Bound Reports
1720

College Station Center
SW Corner of S. Hancock Road & SR 50
Clermont, Florida
Drainage Calculations
Submitted August 9, 2002 (SJRWMD)

84016-1

Table of Contents

Drainage Narrative

Owner:	Presco Associates, Inc.
Project Name:	College Station Center
Location:	State Road 50 & Hancock Road, Lake County
Legal Description:	See Boundary & Topographic Survey (Sheet 2 of construction plans)
Existing Use:	Vacant
Proposed Use:	Commercial

Project Description

The proposed project includes the development of a 18.42 acre site. The project is located within Lake County limits, Section 2, Township 24 South, Range 29 East. The site is located at the southwest corner of State Road 50 & Hancock Road.

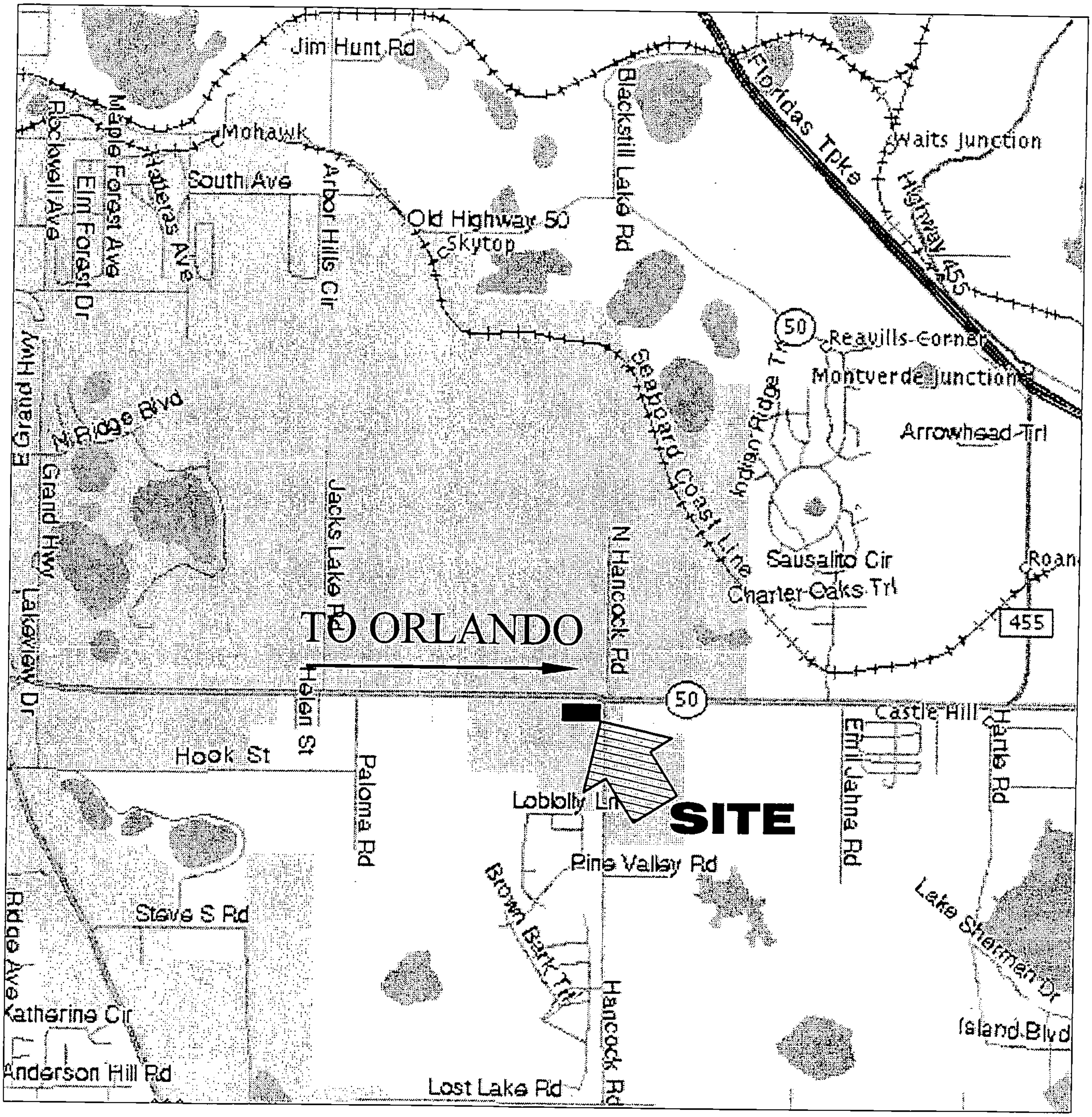
Drainage Methodology

The existing condition consists of an on-site depressional area that served as a basin for the site, off-site area to the south and west as well as a portion of S.R. 50 to the north. The depressional area was hydraulically connected to another depressional area on the north side of S.R. 50. The proposed stormwater management system consists of the conversion of the on-site depressional area into a master dry retention pond for the site only. The off-site contributing areas to the south and west are being permitted through SJRWMD to hold all stromwater runoff on-site, thereby removing those areas from this project's basin area. The off-site drainage from S.R. 50 will continue its flow to the basin on the north side of S.R. 50 via a proposed swale and drainage structure modification in order to preserve pre-development flow patterns. The site exists within a closed basin and all lots are designed for 80% of impervious area.

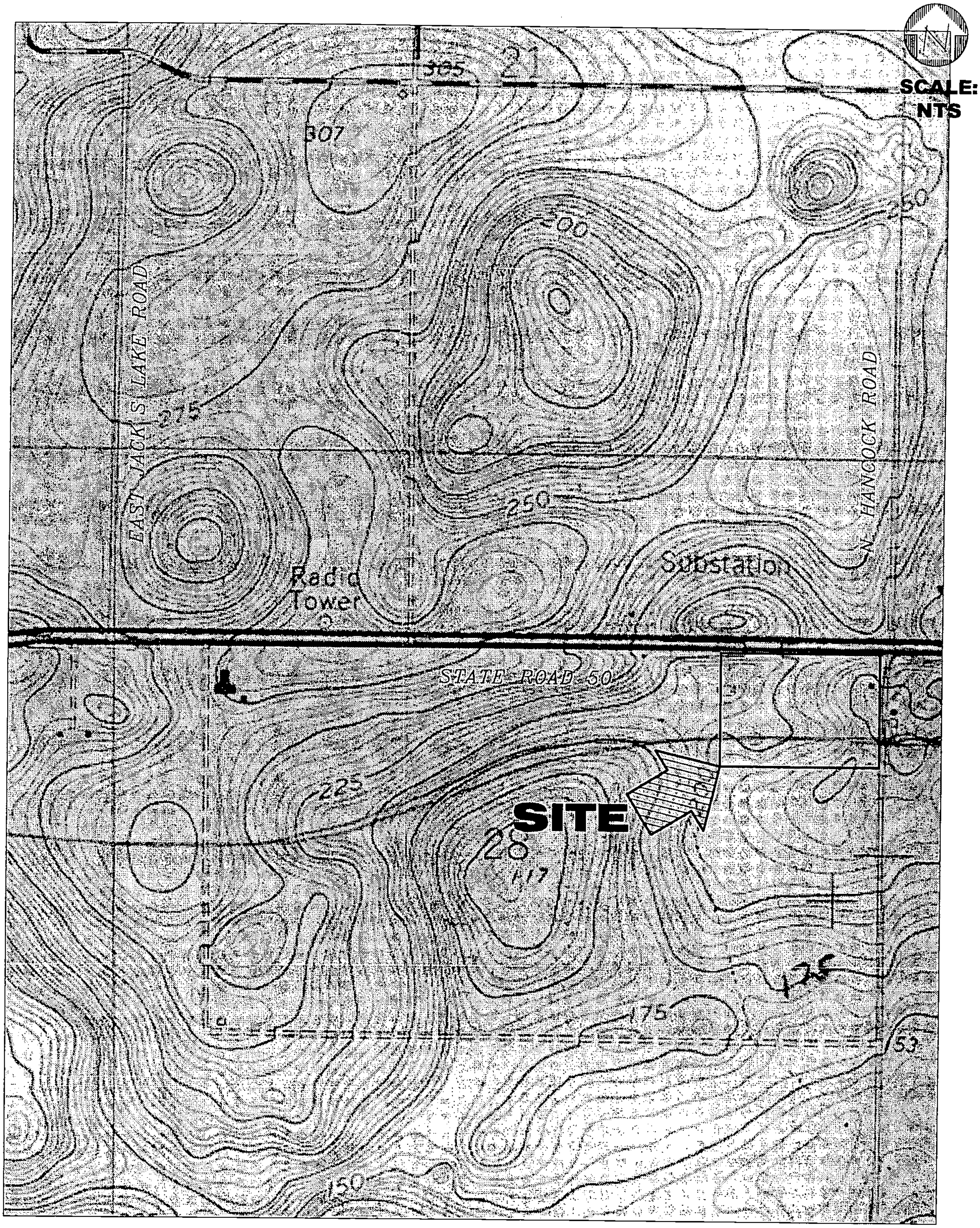
Additionally, the pond is designed to retain the runoff for the 100-year, 24-hour storm event for the City of Clermont and the volumetric difference between the pre and post development conditions for the 25-year, 96-hour storm event for the SJRWMD. The stormwater runoff is conveyed to the pond via a proposed onsite storm sewer system.

Drainage Calculations

SCALE:
NTS



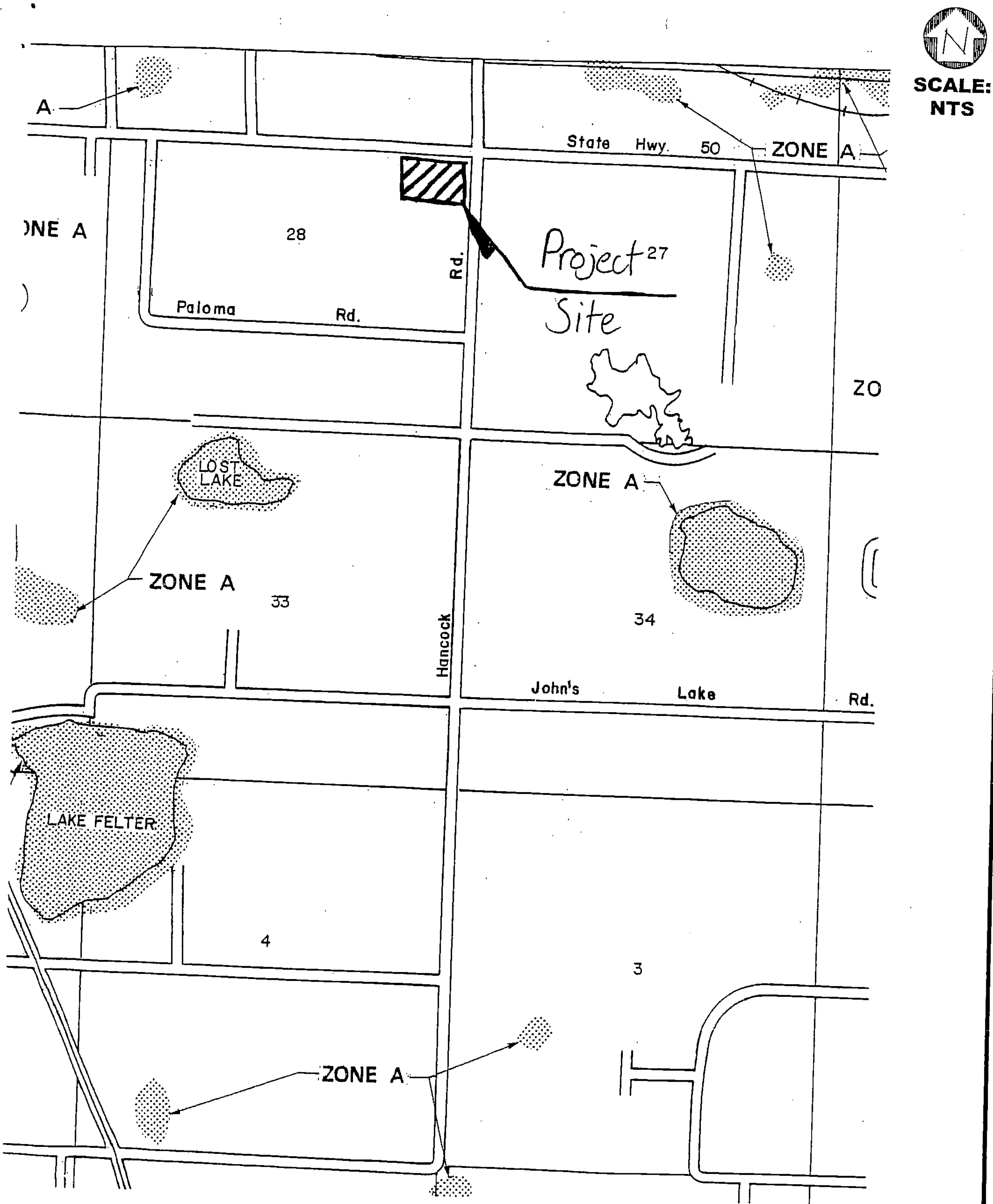
KELLY, COLLINS & GENTRY, INC. ENGINEERING / PLANNING	**COLLEGE STATION CENTER CLERMONT, FLORIDA**	**LOCATION MAP**



