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BY SOUTHWEST DISTRICT

**Hardee County Landfill
Leachate Storage Tank Facility SWMS
(Stormwater Management System)
Hardee County, FL**

**ERP Application to FDEP
June, 1997**

**HARDEE COUNTY LANDFILL
LEACHATE STORAGE TANK FACILITY
STORMWATER MANAGEMENT SYSTEM**

**APPLICATION FOR
ENVIRONMENTAL RESOURCE PERMIT
to
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**PREPARED FOR:
BOARD OF COUNTY COMMISSIONERS
HARDEE COUNTY, FLORIDA**

**PREPARED BY:
POST, BUCKLEY, SCHUH & JERNIGAN, INC.
WINTER PARK, FLORIDA**

JUNE, 1997

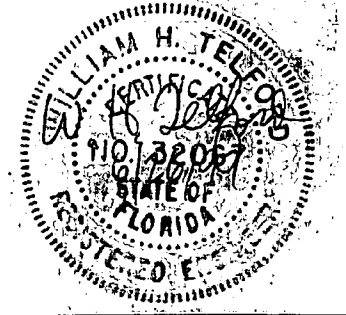


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Section H ERP Application Report

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**ENVIRONMENTAL RESOURCE
PERMIT APPLICATION**

**SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT**

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899
(904) 796-7211 OR FLORIDA WATS 1 (800) 423-1476

FOR AGENCY USE ONLY

ACOE Application # _____	DEP/WMD Application # _____
Date Received _____	Date Received _____
Proposed Project Latitude _____	Fee Received \$ _____
Proposed Project Longitude _____	Fee Receipt # _____

SECTION A

PART 1:

Are any of the activities described in this application proposed to occur in, on, or over wetlands or other surface waters?

☐ yes ☒ no

Is this application being filed by or on behalf of an entity eligible for a fee reduction? ☒ yes ☐ no

PART 2:

A. Type of Environmental Resource Permit Requested (check at least one)

- ☐ Noticed General - include information requested in Section B.
- ☐ Standard General (single family dwelling)-include information requested in Sections C and D.
- ☐ Standard General (all other projects) - include information requested in Sections C and E.
- ☒ Standard General (minor systems) - include information requested in Sections C and H.
- ☐ Standard General (borrow pits) - include information requested in Sections C and I.
- ☐ Individual (single family dwelling) - include information requested in Sections C and D.
- ☐ Individual (all other projects) - include information requested in Sections C and E.
- ☐ Individual (borrow pits) - include information requested in Sections C and I.
- ☐ Conceptual - include information requested in Sections C and E.
- ☐ Mitigation Bank (construction) - include information requested in Section C and F.

(If the proposed mitigation bank involves the construction of a surface water management system requiring another permit listed above, check the appropriate box and submit the information requested by the applicable section.)

- ☐ Mitigation Bank (conceptual) - include information requested in Section C and F.

B. Type of activity for which you are applying (check at least one)

- ☒ Construction or operation of a new system, including dredging or filling in, on or over wetlands and other surface waters. (If reapplying for an expired, denied or withdrawn permit/ application, please provide previous permit # _____.)
- ☐ Alteration or operation of an existing system which was not previously permitted by SWFWMD or DEP.
- ☐ Modification of a system previously permitted by SWFWMD or DEP. Provide previous permit # _____ and check applicable modification type.
- ☐ Alteration of a system ☐ Extension of permit duration ☐ Abandonment of a system
- ☐ Construction of additional phases of a system ☐ Removal of a system

- C. Are you requesting authorization to use State Owned Submerged Lands. ☐ yes ☒ no
If yes, include the information requested in Section G.

- D. For activities in, on or over wetlands or other surface waters, check type of federal dredge and fill permit requested:
- ☐ Individual ☐ Programmatic General ☐ General ☐ Nationwide ☒ Not Applicable

- E. Are you claiming to qualify for an exemption? ☐ yes ☒ no
If yes, provide rule number if known _____.

PART 3:		B. APPLICANT (IF OTHER THAN OWNER)	
A. OWNER(S) OF LAND			
NAME	HARDEE COUNTY BOARD OF COUNTY COMMISSIONERS	NAME	J.R. Prestridge
COMPANY AND TITLE		COMPANY AND TITLE	Assistant County Manager
ADDRESS	412 W. Orange Street	ADDRESS	412 W. Orange Street
CITY, STATE, ZIP	Wauchula, Florida 33873	CITY, STATE, ZIP	Wauchula, Florida 33873
TELEPHONE	(941)773-9430	TELEPHONE	(941)773-5089
FAX	(941)773-0958	FAX	
C. AGENT AUTHORIZED TO SECURE PERMIT (IF AN AGENT IS USED)		D. CONSULTANT (IF DIFFERENT FROM AGENT)	
NAME		NAME	William H. Telford, P.E.
COMPANY AND TITLE		COMPANY AND TITLE	Senior Drainage Engineer
ADDRESS		ADDRESS	1560 Orange Avenue, Suite 700
CITY, STATE, ZIP		CITY, STATE, ZIP	Winter Park, Florida 32789
TELEPHONE		TELEPHONE	(407)647-7275
FAX		FAX	(407)647-0624
PART 4: PROJECT INFORMATION			
A. Name of project, including phase if applicable: <u>Hardee County Landfill Leachate Storage Tank Facility</u>			
B. Is this application for part of a multi-phase project? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no			
C. Total applicant-owned area contiguous to the project: <u>97.5</u> acres			
D. Total project area for which a permit is sought: <u>1.48</u> acres			
E. Total impervious area for which a permit is sought: <u>0.82</u> acres			
F. Total area (metric equivalent for federally funded projects) of work in, on, or over wetlands or other surface waters: <u>0</u> acres or <u>0</u> square feet (<u> </u> hectares or <u> </u> square meters)			
G. Total number of new boat slips proposed: <u>0</u>			

PART 5: PROJECT LOCATION (use additional sheets, if needed)

County(ies) HARDEE

Section(s) 35 Township 33S Range 25E

Section(s) _____ Township _____ Range _____

Land Grant name, if applicable N/A

Tax Parcel Identification Number Unknown

Street address, road, or other location 675 Airport Road

City, Zip Code, if applicable Wauchula, Florida 33873

PART 6: DESCRIBE IN GENERAL TERMS THE PROPOSED PROJECT, SYSTEM, OR ACTIVITY.

Construction of an on-line treatment system stormwater pond (0.33 ac) to serve the

proposed 1.48 acre Leachate Storage Tank Facility (LSTF) located at the Hardee County

Landfill. The stormwater management system will include the pond, a control structure,

and culvert to discharge the treatment volume to the existing swale outfall.

PART 7:

- A. If there have been any pre-application meetings for the proposed project, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.

Date(s)	Location(s)	Names
<u>N/A</u>		

- B. Please identify by number any MSSW/WRM (dredge & fill)/ERP/ACOE permits or applications pending, issued or denied and any related enforcement actions at the proposed project site.

Agency	Date	Number/ Type	Action Taken
<u>SWFWMD</u>	<u>03/94</u>	<u>MSSW 407767.01</u>	<u>Permit Issued</u>

- C. Note: The following information is required for projects proposed to occur in, on or over wetlands that need a federal dredge and fill permit and/or authorization to use state owned submerged lands. Please provide the names, addresses and zip codes of property owners whose property directly adjoins the project (excluding applicant) and/or is located within a 500 foot radius of the project boundary (for proprietary authorizations, if any). Please provide a drawing identifying each owner and adjoining property lines. (Use additional sheets, if needed).

- | | |
|---------------|----------|
| 1. <u>N/A</u> | 2. _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| 3. _____ | 4. _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| 5. _____ | 6. _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

PART 8:

- A. By signing this application form, I am applying, or I am applying on behalf of the owner or applicant, for the permit and/or proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application, and represent that such information is true complete and accurate. I understand that knowingly making any false statement or representation in the application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001. I understand this is an application and not a permit and work prior to approval is a violation. I understand that this application and any permit or proprietary authorization issued pursuant thereto, does not relieve me of any obligation for obtaining any other required federal, state, water management district or local permit prior to commencement of construction. I agree, or I agree on behalf of the owner or applicant, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity.

J.R. Prestridge

Assistant County Manager

Typed/Printed Name of Owner, Applicant or Agent

Corporate Title, if applicable

Signature of Owner, Applicant or Agent

Date

6-24-97

B. AN AGENT MAY SIGN ABOVE ONLY IF THE FOLLOWING IS COMPLETED:

I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirement which may be necessary to procure the permit or authorization indicated above.

Typed/Printed Name of Owner or Applicant

Corporate Title, if applicable

Signature of Owner or Applicant

Date

C. PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

I either own the property described in this application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the Department of Environmental Protection, the Southwest Florida Water Management District and the U.S. Army Corps of Engineers necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor authorized work if a permit is granted.

J.R. Prestridge

Assistant County Manager

Typed/Printed Name

Corporate Title, if applicable

Signature

Date

- D. I certify that the engineering features of this surface water management system have been designed by me or under my responsible charge and in my professional opinion conform with sound engineering principles and all applicable rules and specifications. I further agree that I or my engineering firm will furnish the applicant/permittee with a set of guidelines and schedules for maintenance and operation of the surface water management system.

By:

Signature of Engineer of Record

- AFFIX SEAL -

William H. Telford, P.E.

No. 32067

Name (please type) FL P.E. No.

Post, Buckley, Schuh & Jernigan, Inc.

Company Name

1560 Orange Avenue, Suite 700

Company Address

Winter Park, Florida 32789

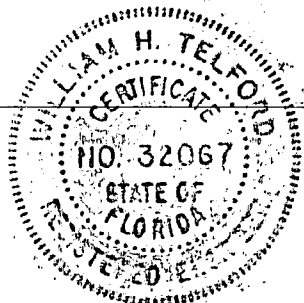
City, State, Zip

Date:

6/26/97

Phone:

(407) 647-7275



ENVIRONMENTAL RESOURCE
PERMIT APPLICATION

SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899
(904) 796-7211 OR FLORIDA WATS 1 (800) 423-1476

SECTION C

ENVIRONMENTAL RESOURCE PERMIT NOTICE OF RECEIPT OF APPLICATION

This information is required in addition to that required in other sections of the application. Please submit five copies of this notice of receipt of application and all attachments. **PLEASE SUBMIT ALL INFORMATION ON 8 1/2" BY 11" PAPER.**

Project Name: **HARDEE COUNTY LANDFILL LEACHATE STORAGE TANK FACILITY**

County: **HARDEE**

Owner: **Board of County Commissioners**

Applicant: **J.R. Prestridge**

Applicant Address: **412 W. Orange Street, Wauchula, Florida 33873**

1. Indicate the project boundaries on a USGS quadrangle map, reduced or enlarged as necessary to legibly show the entire project. If not shown on the quadrangle map, provide a location map, that shows a north arrow, a graphic scale, Section(s), Township(s), and Range(s), and detail sufficient to allow a person unfamiliar with the site to find it. **See Figure 1-1**
2. Provide the names of all wetland or other surface waters that would be dredged, filled, impounded, diverted, drained or would receive discharge (either directly or indirectly), or would otherwise be impacted by the proposed activity, and specify if they are in an Outstanding Florida Water or Aquatic Preserve: **N/A**
3. Attach a depiction (plan and section views), which clearly shows the works or other facilities proposed to be constructed. The depiction must use a scale sufficient to show the location and type of works. **See Sheet C-3**
4. Briefly describe the proposed project (such as "construct a deck with boatshelter", "replace two existing culverts", "construct surface water management system to serve 150 acre residential development"): **Construct an on-line treatment system for a 1.48 acre leachate storage tank facility located at the Hardee County Landfill.**
5. Specify the acreage of wetlands or other surface waters, if any, that are proposed to be disturbed, filled, excavated, or otherwise impacted by the proposed activity: **0.0 acres**
6. Provide a brief statement describing any proposed mitigation for impacts to wetlands and other surface waters: **N/A**

FOR AGENCY USE ONLY

Application Name _____

Application Number: _____

Office where the application can be inspected: _____

NOTE TO NOTICE RECIPIENT: The information in this notice has been submitted by the applicant and has not been verified by the Southwest Florida Water Management District. It may be subject to change prior to final agency action.

ENVIRONMENTAL RESOURCE
PERMIT APPLICATION

SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899
(904) 796-7211 OR FLORIDA WATS 1 (800) 423-1476

SECTION H

INFORMATION FOR STANDARD GENERAL ENVIRONMENTAL RESOURCE
PERMITS FOR MINOR SURFACE WATER SYSTEMS

To obtain a Standard General Permit for a Minor Surface Water Management System, the project must meet all of the requirements of Section A, Part 1 OR one of the requirements of Section A, Part 2 and both of the requirements of Section A, Part 3. Indicate which thresholds apply to your project and submit the information requested in Section B.

A. Project Thresholds

Part 1.

- ☒ The total land area does not equal or exceed 10 acres;
- ☒ The area of impervious surface will not equal or exceed two acres;
- ☒ Any activities to be conducted in, on or over wetlands or other surface waters will consist of less than 100 square feet of dredging or filling;
- ☒ The activities will not utilize pumps for stormwater management;
- ☒ The activities will not utilize storm drainage facilities larger than one 24 inch diameter pipe or its hydraulic equivalent;
- ☒ Discharges from the site will meet State water quality standards, and the surface water management system will meet the applicable technical criteria for stormwater management in the Basis of Review;
- ☒ The proposed building floors will be above the 100-year flood elevations;
- ☒ The surface water management system can be effectively operated and maintained, and;
- ☒ The proposed activities will not cause significant adverse impacts to occur individually or cumulatively.

Part 2.

- ☐ 40D-4.051(4) - DISTRICT PERMIT RECEIVED PRIOR TO OCTOBER 1, 1984
- ☐ 40D-4.051(6) - NOTICED DRI/PHASED PROJECT APPROVED PRIOR TO OCTOBER 1, 1984
- ☐ 40D-4.051(7) - NORMAL AND NECESSARY FARMING AND FORESTRY

Part 3.

- ☐ Discharges from the site will meet State water quality standards, and the surface water management system will meet the applicable technical criteria for stormwater management in the Basis of Review described in Rule 40D-4.091(1), and
- ☐ The Surface Water Management System can be effectively operated and maintained.

B. Technical and Legal Information

1. Provide a copy of the boundary survey and/or a legal description and acreage of the total land area of contiguous property owned or controlled by the applicant, including the project site.

2. Provide recent aerials, legible for photo interpretation with a scale of 1" = 400' or more detailed, with total land, project area and any on-site wetlands delineated.
3. Provide a detailed topographic map (with contours) of the site and adjacent hydrologically related area. The location and description of bench marks (minimum of one per major water control structure) should be included.
4. Describe the location, size (in acres) and type of any on-site wetlands or other surface waters.
5. Provide the project site development plan and acreage of the total area of impervious surface.
6. Provide the Surface Water Management System design plans, calculations and reports signed and sealed by a Florida Registered Professional Engineer, as required by law.
7. Provide construction drawings signed and sealed by the design engineer showing the location and details of the Surface Water Management System including but not limited to any preserved wetlands, lakes, culverts, pipes, under drains, exfiltration trenches, discharge structures, pumps and related facilities such as paving, grading and erosion or sediment control measures to be employed.
8. Indicate type of water quality treatment system used:

<input type="checkbox"/> Wet detention <input checked="" type="checkbox"/> On-line retention <input type="checkbox"/> On-line detention w/ effluent filtration	<input type="checkbox"/> Off-line retention <input type="checkbox"/> Off-line exfiltration <input type="checkbox"/> Other (explain)
--	---
9. If a Water Use Permit has been issued for the project, state the permit number.
10. Indicate how any existing wells located within the project site will be utilized or abandoned.
11. Provide a letter or other current evidence of potential acceptance by the operation and maintenance entity, if the entity is to be a public body such as a city or drainage district. If the entity is a homeowners or other association, final draft documents verifying either the present or imminent existence of such an organization and its ability to accept operation and maintenance responsibility are required.

INTRODUCTION

The project meets all of the Project Thresholds in Part 1 of Section H of the ERP application form. This report provides the Technical and Legal Information required for Section H.

PROJECT SUMMARY

The work to be performed with this project includes the construction of a leachate storage tank facility (LSTF) located at the Hardee County Landfill. The landfill is located at 675 Airport Road, Wauchula, FL, approximately one mile north of State Road 636. The 97.5-acre landfill is in the northwest quadrant of Section 35 of Township 33S, Range 25E. A copy of the legal description of the property boundaries and a USGS quad map showing the landfill location is provided in Appendix A.

The 1.48-acre LSTF area (project area) includes the proposed leachate tanks and pump station, the existing maintenance building, shed, and parking lot, and the access roads which surround them. There are no existing on-site wetlands or surface waters in the project area. There are no existing wells which will be utilized or abandoned in the project area. See Sheets 2/A and 2/B of the attached drawings for more detail.

EXISTING AND PROPOSED LAND USE AND COVER

The project area is vacant, except for the existing maintenance building, shed, and parking lot, and access roads to the north and east of the project area. These are the only impervious areas. No wetlands, surface waters, or water management areas are within the project site. The cover is grass in good condition, with a SCS Runoff Curve Number of 84.

The proposed LSTF will have 0.82 acre of impervious area and 0.33 acre of water management area (on-line retention pond). The remaining pervious area will be kept as grass in good condition, with a Curve Number of 90. A minimum time of concentration of 15 minutes was used for both the pre- and post-development conditions so as not to cause any instability in the adICPR (Advanced Interconnected Channel & Pond Routing Model, ver, 1.40) computer model used to design and analyze the system. See Appendix B for Curve Number data and calculations and Appendix D for model input data and results.

