	-	-	-
78	SAND	215.56	1.18	42	3.573	42%-50%	33-35	474.2	-	-	-	-
79	SAND	239.34	1.33	47	3.619	50%-58%	33-35	526.5	-	-	-	-
80	SAND	252.45	1.39	49	3.665	50%-58%	33-35	555.3	-	-	-	-

**insitu group**

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding # CPT#1  
Test Date Test-Date 05-01-2009 09:54:28

# STANDARD SOIL BEHAVIOR TABLE

Depth	Soil Behavior Type	Qc	Lf	N	Vertical Effective Stress	Relative Density	Friction Angle	Constrained Modulus	Undrained Shear Strength	Sens.	Comp.	OCR
(Feet)		(TSF)	(TSF)	(#)	(TSF)	(%)	(Degrees)	(TSF)	(TSF)			
81	SAND	258.27	1.41	50	3.71	50%-58%	33-35	568.1	-	-	-	-
82	SAND	235.03	1.32	46	3.756	50%-58%	33-35	516.9	-	-	-	-
83	SAND	227.51	1.32	44	3.801	42%-50%	33-35	500.5	-	-	-	-
84	SAND	263.58	1.5	52	3.847	50%-58%	33-35	579.8	-	-	-	-
85	SAND	306.84	1.79	60	3.893	50%-58%	33-35	675	-	-	-	-
86	SAND	281.3	1.71	55	3.938	50%-58%	33-35	618.8	-	-	-	-
87	SAND	263.64	1.57	52	3.984	50%-58%	33-35	579.9	-	-	-	-
88	SAND	212.05	1.31	41	4.03	42%-50%	31-33	466.4	-	-	-	-
89	SAND	192.69	1.18	38	4.075	35%-42%	31-33	423.8	-	-	-	-
90	SAND	230.98	1.3	45	4.121	42%-50%	33-35	508	-	-	-	-
91	SAND	293.86	1.56	57	4.167	50%-58%	33-35	645.9	-	-	-	-
92	GRAVELLY SAND TO SAND	356.46	1.92	58	4.211	58%-65%	35-37	784.1	-	-	-	-
93	GRAVELLY SAND TO SAND	426.52	2.23	69	4.255	65%-85%	35-37	938.2	-	-	-	-
94	GRAVELLY SAND TO SAND	428.88	2.41	70	4.298	65%-85%	35-37	943.5	-	-	-	-
95	SAND	363.53	2.43	71	4.344	58%-65%	35-37	799.6	-	-	-	-
96	GRAVELLY SAND TO SAND	404.64	2.4	66	4.388	65%-85%	35-37	890.1	-	-	-	-
97	GRAVELLY SAND TO SAND	481.97	2.48	75	4.432	65%-85%	35-37	1016.2	-	-	-	-
98	GRAVELLY SAND TO SAND	530.75	2.61	86	4.476	>85%	35-37	1167.5	-	-	-	-
99	GRAVELLY SAND TO SAND	443.19	2.92	72	4.52	65%-85%	35-37	975	-	-	-	-
100.1	END OF SOUNDING	463.77										

**insitu group**

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding # CPT#1  
Test Date Test-Date 05-01-2009 09:54:28

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 16 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT H**