KELLY, COLLINS & GENTRY, INC.
ENGINEERING / PLANNING

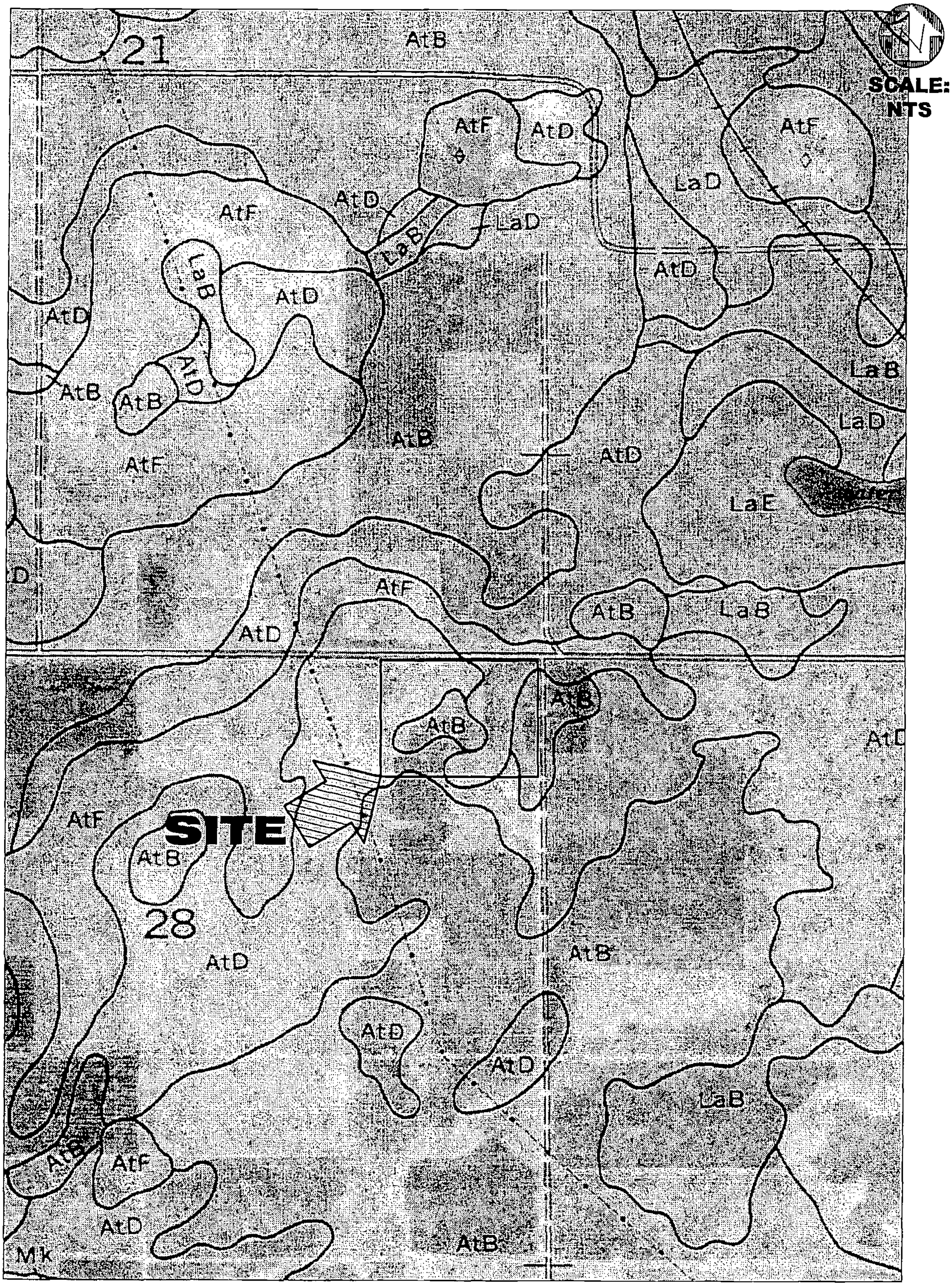
COLLEGE STATION CENTER
CLERMONT, FLORIDA

U.S.G.S. MAP

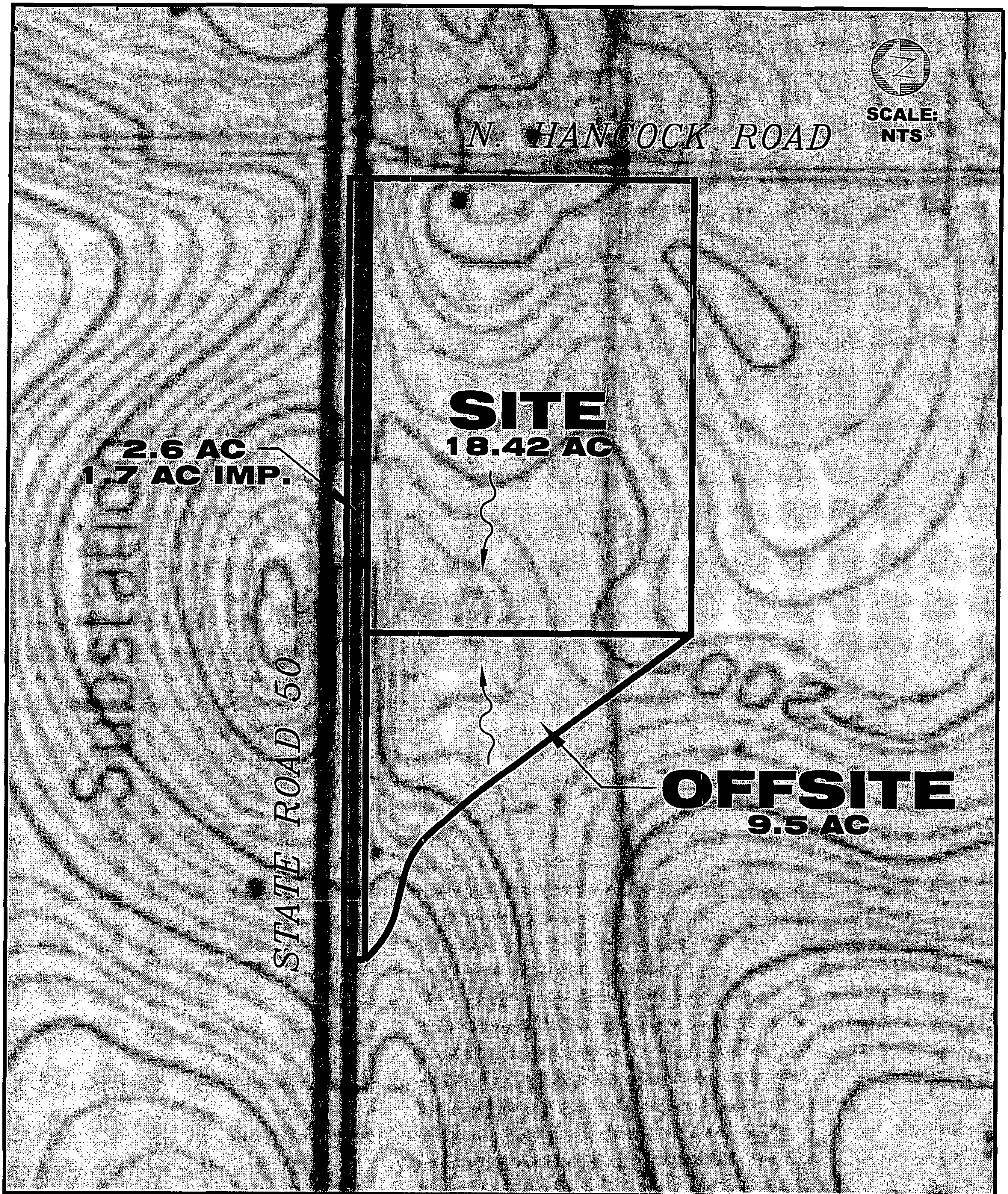


COMMUNITY - PANEL NUMBER 120421 0375 B
EFFECTIVE DATE: APRIL 1, 1982

KELLY, COLLINS & GENTRY, INC. ENGINEERING / PLANNING	COLLEGE STATION CENTER CLERMONT, FLORIDA	FEMA MAP



KELLY, COLLINS & GENTRY, INC. ENGINEERING / PLANNING	**COLLEGE STATION CENTER** **CLERMONT, FLORIDA**	**SOILS MAP**



KELLY, COLLINS & GENTRY, INC. ENGINEERING / PLANNING	**COLLEGE STATION CENTER CLERMONT, FLORIDA**	**PRE-DEVELOPMENT BASIN MAP**

College Station Center
Post-Development
CURVE NUMBER

County: Orange

Hydrologic Group	Soil Symbol	Soil Type	Cover Description	CN	Area (sf)	Area (acres)	Area (%)	Product of CN & Area
A	14, 16, 17 -	Chandler	Open Space, Lawn, Good Condition					
			SUB-TOTAL	39	148,943	3.42	18.56	7.24
D	- - - - -	- - - - -	- 0					
			SUB-TOTAL	89	0	0.00	0.00	0.00
			SUB-TOTAL		0	0.00	0.00	0.00
-	-	Impervious	Pavement, roof, etc.	98	653,400	15.00	81.44	79.81
				Totals	802,343	18.42	100.00	87.05

Basin Composite CN = 87

Gross Area Calculations

Hydrologic Group	Percent of Impervious (%)	Gross Area (sf)	Imp. Area (sf)	Net Area (sf)
A	100	802,343	653,400	148,943
D	0	0	0	0
Totals	**100**	**802,343**	**653,400**	**148,943**

Curve Number Interpollation

Residential Avg. Lot Size (ac)	Avg. % Impervious	Soil C CN	Soil D CN
0.125	65%	90	92
0.2	**49%**	**86**	**89.0**
0.250	38%	83	87

College Station Center

Post-Development

POLLUTION ABATEMENT VOLUME (P.A.V.)