POND AND CONTROL STRUCTURE DESIGN

The pond was designed to meet or exceed the criteria of retaining 0.5" of rainfall over the project area, or 2686 cubic feet. The actual treatment volume is 6490 cubic feet (0.210 ac.-ft.) at the overflow elevation of 83.00 ft., NGVD. Treatment volume and overflow elevation were used in the recovery analysis, discussed in the following section.

The pond will discharge through a FDOT Type C ditch bottom inlet with top of grate elevation at 83.0. A 75', 18" RCP culvert will carry the water under the southern portion of the LSTF access road to a downstream FDOT Type C ditch bottom inlet with sediment sump, weep hole, and slot.

The top of grate elevation of the downstream inlet is 82.5. The weep hole, and a 6" slot from the inlet top to elevation 81.0, will drain the pipe and inlets. See Sheet C-3 of the attached drawings for more detail on the stormwater system, pipe invert elevations, and inlets.

RECOVERY ANALYSIS

Recovery of the treatment volume is analyzed using the Modified MODRET methodology. It is a modification of the methodology developed by Andreyev and Wiseman for the SWFWMD. The calculations are done by hand, using the procedures outlined in Section 26 of the SJRWMD Applicant's Handbook: Regulation of Stormwater Management Systems, April 11, 1994. A copy of the text and figures is included in Appendix C.

Recovery is estimated by first calculating the volume recovered by vertical unsaturated flow through the bottom of the pond, then adding the volume recovered by lateral saturated flow through the sides of the pond. This method is somewhat conservative in that there is no credit for evapotranspiration or seepage during the storm. The volumes recovered, and the time for recovery, are used to determine compliance with the on-line retention system design requirements and the initial pond elevation in the 25-year, 24-hour storm flood routing.

Based on the results of the recovery analysis, presented in Appendix C, the pond will recover the treatment volume in 25.95 hours. The pond elevation is 82.0 ft., NGVD after 36 hours. This is used as the initial pond elevation in the 25-year, 24-hour storm flood routing.

FLOOD ROUTING

Flood routing of the 25-year, 24-hour storm was modeled using adICPR. Based on the results, presented in Appendix D, the maximum stage is 83.33 ft., NGVD based on an initial pond elevation of 82.0 ft., NGVD. The maximum post-development off-site discharge, 6.16 cfs, is less than the maximum pre-development off-site discharge of 7.38 cfs.

EVIDENCE OF POTENTIAL ACCEPTANCE

Proof of ownership of the Hardee County Landfill is provided in Appendix E as evidence of potential acceptance.

CERTIFICATION OF FISCAL HARDSHIP

A permit fee reduction is allowed for counties with population not more than 50,000 and meeting other criteria specified in Ch. 40D-1.608. From the 1995 Florida Statistical Abstract published by the University of Florida, the census population of Hardee County in 1990 was 19,499 and the estimated population in 1997 would be approximately 23,000. Certification of fiscal hardship, based on an ad valorem millage rate greater than 8 mils, is provided in Appendix F.

APPENDIX A

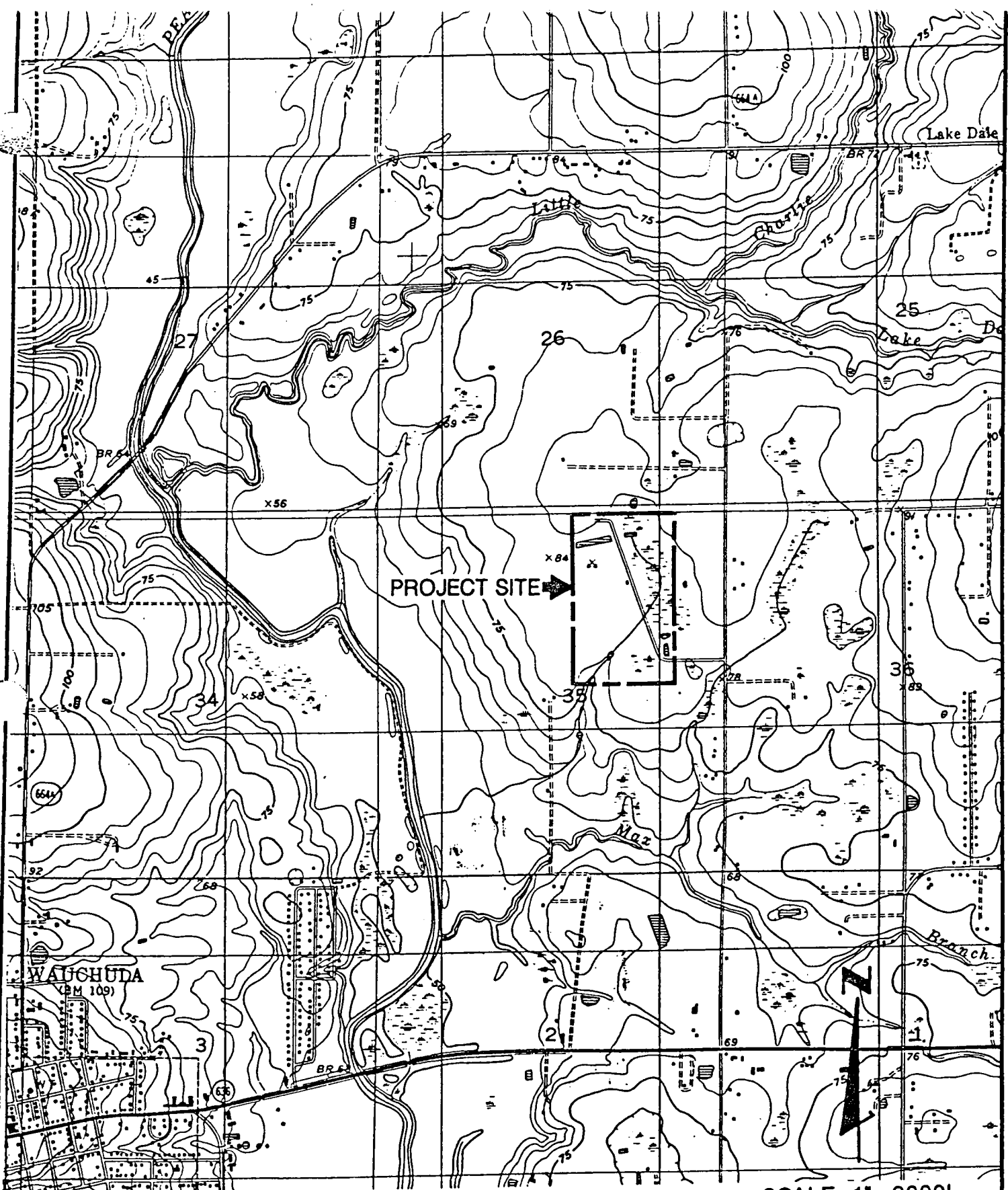
Legal Description, USGS Quad Map, and FIRM Map

SCHEDULE "A"

Begin at the Southeast corner of the NE $\frac{1}{4}$ of Section 35, Township 33 South, Range 25 East, and go West 660 feet to the Point of Beginning, thence run North 2,640 feet, thence West 1,650 feet, thence South 2,310 feet, thence East 330 feet, thence South 330 feet, thence East 1,320 feet to the Point of Beginning;

Together with an non-exclusive easement over, along and across the real property located in Hardee County, Florida, described as follows:

Begin at the Southeast corner of the NE $\frac{1}{4}$ of Section 35, Township 33 South, Range 25 East, and go West 660 feet, thence North 455 feet to a Point of Beginning, being a tract of land 30 feet right and 30 feet left of the following described line: From a point of beginning proceed East approximately 660 feet to the centerline of Airport Road.



SOURCE: U.S.G.S. TOPOGRAPHIC MAP OF
WAUCHULA, FL QUADRANGLE (1954-55, PHOTOREVISED 1987)

SCALE: 1"=2000'



U.S.G.S. QUAD MAP
HARDEE COUNTY REGIONAL LANDFILL
OPERATION PERMIT RENEWAL

FIGURE 1-1

26

ZONE X

ZONE AE

AV

SITE LOCATION

ZONE X

ZONE X

ONE AE

AV

35

ZONE X

LEGEND



SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.



FLOODWAY AREAS IN ZONE AE



OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.



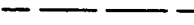
OTHER AREAS

ZONE X Areas determined to be outside 500-year flood plain.

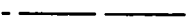
ZONE D Areas in which flood hazards are undetermined.



Flood Boundary



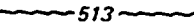
Floodway Boundary



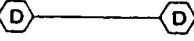
Zone D Boundary



Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.



Base Flood Elevation Line; Elevation in Feet*



Cross Section Line

(EL 987)

Base Flood Elevation in Feet Where Uniform Within Zone*

RM 7_x

Elevation Reference Mark

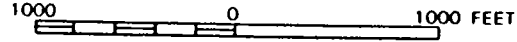
•M1.5

River Mile

*Referenced to the National Geodetic Vertical Datum of 1929



APPROXIMATE SCALE



SOURCE:

FLOOD INSURANCE RATE MAP, HARDEE COUNTY, FL & INCORPORATED AREAS. PANEL 185 (REVISED 5/4/88)

HARDEE COUNTY REGIONAL LANDFILL SITE AREA FLOOD MAP

FIGURE 4-1

APPENDIX B

Stormwater Management System Data and Calculations

Pond Design Calculations

Hardee County Landfill Leachate Storage Tank Facility

Pre-Development

Total Area	64469 sq. ft.
Pervious Areas (Except Water Management Areas)	50377 sq. ft.
Water Management Areas	0 sq. ft.
Impervious Area, Total	14092 sq. ft.

Post-Development

Total Area	64469 sq. ft.
Pervious Areas (Except Water Management Areas)	14810 sq. ft.
Water Management Areas	14157 sq. ft.
Impervious Area, Total	35502 sq. ft.

Treatment Volume (Computed)	
0.5" over Total Area (On-line Retention)	2686 cu. ft.

Proposed On-line Retention Pond Stage-Area-Storage Curve

	Stage (feet)	Area (sq. ft.)	Storage (cu. ft.)	
Pond Bottom Elevation	82.00	3850	0	
Treatment Volume Elevation	83.00	9130	6490	> 2686 cu. ft.
Top of Bank Elevation	83.60	14157	13476	

Proposed On-line Retention Pond Stage-Area-Storage Curve

	Stage (feet)	Area (ac.)	Storage (ac. ft.)
Pond Bottom Elevation	82.00	0.088	0.000
Treatment Volume Elevation	83.00	0.210	0.149
Top of Bank Elevation	83.60	0.325	0.309

Hardee County Landfill Leachate Storage Tank Facility **Weighted Curve Number Calculations**

Area : **LSTF**
Basin: **Pre-Development**

Drainage Area = **64469 sq. ft.**
Normal Water Elev. = **N/A**

Curve Number (CN): (ref. SCS TR-55, Second Ed., June 1986, Table 2-2a.)

Land Use	Hydrologic Soil Group								Product sq. ft. x CN	Total Area	% of Total
	A		B		C		D				
	sq. ft.	CN	sq. ft.	CN	sq. ft.	CN	sq. ft.	CN			
Pavement, Buildings, etc.		98		98		98	14092	98	1381016	14092	22%
Open Space, Good Cond.		39		61		74	50377	80	4030160	50377	78%
Water Management		39		61		74	0	80	0	0	0%
Total	0		0		0		64469		5411176	64469	100%

Weighted CN = Total Product / Total Area = 84

Area : **LSTF**
Basin: **Post-Development**

Drainage Area = **64469 sq. ft.**
Normal Water Elev. = **N/A**

Curve Number (CN): (ref. SCS TR-55, Second Ed., June 1986, Table 2-2a.)

Land Use	Hydrologic Soil Group								Product sq. ft. x CN	Total Area	% of Total
	A		B		C		D				
	sq. ft.	CN	sq. ft.	CN	sq. ft.	CN	sq. ft.	CN			
Pavement, Buildings, etc.		98		98		98	35502	98	3479196	35502	55%
Open Space, Good Cond.		39		61		74	14810	80	1184800	14810	23%
Water Management		39		61		74	14157	80	1132560	14157	22%
Total	0		0		0		64469		5796556	64469	100%

Weighted CN = Total Product / Total Area = 90

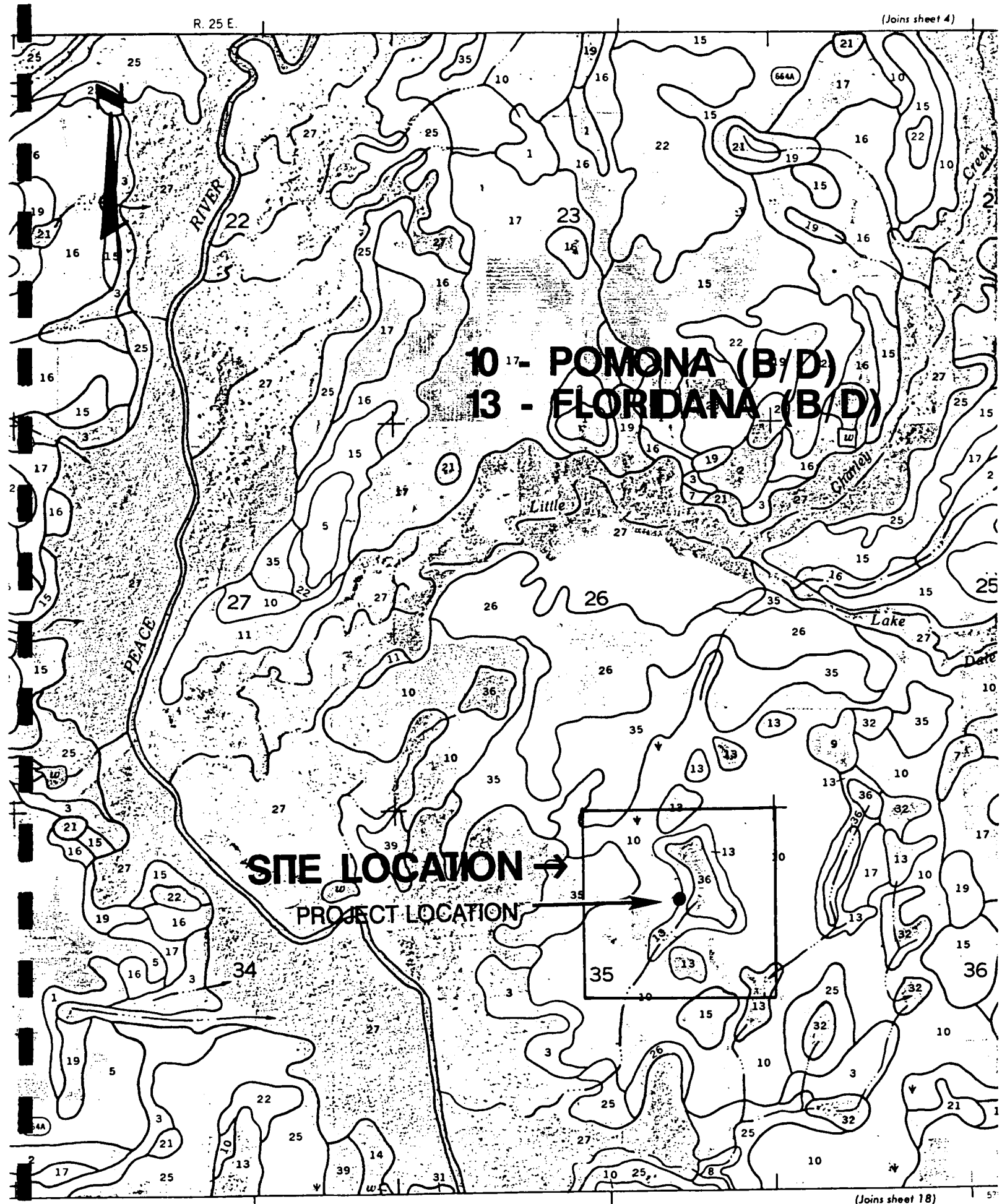


TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "frequent," "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Ini-tial	Total	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>	<u>In</u>		
1----- Adamsville	C	None-----	---	---	2.0-3.5	Apparent	Jun-Nov	---	---	Low-----	Moderate.
2----- Zolfo	C	None-----	---	---	2.0-3.5	Apparent	Jun-Nov	---	---	Low-----	Moderate.
3----- Ft. Green	D	None-----	---	---	0-1.0	Apparent	Jun-Sep	---	---	High-----	Moderate.
4----- Apopka	A	None-----	---	---	>6.0	---	---	---	---	Moderate	High.
5----- Tavares	A	None-----	---	---	3.5-6.0	Apparent	Jun-Dec	---	---	Low-----	High.
6----- Candler	A	None-----	---	---	>6.0	---	---	---	---	Low-----	High.
7----- Basinger	B/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	---	---	High-----	Moderate.
8----- Bradenton	D	Frequent----	Brief-----	Jun-Nov	0-1.0	Apparent	Jun-Dec	---	---	High-----	Low.
9*----- Popash	D	None-----	---	---	+2-1.0	Apparent	Jun-Mar	---	---	Moderate	Moderate.
10----- Pomona	B/D	None-----	---	---	0-1.0	Apparent	Jul-Sep	---	---	High-----	High.
11----- Felda	B/D	None-----	---	---	0-1.0	Apparent	Jul-Mar	---	---	High-----	Moderate.
12----- Felda	B/D	Frequent----	Brief-----	Jul-Feb	0-1.0	Apparent	Jul-Mar	---	---	High-----	Moderate.
13*----- Floridana	B/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	---	---	Moderate	Low.
15----- Immokalee	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	---	---	High-----	High.
16----- Myakka	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	---	---	High-----	High.
17----- Smyrna	B/D	None-----	---	---	0-1.0	Apparent	Jul-Oct	---	---	High-----	High.
18----- Cassia	C	None-----	---	---	1.5-3.5	Apparent	Jul-Jan	---	---	Moderate	High.
19----- Ona	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	---	---	High-----	High.
20*----- Samsula	B/D	None-----	---	---	+2-1.0	Apparent	Jan-Dec	16-20	30-36	High-----	High.
21*----- Placid	B/D	None-----	---	---	+2-1.0	Apparent	Jun-Mar	---	---	High-----	High.
22----- Pomello	C	None-----	---	---	2.0-3.5	Apparent	Jul-Nov	---	---	Low-----	High.
23----- Sparr	C	None-----	---	---	1.5-3.5	Apparent	Jul-Oct	---	---	Moderate	High.