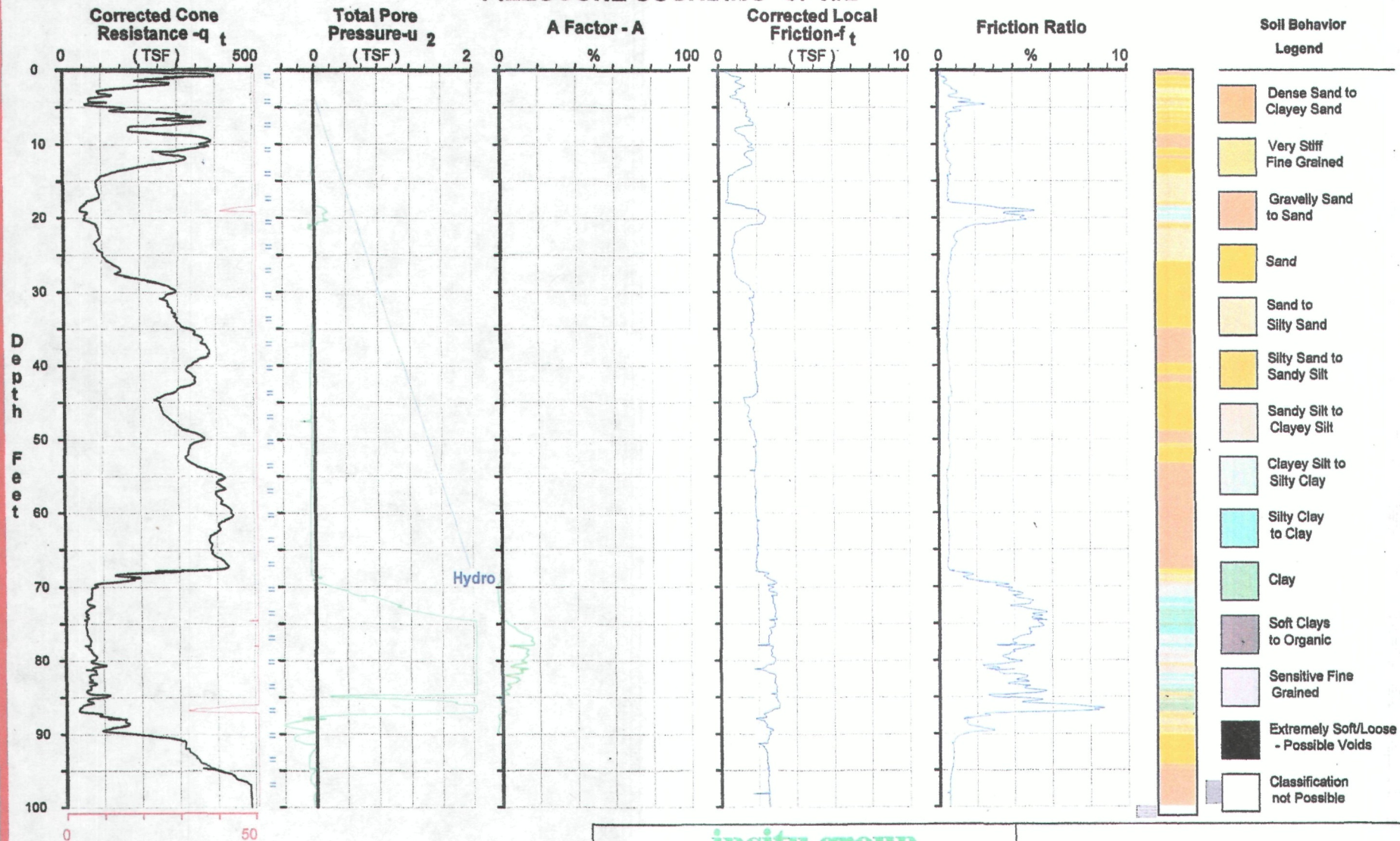
**CITRUS COUNTY MAY 1, 2009**

**CPT #2 PIEZOCONE SOUNDING**

**INSITU GROUP**



## PIEZOCONE SOUNDING CPT#2



insitu group

Citrus County Solid Waste Management  
 Citrus County Central Landfill  
 Sounding: CPT#2  
 Test-Date 05-01-2009 11:52:42