Pond Type: **Dry Retention**
Treatment Method: **Total Retention**

Municipality: **City of Clermont**
Water Management District: **St. Johns**

BASIN	ONSITE		OFFSITE	TOTAL	Impervious	Runoff Depth	Municipality Requirement		
	AREA (SF)	AREA (AC)	AREA (AC)	AREA (AC)	Area (AC)	from 1" Rainfall (inches)	1" Runoff Over Total Area (AC-FT)	1.25" x Impervious Area plus 0.5" over total area (AC-FT)	PAV (AC-FT)
Dry Retention ost-Developmer	802,343	18.42	0.00	18.42	15.00	0.23	1.5349	2.3300	**2.3300**

BASIN	ONSITE		OFFSITE	TOTAL	Impervious	Runoff Depth	Water Management District Requirement		
	AREA (SF)	AREA (AC)	AREA (AC)	AREA (AC)	Area (AC)	from 1" Rainfall (inches)	1" Runoff Over Total Area (AC-FT)	1.25" x Impervious Area plus 0.5" over total area (AC-FT)	PAV (AC-FT)
Dry Retention ost-Developmer	802,343	18.42	0.00	18.42	15.00	0.23	1.5349	2.3300	**2.3300**

P.A.V. (AC-FT) = 2.3300

	TR-55 Cn	Runoff Depth (in)
	85	0.17
Project Cn	87	**0.23**
	90	0.32

College Station Center Pond

Stage [ft]	Area [sf]	Area [ac]	Incremental Storage [cf]	Cumulative Storage [cf]
185	17,340	0.398		0
			617,775	
200	65,030	1.493		617,775
			146,539	
202	81,509	1.871		764,314

TREATMENT VOLUME CALCULATION:

Site Area =	18.42	ac
Impervious Area =	15.00	ac
1" over site area =	66,865	cf
OR		
1.25" over impervious area =	68,063	cf
On-line Ret. (.5" over site)	33,432	cf
	101,495	cf
Treatment Vol. Required =	**101,495**	**cf**

Post Development Runoff Volume = 627,021 + 90,759 + 76,932=	794,712	cf
Pre-Development Runoff Volume =	345,481	cf
Pre-Post Volumetric Difference in Runoff (25yr-96hr storm) =	**449,231**	**cf**
Volume Provided @ Elevation =	**196**	**ft**

College Center Station

********** Basin Summary - 25YR96HR ***

***

Basin Name:	SITE	OFFSITE	PRE	SR50
Group Name:	BASE	BASE	BASE	BASE
Node Name:	POND	POND	PRE	POND
Hydrograph Type:	UH	UH	UH	UH
Unit Hydrograph:	UH484	UH484	UH484	UH484
Peaking Factor:	484.00	484.00	484.00	484.00
Spec Time Inc (min):	4.00	4.00	4.00	2.00
Comp Time Inc (min):	4.00	4.00	4.00	2.00
Rainfall File:	FLMOD	FLMOD	FLMOD	FLMOD
Rainfall Amount (in):	11.00	11.00	11.00	11.00
Storm Duration (hr):	96.00	96.00	96.00	96.00
Status:	ONSITE	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	30.00	30.00	30.00	15.00
Lag Time (hr):	0.00	0.00	0.00	0.00
Area (acres):	18.42	9.50	30.52	2.60
Vol of Unit Hyd (in):	1.00	1.00	1.00	1.00
Curve Number:	87.00	39.00	42.30	77.60
DCIA (%):	0.00	0.00	0.00	0.00
Time Max (hrs):	48.00	48.13	48.07	48.00
Flow Max (cfs):	36.18	5.56	21.73	4.78
Runoff Volume (in):	9.38	2.63	3.12	8.15
Runoff Volume (cf):	627021	90759	345481	76932

Storm Sewer Tabulation

Line #	Line ID	Incr. Area (ac)	Rnoff coeff (C)	Incr. CA	Sum CA	Tc (min)	Rnfal Inten (in/hr)	Total runoff (cfs)	Add. flow (cfs)	Total flow (cfs)	Capac. @ full (cfs)	Line size (in x in)	Line length (ft)	Line slope (%)	Veloc. up (ft/s)	Veloc. down (ft/s)	HGL up (ft)	HGL down (ft)	Invert up (ft)	Invert down (ft)	Dns line #
1	S2-S1	0.34	0.75	0.25	8.04	17.2	6.10	49.0	0.0	49.0	255.0	42 c	160	6.42	7.9	5.1	197.42	188.50	195.28	185.00	0
2	S3-S2	0.55	0.75	0.41	6.88	16.2	6.25	43.0	0.0	43.0	63.8	42 c	184	0.40	5.6	4.7	198.60	198.40	196.02	195.28	1
3	S4-S3	0.50	0.75	0.38	5.57	15.1	6.41	35.7	0.0	35.7	42.4	36 c	188	0.40	5.2	5.1	199.58	199.10	196.78	196.02	2
4	S5-S4	0.00	0.00	0.00	4.41	14.1	6.60	29.1	0.0	29.1	41.8	36 c	196	0.39	4.3	4.1	200.32	200.00	197.55	196.78	3
5	S6-S5	0.77	0.85	0.65	4.41	13.4	6.71	29.5	0.0	29.5	42.3	36 c	112	0.40	4.3	4.2	200.80	200.61	198.00	197.55	4
6	S7-S6	0.49	0.85	0.42	3.75	13.0	6.78	25.5	0.0	25.5	42.3	36 c	77	0.40	3.7	3.6	201.19	201.09	198.31	198.00	5
7	S8-S7	0.40	0.85	0.34	3.34	12.7	6.84	22.8	0.0	22.8	14.2	24 c	56	0.39	7.3	7.3	201.96	201.39	198.53	198.31	6
8	S9-S8	0.61	0.85	0.52	3.00	12.4	6.90	20.7	0.0	20.7	14.2	24 c	56	0.39	6.6	6.6	203.25	202.78	198.75	198.53	7
9	S10-S9	1.09	0.85	0.93	2.48	11.8	7.02	17.4	0.0	17.4	14.2	24 c	111	0.40	5.5	5.5	204.58	203.92	199.19	198.75	8
10	S11-S10	0.09	0.85	0.08	1.55	10.7	7.25	11.2	0.0	11.2	22.6	24 c	194	1.00	3.6	3.6	205.54	205.06	201.13	199.19	9
11	S12-S11	0.19	0.85	0.16	0.16	10.0	7.40	1.2	0.0	1.2	22.8	24 c	124	1.02	0.4	0.4	205.74	205.73	202.39	201.13	10
12	TRACT 1-S2	1.13	0.80	0.90	0.90	10.0	7.40	6.7	0.0	6.7	4.1	15 c	40	0.40	5.5	5.5	198.83	198.40	195.44	195.28	1
13	TRACT 2-S3	1.13	0.80	0.90	0.90	10.0	7.40	6.7	0.0	6.7	4.1	15 c	40	0.40	5.5	5.5	199.53	199.10	196.18	196.02	2
14	TRACT 3-S4	0.98	0.80	0.78	0.78	10.0	7.40	5.8	0.0	5.8	4.1	15 c	40	0.40	4.7	4.7	200.32	200.00	196.94	196.78	3
15	TRACT 4-S11	1.64	0.80	1.31	1.31	10.0	7.40	9.7	0.0	9.7	4.1	15 c	40	0.40	7.9	7.9	206.64	205.73	201.29	201.13	10

PROJECT FILE: STORM14R.STM | I-D-F FILE: ZONE7.IDF | TOTAL NUMBER OF LINES: 15 | RUN DATE: 07-31-2002

NOTES: c = circular; e = elliptical; b = box; Intensity = 77.73657 / (Tc + 14.05001) ^ .7394657; Return period = 10 Yrs.

UNIVERSAL
ENGINEERING SCIENCES

GEOTECHNICAL EXPLORATION

COLLEGE STATION CENTER -
COMMERCIAL INFRASTRUCTURE
STATE ROAD 50 AND HANCOCK ROAD
CLERMONT, LAKE COUNTY, FLORIDA

PROJECT NO. 12228-002-01
REPORT NO. 236124

Prepared By:

Universal Engineering Sciences
3532 Maggie Boulevard
Orlando, Florida 32811
(407) 423-0504

July 29, 2002

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July 29, 2002

Presco Associates, Inc.
232 Mohawk Road
Clermont, Florida 34711

Attention: Mr. Bob Shaker

Reference: Geotechnical Exploration
College Station Center - Commercial Infrastructure
State Road 50 and Hancock Road
Clermont, Lake County, Florida
Project No. 12228-002-01
Report No. 236124

Dear Mr. Shaker:

Universal Engineering Sciences, Inc. (UES) has completed the subsurface investigation for the proposed commercial development at the southwest intersection of State Road 50 and Hancock Road in Clermont, Lake County, Florida. The scope of our investigation was planned in conjunction with, and authorized by you.

This report contains the results of our investigations, an engineering interpretation of these with respect to the project characteristics described to us, and recommendations for preliminary foundation design, retention pond design, pavement design, preliminary site preparation for foundations, final site preparation for pavements, and other concerns as appropriate.

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.

Guy H. Rabens, M.S., E.I.
Project Engineer

R. Kenneth Derick, P.E.
P.E. No. 37711
Senior Vice President

GHR/RKD:si
cc: Client (2)
Kelly Collins & Gentry -Scott Gentry (2)

Project No. 12228-002-01
Report No. 236124

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LIST OF APPENDICES

1.0 EXECUTIVE SUMMARY

In summary, we understand this project consists of developing this parcel of land into retail stores, along with associated parking and stormwater management areas. We have performed field and laboratory investigations to provide geotechnical engineering recommendations for preliminary foundation design, retention pond design, pavement design, site preparation, and other concerns as appropriate.

The soils encountered consist of a surficial layer of very loose to medium dense sand to an average depth of 18 feet, followed by very loose to loose, sand with clay to clayey sand extending to a depth of 27 feet. From 27 feet to a depth of 35 feet, our deepest boring termination depth, was a layer of medium dense sand. At the time of our investigation, we did not encounter the groundwater table with 35 feet below grades at the test boring locations. We estimate the seasonal high groundwater table condition during the rainy season could be on the order of 7 feet (a "perched" condition) to greater than 35 feet below the existing grade at the test boring locations depending on the depth of the confining unit.

Based on the subsurface conditions encountered at the site and our preliminary evaluation, we believe that a shallow foundation system or a thickened edge monolithic slab with conventional site preparation techniques can be used for the proposed structures on this site. Allowable soil bearing pressures on the order of 2,500 psf should be achievable with conventional site preparation techniques. The actual design of the foundations will most likely be governed by the allowable settlement for the structures. Final foundation design recommendations will require additional information obtained from a comprehensive subsurface exploration program, as well as specific details regarding the types and sizes of the proposed structures.

The subsurface conditions at the proposed retention ponds are favorable for design of dry bottom retention ponds as discussed in the report. We would be glad to perform a drawdown recovery or a background seepage evaluation as required, once the final pond design is complete.

Pavements should be designed as a function of the anticipated traffic loadings. We recommend using a three-layer pavement section consisting of stabilized subgrade, base course, and a surface course. We have also included recommendations for rigid pavement sections in heavy truck traffic areas. All pavement designs should incorporate the effects of groundwater, irrigated landscape areas, and construction traffic.

We recommend normal, good practice site preparation procedures to prepare the subgrade to support the structures and pavements.

We hope this report meets your needs and discusses the problems associated with the proposed development. We would be pleased to meet with you and discuss any geotechnical engineering aspects of the project.

2.0 INTRODUCTION

2.1 GENERAL

In this report, we present the results of the subsurface investigation for the proposed commercial development at the southwest intersection of State Road 50 and Hancock Road in Clermont, Lake County, Florida. We have divided this report into the following sections:

- SCOPE OF SERVICES - Defines what we did
- FINDINGS - Describes what we encountered
- RECOMMENDATIONS - Describes what we encourage you to do
- LIMITATIONS - Describes the restrictions inherent in this report
- APPENDICES - Presents support materials referenced in this report.

3.0 SCOPE OF SERVICES

3.1 PROJECT DESCRIPTION

We understand you are planning a commercial development at the southwest corner of SR 50 and Hancock Road in Clermont, Florida. We have been provided with a site plan showing the general tract layout along with planned roads, parking, and stormwater retention. The plan calls for typical out parcels in Tracts 1 through 4 along with a small, single story strip center on the southern half of the site. We used this plan in preparing this proposal.

Because the development plans for the structures have not been finalized, we have been asked to provide preliminary foundation and site preparation recommendations for those buildings. Additional investigations will be required as the plans for the development materialize. For the parking, drive, and retention areas, we have been asked to provide final design level recommendations.