APPENDIX C

Recovery Analysis

RECOVERY ANALYSIS

PROPOSED ON-LINE RETENTION POND

Leachate Storage Tank Facility Stormwater Management System

Ref: Section 26.0 of the SJRWMD Applicant's Handbook: Regulation of Stormwater Management Systems April 11, 1994

OBJECTIVE

- a) To design the Pond/Swale system in order to recover the treatment volume in 72 hours.
- b) Determine the volume discharged (and pond elevation) after 36 hours.

These calculations will model the recovery of the treatment volume of the LSTF Pond. Recovery is assumed to occur only in the Pond, by infiltration alone. No credit is taken for evapotranspiration or seepage, inside or outside of the pond, during the storm event.

GIVEN:

<u>PARAMETER</u>	<u>VALUE</u>	<u>UNITS</u>	<u>SOURCE</u>
Pond Bottom Elevation	82.0	ft, NGVD	1
Overflow Elevation	83.0	ft, NGVD	1
SHGWT Elevation	80.0	ft, NGVD	4
Clay Layer Elevation	72.0	ft, NGVD	2
Clay Layer Thickness	10.0	feet	2
Porosity (f)	0.20	unitless	3
Permeability (K)	12.0	feet per day	4
Treatment Volume	6490	cubic feet	1
Pond Bottom Area (Ab)	3850	square feet	1

Source 1: See "Pond Design Calculations"
Source 2: PSI Geotechnical Report
Source 3: SJRWMD Applicant's Handbook, Section 26.4.5
Source 4: Conservative estimate based on SCS Soil Survey of Hardee County, FL

Part I - Calculate Treatment Volume Elevation in Pond/Swale System

STEP 1.

Stage-Storage Relationship of the Pond/Swale System, from "Pond Design Calculations".

	Stage (ft., NGVD)	Storage (cu. ft.)
	82.00	0
Treatment Volume Elevation	83.00	6490
	83.60	13476

Part II - Unsaturated Vertical Flow Analysis

STEP 2.

Determine if saturated lateral flow will occur (Treatment Volume Depth > Unsaturated Soil Height).

$$H_v = \text{Treatment Volume Depth} = \text{Treatment Volume Elevation} - \text{Pond Bottom Elevation}$$

$$\begin{aligned} H_v &= 83.00 - 82.0 \\ &= 1.00 \text{ ft.} \end{aligned}$$

$$H_u = \text{Unsaturated Soil Height} = \text{Porosity} * \text{Height of Pond Bottom Above SHGWT}$$

$$\begin{aligned} H_u &= 0.20 * (82.0 - 80.0) \\ &= 0.40 \text{ ft.} \end{aligned}$$

Saturated Lateral Flow Will Occur ($H_v > H_u$)

STEP 3.

Calculate the volume of water infiltrated in unsaturated vertical flow.

V_u = Volume Infiltrated During Unsaturated Vertical Flow

= Pond Bottom Area * Height of Pond Bottom Above SHGWT * Porosity

$$V_u = 3850.0 * 0.20 * (82.0 - 80.0)$$

$$= 1540 \text{ cu. ft.}$$

STEP 4.

Calculate the time to infiltrate the volume, V_u , in unsaturated vertical flow.

T_{sat} = Time to Soil Saturation Beneath the Pond Bottom = $f * H_b / I_d$

where: f = Fillable Porosity = 0.20

H_b = Height of Basin Bottom Above SHGWT = 2.0 ft.

I_d = Design Infiltration Rate = K_{vu}/FS

and K_{vu} = Vertical Unsaturated Permeability = $(2 / 3) * K$

K = Permeability = 12.0 fpd

FS = Factor of Safety = 2.0

Thus: $K_{vu} = (2 / 3) * K = 8.0 \text{ fpd}$

and $I_d = K_{vu}/FS = 4.0 \text{ fpd}$

$$T_{sat} = f * H_b / I_d = \underline{0.10} \text{ day}$$

$$T_{sat} = \underline{2.4} \text{ hours}$$

Part III - Saturated Lateral Flow Analysis

STEP 5.

Calculate the remaining treatment volume to be recovered under saturated lateral flow conditions.

$$V_s = \text{Remaining Treatment Volume} = \text{Treatment Volume} - \text{Volume Infiltrated}$$

$$\begin{aligned} V_s &= 6490 - 1540 \\ &= 4950 \quad \text{cu. ft.} \end{aligned}$$

The Remaining Treatment Volume, V_s , is between elevation 82.0 and 83.00. Interpolating:

$$\begin{aligned} V_s \text{ Elevation} &= (83.00 - 82.0) * [(4950 - 0) / (6490 - 0)] + 82.0 \\ &= 82.8 \quad \text{ft, NGVD} \end{aligned}$$

STEP 6.

Calculate F_y and F_x .

At the Start of Saturated Lateral Flow:

$$H_t = \text{Height of Water Above SHGWT} = V_s \text{ Elevation (T = 0)} - \text{SHGWT Elevation}$$

$$\begin{aligned} H_t &= 82.8 - 80.0 \\ &= 2.8 \quad \text{ft.} \end{aligned}$$

At the End of Saturated Lateral Flow:

$$H_c = \text{Height of Water Above SHGWT} = V_s \text{ Elevation (T = T}_{\text{total}}) - \text{SHGWT Elevation}$$

$$\begin{aligned} H_c &= 82.0 - 80.0 \\ &= 2.0 \quad \text{ft.} \end{aligned}$$

$$F_y = \text{Dimensionless Parameter} = H_c / H_t = \underline{0.72}$$

$$L/W = \text{Pond Length to Width Ratio} = \text{Pond Bottom Length} / \text{Pond Bottom Width}$$

$$A_b = \text{Pond Bottom Area} = 3850 \quad \text{sq. ft.}$$

$$L = \text{Pond Bottom Length} = 110.0 \quad \text{ft.}$$

$$W = \text{Pond Bottom Width} = 35.0 \quad \text{ft.}$$

$$L/W = 3.1$$

From Figure 26-6, for $f = 0.20$, $L/W = 3$, and $F_y = 0.72$

$$F_x = \text{Dimensionless Parameter} = \underline{1.70}$$

STEP 7.

Calculate the time to recover the remaining treatment volume.

T = Time to Recover the Remaining Treatment Volume

$$W = \text{Pond Bottom Width} = 35.0 \text{ ft.}$$

$$K_h = \text{Horizontal Permeability} = 12.0 \text{ fpd}$$

$$D = \text{Average Saturated Thickness} = H + H_b / 2 = 9.0 \text{ ft.}$$

where H = SHGWT Elevation - Clay Layer Elevation = 8.0 ft.

$$F_x = \text{Dimensionless Parameter} = 1.70$$

$$T = W^2 / (4 * K_h * D * F_x^2) = \underline{0.98} \text{ day}$$

$$T = \underline{23.55} \text{ hours}$$

STEP 8.

Calculate the total time to recover the treatment volume.

T_{total} = Time to Recover Under Vertical Unsaturated and Lateral Saturated Flow

$$T_{\text{total}} = T_{\text{sat}} + T = \underline{25.95} \text{ hours}$$

The design meets the 72 hour recovery time criteria

The water surface elevation of the pond after 36 hours is 82.00 ft., NGVD

Excerpts from the SJRWMD Applicant's Handbook

The District only reviews the models for a minimum level of proficiency. The District can neither endorse any program nor certify program results.

Applicants are encouraged to receive District acceptance of programs not on the list prior to application submittal to avoid permitting delays associated with review of the model.

If applicants wish to calculate retention basin recovery by hand, acceptable methodologies and design examples are described in the following sections.

26.3.4 Accepted Methodology for Estimating Vertical Unsaturated Flow

Vertical unsaturated flow consists of primarily downward movement of water stored in the basin into an unsaturated portion of the soil profile existing beneath the basin (Mongeau 1991). Vertical unsaturated flow only applies when the groundwater table or mound is below the retention basin bottom. Acceptable methodologies for calculating unsaturated vertical infiltration include the Green and Ampt equation, Hantush equation, Horton equation, Darcy equation employing an unsaturated coefficient of permeability, and Holton equation. Andreyev and Wiseman (1989) utilized the following methodology in the MODRET computer program to estimate recovery in retention basins during unsaturated vertical flow. This methodology, which can easily be solved by hand, utilizes the modified Green and Ampt infiltration equation:

$$I_d = \frac{K_{vu}}{FS} \quad (26-1)$$

where: I_d = Design infiltration rate
 K_{vu} = Unsaturated vertical hydraulic conductivity
 FS = Factor of safety (recommend $FS = 2.0$)

The time to saturate (t_{sat}) the soil mass below the basin is:

$$t_{sat} = \frac{f h_b}{I_d} \quad (26-2)$$

where: t_{sat} = Time to saturate soil below the basin
 h_b = Height of basin bottom above the groundwater table
 f = Fillable porosity (generally 0.2 to 0.3)

See Figure 26-2 for a schematic of the retention basin with the appropriate design parameters illustrated for vertical unsaturated flow conditions.

The total volume of water required to saturate the soil below the basin bottom (V_u) can be calculated as follows:

$$V_u = A_b h_b f \quad (26-3)$$

where: A_b = Area of basin bottom

Likewise, the height of water required to saturate the soil below the basin bottom (h_u) can be calculated using:

$$h_u = f h_b \quad (26-4)$$

Recovery of the treatment storage will occur entirely under vertical unsaturated flow conditions when:

- (a) Treatment volume $\leq V_u$; or
- (b) Height of the treatment volume (h_v) in the basin $\leq h_u$

If recovery of the treatment storage occurs entirely under vertical unsaturated conditions, analysis of the system for saturated lateral flow conditions will not be necessary.

This simplified approach is conservative because it does not consider the horizontal movement of water from the ground water mound that forms during this stage. In cases where the horizontal permeability is great, a more accurate estimate of the total vertical unsaturated flow can be obtained by using the Hantush equation. However, horizontal permeability of the unsaturated zone must be determined using an appropriate field or laboratory test.

The factor of safety (FS) is recommended to account for flow losses due to basin bottom siltation and clogging. For most sandy soils the fillable porosity (f) is approximately 0.2 to 0.3. The unsaturated vertical hydraulic conductivity (K_{uv}) can be measured using the field testing procedures or laboratory methods recommended in section 26.4.

A design example for utilizing the above methodology is presented below in section 26.5.

26.3.5 Methodology for Analyzing Recovery by Lateral Saturated Flow by Hand

If the ground water mound is at or above the basin bottom, the rate of water level decline in the basin is directly proportional to the rate of mound recession in the saturated aquifer. One methodology for analyzing lateral saturated flow from retention basins by hand is presented by Andreyev and Wiseman (1989) as part of their MODRET report. During

the District's retention basin study, PSI/Jammal and Associates (1993) discovered that the MODRET model was producing unstable MODFLOW solutions when modeling the recovery of some of the retention basins monitored. This problem generally occurs when one or a combination of the following is true:

- The pond dimensions are relatively large (greater than 100 feet)
- The aquifer is relatively thin (less than 5 feet)
- The horizontal hydraulic conductivity is relatively low (less than 5 ft/day)

Therefore, the above parameters should be checked prior to utilizing the MODRET saturated lateral flow analysis presented below.

Andreyev and Wiseman (1989) used the MODFLOW groundwater flow computer model developed by the U.S. Geological Survey to generate a series of dimensionless curves to predict retention basin recovery under lateral saturated flow (Stage Two) conditions. The dimensionless parameters can be expressed as:

$$F_x = \sqrt{\frac{W^2}{4 K_H D t}} \quad (26-5)$$

$$F_y = \frac{h_c}{H_T} \quad (26-6)$$

- where:
- F_x = Dimensionless parameter representing physical and hydraulic characteristics of the retention basin and effective aquifer system (x-axis)
 - F_y = Dimensionless parameter representing percent of water level decline below a maximum level (y-axis)
 - W = Average width of the retention basin, midway between basin bottom and water level at time t (ft)
 - K_H = Average horizontal hydraulic conductivity (ft/day)
 - D = Average saturated thickness of the aquifer (ft)
 - t = Cumulative time since saturated lateral (Stage Two) flow started (days)
 - h_c = Height of water in the basin above the initial ground water table at time t (ft)
 - H_T = Height of water in the basin above the initial ground water table at the start of saturated lateral (Stage Two) flow (ft)

The average saturated thickness of the aquifer (D) can be expressed as:

$$D = H + \frac{h_c}{2} \quad (26-7)$$

where: H = Initial saturated thickness of the aquifer (ft)

The height of water in the basin above the initial groundwater table at the start of saturated lateral (Stage Two) flow (H_T) is:

$$H_T = h_b + h_2 \quad (26-8)$$

where: h_2 = Height of water in the basin above the basin bottom at the start of saturated lateral (Stage Two) flow (ft)

Figure 26-3 contains an illustration of the design parameters for analysis of saturated lateral (Stage Two) flow conditions. The design parameters for a retention system utilizing both unsaturated vertical (Stage One) and saturated lateral (Stage Two) flow is represented in Figure 26-4.

The equation for F_x can be rearranged to solve for the time (t) to recover the remaining treatment volume under saturated lateral (Stage Two) flow:

$$t = \frac{W^2}{4 K_H D F_x^2} \quad (26-9)$$

Andreyev and Wiseman (1989) developed four families of dimensionless curves for fillable porosity (f) = 0.1, 0.2, 0.3, and 0.4. Five individual curves, for length to width ratios of 1, 2, 4, 10, and 100 were developed for each family. The resulting dimensionless curves are presented on Figures 26-5 through 26-8. These curves can be used to calculate the recovery time given the hydraulic parameters of the aquifer, the recharge rate, and the physical configuration of the basin. An example design problem utilizing both unsaturated vertical (Stage One) and saturated lateral (Stage Two) flows to estimate the recovery time is given below in section 26.5.

Section 26.4 Recommended Field and Laboratory Tests for Aquifer Characterization

The following field and laboratory investigation and testing guidelines are recommended for aquifer characterization and are described in more detail in District Special Publication SJ93-SP10.

26.4.1 Definition of Aquifer Thickness

Standard Penetration Test (SPT) borings (ASTM D-1586) or auger borings (ASTM D 1452) should be used to define the thickness of the mobilized aquifer (i.e., depth to "hardpan" or restrictive layer) especially where the ground water table is high. This type

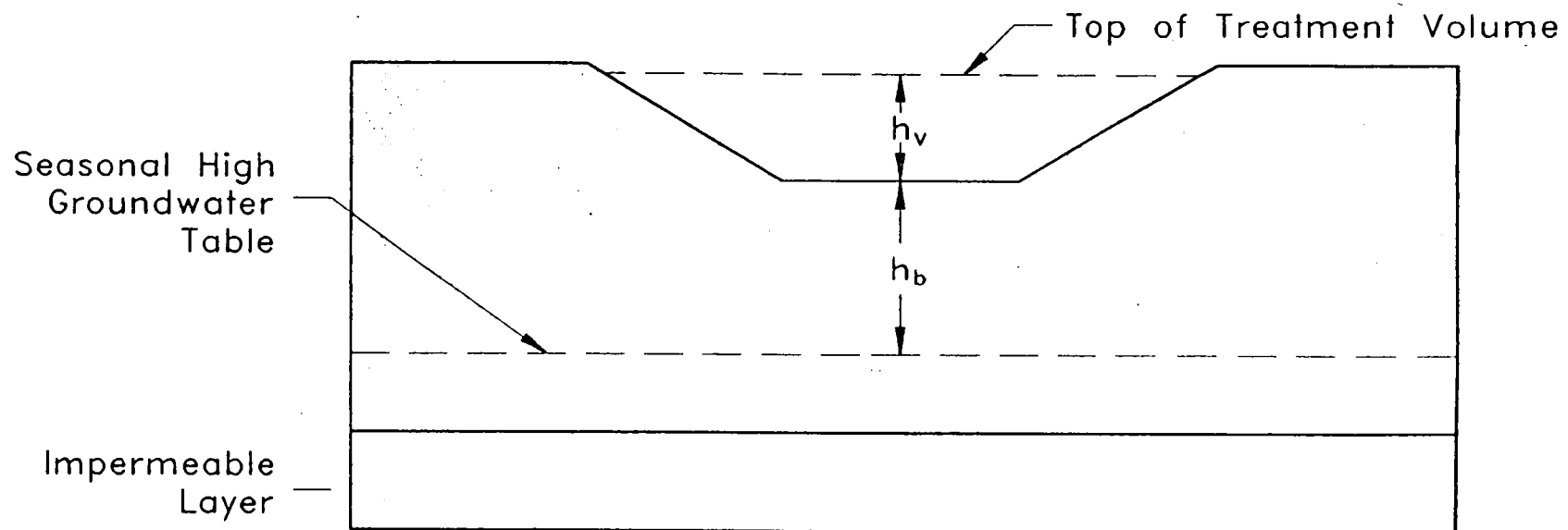


Figure 26-2. Design Parameters for Analysis of Stage One (vertical) Flow

Source: Andreyev and Wiseman (1989).