## STANDARD SOIL BEHAVIOR TABLE

Depth (Feet)	Soil Behavior Type	Qc (TSF)	Lf (TSF)	N (#)	Vertical Effective Stress (TSF)	Relative Density (%)	Friction Angle (Degrees)	Constrained Modulus (TSF)	Undrained Shear Strength (TSF)	Sens.	Comp.	OCR
1	GRAVELLY SAND TO SAND	308.9	0.96	50	.043	>85%	>43	679.5	-	-	-	-
2	SAND	218.18	1.19	43	.089	>85%	>43	479.9	-	-	-	-
3	SAND TO SILTY SAND	105.92	0.91	26	.137	65%-85%	>43	232.9	-	-	-	-
4	SILTY SAND TO SANDY SILT	78.58	1.12	26	.164	58%-65%	41-43	172.8	-	-	-	-
5	SAND TO SILTY SAND	119.15	1.46	29	.19	65%-85%	>43	282.1	-	-	-	-
6	SAND	277.81	1.54	54	.214	>85%	>43	611.1	-	-	-	-
7	SAND	303.02	1.75	59	.238	>85%	>43	666.6	-	-	-	-
8	SAND	192.39	1.04	38	.261	>85%	>43	423.2	-	-	-	-
9	GRAVELLY SAND TO SAND	355.38	1.43	58	.285	>85%	>43	781.7	-	-	-	-
10	GRAVELLY SAND TO SAND	367.05	1.72	60	.309	>85%	>43	807.4	-	-	-	-
11	SAND	281.01	1.52	55	.333	>85%	>43	618.2	-	-	-	-
12	SAND	304.17	1.68	59	.356	>85%	>43	669	-	-	-	-
13	SAND	193.73	1.37	38	.38	>85%	41-43	426.2	-	-	-	-
14	SAND TO SILTY SAND	113.65	0.89	28	.406	58%-65%	39-41	249.9	-	-	-	-
15	SAND TO SILTY SAND	87.34	0.5	21	.433	58%-65%	39-41	192.1	-	-	-	-
16	SAND TO SILTY SAND	89.49	0.49	22	.459	58%-65%	37-39	196.8	-	-	-	-
17	SAND TO SILTY SAND	82.88	0.45	20	.485	58%-65%	37-39	182.2	-	-	-	-
18	SILTY SAND TO SANDY SILT	52.72	1.05	17	.512	50%-58%	35-37	115.9	-	-	-	-
19	CLAYEY SILT TO SILTY CLAY	52.21	2.18	26	.543	-	-	-	3.49	2.3	0	>6
20	CLAYEY SILT TO SILTY CLAY	60.98	2.41	30	.574	-	-	-	4.08	2.5	0	>6
21	SILTY SAND TO SANDY SILT	86.19	1.48	28	.8	50%-58%	37-39	189.5	-	-	-	-
22	SAND TO SILTY SAND	92.82	0.86	23	.827	50%-58%	37-39	204.1	-	-	-	-
23	SAND TO SILTY SAND	83.98	0.8	21	.853	50%-58%	37-39	184.7	-	-	-	-
24	SAND TO SILTY SAND	91.6	0.71	22	.879	50%-58%	37-39	201.5	-	-	-	-
25	SAND TO SILTY SAND	105	0.73	26	.706	50%-58%	37-39	230.9	-	-	-	-
26	SAND	130.62	0.83	26	.729	58%-65%	37-39	287.3	-	-	-	-
27	SAND	144.84	0.88	28	.753	58%-65%	37-39	318.6	-	-	-	-
28	SAND	207.99	1.14	41	.777	>85%	39-41	457.5	-	-	-	-
29	SAND	279.18	1.64	55	.801	>85%	41-43	614.1	-	-	-	-
30	SAND	271.69	1.8	53	.824	>85%	41-43	597.6	-	-	-	-
31	SAND	270.19	1.74	53	.848	>85%	39-41	594.3	-	-	-	-
32	SAND	282.15	1.79	55	.872	>85%	41-43	620.6	-	-	-	-
33	SAND	292.74	1.83	57	.896	>85%	41-43	644	-	-	-	-
34	SAND	303.93	1.74	59	.92	>85%	41-43	668.5	-	-	-	-
35	GRAVELLY SAND TO SAND	340.8	1.72	55	.943	>85%	41-43	749.7	-	-	-	-
36	GRAVELLY SAND TO SAND	361.14	1.82	59	.967	>85%	41-43	794.4	-	-	-	-
37	GRAVELLY SAND TO SAND	373.75	1.81	61	.991	>85%	41-43	822.2	-	-	-	-
38	GRAVELLY SAND TO SAND	376.24	1.86	61	1.015	>85%	41-43	827.7	-	-	-	-
39	GRAVELLY SAND TO SAND	344.37	1.9	56	1.038	>85%	41-43	757.6	-	-	-	-
40	SAND	322.4	1.91	63	1.062	>85%	39-41	709.2	-	-	-	-

insitu group

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding # CPT#2  
Test Date Test-Date 05-01-2009 11:52:42