Although no specification was provided for pavement design in the Site Development Package, we have assumed traffic loadings of 10,000 and 50,000 18-kip ESALS for light duty and heavy duty pavement sections, respectively.

Our recommendations are based upon the above considerations. If any of this information is incorrect or if you anticipate any changes, inform Universal Engineering Sciences so that we may review our recommendations.

The project is located at the southwest intersection of State Road 50 and Hancock Road in Section 28, Township 22 South, and Range 26 East in Clermont, Lake County, Florida. A general location map of the project area appears in Appendix A: Site Location Map.

3.2 PURPOSE

The purposes of this investigation were:

- to investigate the general subsurface conditions at the site;
- to interpret and review the subsurface conditions with respect to the proposed construction; and
- to provide geotechnical engineering recommendations for preliminary foundation design, retention pond design, pavement design, preliminary site preparation for foundations, final site preparation for pavements, and other concerns as appropriate.

This report presents an evaluation of site conditions on the basis of traditional geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. Universal Engineering Sciences would be pleased to perform these services, if you desire.

Our investigation was confined to the zone of soil likely to be stressed by the proposed construction. Our work did not address the potential for surface expression of deep geological conditions, such as sinkhole development related to karst activity. This evaluation requires a more extensive range of field services than performed in this study. We will be pleased to conduct an investigation to evaluate the probable effect of the regional geology upon the proposed construction, if you desire.

3.3 FIELD INVESTIGATION

The subsurface conditions for the proposed development were investigated with 13 soil borings advanced to depths ranging from 10 to 35 feet below existing grades, while performing the Standard Penetration Test (SPT). The locations of these soil borings are indicated in Appendix B: Boring Location Plan.

We performed the Standard Penetration Test according to the procedures of ASTM D-1586; however, we used continuous sampling to detect slight variations in the soil profile at shallow depths. The basic procedure for the Standard Penetration Test is as follows: A standard split-barrel sampler is driven into the soil by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler 1-foot, after seating 6 inches, is designated the penetration resistance, or N-value; this value is an index to soil strength and consistency.

No site survey was available for our field investigation. Consider the indicated locations and depths to be approximate. Our drilling crew located the borings based upon estimated distances and relationships to obvious landmarks. Further, the boring locations are based on the conceptual plan provided by Avid Engineering.

Jar samples of the soils encountered will be held in our laboratory for your inspection for 60 days unless we are notified otherwise.

3.4 LABORATORY INVESTIGATION

The soil samples recovered from the soil test borings were returned to our laboratory and then a geotechnical engineer visually examined and reviewed the field descriptions. We selected representative soil samples for laboratory testing consisting of 10 wash No. 200 sieve determinations, 10 moisture content determinations and 4 laboratory constant head permeability tests.

We performed these tests to aid in classifying the soils and to help to evaluate the general engineering characteristics of the site soils. See Appendix B: Boring Logs and Description of Testing Procedures, for further data and explanations.

4.0 FINDINGS

4.1 SURFACE CONDITIONS

We examined aerial maps, U.S.G.S. topographic quadrangle maps and the USDA Soil Conservation Service Soil Survey of Lake County for relevant information about the site. According to the SCS Lake County Soil Survey, the subject site potentially includes the following native soil types and corresponding seasonal high groundwater table.

Table 1: USDA SCS Soil Classifications

Soil Symbol	Name	Predicted Seas. High Water Table	Drainage Features
AtB	Astatula Sand, 0 to 5% Slopes	SHGWT > 6.0 feet	Excessively Drained
AtD	Astatula Sand, 5 to 12% Slopes	SHGWT > 6.0 feet	Excessively Drained
AtF	Astatula Sand, 12 to 40% Slopes	SHGWT > 6.0 feet	Excessively Drained

4.2 SUBSURFACE CONDITIONS

Overall, the subsurface conditions encountered in our test borings closely reflected the surficial soil and groundwater conditions described in the USDA Soils survey. The boring locations and detailed subsurface conditions are illustrated in Appendix B: Boring Location Plan and Boring Logs. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples and a limited number of laboratory tests. Also, see Appendix B: Soils Classification Chart, for further explanation of the symbols and placement of data on the Boring Logs. Table 2: General Soil Profile, summarizes the soil conditions encountered.

TABLE 2: GENERAL SOIL PROFILE	
Typical Depths Below Existing Grades (feet)	**General Soil Description**
0 - 18	Very loose to medium, light yellow-brown to orange SAND [SP]
18 - 27	Very loose to loose, orange-brown SAND with clay to clayey SAND [SP-SC to SC]
27 - 35*	Medium dense, light orange SAND [SP]
*** Termination of the Deepest Soil Borings** **[ ] Bracketed Text Indicates Unified Soil Classification**	

A notable exception to the above soil profile was the presence of a shallower sand with a clay layer at boring location SWL-1 beginning at a depth of 9 feet to 15 feet, our boring termination depth. We did not encounter the groundwater within a depth of 35 feet below existing grades at the test boring locations at the time of our investigation.

5.0 RECOMMENDATIONS

5.1 GENERAL

The following recommendations are made based upon a review of the attached soil test data, our understanding of the proposed construction, and experience with similar projects and subsurface conditions. If the structural loadings, building locations, or grading plans change from those discussed previously, we request the opportunity to review and possibly amend our recommendations with respect to those changes.

Additionally, if subsurface conditions are encountered during construction which were not encountered in the borings, report those conditions immediately to us for observation and recommendations.

In this section of the report, we present our detailed recommendations for groundwater control, building foundations, retention pond soils, pavements, site preparation, and construction related services.

5.2 GROUNDWATER CONTROL

The groundwater table will fluctuate seasonally depending upon local rainfall. The rainy season in Central Florida is normally between June and September. Based upon our review of U.S.G.S. data, Lake County Soils Survey, and regional hydrogeology, our best estimate for the seasonal high groundwater table is from a depth of 7 feet (a "perched" condition) to greater than 35 feet below the existing grade at the test boring locations. The existing and estimated seasonal high groundwater table at each location appears in Appendix B: Boring Logs.

It should be noted that the estimated seasonal high groundwater levels do not provide any assurance that groundwater levels will not exceed these estimated levels during any given year in the future. Should impediments to surface water drainage exist on the site, or should rainfall intensity and duration, or total rainfall quantities, exceed the normally anticipated rainfall quantities, groundwater levels may exceed our seasonal high estimates. We recommend positive drainage be established and maintained on the site during construction and throughout the life of the project. We recommend all foundation designs, pavement designs, and stormwater retention analysis incorporate the seasonal high groundwater conditions.

We do not believe temporary dewatering will be required at this site if construction proceeds during the wet season. However, we recommend that the contract documents provide for determining the depth to the groundwater table just prior to construction, and for any required remedial dewatering for deep excavations. We recommend that the groundwater table be maintained at least 24 inches below all earthwork and compaction surfaces during construction.

5.3 PRELIMINARY BUILDING FOUNDATIONS RECOMMENDATIONS

5.3.1 GENERAL

The results of our test borings indicate the presence of very loose to loose soil deposits within the upper 10 to 15 feet or deeper of subsoil on the site. Overall, the soils encountered in majority of the site are suitable as subgrade material for support of building foundations with surficial improvement.

We believe that a shallow foundation system or a thickened edge monolithic slab with conventional site preparation techniques can be used for the proposed structures on this site. Based on the general subsurface conditions encountered, we anticipate relatively moderate allowable soil bearing pressures (i.e., 2500 psf) for design of these building foundations. The actual design of the foundations will most likely be governed by the allowable settlement for the structures.

In any event, detailed subsurface exploration and analysis of the soil properties is necessary for final foundation design. Therefore, we strongly recommend the foundation design should be based on additional information obtained from a comprehensive subsurface exploration program.

5.4 STORMWATER MANAGEMENT PONDS

5.4.1 GENERAL DISCUSSION

Our field investigation included two soil borings designated as P-1 & P-2 performed within the proposed stormwater management pond in the southwest corner of the site. The soil profiles encountered generally consisted of loose to medium dense sands with low soil fines contents extending to the depth of termination of the soil borings.

At the time of our investigation we did not encounter the groundwater table within 35 feet below existing grade.

In order to evaluate the general permeability characteristics, we performed a total of four constant-head permeability tests on soil samples recovered from the surficial sand layer. The tests resulted in vertical permeability values ranging from 33 feet per day to 55 feet per day. Based on the sandy nature of the surficial soils, the fast permeability test results, and the estimated deep seasonal high groundwater table conditions, this site is suitable for design of dry bottom stormwater retention ponds.

It should be noted that the coefficient of permeability indicated on the boring logs is not an infiltration rate. The actual infiltration rate is influenced by the coefficient of permeability as well as several factors, including the bottom elevation of the infiltration structures, the water level in the structures, the elevation of the wet season water table, and the confining layer. These factors must be accounted for in an appropriate groundwater model to determine the infiltration rate of a given soil stratum. We recommend that the designer use a commercial software program such as "Ponds" or "Modret" in order to evaluate the infiltration structures. We would be glad to provide a proposal to perform the recovery or background seepage evaluation once the pond design is complete.

We recommend the following parameters for the design of the stormwater management ponds.

TABLE 3: RECOMMENDED STORMWATER MANAGEMENT DESIGN PARAMETERS

Parameter	Pond Borings P-1 & P-2
Average Depth of Confining Layer (feet)	35*
Seasonal Fluctuation of Groundwater Table (feet)	4
Avg. Horizontal Saturated Hydraulic Conductivity (feet per day)	40
Avg. Vertical Unsaturated Infiltration (feet per day)	26
Fillable Porosity (percent)	25
Estimated Depth Seasonal High Groundwater Table (ft)	34**

* Assumed boring termination depth as confining unit since the confining unit was not encountered prior to boring termination.

** Assumed seasonal high groundwater table depth at 1 foot above the boring termination depth for analysis purposes. We did not encounter the groundwater table within 35 feet below existing grade at the pond location during the exploration program.

5.5 ON-SITE FLEXIBLE PAVEMENTS

5.5.1 GENERAL

We recommend using a flexible pavement section on this project. Flexible pavements combine the strength and durability of several layer components to produce an appropriate and cost-effective combination of available materials.

5.5.2 LAYER COMPONENTS

For flexible pavement designs, we recommend using a three-layer pavement section consisting of stabilized subgrade, base course, and surface course placed on top of existing subgrade or a compacted embankment.

Because traffic loadings are commonly unavailable, we have generalized our pavement design into two groups. The group descriptions and the recommended component thicknesses are presented in Table 4: Pavement Component Recommendations. The structural numbers in Table 4 are based on a structural number analysis with the stated estimated daily traffic volume for a 15-year placement design life.

TABLE 4: Pavement Component Recommendations

Traffic Group	Structural Number	Component Thickness (inches)		
		Stabilized Subgrade	Base Course	Surface Course
Parking lots - light duty	2.2	8	6	1.5
Driveways & Parking lots - heavy duty	3.0	10	8	2.5

Parking lots-light duty: auto parking areas; light panel and pickup trucks; 10,000 18-kip equivalent axle loads for a 15-year design life

Parking lots-heavy duty: shopping center driveways; delivery vehicles and semi-truck; 50,000 18-kip equivalent axle loads for a 15-year design life

5.5.3 STABILIZED SUBGRADE

We recommend that the upper 24-inches of the subgrade materials below the pavement be compacted in place to a minimum density of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557) according to the requirements in the "Site Preparation" section of this report.

Further, stabilize the subgrade materials to the depth provided above in Table 4 to a minimum Limerock Bearing Ratio (LBR) of 40 percent or Florida Bearing Value (FBV) of 50 psi, as specified by Florida Department of Transportation (FDOT) requirements for Type B or Type C Stabilized Subgrade. Subgrades should be stabilized to the depth shown in the preceding Table 4: Pavement Component Recommendations.