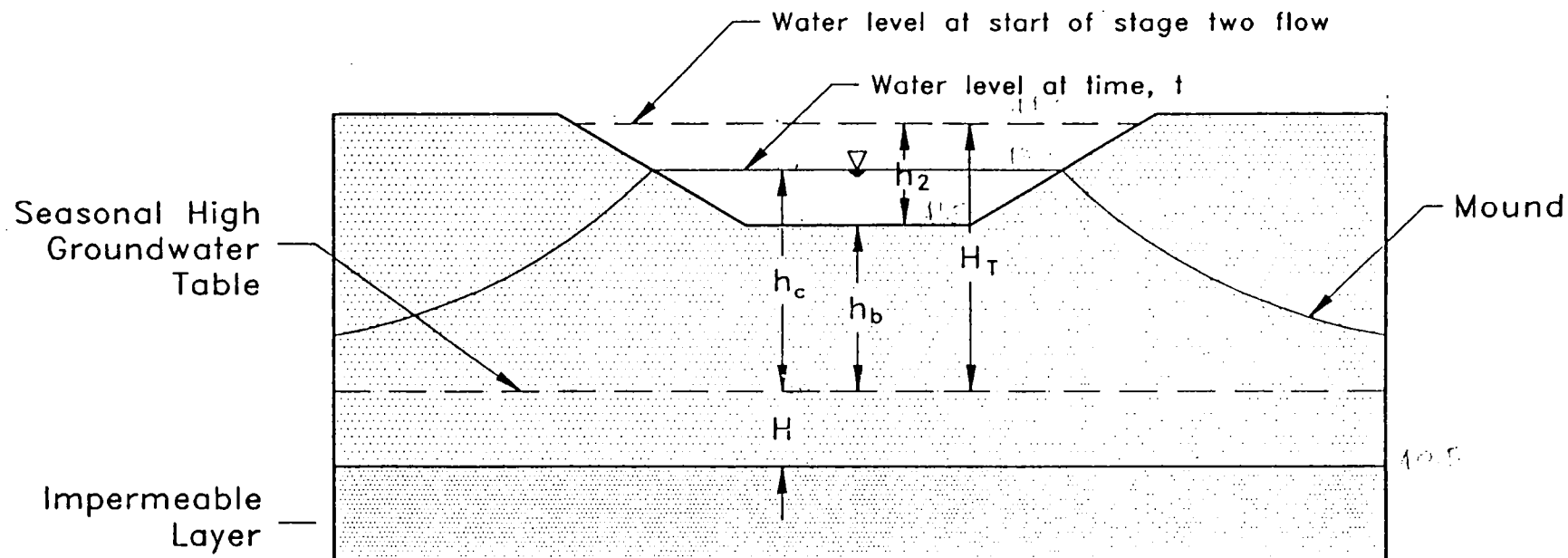
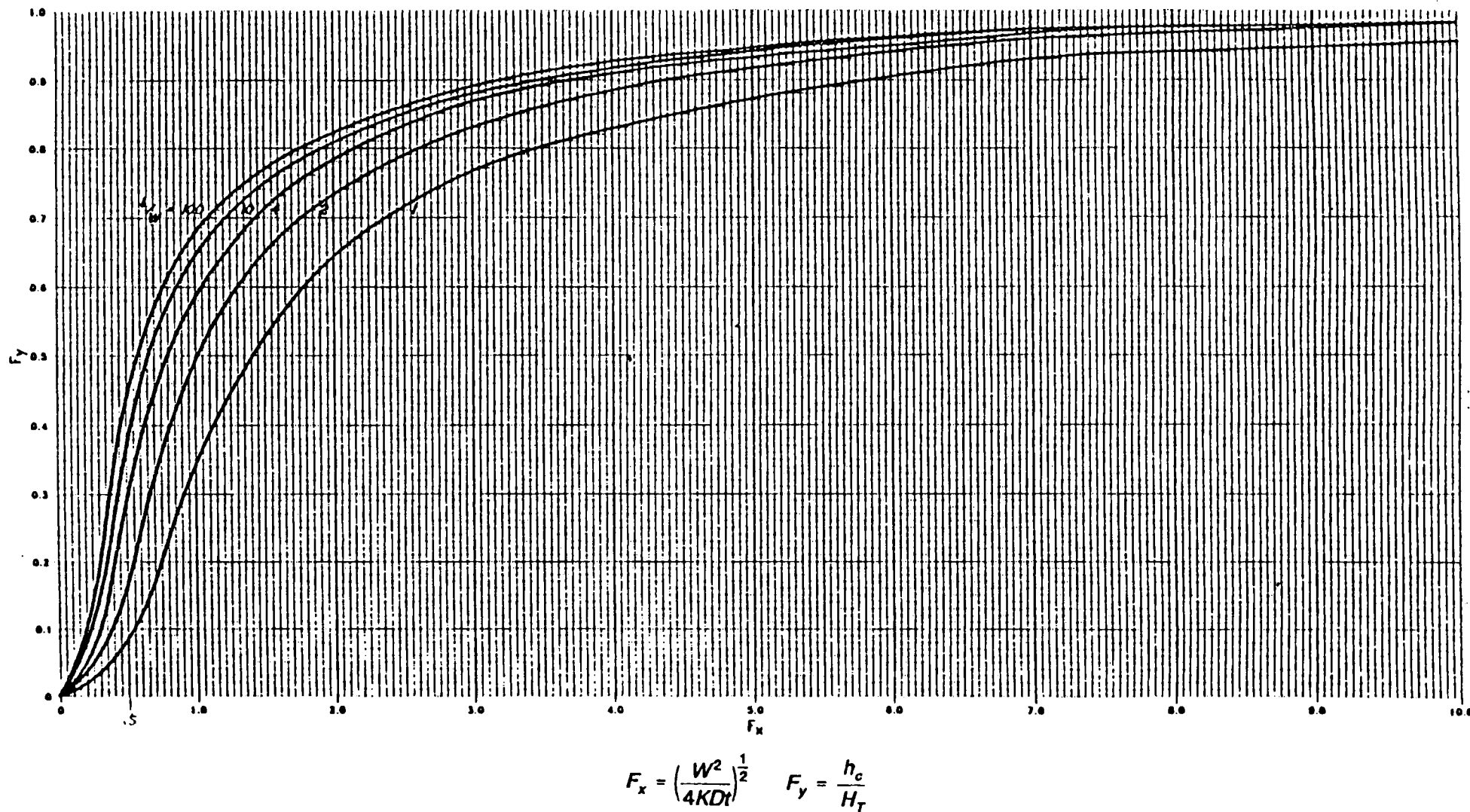


Figure 26-3. Design Parameters for Groundwater Mounding Analysis for Stage Two (lateral) Flow

Source: Andreyev and Wiseman (1989).



Dimensionless Curves Relating Basin Design Parameters to Basin Water Level
in a Rectangular Retention Basin Over an Unconfined Aquifer ($f = 0.2$)

Figure 26-6

Source: Andreyev and Wiseman (1989).

26.4.5 Estimation of Fillable Porosity

In Florida, the receiving aquifer system for retention basins predominantly comprises poorly graded (i.e., relatively uniform particle size) fine sands. In these materials, the water content decreases rather abruptly with the distance above the water table and they therefore have a well-defined capillary fringe.

Unlike the hydraulic conductivity parameter, the fillable porosity value of the poorly graded fine sand aquifers in Florida are in a much narrower range (20 to 30 percent), and can therefore be estimated with much more reliability. For fine sand aquifers, it is therefore recommended that a fillable porosity in the range 20 to 30 percent be used in infiltration calculations. The higher values of fillable porosity will apply to the well- to excessively-drained, hydrologic group "A" fine sands, which are generally deep, contain less than 5 percent by weight passing the U.S. No. 200 (0.074 mm) sieve, and have a natural moisture content of less than 5 percent. No specific field or laboratory testing requirements is recommended to estimate this parameter.

26.5 Design Example for Retention Basin Recovery

The following design example is for estimating retention basin recovery by hand utilizing the methodologies in sections 26.3.4 and 26.3.5.

Given: Commercial project discharging to Class III waters

Drainage area = 1.5 acres

Percent impervious = 60%

Off-site drainage area = 0 acres

On-line treatment

$f = 0.30$; $K_{v,} = 2$ ft/day; $K_H = 10$ ft/day; $FS = 2.0$

Basin bottom elevation = 20.0 feet

Seasonal high groundwater table elevation = 17.0 feet

Impervious layer elevation = 14.0 feet

Rectangular retention basin with bottom dimensions of length = 100 ft and width = 50 ft

The proposed detention basin has the following stage-storage relationship:

<u>Stage (ft)</u>	<u>Storage (ft³)</u>
20.00	0
20.25	1278
20.50	2615
20.75	4011
21.00	5468
21.25	6988

Objective: Calculate the time to recover the treatment volume.

Design Calculations

Part I. Calculate the Treatment Volume and the Height of the Treatment Volume in the Basin

Step 1. Calculate the required treatment volume. For on-line retention, the rule requires retention of 0.5 inches of runoff or 1.25 inches times the impervious area, whichever is greater, plus an additional 0.5 inch.

$$0.5'' \text{ volume} = \frac{(1.5 \text{ ac}) (0.5 \text{ in}) (43560 \text{ ft}^2/\text{ac})}{12 \text{ in/ft}} = 2723 \text{ ft}^3$$

$$1.25'' \times \text{imp. area} = \frac{1.5 \text{ ac} (0.6) (1.25 \text{ in}) (43560 \text{ ft}^2/\text{ac})}{12 \text{ in/ft}} = 4084 \text{ ft}^3$$

$$\text{Total treatment volume} = 2723 + 4084 = 6807 \text{ ft}^3$$

Step 2. Calculate the height of the treatment volume in the basin. Using the stage/storage data, we see that 6807 ft³ is between elevation 21.0 and 21.25 ft. Interpolating:

$$\text{Treatment vol. elev.} = (21.25 - 21.0 \text{ ft}) \times \frac{(6807 \text{ ft}^3 - 5468 \text{ ft}^3)}{(6988 \text{ ft}^3 - 5468 \text{ ft}^3)} + 21.0 \text{ ft} = 21.22 \text{ ft}$$

Part II. Unsaturated Vertical Flow Analysis

Step 3. Determine if saturated lateral (Stage Two) flow will occur.

$$\text{Treatment volume depth } (h_v) = 21.22 - 20.00 \text{ ft} = 1.22 \text{ ft}$$

From Equation 26-4, the height of water to saturate the soil (h_u) is:

$$h_u = f(h_b) = 0.3^{0.35} (3 \text{ ft}) = 1.05 \text{ ft}$$

Saturated lateral flow will occur since $h_v > h_u$.

Step 4. Calculate the volume of water infiltrated in unsaturated vertical (Stage One) flow and the time to infiltrate this volume. The area of basin bottom (A_b) is:

$$A_b = 50 \text{ ft} \times 100 \text{ ft} = 5000 \text{ ft}^2$$

Utilizing Equation 26-3, the volume infiltrated during Stage One (V_u) is:

$$V_u = 5000 \text{ ft}^2 (3 \text{ ft}) (0.35) = 5250 \text{ ft}^3$$

The unsaturated vertical hydraulic conductivity (K_{vu}) is determined from Equation 26-11:

$$K_{vu} = \frac{2 (2 \text{ ft/day})}{3} = 1.33 \text{ ft/day}$$

The design infiltration rate (I_d) is found from Equation 26-1:

$$I_d = \frac{1.33 \text{ ft/day}}{2} = 0.67 \text{ ft/day}$$

From Equation 26-2, the time to saturate soil beneath the basin (t_{sat}) is:

$$t_{sat} = \frac{(3 \text{ ft})(0.35)}{0.67 \text{ ft/day}} = 1.57 \text{ days}$$

Part III. Saturated Lateral Flow Analysis

Step 5. Calculate the remaining treatment volume to be recovered under saturated lateral (Stage Two) flow conditions.

$$\text{Remaining volume to be infiltrated under saturated lateral flow} = 6807 - 5250 = 1557 \text{ ft}^3$$

Calculate the elevation of treatment volume at the start of saturated lateral flow by interpolating:

$$\begin{aligned} \text{Treatment volume elev. at start of saturated lateral flow} &= (20.50 - 20.25 \text{ ft}) \times \frac{(1557 \text{ ft}^3 - 1278 \text{ ft}^3)}{(2615 \text{ ft}^3 - 1278 \text{ ft}^3)} + 20.25 \text{ ft} = 20.30 \text{ ft} \end{aligned}$$

Step 6. Calculate F_y and F_x

When the treatment volume is recovered (time $t = t_{Total}$) the water level is at the basin bottom. Hence, the height of the water level above the initial groundwater table (h_c) will be equal to h_b .

$$h_c = h_b = 3 \text{ ft (at } t = t_{Total})$$

The height of water in the basin at the start of saturated lateral flow (h_2) is:

$$h_2 = 20.3 - 20.0 = 0.3 \text{ ft}$$

From Equation 26-8:

$$H_T = h_b + h_2 = 3.0 + 0.3 = 3.3 \text{ ft}$$

F_y is determined from Equation 26-6:

$$F_y = \frac{3 \text{ ft}}{3.3 \text{ ft}} = 0.91$$

When the water level is at the basin bottom (time $t = t_{Total}$) the basin length (L) = 100 ft and the basin width (W) = 50 ft.

$$\text{Basin length to width ratio } (L/W) = \frac{100 \text{ ft}}{50 \text{ ft}} = 2$$

Determine F_x .

From Figure 26-7; $F_x = 4.65$ (for $f = 0.3$, $L/W = 2$, and $F_y = 0.91$)

Step 7. Calculate the time to recover the remaining treatment volume under saturated lateral flow.

$$H = 17.0 - 14.0 = 3.0 \text{ ft}$$

The average saturated thickness (D) can be found from Equation 26-7:

$$D = H + \frac{hc}{2} = 3.0 + \frac{3.0}{2} = 4.5 \text{ ft}$$

The time (t) to recover the remaining treatment volume under lateral saturated flow conditions is determined from Equation 26-9:

$$t = \frac{(50 \text{ ft})^2}{(4) (10 \text{ ft/day}) (4.5 \text{ ft}) (4.75)^2} = 0.62 \text{ days}$$

Part IV. Calculate Total Recovery Time

Step 8. Total time to recover the treatment volume (t_{Total}) equals the time to recover during unsaturated vertical flow plus the time to recover under lateral saturated conditions.

$$\text{Total recovery time } (t_{Total}) = 1.57 \text{ days} + 0.62 \text{ days} = 2.19 \text{ days or } 53 \text{ hours}$$

Therefore, the design meets the 72 hour recovery time criteria.

26.6 References

Andreyev, N.E., and L.P. Wiseman. 1989. *Stormwater Retention Pond Infiltration Analysis in Unconfined Aquifers*. Prepared for Southwest Florida Water Management District, Brooksville, Florida.

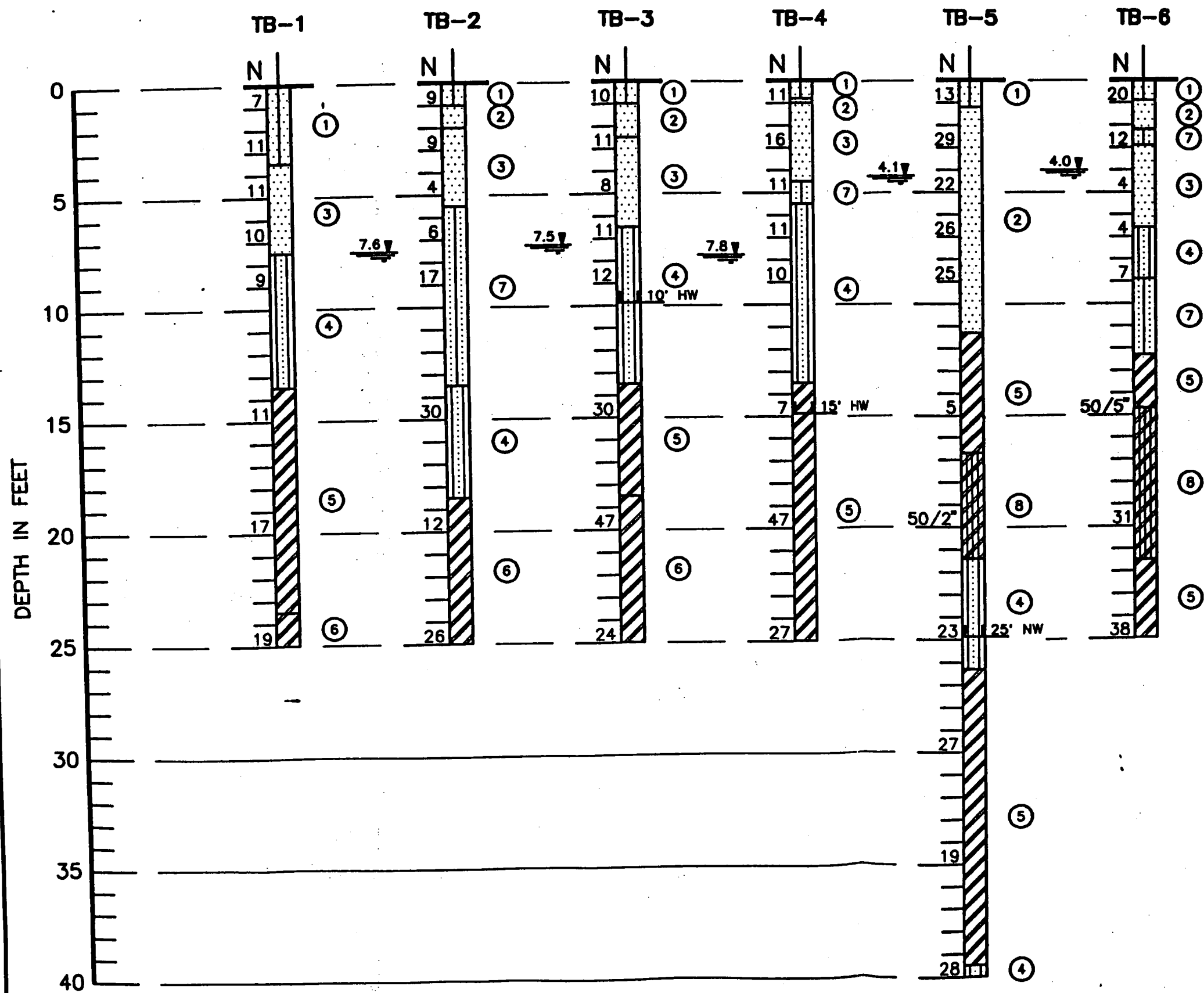
Kuhns, G.L. 1990. *PONDFLOW II - Stormwater Recovery Analysis Program*. User Manual (unpublished).