# STANDARD SOIL BEHAVIOR TABLE

Depth (Feet)	Soil Behavior Type	Qc (TSF)	Lf (TSF)	N (#)	Vertical Effective Stress (TSF)	Relative Density (%)	Friction Angle (Degrees)	Constrained Modulus (TSF)	Undrained Shear Strength (TSF)	Sens.	Comp.	OCR
41	GRAVELLY SAND TO SAND	337.57	1.92	55	1.086	>85%	39-41	742.5	-	-	-	-
42	SAND	326.62	1.98	64	1.11	>85%	39-41	718.5	-	-	-	-
43	SAND	280.92	1.94	55	1.134	>85%	39-41	618	-	-	-	-
44	SAND	245.9	1.37	48	1.157	>85%	39-41	540.9	-	-	-	-
45	SAND	251.45	1.5	49	1.181	>85%	39-41	553.1	-	-	-	-
46	SAND	261.43	1.5	51	1.205	>85%	39-41	575.1	-	-	-	-
47	SAND	283.36	1.59	55	1.229	>85%	39-41	623.3	-	-	-	-
48	SAND	312.12	1.69	61	1.252	>85%	39-41	686.5	-	-	-	-
49	GRAVELLY SAND TO SAND	358.59	1.84	58	1.278	>85%	39-41	788.8	-	-	-	-
50	GRAVELLY SAND TO SAND	336.61	1.86	55	1.3	>85%	39-41	740.5	-	-	-	-
51	SAND	324.91	1.88	63	1.324	>85%	39-41	714.7	-	-	-	-
52	SAND	321.42	1.9	63	1.348	>85%	39-41	707	-	-	-	-
53	GRAVELLY SAND TO SAND	349.08	1.88	57	1.371	>85%	39-41	767.9	-	-	-	-
54	GRAVELLY SAND TO SAND	401.39	1.8	65	1.395	>85%	39-41	883	-	-	-	-
55	GRAVELLY SAND TO SAND	406.22	1.86	66	1.419	>85%	39-41	893.6	-	-	-	-
56	GRAVELLY SAND TO SAND	411.12	1.87	67	1.443	>85%	39-41	904.4	-	-	-	-
57	GRAVELLY SAND TO SAND	403.75	1.87	66	1.466	>85%	39-41	888.2	-	-	-	-
58	GRAVELLY SAND TO SAND	417.82	1.87	68	1.49	>85%	39-41	919.1	-	-	-	-
59	GRAVELLY SAND TO SAND	436.94	1.86	71	1.514	>85%	39-41	961.2	-	-	-	-
60	GRAVELLY SAND TO SAND	427.69	1.91	70	1.538	>85%	39-41	940.8	-	-	-	-
61	GRAVELLY SAND TO SAND	405.1	1.92	66	1.562	>85%	39-41	891.1	-	-	-	-
62	GRAVELLY SAND TO SAND	390.24	1.95	64	1.585	>85%	39-41	858.4	-	-	-	-
63	GRAVELLY SAND TO SAND	380.51	1.94	62	1.609	>85%	39-41	837	-	-	-	-
64	GRAVELLY SAND TO SAND	384.41	1.91	63	1.633	>85%	39-41	845.6	-	-	-	-
65	GRAVELLY SAND TO SAND	394.72	1.91	64	1.657	>85%	39-41	868.3	-	-	-	-
66	GRAVELLY SAND TO SAND	421.51	1.86	69	1.68	>85%	39-41	927.2	-	-	-	-
67	SAND	317.01	2.04	62	1.704	>85%	37-39	697.3	-	-	-	-
68	SAND TO SILTY SAND	159.86	2.52	39	1.73	50%-58%	35-37	351.6	-	-	-	-
69	SANDY SILT TO CLAYEY SILT	78.36	2.68	31	1.759	35-42%	31-33	172.3	-	-	-	-
70	CLAYEY SILT TO SILTY CLAY	67.88	2.74	33	1.791	-	-	-	4.37	2.4	0	6
71	SILTY CLAY TO CLAY	59.19	2.73	39	1.822	-	-	-	3.77	2.1	.01	6
72	CLAYEY SILT TO SILTY CLAY	62.52	2.84	31	1.853	-	-	-	3.99	2.2	0	6
73	SILTY CLAY TO CLAY	55.12	2.85	36	1.884	-	-	-	3.49	1.9	.01	6
74	CLAYS	52.08	2.79	51	1.916	-	-	-	3.27	1.8	.02	6
75	SILTY CLAY TO CLAY	54.3	2.61	35	1.947	-	-	-	3.42	2	.01	6
76	CLAYEY SILT TO SILTY CLAY	61.54	2.49	30	1.978	-	-	-	3.91	2.4	0	6
77	CLAYEY SILT TO SILTY CLAY	60.09	2.52	29	2.009	-	-	-	3.81	2.3	0	6
78	CLAYEY SILT TO SILTY CLAY	71.82	2.66	35	2.041	-	-	-	4.6	2.6	0	6
79	CLAYEY SILT TO SILTY CLAY	75.62	2.63	37	2.072	-	-	-	4.86	2.6	0	6
80	SANDY SILT TO CLAYEY SILT	79.97	2.25	31	2.101	<35%	31-33	175.8	-	-	-	-

**insitu group**

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding # CPT#2  
Test Date Test-Date 05-01-2009 11:52:42



# STANDARD SOIL BEHAVIOR TABLE

Depth (Feet)	Soil Behavior Type	Qc (TSF)	Lf (TSF)	N (#)	Vertical Effective Stress (TSF)	Relative Density (%)	Friction Angle (Degrees)	Constrained Modulus (TSF)	Undrained Shear Strength (TSF)	Sens.	Comp.	OCR
81	CLAYEY SILT TO SILTY CLAY	68.81	2.74	34	2.132	-	-	-	4.39	2.5	0	6
82	CLAYEY SILT TO SILTY CLAY	68.15	2.86	33	2.163	-	-	-	4.34	2.3	0	6
83	VERY STIFF FINE GRAINED	58.42	2.89	57	2.195	-	-	-	3.67	2	.01	6
84	SANDY SILT TO CLAYEY SILT	78.79	2.91	31	2.223	<35%	29-31	173.2	-	-	-	-
85	CLAYS	50.32	3.06	49	2.255	-	-	-	3.11	1.6	.02	6
86	CLAYEY SILT TO SILTY CLAY	59.31	2.49	29	2.286	-	-	-	3.72	2.3	0	6
87	SAND TO SILTY SAND	139.16	2.15	34	2.312	35%-42%	33-35	306.1	-	-	-	-
88	SILTY SAND TO SANDY SILT	125.82	2.5	41	2.339	35%-42%	31-33	276.7	-	-	-	-
89	SAND TO SILTY SAND	204.04	2.53	50	2.365	50%-58%	35-37	448.8	-	-	-	-
90	SAND	308.04	2.27	60	2.389	65%-85%	37-39	877.6	-	-	-	-
91	SAND	319.42	2.31	62	2.412	65%-85%	37-39	702.6	-	-	-	-
92	SAND	340.07	2.4	66	2.436	65%-85%	37-39	748.1	-	-	-	-
93	SAND	362.52	2.42	71	2.46	65%-85%	37-39	797.5	-	-	-	-
94	GRAVELLY SAND TO SAND	410.44	2.45	67	2.484	>85%	37-39	902.9	-	-	-	-
95	GRAVELLY SAND TO SAND	458.85	2.44	75	2.507	>85%	37-39	1008.4	-	-	-	-
96	GRAVELLY SAND TO SAND	484.05	2.48	79	2.531	>85%	37-39	1064.8	-	-	-	-
97	GRAVELLY SAND TO SAND	485.44	2.44	79	2.555	>85%	37-39	1067.9	-	-	-	-
98	GRAVELLY SAND TO SAND	486.41	2.49	79	2.579	>85%	37-39	1070	-	-	-	-
99	GRAVELLY SAND TO SAND	484.54	2.51	79	2.603	>85%	37-39	1065.9	-	-	-	-
100.1	END OF SOUNDING	488.88										