The stabilized subgrade can be imported material or a blend of on-site soils and imported materials. If a blend is proposed, we recommend that the contractor perform a mix design to find the optimum mix proportions.

5.5.4 BASE COURSE

We recommend the base course be either limerock or soil-cement. Since the final pavement area grades have not yet been established, we have provided the following guidelines concerning base course selection:

1) If the final grades will include fill sufficient to provide a minimum separation of 12-inches between the bottom of the base course and the seasonal high groundwater level, either a limerock or soil-cement base course should be suitable for the proposed construction.

2) If underdrains are used in the pavement areas to lower the seasonal high groundwater conditions and to provide the recommended 12-inches of separation between the bottom of the base course and the seasonal high groundwater conditions, we recommend the use of a soil-cement base course.

Please refer to later paragraphs in this section for discussions concerning the recommended separation between the seasonal high groundwater levels and pavement base courses.

For limerock base courses, the limerock should have a minimum LBR of 100 percent and should be mined from an FDOT approved source. Place limerock in maximum 6-inch lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density.

For a soil-cement base, we recommend the contractor perform a soil-cement design with a minimum seven-day strength of 300 pounds per square inch (psi) on the materials he intends to use. Place soil-cement in maximum 6-inch lifts and compact in place to a minimum density of 95 percent of the Standard Proctor maximum dry density according to specifications in ASTM D-558.

Place and finish the soil-cement according to Portland Cement Association requirements. Final review of the soil-cement base course should include manual "chaining" and/or "soundings" seven days after placement. Shrinkage cracks will form in the soil-cement mixture and you should expect reflection cracking on the surface course.

Perform compliance testing for either limerock or soil-cement for full depth at a frequency of one test per 10,000 square feet, or at a minimum of two test locations, whichever is greater.

5.5.5 SURFACE COURSE

In light duty areas where there is occasional truck traffic, but primarily passenger cars, we recommend using an asphaltic concrete, FDOT Type S-III, which has a stability of 1,000 pounds.

In heavy duty areas, where truck traffic is predominant, we recommend using as asphaltic concrete, FDOT Type S-III or S-I, which has a minimum stability of 1,500 pounds.

Asphaltic concrete mixes should be a current FDOT approved design of the materials actually used. Test samples of the materials delivered to the project to verify that the aggregate gradation and asphalt content satisfies the mix design requirements. Compact the asphalt to a minimum of 95 percent of the Marshall design density.

After placement and field compaction, core the wearing surface to evaluate material thickness and to perform laboratory densities. Obtain cores at frequencies of at least one core per 3,000 square feet of placed pavement or a minimum of two cores per day's production.

5.5.6 EFFECTS OF GROUNDWATER

One of the most critical influences on the pavement performance in Central Florida is the relationship between the pavement subgrade and the seasonal high groundwater level.

Many roadways and parking areas have been destroyed as a result of deterioration of the base and the base/surface course bond. Regardless of the type of base selected, we recommend that the seasonal high groundwater level and the bottom of the base course be separated by at least 12-inches. To maintain this separation, either raise the roadway grades or artificially lower the groundwater level with underdrains.

At this time, it appears that pavements constructed at or above current grade will not require underdrains. As the project design progresses, we recommend that we review the grading plans to evaluate the possible need for underdrains.

5.5.7 LANDSCAPE DRAINS

We recommend that drains (see typical cross section in Appendix B) be installed around the landscaped sections adjacent to the parking lots and driveways to protect the asphalt pavement from excess rainfall and over irrigation. Migration of irrigation water from the landscape areas to the interface between the asphalt and the base usually occurs unless landscape drains are installed. This migration often causes separation of the wearing surface from the base and subsequent rippling and pavement deterioration. The underdrains or strip drains should be routed to a positive outfall at the pavement area catch basins.

5.5.8 CONSTRUCTION TRAFFIC

Light duty roadways and incomplete pavement sections will not perform satisfactorily under construction traffic loadings. We recommend that construction traffic (construction equipment, concrete trucks, sod trucks, garbage trucks, moving vans, dump trucks, etc.) be re-routed away from these roadways or that the pavement section be designed for these loadings.

5.6 RIGID PAVEMENTS

It is our opinion that the areas of the site subject to heavy truck traffic and increased impact and abrasion loads should be designed with rigid pavement. These areas include a 20-foot approach to the dumpster pad, truck dock, the dumpster pad itself, and all truck access, delivery pit and turnaround areas. Rigid pavements may be constructed of un-reinforced Portland cement concrete (Type 1 Portland cement) providing a minimum 28-day compressive strength of 4,000 psi.

Pavement thickness should be a minimum of 7 inches for areas where 18-wheel, tandem axle trucks will travel for delivery purposes. Control joints for crack control for the pavement should be spaced closely, at about 8 to 12 feet apart, and should provide a uniform square or rectangular pattern. The joint pattern should be submitted for review and approval prior to construction. Joints should be sawed as soon as the concrete can withstand traffic, while not so soon as to cause raveling of the concrete surface and aggregate during sawing.

It is our opinion that reinforcement for concrete pavements is not required; however, should you wish to reinforce the pavements, we recommend that you use reinforcement consisting of a single mat of No. 3 bars at 1-foot centers each way, placed mid-depth in the slab.

We recommend that the subgrade materials beneath rigid concrete pavements be compacted in place according to the requirements outlined in the Site Preparation section of this report. Pavement sections should be constructed only over smooth, stable subgrades. Rutting or subgrades from concrete trucks and other traffic should be repaired prior to the placement of concrete. The subgrades should be thoroughly wetted immediately prior to concrete placement to minimize absorption of moisture from the concrete during curing.

Placement and curing of concrete pavement should conform with all applicable American Concrete Institute (ACI) standards and in particular with recommended procedures for hot weather concrete work.

5.7 SITE PREPARATION

We recommend normal, good practice site preparation procedures. These procedures include: stripping the site of vegetation, proof-rolling and proof-compacting the subgrade, and filling to grade with engineered fill.

A more detailed synopsis of this work is as follows:

1. Perform remedial dewatering prior to any earthwork operations. This step is probably unnecessary for this site.

2. Strip the proposed construction limits of all grass, roots, topsoil, construction debris, and other deleterious materials within and 10 feet beyond the perimeter of the proposed building and in all paved areas. Expect clearing and grubbing to depths of 12 inches. Deeper clearing and grubbing depths may be encountered in heavily vegetated areas where major root systems are encountered.

3. **In building areas**, grade the site under the proposed building footprint to the final subgrade elevation and proof-roll the building area subgrade using a heavily loaded, rubber-tired vehicle making a minimum of 10 passes in each of two perpendicular directions under the observation of a Universal Engineering Sciences geotechnical engineer or his representative. Proof-rolling will help locate any zones of especially loose or soft soils not encountered in the soil test borings. Then undercut, or otherwise treat these zones as recommended by the engineer.

4. Proof-compact the building subgrade from the surface by a heavy-weight vibratory roller (a 20-ton roller, for example), until you obtain a minimum density of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), to a minimum depth of 3 feet below the final footing elevation in the building limits.

5. Test the building subgrade for compaction at a frequency of not less than one test per 2,500 square feet, per foot of depth improvement in the building area.

6. **In pavement areas**, proof-roll the subgrade using a heavily loaded, rubber-tired vehicle making a minimum of 10 passes in each of two perpendicular directions under the observation of a Universal Engineering Sciences geotechnical engineer or his representative. Proof-rolling will help locate any zones of especially loose or soft soils not encountered in the soil test borings. Then undercut, or otherwise treat these zones as recommended by the engineer.

7. Proof-compact the pavement subgrade from the surface by a heavy-weight vibratory roller (a 20-ton roller, for example), until you obtain a minimum density of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), to a depth of 2 feet below the bottom of the base course in the pavement areas.

8. Test the pavement area subgrade for compaction at a frequency of not less than one test per 10,000 square feet, or at a minimum of 2 test locations, whichever is greater.

9. Place fill material, as required. The fill should consist of "clean," fine sand with less than 5 percent soil fines. You may use fill materials with soil fines between 5 and 10 percent, but strict moisture control may be required. Place fill in uniform 10- to 12-inch loose lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density.

10. Perform compliance tests within the fill at a frequency of not less than one test per 2,500 square feet per lift in the building areas, or at a minimum of two test locations, whichever is greater. In paved areas, perform compliance tests at a frequency of not less than one test per 10,000 square feet per lift, or at a minimum of two test locations, whichever is greater.

11. Stabilize the pavement subgrade as recommended in the pavement design recommendations section of this report and compact the stabilized subgrade to a minimum density of 95 percent of the Modified Proctor maximum dry density.

12. Perform compliance tests on the stabilized subgrade for full depth at a frequency of one test per 10,000 square feet, or at a minimum of two test locations, whichever is greater.

Using vibratory compaction equipment at this site may disturb adjacent structures. We recommend you monitor nearby structures before and during proof-compaction. If disturbance is noted, halt vibratory compaction and inform Universal Engineering Sciences immediately. We will review the compaction procedures and evaluate if the compactive effort results in a satisfactory subgrade, complying with our original design assumptions.

5.8 CONSTRUCTION RELATED SERVICES

We recommend the owner retain Universal Engineering Sciences to perform construction materials tests and observations on this project. Field tests and observations include verification of foundation and pavement subgrades by monitoring proof-rolling operations and performing quality assurance tests on the placement of compacted structural fill and pavement courses.

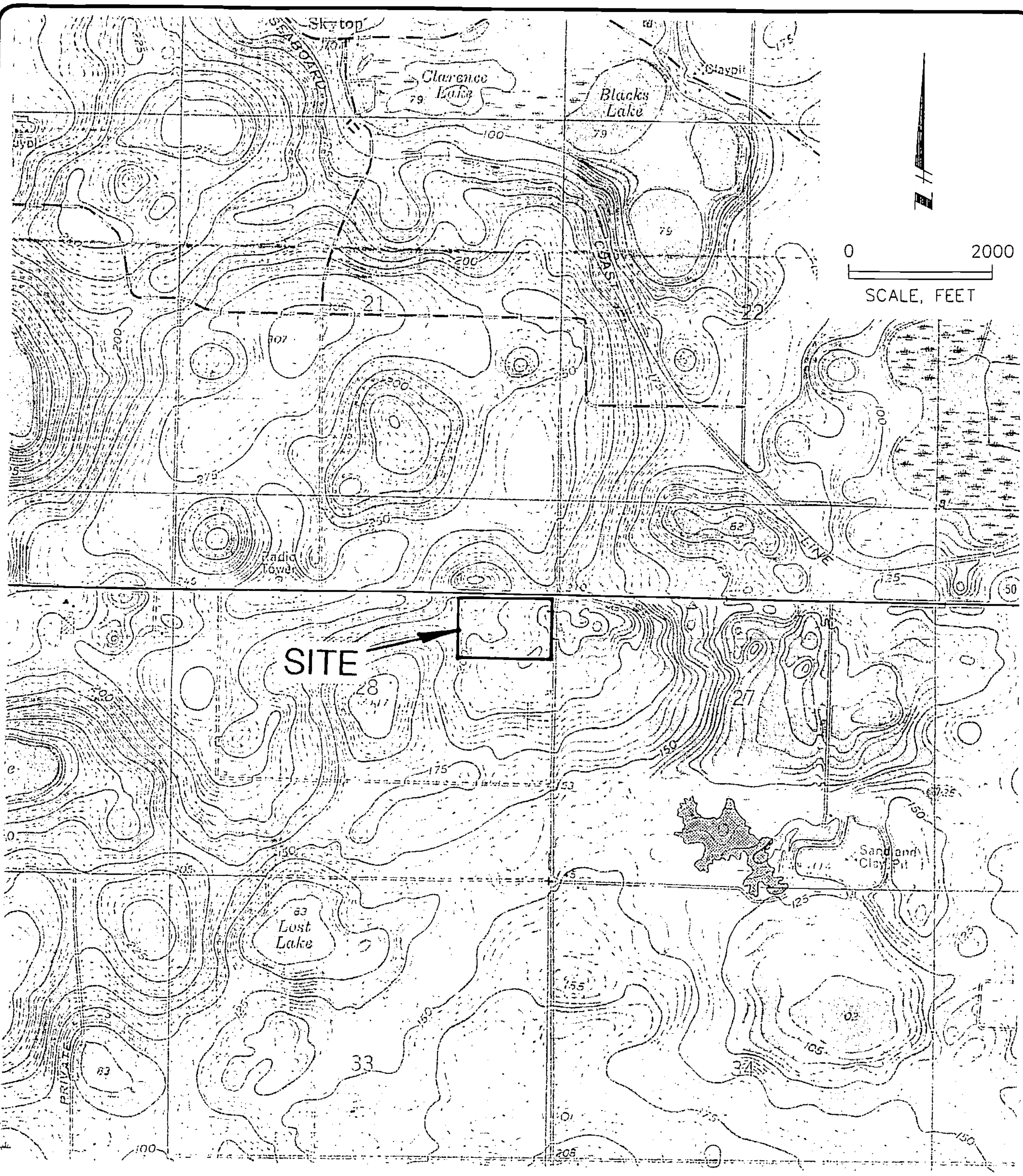
The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address problems that might arise during construction in a timely and cost-effective manner.