Mongeau, M.L. 1991. Groundwater Considerations. In *Stormwater Management: A Designer's Course*. Florida Engineering Society, Orlando, Florida.

Professional Service Industries, Inc. (PSI), Jammal & Associates Division. 1993. *Full-Scale Hydrologic Monitoring of Stormwater Retention Ponds and Recommended Hydro-Geotechnical Design Methodologies*. Prepared for St. Johns River Water Management District, Palatka, Florida. Special Publication SJ93-SP10.

Geotechnical Report

Report
Geotechnical Engineering Services
Hardee County Sanitary Landfill
PSI Project No. 757-75054



LEGEND

- ① GRAY TO BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND TRACE ROOTS, (SP), (SP-SM)
- ② LIGHT GRAY FINE SAND, (SP)
- ③ LIGHT BROWN FINE SAND, (SP)
- ④ GRAY TO BROWN SILTY FINE SAND TO CLAYEY FINE SAND, (SM), (SC)
- ⑤ GREEN TO GRAY CLAY WITH SAND SEAMS OCCASIONAL PHOSPHATES, (CL)
- ⑥ GREEN CLAY, (CH)
- ⑦ LIGHT TO DARK RED-BROWN SLIGHTLY SILTY TO SILTY FINE SAND, OCCASIONAL WEAKLY CEMENTED FINE SAND, (SP-SM), (SM)
- ⑧ LIGHT GRAY BROWN INDURATED CLAY/SILT TO WEATHERED LIMESTONE
- (SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL
- 7.6 v DEPTH TO GROUNDWATER LEVEL IN FEET: 2/13/97 TO 2/17/97
- N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
- 50/5' NUMBERS OF BLOWS REQUIRED (50) TO DRIVE SAMPLING SPOON 5 INCHES
- 11 10' NW/HW DEPTH TO WHICH NW/HW CASING WAS DRIVEN IN FEET, (NOTE: 3" CASING/4" CASING RESPECTIVELY)

GEOTECHNICAL ENGINEERING SERVICES
HARDEE COUNTY LANDFILL
WACHULA, FLORIDA

DSI Environmental
Geotechnical
Construction
Consulting • Engineering • Testing

DRAWN: DCB	SCALE: NOTED	PROJ. NO: 757-75054
CHKD: IK	DATE: 2-21-97	SHEET: 2

APPENDIX D

adICPR Model Input and Results

Pre-Development

Advanced Interconnected Channel & Pond Routing (adICPR Ver 1.40)
Copyright 1989, Streamline Technologies, Inc.

HARDEE COUNTY LEACHATE STORAGE TANK FACILITY
06/05/97

BASIN NAME	LSTF
NODE NAME	SWALE

UNIT HYDROGRAPH	UH484
PEAKING FACTOR	484.

RAINFALL FILE	FLMOD
RAIN AMOUNT (in)	8.20
STORM DURATION (hrs)	24.00

AREA (ac)	1.48
CURVE NUMBER	84.00
DCIA (%)	.00
TC (mins)	15.00
LAG TIME (hrs)	.00
BASIN STATUS	ONSITE

BASIN QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
LSTF	7.38	12.07	6.28

Post-Development

Advanced Interconnected Channel & Pond Routing (adICPR Ver 1.40)
Copyright 1989, Streamline Technologies, Inc.

HARDEE COUNTY LEACHATE STORAGE TANK FACILITY
06/05/97

BASIN NAME	LSTF
NODE NAME	SWALE

UNIT HYDROGRAPH	UH484
PEAKING FACTOR	484.

RAINFALL FILE	FLMOD
RAIN AMOUNT (in)	8.20
STORM DURATION (hrs)	24.00

AREA (ac)	1.48
CURVE NUMBER	90.00
DCIA (%)	.00
TC (mins)	15.00
LAG TIME (hrs)	.00
BASIN STATUS	ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
LSTF	7.92	12.03	6.99	

Advanced Interconnected Channel & Pond Routing (adICPR Ver 1.40)
 Copyright 1989, Streamline Technologies, Inc.

HARDEE COUNTY LEACHATE STORAGE TANK FACILITY
 06/05/97

NODE NAME	NODE TYPE	INI STAGE (ft)	X-COOR (ft)	Y-COOR (ft)	LENGTH (ft)	STAGE (ft)	AR/TM/STR (ac/hr/af)
SWALE	AREA	82.000	.000	.000	.000	82.000	.088
						83.000	.210
						83.600	.325
OUT	AREA	79.000	.000	.000	.000	79.000	.000
						82.500	.000
						82.600	999.000

Advanced Interconnected Channel & Pond Routing (adICPR Ver 1.40)
Copyright 1989, Streamline Technologies, Inc.

HARDEE COUNTY LEACHATE STORAGE TANK FACILITY
06/05/97

>>REACH NAME : 1
FROM NODE : SWALE
TO NODE : OUT
REACH TYPE : DROP STRUCTURE w/ CIRC. CULVERT
FLOW DIRECTION : POSITIVE AND NEGATIVE FLOWS ALLOWED
TURBO SWITCH : OFF

CULVERT DATA :
SPAN (in): 18.000 RISE (in): 18.000 LENGTH (ft): 75.000
U/S INVERT (ft): 80.500 D/S INVERT (ft): 80.000 MANNING N: .012
ENTRNC LOSS: .500 # OF CULVERTS: 1.000

POSITION A : RECTANGULAR RISER SLOT
CREST EL. (ft): 83.000 CREST LN. (ft): 10.000 OPENING (ft): 999.000
WEIR COEF.: 3.200 GATE COEF.: .600 NUMBER OF ELEM.: 1.000

POSITION B : NOT USED

NOTE: 75' 18" RCP, FDOT TYPE C INLET

Advanced Interconnected Channel & Pond Routing (adICPR Ver 1.40)
Copyright 1989, Streamline Technologies, Inc.

HARDEE COUNTY LEACHATE STORAGE TANK FACILITY
06/05/97

CONTROL PARAMETERS

=====

START TIME: .00
END TIME: 24.00

TO TIME (hours)	SIMULATION INC (secs)	PRINT INC (mins)
-----	-----	-----
24.00	150.00	15.00

RUNOFF HYDROGRAPH FILE: DEFAULT
OFFSITE HYDROGRAPH FILE: DEFAULT
BOUNDARY DATABASE FILE: NONE

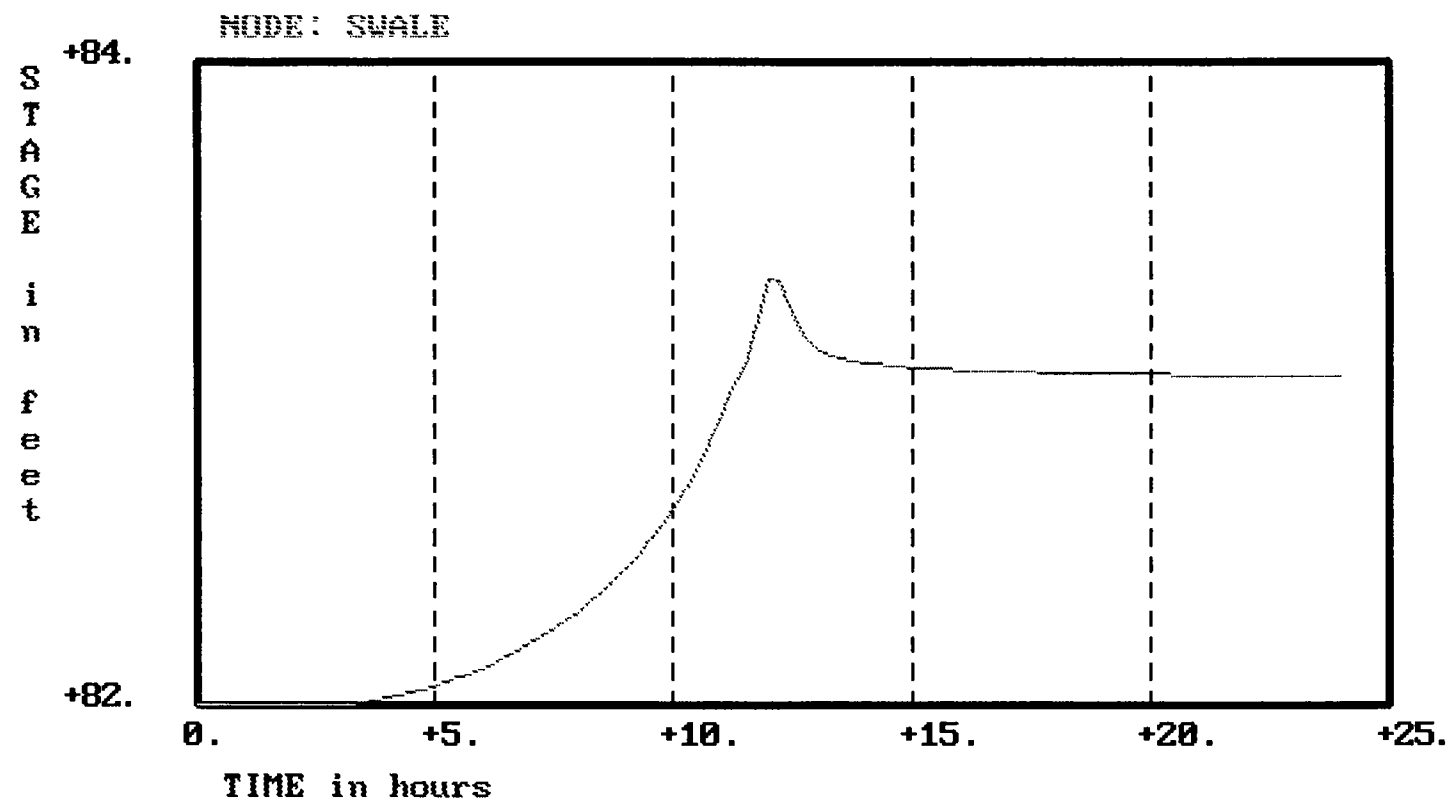
NOTE:

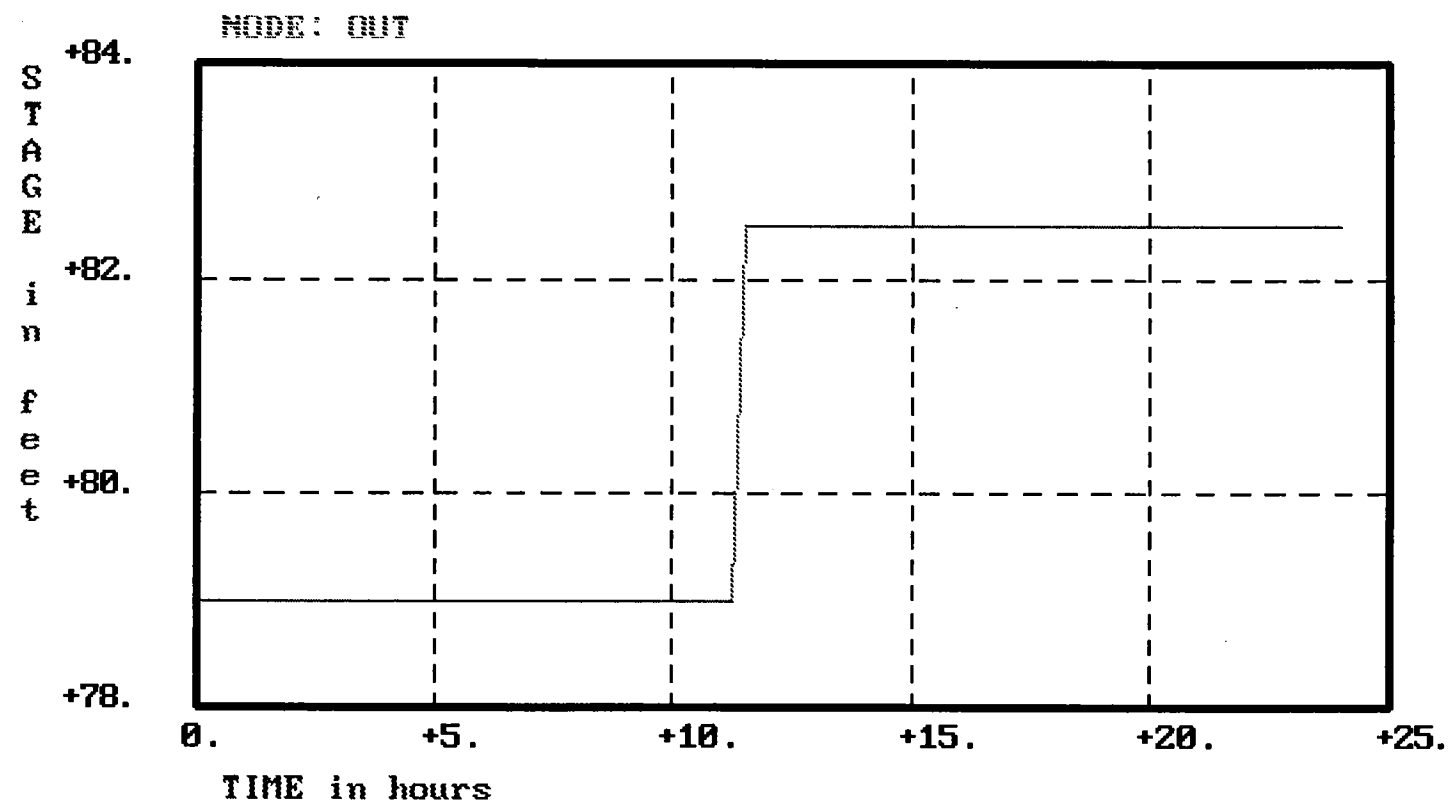
HARDEE COUNTY LEACHATE STORAGE TANK FACILITY
 06/05/97

NODAL MIN/MAX/TIME CONDITIONS REPORT

NODE ID	PARAMETER	<-- MINIMUMS -->		<-- MAXIMUMS -->	
		VALUE	TIME (hr)	VALUE	TIME (hr)
SWALE	STAGE (ft):	82.00	2.00	83.33	12.00
	VOLUME (af):	.00	2.00	.24	12.00
	RUNOFF (cfs):	.00	2.00	7.70	12.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	11.00	<u>6.16</u>	12.00
OUT	STAGE (ft):	82.50	24.00	82.50	24.00
	VOLUME (af):	.00	11.25	.70	24.00
	RUNOFF (cfs):	.00	24.00	.00	24.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	11.00	6.16	12.00
	OUTFLOW (cfs):	.00	24.00	.00	24.00

* The maximum post development discharge, 6.16 cfs, is less than the maximum pre-development discharge of 7.38 cfs.





APPENDIX E

Evidence of Potential Acceptance / Proof of Ownership

Wauchula Abstract & Title Co., Inc.
Abstracts - Title Insurance - Title Searches

PHONE 773-9054 & 773-4378

P. O. BOX 1028

123 SOUTH 8TH AVE.

WAUCHULA, FLORIDA 33873

#87-827

October 23, 1987, at 5:00 P. M.

Board of County Commissioners
Hardee County
Public Works Department
412 West Orange Street
Wauchula, Florida 33873

Gentlemen:

This is to certify that we have made a search of the public records of Hardee County, Florida, regarding the root title to the following described property:

See Schedule "A" attached hereto

We find root title to this property begins with a Deed from The Trustees of the Internal Improvement Fund of the State of Florida to Florida Southern Railway Company, dated April 9, 1886, filed August 10, 1888, and recorded in Deed Book 4, page 773, re-recorded in Deed Book 17, page 95, Public Records of DeSoto County, Florida, as to E $\frac{1}{2}$ of NE $\frac{1}{4}$ of Section 35, Township 33 South, Range 25 East;

and with a Patent from the United States of America to Henry W. Edwards, dated September 24, 1912, filed January 23, 1913, and recorded in Deed Book 93, page 19, Public Records of DeSoto County, Florida, as to W $\frac{1}{2}$ of NE $\frac{1}{4}$ of Section 35, Township 33 South, Range 25 East.

We find that the E $\frac{1}{2}$ of NE $\frac{1}{4}$ was patented by the United States of America to the State of Florida as shown in Mayo Certificate recorded in O. R. Book 63, page 257.