**insitu group**

Citrus County Solid Waste Management  
Citrus County Central Landfill  
Sounding # CPT#2  
Test Date Test-Date 05-01-2009 11:52:42

FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION  
JUL 16 2009  
SOUTHWEST DISTRICT  
TAMPA

**ATTACHMENT I**  
**CITRUS COUNTY MAY 2009**  
**VIDEO INSPECTION LEACHATE PIPES**  
**2 DISKS**

**ATTENTION**

**ATTACHMENT I**

**IS A DISK  
CONTAINING A  
VIDEO  
INSPECTION**

- To view this disk please contact:

**State of Florida**

Department of Environmental Protection

Solid Waste Program

13051 North Telecom Parkway

Temple Terrace, FL 33637-0926

Phone: (813) 632-7600

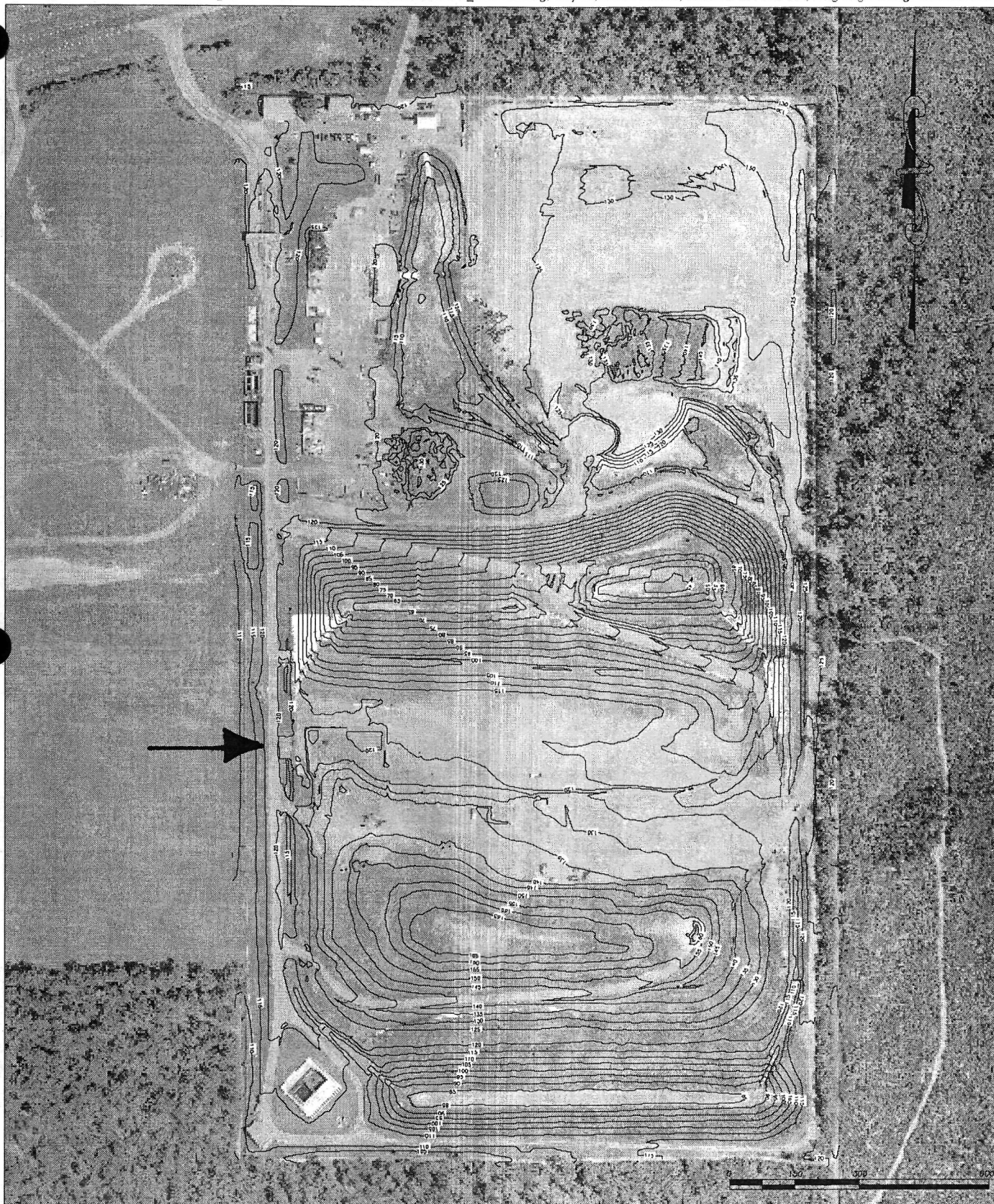