6.0 LIMITATIONS

During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. An Association of Engineering Firms Practicing in the Geosciences (ASFE) publication, "Important Information About Your Geotechnical Engineering Report" appears in Appendix C, and will help explain the nature of geotechnical issues.

Further, we present documents in Appendix C: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

APPENDIX A



BASE MAP: "CLERMONT EAST, FLA." U.S.G.S. QUADRANGLE MAP, PHOTOREVISED 1970

UNIVERSAL
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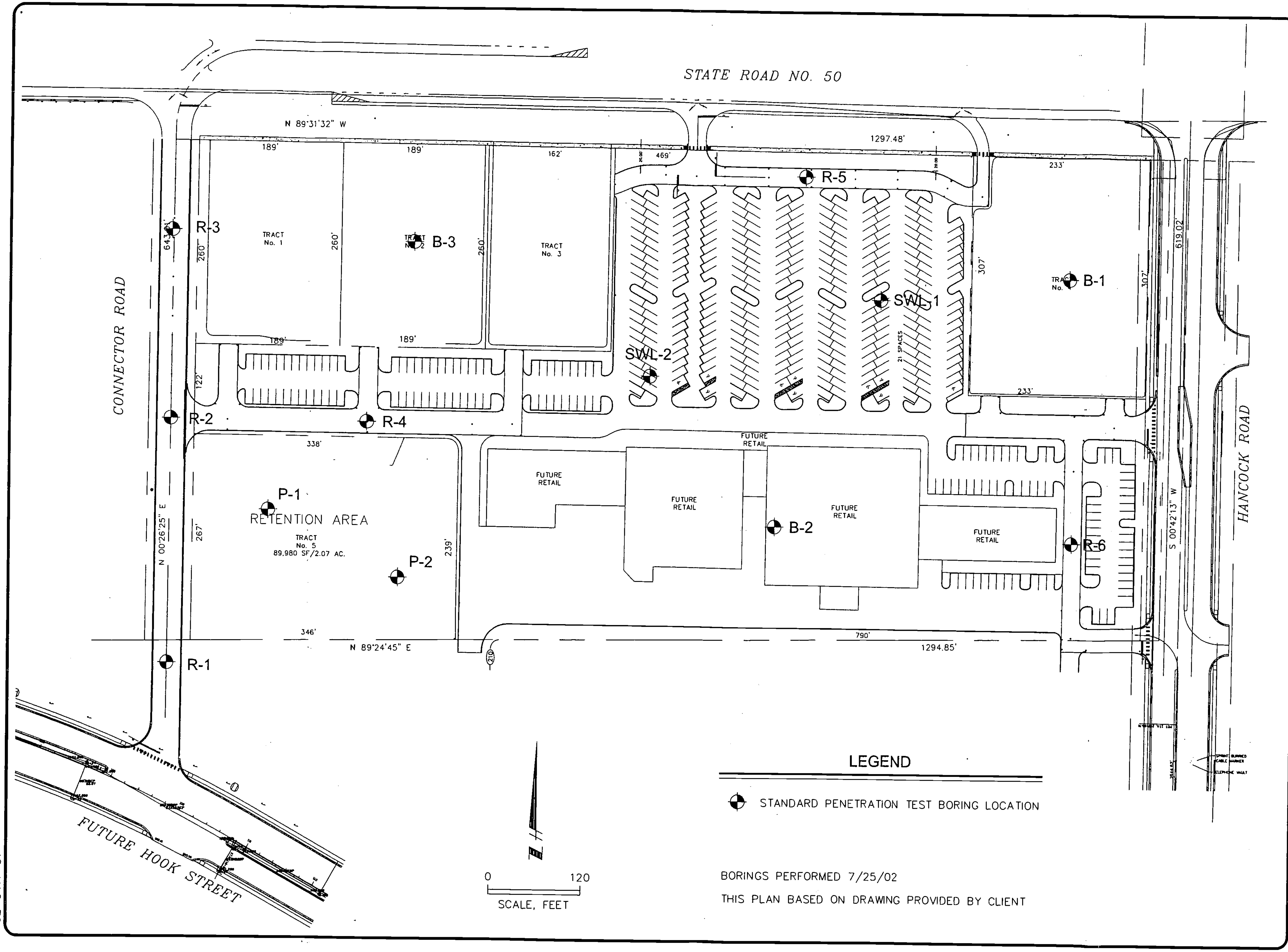
GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
STATE ROAD 50 AND HANCOCK ROAD
CLERMONT, LAKE COUNTY, FLORIDA

U.S.G.S. SITE LOCATION MAP

DRAWN BY:	G.B.	DATE:	7/29/02	CHECKED BY:	(signature)	DATE:	7-31-02
SCALE:	AS SHOWN	PROJECT NO:	12228-002-01	REPORT NO:	236124	PAGE NO:	A-1

APPENDIX B



02-0411-01

FOR: PRESCO ASSOCIATES, INC.

DRAWN BY:	G.B.	DATE:	7/29/02
CHECKED BY:		DATE:	7-31-02
REPORT NO:	236124	SCALE:	AS SHOWN
PROJECT NO:	12228-002-01		

GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
STATE ROAD 50 AND HANCOCK ROAD
CLERMONT, LAKE COUNTY, FLORIDA

BORING LOCATION PLAN

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BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.1

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **B-1** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED, EST. W.S.W.T. REPRESENTS "PERCHED" WATER TABLE

G.S. ELEVATION (ft): N.S. DATE STARTED: 7/25/02
WATER TABLE (ft): > 35.0 DATE FINISHED: 7/25/02
DATE OF READING: 7/24/02 DRILLED BY: UES - ORLANDO
EST. W.S.W.T. (ft): 16.0 TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Medium dense light brown fine SAND [SP]						
	X	3-6-6	12									
	X	6-8-10	18									
5	X	4-5-6	11									
	X	3-3-3	6			-- loose; light yellow brown						
	X	3-2-2	4									
10	X	2-2-2	4									
						-- orange brown						
15	X	4-3-4	7				2	4				
				▽								
						Loose orange brown slightly clayey fine SAND [SC]						
20	X	3-2-3	5				19	12				
						Loose orange brown fine SAND with clay [SP-SC]						
25	X	3-3-3	6				8	7				
						Medium dense light yellow brown fine SAND [SP]						
30	X	8-10-11	21									
						-- light orange						
35	X	15-11-14	25			BORING TERMINATED AT 35.0 FEET						
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.2

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **B-2** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 15.0
DATE OF READING: 7/24/02
EST. W.S.W.T. (ft): > 15.0

DATE STARTED: 7/24/02
DATE FINISHED: 7/24/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	1-2-2	4									
	X	1-1-1	2									
5	X	1-1-1	2									
	X	2-1-1	2									
	X	2-2-2	4									
						-- loose						
	X	2-2-3	5									
10												
						-- very light orange						
	X	3-2-4	6									
15						BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
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PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **B-3** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S. DATE STARTED: 7/24/02
WATER TABLE (ft): > 15.0 DATE FINISHED: 7/24/02
DATE OF READING: 7/24/02 DRILLED BY: UES - ORLANDO
EST. W.S.W.T. (ft): > 15.0 TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	2-2-1	3									
	X	1-0-1	1									
5	X	1-1-1	2									
	X	1-2-1	3									
	X	1-2-2	4									
						-- loose						
	X	2-2-3	5									
10												
						-- light orange						
	X	3-3-4	7									
15						BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
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PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **P-1** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S. DATE STARTED: 7/24/02
WATER TABLE (ft): > 35.0 DATE FINISHED: 7/24/02
DATE OF READING: 7/24/02 DRILLED BY: UES - ORLANDO
EST. W.S.W.T. (ft): > 35.0 TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	2-1-1	2									
	X	1-1-1	2									
5	X	1-1-1	2				3	5			32.5	
	X	1-1-2	3									
	X	2-2-2	4				3	6			33.4	
10	X	2-1-2	3									
						-- loose						
15	X	3-2-3	4									
20	X	3-3-4	7				5	6				
						-- medium dense						
25	X	4-6-7	13									
						-- light pale orange						
30	X	6-7-9	16				2	5				
						Loose orange fine SAND with silt [SP-SM]						
35	X	3-5-4	9				7	6				
						BORING TERMINATED AT 35.0 FEET						
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.: 12228-002-01
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PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **P-2** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S. DATE STARTED: 7/24/02
WATER TABLE (ft): > 35.0 DATE FINISHED: 7/24/02
DATE OF READING: 7/24/02 DRILLED BY: UES - ORLANDO
EST. W.S.W.T. (ft): > 35.0 TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	2-2-2	4									
	X	2-2-1	3									
5	X	1-1-1	2				3	5			41.9	
	X	1-2-2	4									
	X	1-2-2	4				4	6			54.6	
10	X	2-2-2	4									
						-- loose; light orange						
15	X	4-3-4	7									
						-- medium dense						
20	X	8-8-9	17									
						-- light yellow brown						
25	X	7-9-13	22									
						-- dense; mottled						
30	X	20-20-20	40									
						-- medium dense; light yellow						
35	X	12-14-15	29			BORING TERMINATED AT 35.0 FEET						
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
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PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **R-1**   SHEET: **1 of 1**
SECTION: 28   TOWNSHIP: 22S   RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S.   DATE STARTED: 7/24/02
WATER TABLE (ft): > 15.0   DATE FINISHED: 7/24/02
DATE OF READING: 7/24/02   DRILLED BY: UES - ORLANDO
EST. W.S.W.T. (ft): > 10.0   TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	2-1-2	3									
	X	1-1-1	2									
5	X	1-0-1	1									
	X	1-1-1	2									
	X	1-1-2	3			-- loose						
	X	2-2-3	5									
10						BORING TERMINATED AT 10.0 FEET						
15												
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
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PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **R-2** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 15.0
DATE OF READING: 7/24/02
EST. W.S.W.T. (ft): > 15.0

DATE STARTED: 7/24/02
DATE FINISHED: 7/24/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	1-2-1	3									
	X	2-2-2	4									
5	X	2-2-2	4									
	X	1-2-1	3									
	X	2-2-1	3									
10	X	2-1-2	3									
15	X	2-2-2	4			BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.8

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **R-3** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.