Title was searched from date of the above Deed and Patent to and including October 23, 1987, at 5:00 P. M., and we find the fee simple title vested in:

Hardee County, a political subdivision of the State
of Florida

by virtue of that certain Special Warranty Deed from Mobil Oil Corporation, a corporation existing under the laws of the State of New York, to Hardee County, a political subdivision of the State of Florida, dated July 1, 1987, filed August 25, 1987, and recorded in O. R. Book 342, page 547;

and by virtue of that certain Easement from Mobil Oil Corporation, a New York corporation, to Hardee County, a political subdivision of the State of Florida, dated July 1, 1987, filed August 25, 1987, and recorded in O. R. Book 342, page 549.

Subject to the following:

- (1) Outstanding mineral rights of record as to the SE $\frac{1}{4}$ of SE $\frac{1}{4}$ of NE $\frac{1}{4}$ and affects the property described in the Easement only.
- (2) Special Warranty Deed from Mobil Oil Corporation to Hardee County recorded in O. R. Book 342, page 547, was signed in name of Mobil Oil Corporation by J. P. Rogers and D. C. Ferro as Attorney-in-Fact. No Power of Attorney for either party is recorded in public records of Hardee County.
- (3) Easement from Mobil Oil Corporation to Hardee County recorded in O. R. Book 342, page 549, was signed in name of Mobil Oil Corporation by J. P. Rogers, Attorney-in-Fact. No Power of Attorney is recorded in Public Records of Hardee County.
- (4) Reservation of a strip of ground 15 feet wide along section and half section lines to be used as one-half of right of way for public roads in Deed Book 1, page 407, public records of Hardee County, Florida.
- (5) Obligations and Hold Harmless agreement set out in Special Warranty Deed from Mobil Oil Corporation to Hardee County, filed August 25, 1987, and recorded in O. R. Book 342, page 547.
- (6) Obligations and Hold Harmless agreement as set out in Easement from Mobil Oil Corporation to Hardee County, filed August 25, 1987, and recorded in O. R. Book 342, page 549.

The County Taxes are paid up to and including 1986.

We find no other reservations or easements of record except as shown above.

There are no outstanding mortgages, liens or other encumbrances of any kind against the foregoing described land for the time covered by this Certificate.

This report is not to be construed as a Certificate of Title or a Guaranty of said Title, but is limited to the record information specified above. Liability hereunder shall be limited to the amount paid for this report.

Respectfully,

WAUCHULA ABSTRACT & TITLE CO., INC.



Max A. Campbell, President

MAC:afn

Attachments

SCHEDULE "A"

Begin at the Southeast corner of the NE $\frac{1}{4}$ of Section 35, Township 33 South, Range 25 East, and go West 660 feet to the Point of Beginning, thence run North 2,640 feet, thence West 1,650 feet, thence South 2,310 feet, thence East 330 feet, thence South 330 feet, thence East 1,320 feet to the Point of Beginning;

Together with an non-exclusive easement over, along and across the real property located in Hardee County, Florida, described as follows:

Begin at the Southeast corner of the NE $\frac{1}{4}$ of Section 35, Township 33 South, Range 25 East, and go West 660 feet, thence North 455 feet to a Point of Beginning, being a tract of land 30 feet right and 30 feet left of the following described line: From a point of beginning proceed East approximately 660 feet to the centerline of Airport Road.

SPECIAL WARRANTY DEED

THIS SPECIAL WARRANTY DEED made the 1st day of July, 1987 by MOBIL OIL CORPORATION, a corporation existing under the laws of the State of New York, and having its principal place of business at New York, New York, hereinafter called the grantor, to HARDEE COUNTY, a political subdivision of the State of Florida, whose post office address is 412 West Orange Street, Wauchula, Florida 33873, hereinafter called the grantee:

WITNESSETH: That the grantor, for and in consideration of the sum of \$10.00 and other valuable considerations, receipt whereof is hereby acknowledged, by these presents does grant, bargain, sell, alien, remise, release, convey and confirm unto the grantee, all that certain land situate in Hardee County, Florida, viz:

Begin at the SE corner of the NE-1/4 of Section 35, Township 33 South, Range 25 East and go West 660 feet to the point of beginning, thence run North 2,640 feet, thence West 1,650 feet, thence South 2,310 feet, thence East 330 feet, thence South 330 feet, thence East 1,320 feet to the point of beginning.

TOGETHER with all the tenements, hereditaments and appurtenances thereto belonging or in anywise appertaining.

TO HAVE AND TO HOLD, the same in fee simple forever.

AND the grantor hereby covenants with said grantee that it is lawfully seized of said land in fee simple; that it has good right and lawful authority to sell and convey said land; that it hereby fully warrants the title to said land and will defend the same against the lawful claims of all persons claiming by, through or under the said grantor.

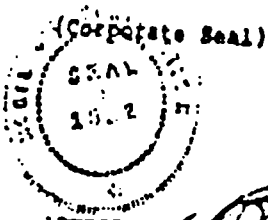
AND the grantee shall defend, indemnify and hold harmless the grantor, its agents, employees and assigns, from any and all losses, liabilities, penalties, expenses, damages, demands, and claims (including costs of defense and reasonable attorneys' fees) in connection with or arising out of any injury or alleged injury (including death) to any person, or damage or alleged damage to property, or contamination of or adverse effects on the environment, or any violation of governmental laws, regulations, orders, permits or permit conditions, caused or sustained or alleged to have been caused or sustained in connection with, or to have arisen out of or to have occurred in connection with, the use or occupancy of the land, whether by the grantee or by any transferee, lessee, assignee, licensee or contractor of the grantee or by any successor in interest to the grantee, and whether or not the event, cause, circumstance or condition giving rise to the claim or liability is (i) known or unknown as of the date hereof, or (ii) occurred prior or subsequent to the date hereof.

AND the grantee further agrees that the above obligations shall be inserted in any transfer, lease or assignment of the land or in any license or contract with respect to the use of the land, and that those obligations shall, to the extent legally permissible, be a covenant running with the land, binding on the grantee's successors and assigns and all other subsequent owners of the land.

AND the parties hereby acknowledge and confirm that the prior Lease Agreement between the parties regarding said lands is hereupon terminated.

IN WITNESS WHEREOF the grantor has caused these presents to be executed in its name, and its corporate seal to be hereunto

affixed, by its proper officers thereunto duly authorized, the day and year first above written.



MOBIL OIL CORPORATION

By

By

Attorney in Fact

Attorney in Fact

ATTEST:

Assistant Secretary

Signed, sealed and delivered in the presence of:

Dr. E. Heath

Dr. J. W. Dwyer

Cap STATE OF NEW YORK VIRGINIA
COUNTY OF NEW YORK MANOVC

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State and County aforesaid to take acknowledgments, personally appeared Dr. E. Heath and Dr. J. W. Dwyer and well known to me to be the Attorneys in Fact and Assistant Secretary of the corporation named as grantor in the foregoing deed, and that they severally acknowledged executing the same in the presence of two subscribing witnesses freely and voluntarily under authority duly vested in them by said corporation and that the seal affixed thereto is the true corporate seal of said corporation.

WITNESS my hand and official seal in the County and State last aforesaid this 1st day of July, 1987.

(Notarial Seal)

Notary Public

My commission expires:

MY COMMISSION EXPIRES OCTOBER 6, 1988

FILED AND RECORDED IN
OFFICIAL RECORDS RECORD VERIFIED
AUG 25 1987 8:30 AM
COLEMAN W. BEST, CLERK CIRCUIT CRT.
BY BSC HARDEE COUNTY, FL

RECORDED THIS	DATE
<u>1987</u>	<u>55</u>
BY PAYMENT OF DOCUMENTARY STAMPS	
AND \$ <u>0</u> INTANGIBLE TAX	
COLEMAN W. BEST	
CLERK OF COURT	
BY <u>BSC</u> <u>0000</u> ac	

874866

342 518

EASEMENT

NORIL OIL CORPORATION, a New York corporation, the "Grantor" for and in consideration of the sum of One Dollar (\$1.00) and other valuable considerations received from HARDEE COUNTY, a political subdivision of the State of Florida, the "Grantee," whose mailing address is: 412 West Orange Street, Wauchula, Florida 33873, hereby grants to the Grantee a non-exclusive easement over, along and across the real property located in Hardee County, Florida, described as follows:

Begin at the SE corner of the NE-1/4 of Section 35, Township 33 South, Range 25 East and go West 660 feet, thence North 455 feet to a point of beginning; being a tract of land 30 feet right and 30 feet left of the following-described line: From a point of beginning, proceed East approximately 660 feet to the centerline of Airport Road.

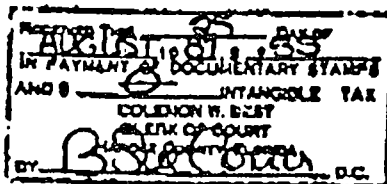
for use as ingress and egress from Airport Road to the following-described lands this day conveyed by Grantor to Grantee:

Begin at the SE corner of the NE-1/4 of Section 35, Township 33 South, Range 25 East and go West 660 feet to the point of beginning, thence run North 2,640 feet, thence West 1,650 feet, thence South 2,310 feet, thence East 330 feet, thence South 330 feet, thence East 1,320 feet to the point of beginning.

TO HAVE AND TO HOLD the same unto the said Grantee until this easement is terminated upon the abandonment of said easement by the Grantee or upon 90 days written notice of termination given by Grantor to Grantee, and Grantee shall thereupon execute and deliver to Grantor a recordable document acknowledging said termination.

AND the Grantee shall defend, indemnify and hold harmless the Grantor, its agents, employees and assigns, from any and all losses, liabilities, penalties, expenses, damages, demands, and claims (including costs of defense and reasonable attorneys' fees) in connection with or arising out of any injury or alleged injury (including death) to any person, or damage or alleged damage to property, or contamination of or adverse effects on the environment, or any violation of governmental laws, regulations, orders, permits or permit conditions, caused or sustained or alleged to have been caused or sustained in connection with, or to have arisen out of or to have occurred in connection with, the use or occupancy of the easement, whether by the Grantee or by any transferee, lessee, assignee, licensee or contractor of the Grantee or by any successor in interest to the Grantee, and whether or not the event, cause, circumstance or condition giving rise to the claim or liability is (i) known or unknown as of the date hereof, or (ii) occurred prior or subsequent to the date hereof.

AND the Grantee further agrees that the above obligations shall be inserted in any transfer, lease or assignment of the easement or in any license or contract with respect to the use of the easement, and that those obligations shall, to the extent legally permissible, be a covenant running with the land, binding



342 549

on the Grantee's successors and assigns and all other subsequent owners of the easement.

DATED July 1, 1987

SEAL
(Corporate Seal)
2532

MOBIL OIL CORPORATION

By

J. P. Rosen

Attorney in Fact

ATTEST:

[Signature]

Assistant Secretary

Signed, sealed and delivered
in the presence of:

Don E. Heath

[Signature]

STATE OF ~~NEW YORK~~ VIRGINIA
COUNTY OF ~~NEW YORK~~ HANOVER

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State and County aforesaid to take acknowledgments, personally appeared J. P. Rosen and D. E. Heath well known to me to be the Attorney in Fact and Assistant Secretary of the corporation named as grantor in the foregoing Easement, and that they severally acknowledged executing the same in the presence of two subscribing witnesses freely and voluntarily under authority duly vested in them by said corporation and that the seal affixed thereto is the true corporate seal of said corporation.

WITNESS my hand and official seal in the County and State last aforesaid this 1st day of July, 1987.

(Notarial Seal)

Carol A. Pemberton
Notary Public

My commission expires:

MY COMMISSION EXPIRES OCTOBER 6, 1988

874867

342 550

...under the laws of the State of Florida, party of the first part, and W. A. COLE, party of the second part, ...
WITNESSETH: That the said party of the first part, for and in consideration of the sum of One dollar and other good and valuable considerations, to it in hand paid the receipt whereof is hereby acknowledged, has bargained, sold and transferred, unto the said party of the second part, his successors and assigns forever, all that certain parcel of land lying and being in the County of Hardee, State of Florida, more particularly described as follows:

West one half ($\frac{1}{2}$) of the South-east one-quarter ($\frac{1}{4}$) of
the North-east one-quarter ($\frac{1}{4}$) of Section Thirty-five (35)
Township Thirty-three (33) South Range Twenty-five (25)
East. (\$1.00 U S Rev Stamps Cancelled)

Excepting and Reserving, however, unto the party of the first part, its successors and assigns, a strip of ground fifteen feet wide along section and half-section lines to be used as one-half of right of way for public roads.

And the said party of the first part does hereby fully warrant the title to said lands, and will defend the same against the lawful claims of all persons.

IN WITNESS WHEREOF, said party of the first part has caused these presents to be signed in its name by its President, and its corporate seal to be affixed, hereto, the day and year above written.

Signed, sealed and delivered in

our presence as witnesses;

C L Richardson Jr

P M Dewey

.....
'CORPORATE'
'S E A L'
.....

THE VAUGHNULA DEVELOPMENT COMPANY

By H B Rainey

Vice-President.

STATE OF FLORIDA)
COUNTY OF HARDEE.)

I do hereby certify that on this 20th day of June A D 1921, before me personally appeared Homer B Rainey, Vice-President of The Vaughnula Development Company, a corporation existing under the laws of the State of Florida, to me known to be the person described, in and who executed the foregoing conveyance and acknowledged the execution thereof to be his free act and deed as such officer for the uses and purposes therein mentioned, and that he caused to be affixed thereto the official seal of said corporation.

WITNESS my signature and official seal at Vaughnula, in the County of Hardee, State of Florida, the day and year aforesaid.

(S E A L)

C A Samuelson, (Seal) Notary Public, State
of Florida. My commission as Notary expires
on the 8 day of January 1925.

I Hereby certify that the above and foregoing is a true and correct copy of the original as filed for record this the 21st day of December 1921.

Geo M Hardee

Clerk of the Court

By *M. A. [Signature]*

Deputy Clerk

APPENDIX F

Certification of Fiscal Hardship

**HARDEE COUNTY
BOARD OF COUNTY COMMISSIONERS**
412 West Orange Street
Room A-203, Courthouse Annex
Wauchula, Florida 33873-2867
(941)773-9430 * (941)773-6952 * Fax (941)773-0958

March 03, 1997

Department of Environmental Protection
Solid Waste Section
Attention: Bob Butera
3804 Coconut Palm Drive
Tampa, Florida 33619-8318

Re: Permit Fee Reduction

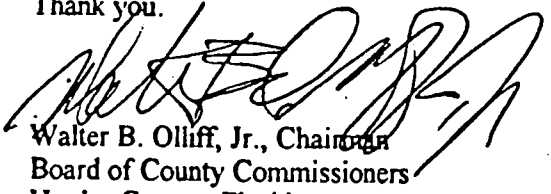
Dear Mr. Butera:

Pursuant to the Florida State Law 94-278, Hardee County is requesting a permit fee reduction.

Hardee County is currently at the ten mill ad valorem tax cap. Florida Law states that millage greater than eight mills would justify a permit fee reduction or waiver to be granted on the basis of fiscal hardship. Hardee County certifies that the cost of the permit processing fee is a fiscal hardship due to the fact that ad valorem operating millage is greater than eight mills.

Attached you will find the certification of the county millage by the Hardee County Property Appraisers Officer.

Thank you.



Walter B. Olliff, Jr., Chairman
Board of County Commissioners
Hardee County, Florida

WBO/jw

c: file
Hardee County Solid Waste Dept.
Ed Hilton, PBSJ

edppermitfee

Minor L. Bryant - Benny W. Albritton - Gordon R. Norris
E. Milton Lanier - Walter B. Olliff, Jr.
County Manager Gary Oden - Asst. Co. Manager J. R. Prestridge - County Attorney Gary A. Vorbeck

"An Equal Opportunity Employer"

RESOLUTION NO. 96-29

A RESOLUTION ADOPTING THE FINAL MILLAGE RATE
FOR HARDEE COUNTY BOARD OF COUNTY
COMMISSIONERS FOR FISCAL YEAR COMMENCING ON
OCTOBER 1, 1996 AND ENDING SEPTEMBER 30, 1997.

NOW, THEREFORE BE IT RESOLVED BY THE GOVERNING BOARD OF THE HARDEE
COUNTY COMMISSIONERS THAT:

SECTION 1. The Governing Board does hereby adopt its final millage rate of 10 mills to be levied
for the general fund upon all real and tangible personal property located within the boundaries of the
above named taxing authority.

SECTION 2. THE FINAL LEVY OF 10 MILLS WILL RESULT IN A 9.613 PERCENT
INCREASE OF THE ROLLED BACK RATE OF 9.123.

SECTION 3. This final millage rate of 10 mills for the general fund is for the calendar year 1997 to
fund the expenses for the fiscal year commencing October 1, 1996 and ending September 30, 1997.

PASSED AND ADOPTED THIS 17TH DAY OF SEPTEMBER 1996.

STATE OF FLORIDA

COUNTY OF HARDEE

YES -


BENNY ALBRITTON, CHAIRMAN

ABSENT

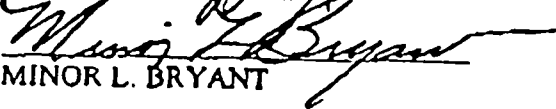
THIS IS TO CERTIFY THAT THE FOREGOING IS A TRUE
AND CORRECT COPY OF Resolution 96-29.

NO -

AS ADOPTED BY THE BOARD OF COUNTY COMMISSIONERS
OF HARDEE COUNTY THE 17th DAY OF September

YES -


WALTER OLLIE JR.