FIGURE 1. LOCATION OF PHASE 1/1A LEACHATE PIPES

**King**  
ENGINEERING ASSOCIATES, INC.  
4921 MEMORIAL HIGHWAY  
ONE MEMORIAL CENTER, SUITE 300  
JACKSONVILLE, FLORIDA 32216  
ENGINEERING LICENSE #00002610

PHONE 813 • 880 • 8881  
FAX 813 • 880 • 8882  
E-MAIL king@kingengineering.com

CITRUS COUNTY  
SOLID WASTE TRANSFER STATION  
& ASSOCIATED SITE IMPROVEMENTS

JOB NO

4217-001-001

DATE

MAY 2009

EXHIBIT

1

**BLACK & WHITE PHOTO**  
**IMAGE IS OF POOR QUALITY**

# CITRUS COUNTY CENTRAL LANDFILL

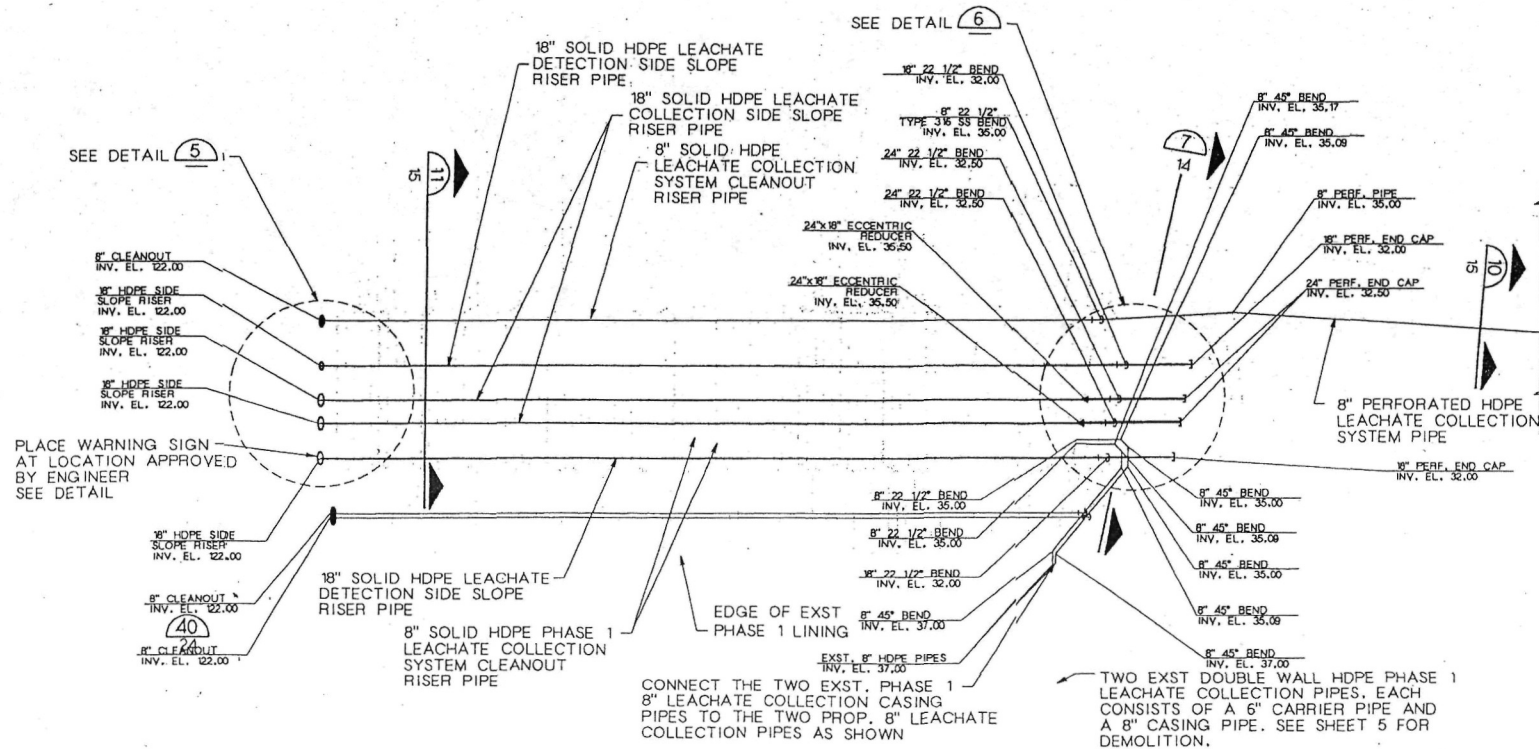


FIGURE 2. LEACHATE COLLECTION PIPING (EXCERPTED FROM 9/4/97 AS BUILT DRAWINGS  
BY CH2M HILL, SHEET 13)