LOCATION: SEE BORING LOCATION PLAN

REMARKS: "N.S." DENOTES NOT SURVEYED, EST. W.S.W.T. REPRESENTS "PERCHED" WATER TABLE

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 15.0
DATE OF READING: 7/24/02
EST. W.S.W.T. (ft): 7.0

DATE STARTED: 7/24/02
DATE FINISHED: 7/24/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose orange fine SAND [SP]						
	X	3-3-2	5									
	X	1-1-2	3			-- very loose						
5	X	1-1-1	2									
	X	1-1-1	2	∇								
	X	1-2-1	3			Very loose orange SAND with silt [SP-SM]						
10	X	2-2-1	3			Very loose orange slightly clayey fine SAND [SC]						
						-- loose						
15	X	2-2-3	5									
						BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.9

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **R-4** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 10.0
DATE OF READING: 7/24/02
EST. W.S.W.T. (ft): > 10.0

DATE STARTED: 7/24/02
DATE FINISHED: 7/24/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	1-1-1	2									
	X	1-1-1	2									
5	X	1-1-1	2			-- light orange						
	X	1-1-1	2			-- orange						
	X	1-2-1	3									
	X	2-1-2	3									
10						BORING TERMINATED AT 10.0 FEET						
15												
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.10

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **R-5** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 15.0
DATE OF READING: 7/25/02
EST. W.S.W.T. (ft): > 15.0

DATE STARTED: 7/25/02
DATE FINISHED: 7/25/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose brown to orange brown fine SAND [SP]						
	X	1-2-2	4									
	X	2-1-1	2			-- orange						
5	X	1-1-1	2									
	X	1-1-2	3									
	X	2-2-1	3									
10	X	3-2-2	4									
15	X	2-2-2	4									
						BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.11

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **R-6** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED, EST. W.S.W.T. REPRESENTS "PERCHED" WATER TABLE

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 20.0
DATE OF READING: 7/24/02
EST. W.S.W.T. (ft): 16.0

DATE STARTED: 7/24/02
DATE FINISHED: 7/24/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	1-0-1	1									
	X	1-0-1	1									
5	X	1-1-1	2									
	X	1-2-1	3			-- shade lighter						
	X	2-3-3	6									
10	X	3-2-2	4									
						-- loose; mottled orange and tan						
15	X	3-5-5	10									
				▽								
						Medium dense orange slightly clayey fine SAND [SC]						
20	X	5-9-7	16									
						BORING TERMINATED AT 20.0 FEET						
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.12

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **SWL-1** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.
LOCATION: SEE BORING LOCATION PLAN
REMARKS: "N.S." DENOTES NOT SURVEYED, EST. W.S.W.T. REPRESENTS "PERCHED" WATER TABLE

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 15.0
DATE OF READING: 7/25/02
EST. W.S.W.T. (ft): 7.0

DATE STARTED: 7/25/02
DATE FINISHED: 7/25/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Orange fine SAND [SP]						
	X	2-3-4	7									
	X	3-3-4	7									
5	X	2-2-1	3									
	X	2-1-2	3	▽								
	X	2-2-2	4									
	X	3-2-2	4			Very loose orange slightly clayey fine SAND [SC]						
10												
						-- loose						
15	X	2-3-3	6			BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	12228-002-01
REPORT NO.:	236124
PAGE:	B-2.13

PROJECT: GEOTECHNICAL EXPLORATION
COLLEGE STATION CENTER - COMMERCIAL INFRASTRUCTURE
CLERMONT, FLORIDA

BORING DESIGNATION: **SWL-2** SHEET: **1 of 1**
SECTION: 28 TOWNSHIP: 22S RANGE: 26E

CLIENT: PRESCO ASSOCIATES, INC.

LOCATION: SEE BORING LOCATION PLAN

REMARKS: "N.S." DENOTES NOT SURVEYED, EST. W.S.W.T. REPRESENTS "PERCHED" WATER TABLE

G.S. ELEVATION (ft): N.S.
WATER TABLE (ft): > 15.0
DATE OF READING: 7/25/02
EST. W.S.W.T. (ft): > 15.0

DATE STARTED: 7/25/02
DATE FINISHED: 7/25/02
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose orange fine SAND [SP]						
	X	2-1-1	2									
	X	1-1-1	2									
5	X	1-1-1	2									
	X	1-2-1	3									
	X	2-2-1	3									
						-- loose						
	X	3-2-3	5									
10												
	X	3-4-5	9									
15						BORING TERMINATED AT 15.0 FEET						
20												
25												
30												
35												
40												

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KEY TO BORING LOGS

SYMBOLS

Symbol	Meaning
22	Number of Blows of a 140-lb Weight Falling 30 In. Required to Drive Standard Spoon One Foot
WOR	Weight of Drill Rods
S	Thin-Wall Shelby Tube Undisturbed Sampler Used
90% Rec.	Percent Core Recovery from Rock Core-Drilling Operations
■	Sample Taken at this Level
□	Sample Not Taken at this Level
	Change in Soil Strata
▼	Free Ground Water Level
▽	Seasonal High Ground Water Level

RELATIVE DENSITY (sand-silt)

Very Loose - Less Than 4 Blows/Ft.
Loose - 4 - 10 Blows/Ft.
Medium - 10 to 30 Blows/Ft.
Dense - 30 to 50 Blows/Ft.
Very Dense - More Than 50 Blows/Ft.

CONSISTENCY (clay)

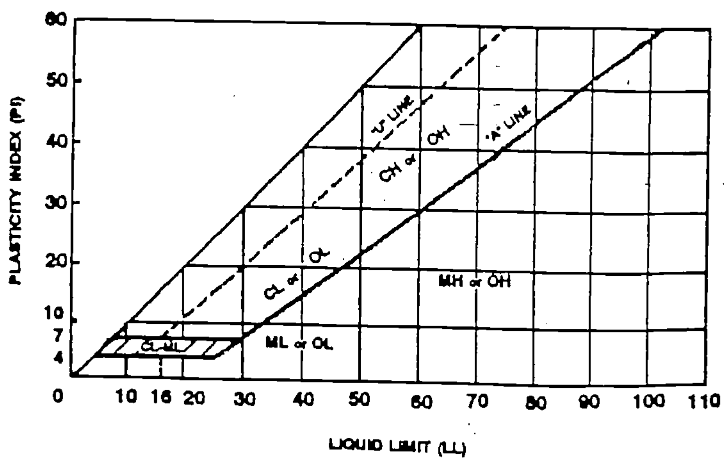
Very Soft - Less Than 2 Blows/Ft.
Soft - 2 to 4 Blows/Ft.
Medium - 4 to 8 Blows/Ft.
Stiff - 8 to 15 Blows/Ft.
Very Stiff - 15 to 30 Blows/Ft.
Hard - More Than 30 Blows/Ft.

UNIFIED CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

* Based on the material passing the 3-in. (75-mm) sieve.

PLASTICITY CHART



DESCRIPTION OF LABORATORY TESTING PROCEDURES

WASH 200 TEST

The Wash 200 test is performed by passing a representative soil sample over a No. 200 sieve and rinsing with water. The percentage of the soil grains passing this sieve is then calculated.

MOISTURE CONTENT DETERMINATION ASTM D-2216

Moisture content is the ratio of the weight of water to the dry weight of soil. Moisture content is measured by drying a sample at 105 degrees Celsius. The moisture content is expressed as a percent of the oven dried soil mass.

LABORATORY PERMEABILITY TEST, CONSTANT-HEAD (ASTM D-2434)

The constant-head laboratory permeability test is performed by placing the soil sample in a tube and sealing the soil sample on both ends with a porous disk. The tube and soil sample are then sealed and the soil sample is saturated. Once the soil sample has been saturated, a constant-head water supply is run through the sealed soil sample. A pair of manometer tubes is used to measure the pressure head change through the soil. Once the manometer tubes indicate steady-state flow, test measurements of pressure head difference, quantity of flow and time of flow are made. The data recovered from this test are then used to calculate Darcy's Coefficient of Permeability (k) of the soil.

APPENDIX C

Important Information About Your
Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique; each geotechnical engineering report is uniquely prepared for the client. No one except you should rely on your geotechnical engineering report without first confiding with the geotechnical engineer who prepared it. And no one-not even you-should apply the report for any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report is Based on A Unique Set of Project Specific Factors

Geotechnical engineers consider a number of unique project specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conduced the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership

As a general rule, always inform your geotechnical engineer of project changes-even minor ones-and request an assessment of their impact. Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of when they were not informed.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. Do not rely on a geotechnical engineering report whose adequacy may have been affected by the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events such as flood, earthquakes, or groundwater fluctuations. Always contact the geotechnical engineer before applying the report, to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identified subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly-from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not over rely on the construction recommendations included in your report. Those recommendations are not final, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also, retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a geoenvironmental study differ significantly from those used to perform a geotechnical study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. Do not rely on an environmental report prepared for someone else.

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE PROFESSIONAL FIRMS PRACTICING IN THE GEOSCIENCES

8811 Colesville Road Suite G106 Silver Spring, MD 20910
Telephone: 301-565-2733 Facsimile: 301-589-2017
email: info@asfe.org www.asfe.org

IIGER06983.5M

CONSTRAINTS AND RESTRICTIONS

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of investigation. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

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Consultants in: Geotechnical Engineering • Threshold Inspection
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• West Palm Beach
• Jacksonville
• Ocala
• Tampa
• Debary

August 5, 2002

Presco Associates, Inc.
232 Mohawk Road
Clermont, Florida 34711

Attention: Mr. Bob Shaker

Reference: Retention Pond Recovery Analysis
College Station Center
Lake County, Florida
Project No. 12228-002-01
Report No. 237738

Dear Mr. Shaker:

Universal Engineering Sciences, Inc. (UES) has completed the recovery analysis for the proposed retention pond at the College Station Center Development in Lake County, Florida.

We received a copy of the final site plan indicating the proposed pond location and dimensions. Additionally, we received post-development stage storage information for the pond and the P.A.V. treatment volume for our recovery analysis from Mr. Greg Hudak with Kelly, Collins & Gentry, Inc. We used this information in conducting our pond recovery evaluation.

1.0 RETENTION POND EVALUATION

Universal Engineering Sciences, Inc. has completed the recovery analysis for the dry retention pond using the commercial software "Ponds 2.26". We used the following design parameters and assumptions based on the information available.

TABLE 1: SUMMARY OF RETENTION POND PARAMETERS

Retention Pond Parameters Based on Pond Borings P-1 & P-2	Value
Pond Bottom Elevation	185.0 feet
Estimated Average Wet Season Groundwater Elevation**	167.0 feet
Elevation of the Base of Surficial Aquifer*	165.0 feet
Approximate Equivalent Length of Pond	330 feet
Approximate Equivalent Width of Pond	240 feet
Estimated Fillable Porosity of surficial Aquifer	25 percent
Average Unsaturated Vertical Hydraulic Conductivity	26 feet per day
Average Saturated Horizontal Hydraulic Conductivity	40 feet per day

Notes: * Assumed boring termination depth as confining unit since the confining unit was not encountered prior to boring termination.

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**** Assumed seasonal high groundwater table depth at 2 feet above the boring termination depth for analysis purposes. We did not encounter the groundwater table within 35 feet below existing grade at the pond location during the exploration program.**

The results of our evaluation indicate the proposed retention pond will recover the PAV volume, within 3 days after the storm event. The detailed results of our drawdown evaluation are included as Appendix A: Retention Pond Recovery Analysis Results. A summary of the results is also indicated in the following table.

TABLE 2: SUMMARY OF RETENTION POND RECOVERY ANALYSIS RESULTS

Result	PAV Treatment Volume
Total Volume	101,495 cubic feet [2.33 acre-feet]
Estimated Recovery Time	1 hour

2.0 CLOSURE

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.