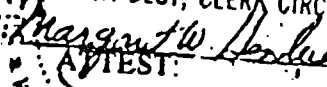

MINOR L. BRYANT

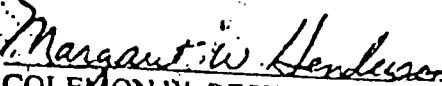
ABSENT

MILTON LANIER

WITNESS MY HAND AND OFFICIAL SEAL THIS 19th
DAY OF September, 1996

COLEMON W. BEST, CLERK CIRCUIT COURT

BY:  MARGARET W. HENDERSON, DC
ATTEST:

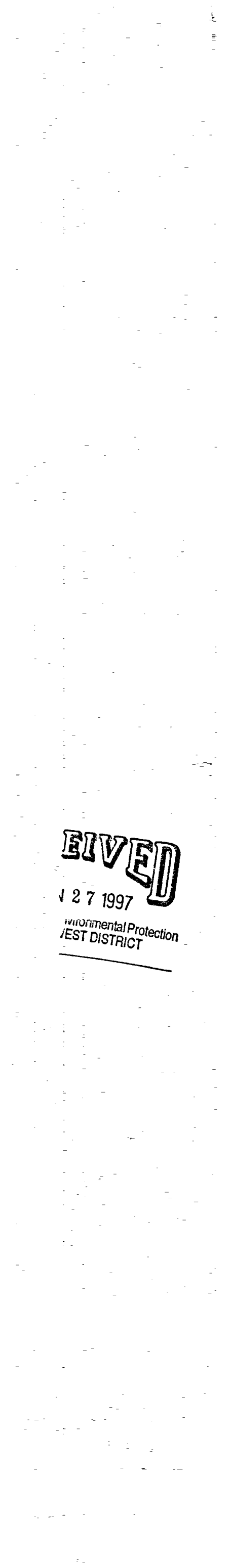

COLEMON W. BEST, CLERK

REC
JU
Department of
SOUTH
BY

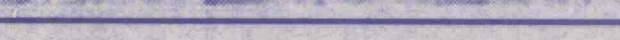


SCALE: 1"=200'

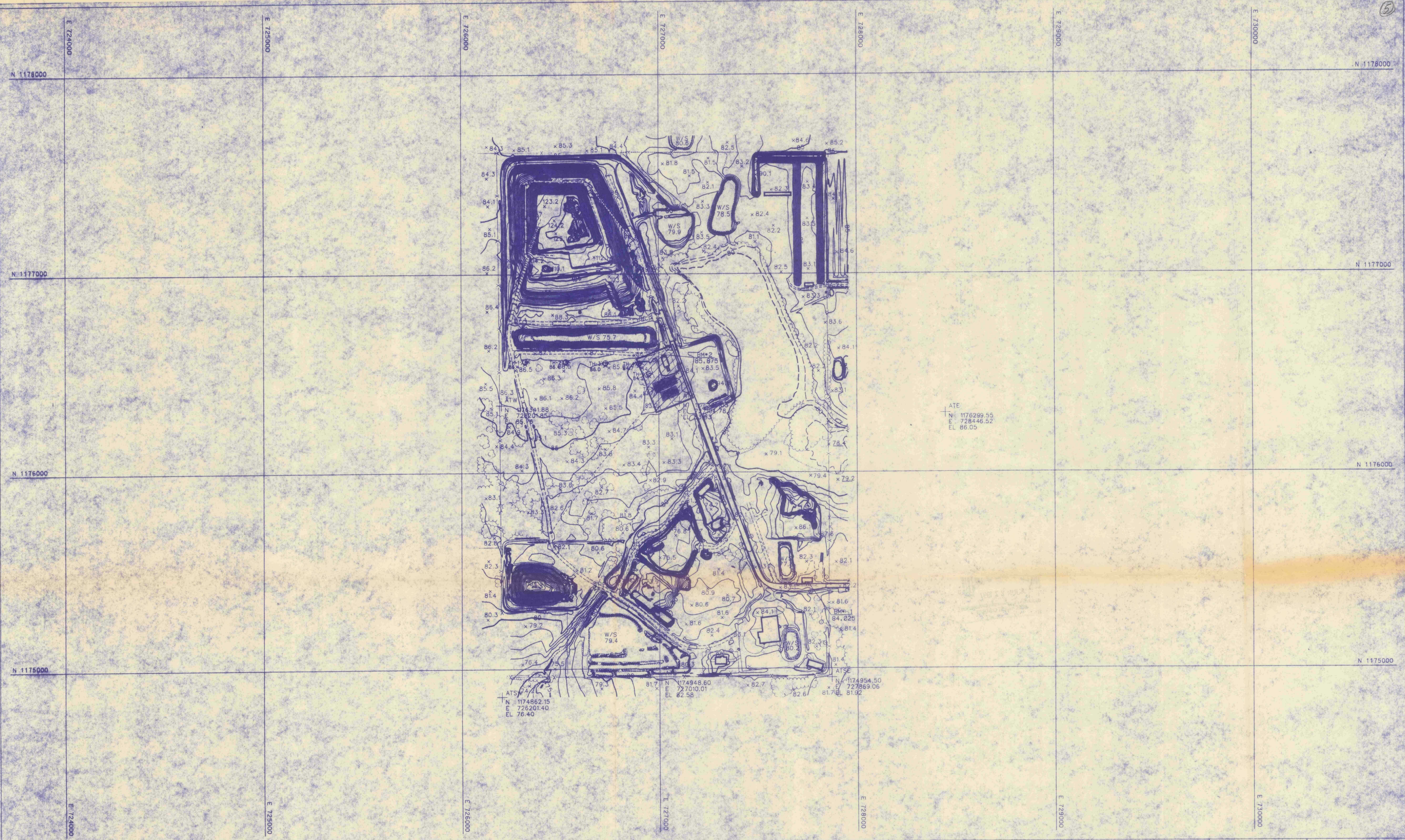
 POST, BUCKLEY, SCHUH & JERNIGAN, INC.	CLIENT	HARDEE COUNTY	PROJECT	HARDEE COUNTY	TASK	AERIAL SURVEY	ORIGINAL	APRIL 1997	6	<div>NOT VALID FOR CONSTRUCTION UNLESS SIGNED IN THIS BLOCK</div>	JOB NO.	07-862.23
	BOARD OF COUNTY COMMISSIONERS		REGIONAL LANDFILL		(500 FT & 1000 FT RADIUS)		REVISIONS:		7		DRAWN	AMS
			PERMIT RENEWAL				1		8		DESIGNED	KAL
							2		9		CHECKED	REM
							3		10		QC	
						4		11				
						5		12			SHEET	2B/5





 POST, BUCKLEY, SCHUH & JERNIGAN, INC.	CLIENT	HARDEE COUNTY	PROJECT	HARDEE COUNTY	TASK	AERIAL SURVEY	ORIGINAL	APRIL 1997	6	JOB NO. 07-862.23 DRAWN AMS DESIGNED KAL CHECKED REM QC
	BOARD OF COUNTY COMMISSIONERS		REGIONAL LANDFILL	(500 FT & 1000 FT RADIUS)			REVISIONS:	7		
			PERMIT RENEWAL			1	8			
					2	9				
					3	10				
					4	11				NOT VALID FOR CONSTRUCTION UNLESS SIGNED IN THIS BLOCK
					5	12				
SHEET 2A/5										

RECEIVED
JUN 27 1997
Department of Environment and
by SOUTHWEST DISTRICT



PAVED ROAD
CURB-OUTTER
DIRT ROAD
TRAIL
DRIVEWAYS
PARK LOTS
SIDEWALKS
HIGHWAY

RR SINGLE
RR DOUBLE
GUARDRAIL
RETAINING WALL
WALLS
FENCES
PIPELINES
DRAINAGE

INDEX CONTOUR
OBSCURED INDEX
DEPRESSED INDEX
INTERMEDIATE CONTOUR
OBSCURED INTERMEDIATE
DEPRESSED INTERMEDIATE
OBSCURED DEP INTERMEDIATE

LAKE
RIVER
STREAM
TREE LINE
BRUSH LINE
HEDGE
GROVE

BUILDINGS
OUTLINE
STRUCTURES
TH 84.7

UVC
DEBRIS
PAD
SPOT HEIGHT
OBSCURED SPOT HEIGHT
TEST BORING

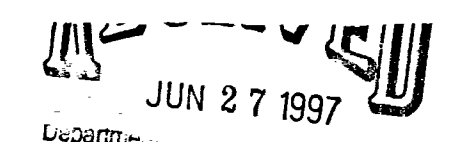
CONTROL POINT
ANTENNA
TOWER
UTILITY POLES
TRAFFIC LIGHT
STREET LIGHT
MAN HOLE
DROP INLET
CATCH BASIN

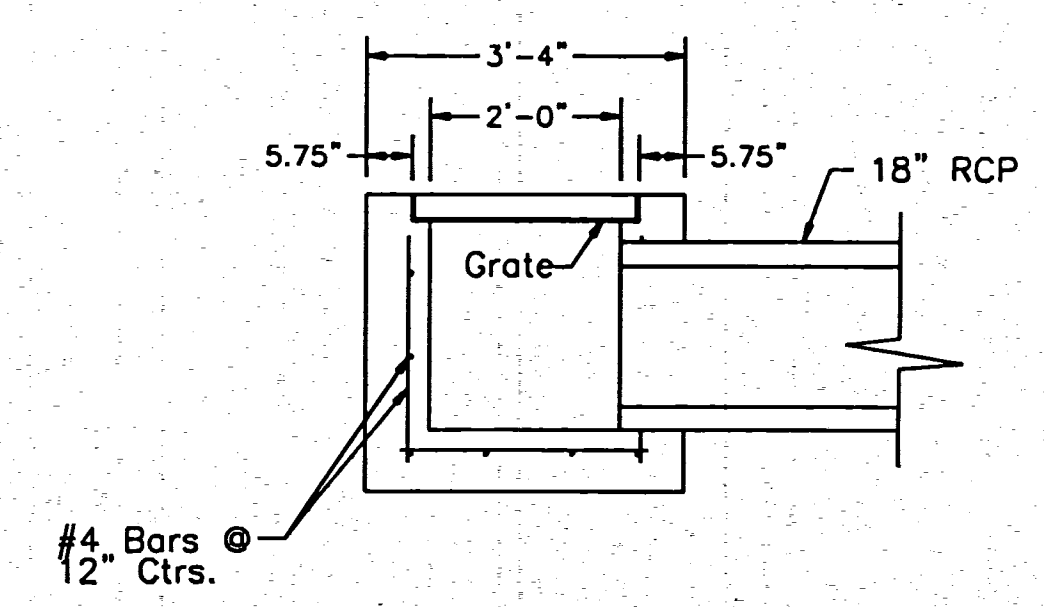
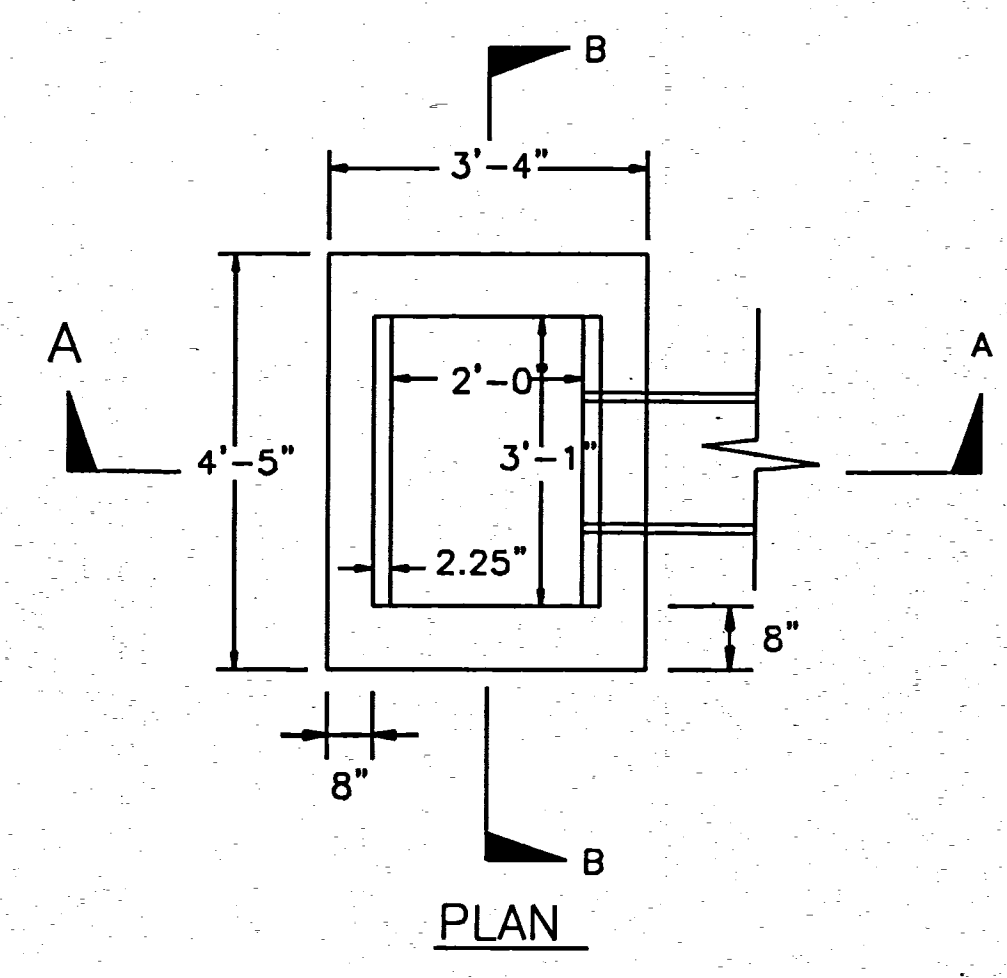
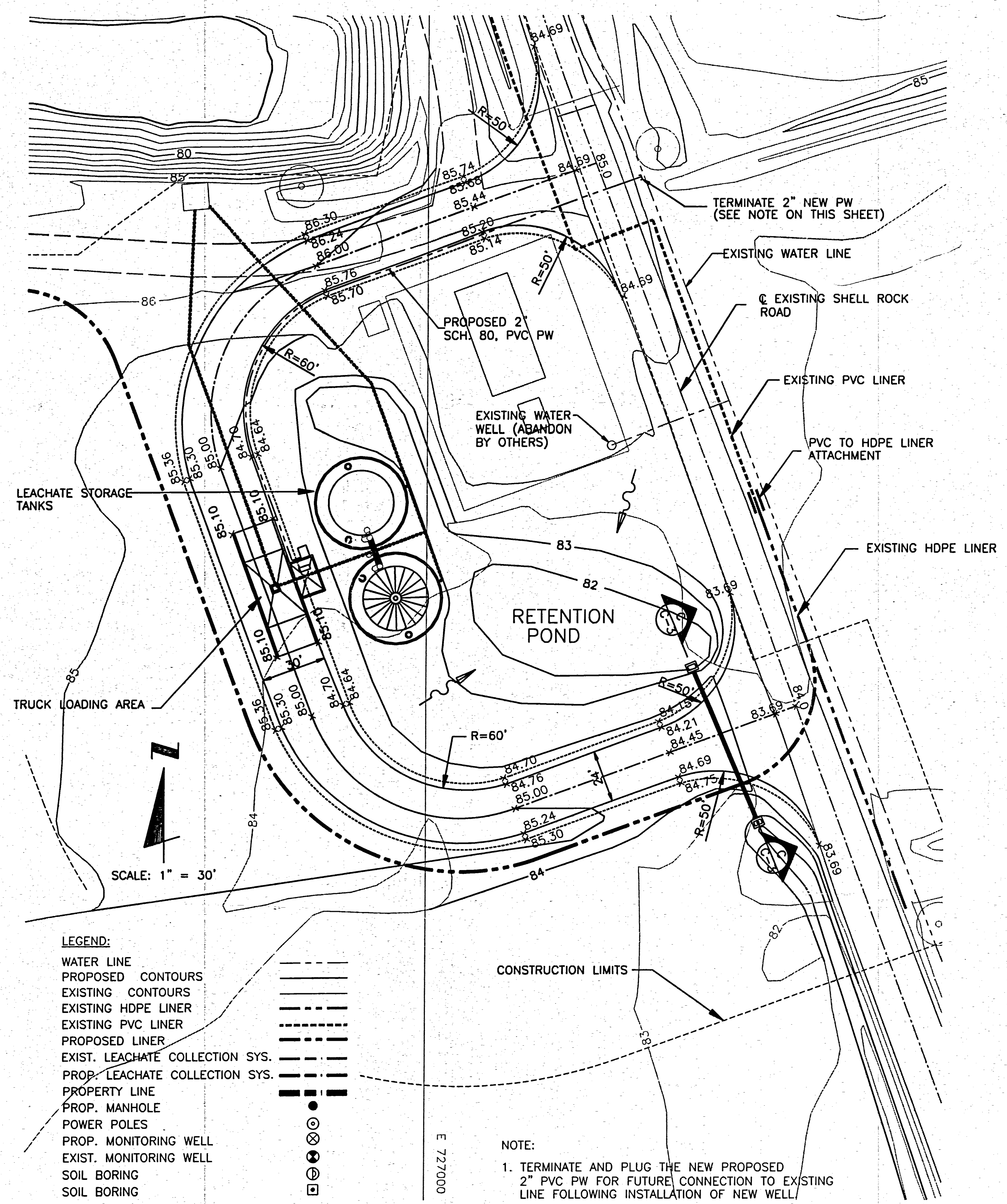
SIGN
MISC. POST
FLAG POLE
INDIVIDUAL
TREES
FIRE HYDRANT
MAIL BOX
SWAMP
WATER SURFACE
ELEVATION

DATE OF PHOTOGRAPHY: DAVID F. MURRAY, PSM #5435
UNLESS THIS MAP BEARS THE SIGNATURE AND ORIGINAL RASSED
SEAL OF THE ABOVE FLORIDA LICENSED SURVEYOR AND MAPPER,
IT IS FOR INFORMATIONAL PURPOSES ONLY AND IS NOT VALID.
NOTE: CONTROL FROM AM ENGINEERING & SURVEYING, INC.