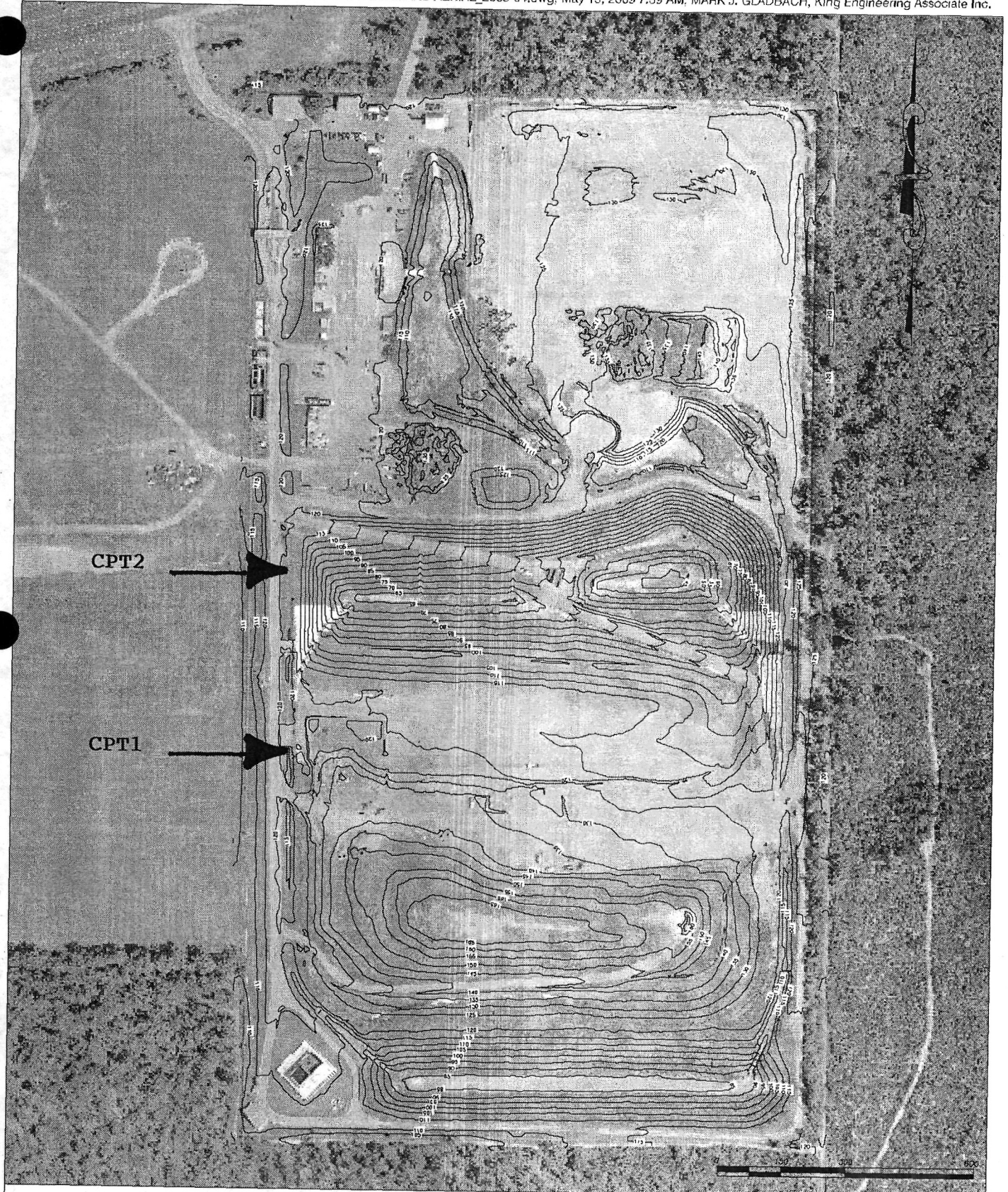


FIGURE 3. LOCATION OF CONE PENETROMETER TESTS

**BLACK & WHITE PHOTO**  
**IMAGE IS OF POOR QUALITY**

**King**  
 ENGINEERING ASSOCIATES, INC.  
 4921 MEMORIAL HIGHWAY  
 ONE MEMORIAL CENTER, SUITE 300  
 TAMPA, FLORIDA 33634  
 ENGINEERING LICENSE #00002610  
 PHONE 813 • 880 • 8881  
 FAX 813 • 880 • 8882  
 E-MAIL king@kingengineering.com