1" = 200'
SCALE: 1" = 200'
DRAWN BY: P-3
DATE: 2-19-97
CONT. INTERVAL: 1"
CHK. BY: K.M.G.
DATUM: FLORIDA STATE PLANE NAD 83, NGVD 29

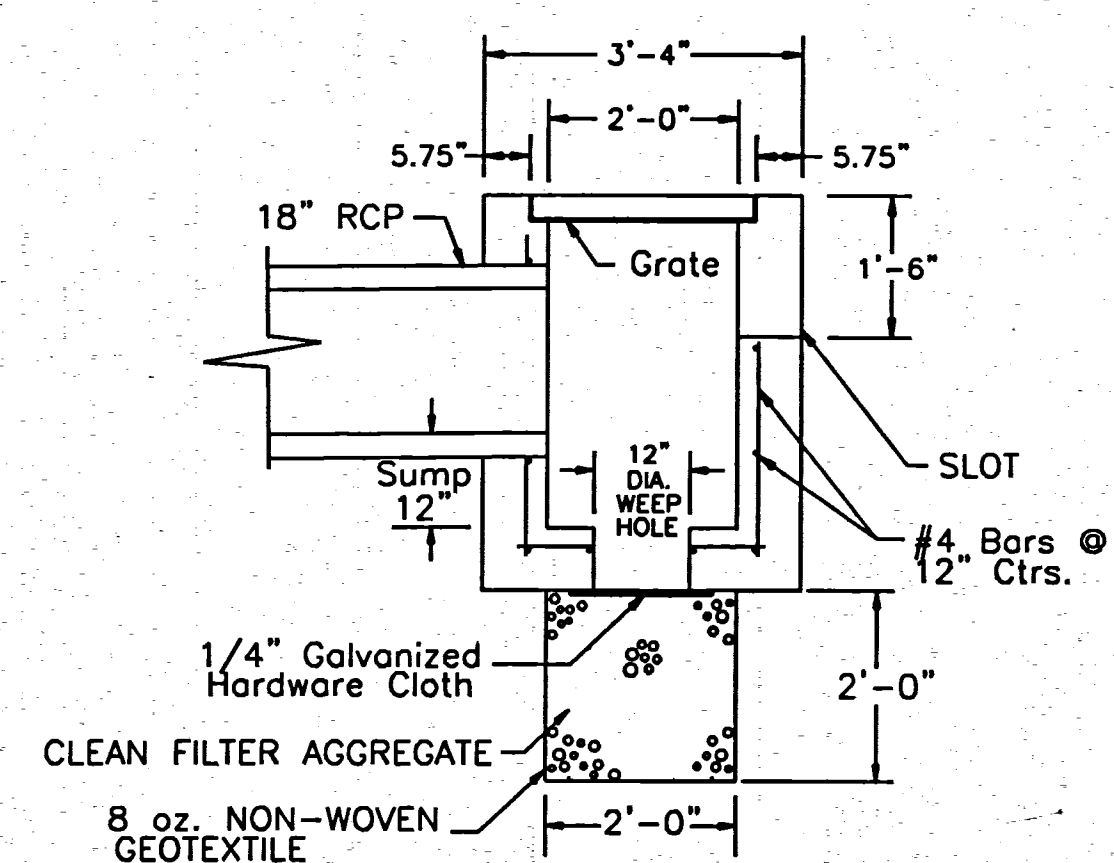
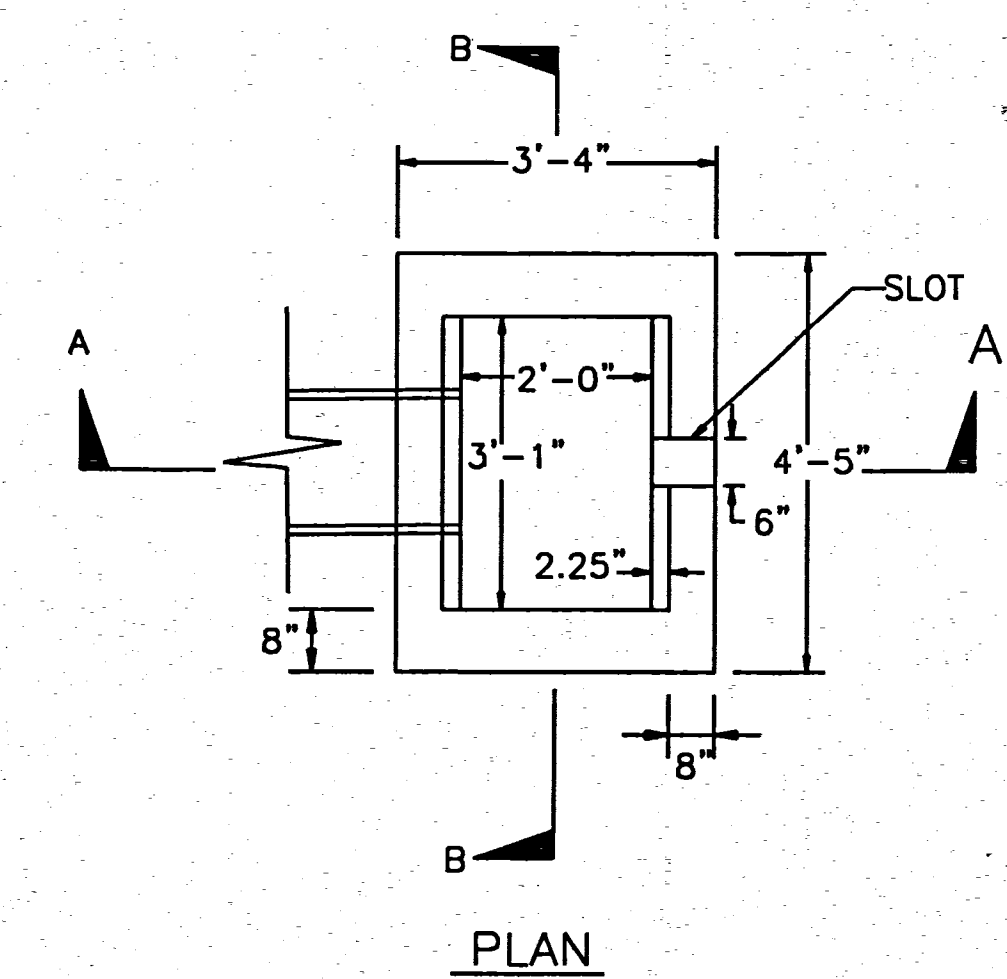
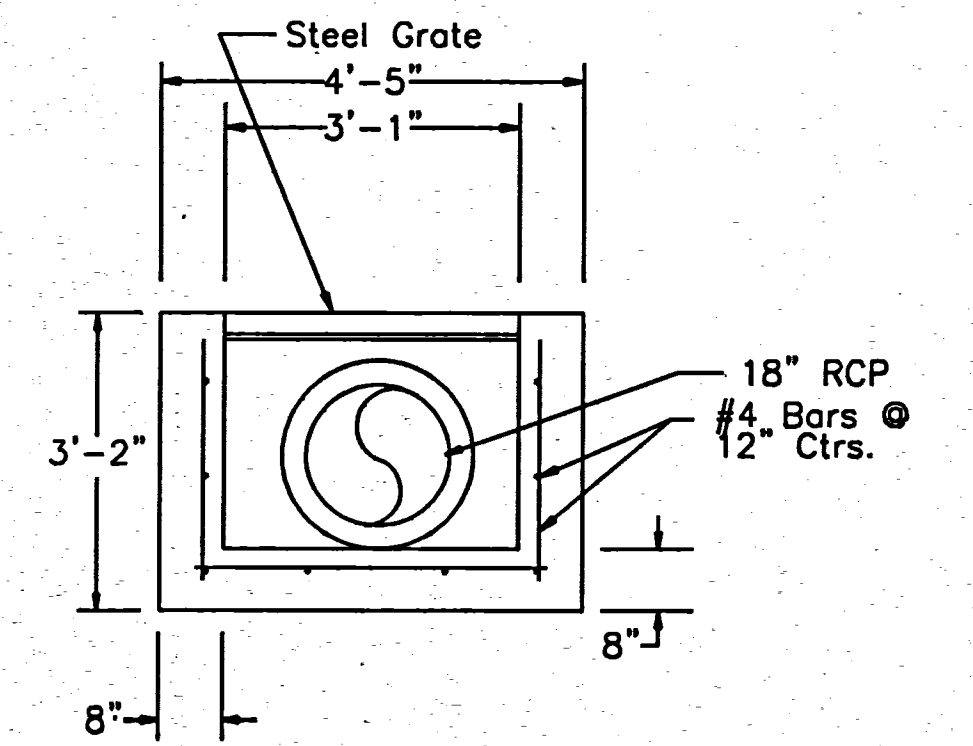
AIM ENGINEERING & SURVEYING, INC.
HARDEE COUNTY LANDFILL
SHEET 1 OF 1

 JUN 27 1997
Department of Environmental Protection
SOUTHWEST DISTRICT
BY _____



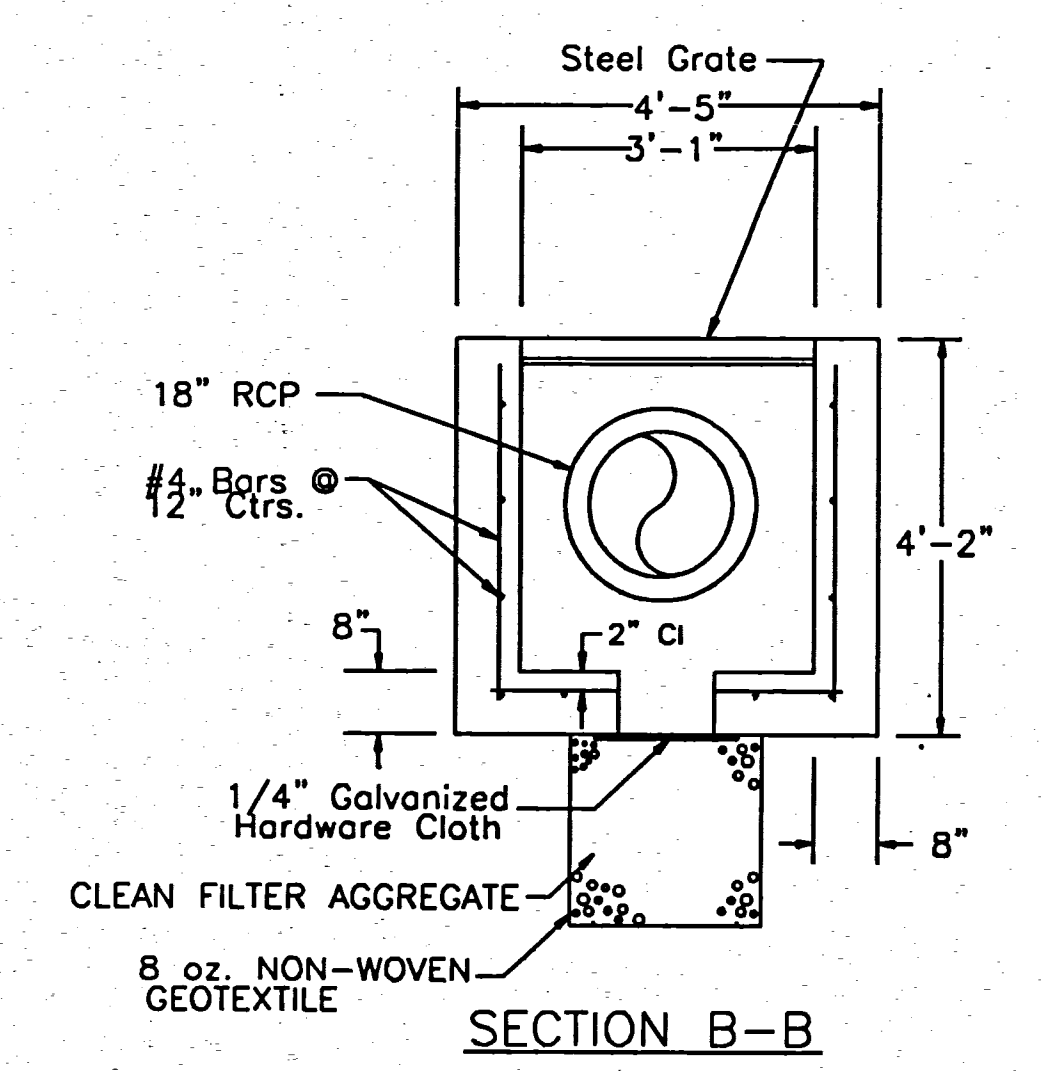
NOTE: SEE FOOT TYPE "C" INLET INDEX NO. 232 AND SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS, INDEX NO. 201

INLET 1 SCALE 1"=2' C-3

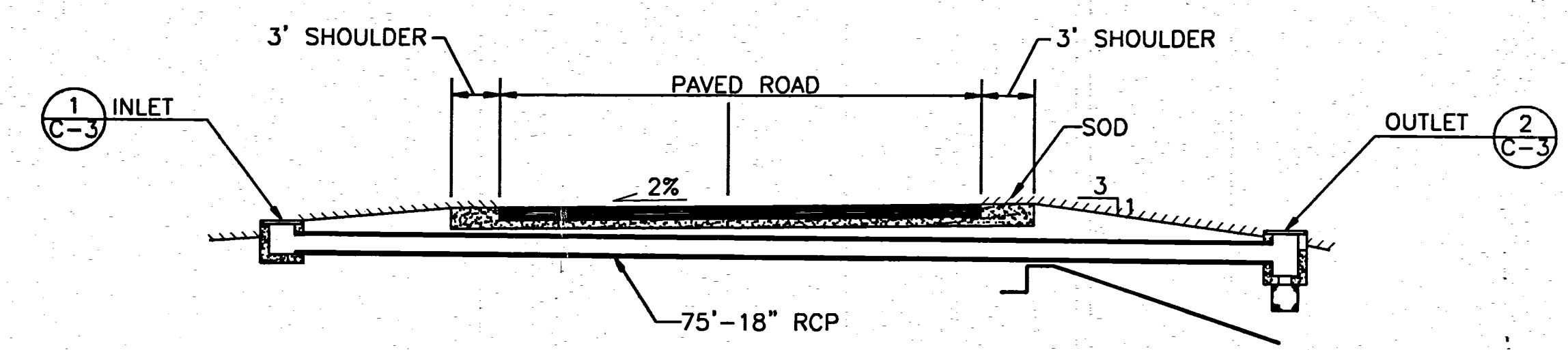


SEE FOOT TYPE "C" INLET INDEX NO. 232 AND SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS, INDEX NO. 201

OUTLET 2 SCALE 1"=2' C-3



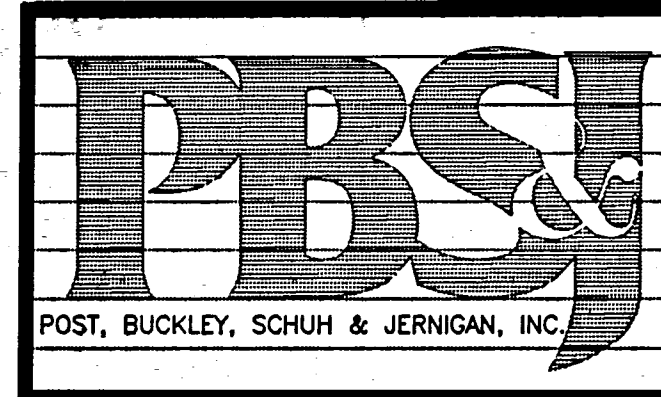
	INLET	GRATE EL.	PIPE INV. EL.	BOTTOM EL.	NORTHING	EASTING
1		83.0	80.5	80.5	1,176,406.35	727,120.80
2		82.5	80.0	79.0	1,176,343.76	727,147.21



SCALE: 1"=10'

RECEIVED
JUN 27 1997
Department of Environmental Protection
SOUTHWEST DISTRICT
BY

I:\ENV\000\WATERMAN\ARJEE\CONSTRUCTION\HAC-C4.DWG
RCC 05/12/97 09:48:28
AutoCAD Release 13

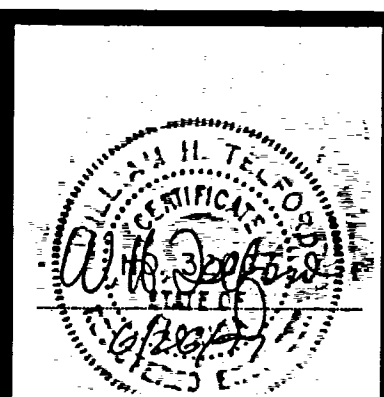


CLIENT
HARDEE COUNTY
BOARD OF COUNTY COMMISSIONERS

PROJECT
HARDEE COUNTY LANDFILL
CONSTRUCTION PLANS

TASK
LEACHATE STORAGE AREA
GRADING AND DRAINAGE

ORIGINAL	6
REVISIONS:	7
1	8
2	9
3	10
4	11
5	12



JOB NO. 07-862.3
DRAWN KAL/RCC
DESIGN KAL
CHECKED CEH
Q.C.
SHEET 4/16