CITRUS COUNTY  
 SOLID WASTE TRANSFER STATION  
 & ASSOCIATED SITE IMPROVEMENTS

JOB NO	EXHIBIT
4217-001-001	1
DATE	
MAY 2009	



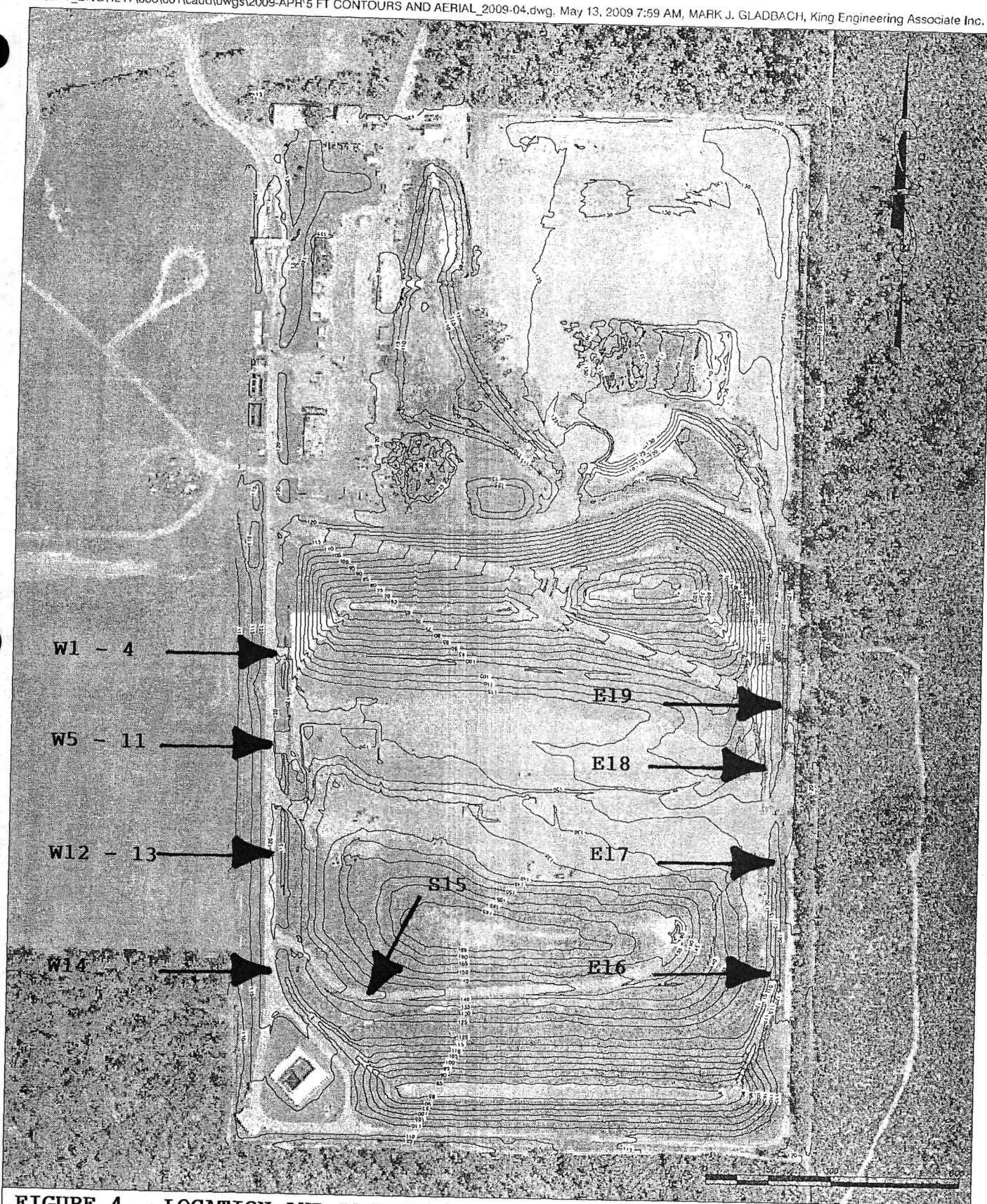


FIGURE 4. LOCATION AND DESIGNATION OF LEACHATE PIPES VIDEO INSPECTION IN MAY 2009, CITRUS COUNTY CENTRAL LANDFILL

**King**  
ENGINEERING ASSOCIATES, INC.  
4321 MEMORIAL HIGHWAY  
ONE MEMORIAL CENTER SUITE 300  
TALLAHASSEE, FLORIDA 32310  
ENGINEERING LICENSE #00002610  
PHONE 813-880-8881  
FAX 813-880-8882  
E-MAIL king@kingeng.com

CITRUS COUNTY  
SOLID WASTE TRANSFER STATION  
& ASSOCIATED SITE IMPROVEMENTS

JOB NO  
4217-001-001  
DATE  
MAY 2009

EXHIBIT  
1