Guy H. Rabens, M.S., E.I.
Project Engineer

8/5/02

Bruce H. Woloshin, P.E.
P.E. No. 36734
Manager-Geotechnical Engineering

GHR\BHW:si
cc: Client (3)
KCG Engineering, Attn: Mr. Greg Hudak (3)
Attachment:
Appendix A: Retention Pond Recovery Analysis Results

APPENDIX A

PONDS - Version 2.26

Written By Devo Seereeram, Ph.D., P.E.
And Robert D. Casper

Retention Pond Recovery Analysis

I. Job Information

Job Name: College Station Center.....Saved as CSCRec.dat
Engineer: Guy Rabens
Date: 8-5-02

II. Input Data

Equivalent Pond Length, [L] (ft):	330.00
Equivalent Pond Width, [W] (ft):	240.00
Pond Bottom Elevation, [PB] (ft above datum):	185.00
Porosity Of Material Within Pond, [p] (%):	100.00
Base Of Aquifer Elevation, [B] (ft above datum):	165.00
Water Table Elevation, [WT] (ft above datum):	167.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day)	40.00
Fillable Porosity of Aquifer, [n] (%):	25.00
Vertical Unsaturated Infiltration, [Iv] (ft/day):	26.00
Runoff Volume, [V] (cubic feet)	101495.00
Percent Recovery Of Runoff Volume, [PV] (%)	100.00

III. Results

UNSATURATED FLOW

Recovery Time From Unsaturated Flow, [T1] (days):	0.0493
Recovered Volume From Unsaturated Flow, [V1] (ft^3):	101495.00

SATURATED FLOW

Recovery Time From Saturated Flow, [T2] (days):	0.0000
Recovered Volume From Saturated Flow, [V2] (ft^3):	0.00
Maximum Radius Of Influence, [R] (ft):	0.00
Maximum Driving Head, [Hmax] (ft):	0.000
Minimum Driving Head, [Hmin] (ft):	0.000

TOTAL

Total Recovery Time, [T] (days):	0.0493
Total Recovered Volume, [V] (ft^3):	101495.00

33/21

PRESCO
Associates, LLC

LETTER OF AUTHORIZATION

This letter authorizes Scott M. Gentry, P.E. of Kelly, Collins & Gentry, Inc. to act as our agent for and with all regulatory agencies, departments and their personnel for the St. Johns River Water Management District, Florida Department of Transportation, Florida Department of Environmental Protection, City of Clermont and Lake County in an effort to receive permits and approvals necessary for the development of a commercial site located at South Hancock and S.R. 50 known as College Station Center in the City of Clermont.

By: PRESCO ASSOCIATES, LLC. (Developer)

By: *Robert M. Shakar*
Robert M. Shakar, President

STATE OF FLORIDA
COUNTY OF LAKE

The foregoing instrument was acknowledged before me this 5th day of JUNE, 2002 by ROBERT M. SHAKAR. He/she is personally known to me or has produced ________________ as identification and did/did not take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 5th day of JUNE, 2002.

Gloria J. Hall
Notary Public

My commission expires: 9/15/02

84016 - 1

NOTARY PUBLIC - STATE OF FLORIDA
GLORIA J. HALL
COMMISSION # CC775472
EXPIRES 9/15/2002
BONDED THRU ASA 1-888-NOTARY1

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AUG 1 2 2002
PDS
ALTAMONTE SVC. CTR.

College Station Center
Clermont, Florida
Drainage Calculations
Submitted June 5, 2002 (SJRWMD, Clermont, FDOT)

84016-1

SCOTT MITCHELL ... No. 44697 STATE OF FLORIDA PROFESSIONAL ENGINEER

Table of Contents

Drainage Narrative

Owner:	Presco Associates, Inc.
Project Name:	College Station Center
Location:	State Road 50 & Hancock Road, Lake County
Legal Description:	See Boundary & Topographic Survey (Sheet 2 of construction plans)
Existing Use:	Vacant
Proposed Use:	Commercial

Project Description

The proposed project includes the development of a 18.42 acre site. The project is located within Lake County limits, Section 2, Township 24 South, Range 29 East. The site is located at the southwest corner of State Road 50 & Hancock Road.

Drainage Methodology

The existing condition consists of an on-site depressional area that served as a basin for the site, off-site area to the south and west as well as a portion of S.R. 50 to the north. The depressional area was hydraulically connected to another depressional area on the north side of S.R. 50. The proposed stormwater management system consists of the conversion of the on-site depressional area into a master dry retention pond for the site only. The off-site contributing areas to the south and west are being permitted through SJRWMD to hold all stromwater runoff on-site, thereby removing those areas from this project's basin area. The off-site drainage from S.R. 50 will continue its flow to the basin on the north side of S.R. 50 via a proposed swale and drainage structure modification in order to preserve pre-development flow patterns. The site exists within a closed basin and all lots are designed for 80% of impervious area.

Additionally, the pond is designed to retain the runoff for the 100-year, 24-hour storm event for the City of Clermont and the volumetric difference between the pre and post development conditions for the 25-year, 96-hour storm event for the SJRWMD. The stormwater runoff is conveyed to the pond via a proposed onsite storm sewer system.

Drainage Calculations

College Station Center

Post-Development

STAGE STORAGE

Elevation	North (SF)	South (SF)	Total Area (SF)	Area (AC)	Volume (AC-FT)	Volume (AC-FT)	Volume (CF)
185	17,340		17,340	0.398		0.000	-
					14.182		
200	65,030		65,030	1.493		14.182	617,775
					3.364		
202	81,509		81,509	1.871		17.546	764,314
					17.546		

P.A.V. =	2.33	AC-FT
P.A.V. Elevation =	**187.46**	FT
1/2 P.A.V. =	1.16	AC-FT
1/2 P.A.V. Elevation =	**186.23**	FT

Weir Elev.	187.464 FT
Volume	101,494 CF
Max Stage	205 FT
Volume	984,123 CF

Precipitation (P)	11	inches
Storage (S)	1.48798	inches
Runoff (R)	9.39605	inches
Runoff Volume (V)	**14.42**	acre-ft

Pond Boring	Existing Ground	SHWT Depth	SHWT Elevation
P-1			0.0
P-2			0.0
AVERAGES			0.0

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

College Center Station
Post-Development
June 7, 2002

********** Node Maximum Conditions - 100Y24H **********

(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
99	BASE	12.00	160.00	185.00	0.0139	0.00	23.99	4.33	0.00	0.00
POND	BASE	23.99	198.41	202.00	0.0500	59964.10	18.24	68.30	23.99	4.33

College Center Station
Post-Development
June 7, 2002

********** Basin Summary - 100Y24H **

***

Basin Name:	SITE
Group Name:	BASE
Node Name:	POND
Hydrograph Type:	UH
Unit Hydrograph:	UH484
Peaking Factor:	484.00
Spec Time Inc (min):	1.33
Comp Time Inc (min):	1.33
Rainfall File:	FDOT-240
Rainfall Amount (in):	11.00
Storm Duration (hr):	24.00
Status:	ONSITE
Time of Conc. (min):	10.00
Lag Time (hr):	0.00
Area (acres):	18.42
Vol of Unit Hyd (in):	1.00
Curve Number:	87.00
DCIA (%):	0.00
Time Max (hrs):	18.40
Flow Max (cfs):	68.54
Runoff Volume (in):	9.38
Runoff Volume (cf):	627019

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

College Center Station
6-7-02

```
********** Input Report *********************************************************
--------Class: Node--------------------------------------------------------------
   Name: 99         Base Flow(cfs): 0          Init Stage(ft): 150
  Group: BASE                                  Warn Stage(ft): 185
Comment:

Time(hrs)     Stage(ft)
0             150
12            160
24            150
--------Class: Node--------------------------------------------------------------
   Name: POND       Base Flow(cfs): 0          Init Stage(ft): 185
  Group: BASE                                  Warn Stage(ft): 202
Comment:

Stage(ft)     Area(ac)
185           0.398
200           1.493
202           1.871
--------Class: Operating Table---------------------------------------------------
   Name: INFILTRA      Type: Rating Curve
Comment:

   U/S Stage(ft)     Discharge(cfs)
   185               1.25
   200               4.7

--------Class: Basin-------------------------------------------------------------
Basin: SITE       Node: POND       Status: On Site     Type: SCS Unit Hydr
Group: BASE
    Unit Hydrograph: UH484                  Peak Factor: 484
      Rainfall File: FDOT-240        Storm Duration(hrs): 24
Rainfall Amount(in): 11
           Area(ac): 18.42       Concentration Time(min): 10
            Curve #: 87                  Time Shift(hrs): 0
            DCIA(%): 0
```

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [2]
Copyright 1995, Streamline Technologies, Inc.

College Center Station
6-7-02

********** Input Report ******************************************************
--------Class: Rating Curve---------------------------------------------------
    Name: GROUND      Count: 1         From Node: POND
   Group: BASE         Flow: Both        To Node: 99

          TABLE     ELEV ON(ft) ELEV OFF(ft)
      #1: INFILTRA  185         202
      #2:           0           0
      #3:           0           0
      #4:           0           0



--------Class: Simulation----------------------------------------------------
C:\ICPR2\100Y24H
Execution: Both
   Header: College Center Station
           Post-Development
           June 7, 2002
---------HYDRAULICS----------------------------HYDROLOGY-------------------
        Max Delta Z (ft): 1
          Delta Z Factor: 0.05          Override Defaults: Yes
     Time Step Optimizer: 10               Storm Dur(hrs): 24
Drop Structure Optimizer: 10              Rain Amount(in): 11
     Sim Start Time(hrs): 0                 Rainfall File: FDOT-240
       Sim End Time(hrs): 24
      Min Calc Time(sec): 0.5
      Max Calc Time(sec): 60
        To Hour:    PInc(min):                To Hour:    PInc(min):
        24          15                        24          15
---------GROUP SELECTIONS--------------------------------------------------
+ BASE     [06/07/02]
```

College Station Center
Post-Development
POLLUTION ABATEMENT VOLUME (P.A.V.)

Pond Type: **Dry Retention**
Treatment Method: **Total Retention**

Municipality: **City of Clermont**
Water Management District: **St. Johns**

BASIN	ONSITE AREA (SF)	ONSITE AREA (AC)	OFFSITE AREA (AC)	TOTAL AREA (AC)	Impervious Area (AC)	Runoff Depth from 1" Rainfall (inches)	Municipality Requirement: 1" Runoff Over Total Area (AC-FT)	Municipality Requirement: 1.25" x Impervious Area plus 0.5" over total area (AC-FT)	Municipality Requirement: PAV (AC-FT)
Dry Retention ost-Developme	802,343	18.42	0.00	18.42	15.00	0.23	1.5349	2.3300	**2.3300**

BASIN	ONSITE AREA (SF)	ONSITE AREA (AC)	OFFSITE AREA (AC)	TOTAL AREA (AC)	Impervious Area (AC)	Runoff Depth from 1" Rainfall (inches)	Water Management District Requirement: 1" Runoff Over Total Area (AC-FT)	Water Management District Requirement: 1.25" x Impervious Area plus 0.5" over total area (AC-FT)	Water Management District Requirement: PAV (AC-FT)
Dry Retention ost-Developme	802,343	18.42	0.00	18.42	15.00	0.23	1.5349	2.3300	**2.3300**

P.A.V. (AC-FT) = 2.3300

	TR-55 Cn	Runoff Depth (in)
	85	0.17
Project Cn	87	**0.23**
	90	0.32

College Station Center
Post-Development
CURVE NUMBER

County: Orange

Hydrologic Group	Soil Symbol	Soil Type	Cover Description	CN	Area (sf)	Area (acres)	Area (%)	Product of CN & Area
A	14, 16, 17 -	Chandler	Open Space, Lawn, Good Condition					
			SUB-TOTAL	39	148,943	3.42	18.56	7.24
D	- - - - -	- - - - -	- 0					
			SUB-TOTAL	89	0	0.00	0.00	0.00
			SUB-TOTAL		0	0.00	0.00	0.00
-	-	Impervious	Pavement, roof, etc.	98	653,400	15.00	81.44	79.81
				Totals	802,343	18.42	100.00	87.05

Basin Composite CN = 87

Gross Area Calculations					Curve Number Interpollation			
Hydrologic Group	Percent of Impervious (%)	Gross Area (sf)	Imp. Area (sf)	Net Area (sf)	Residential Avg. Lot Size (ac)	Avg. % Impervious	Soil C CN	Soil D CN
A	100	802,343	653,400	148,943	0.125	65%	90	92
D	0	0	0	0	**0.2**	**49%**	**86**	**89.0**
					0.250	38%	83	87
Totals	**100**	**802,343**	**653,400**	**148,943**				

College Station Center

Post-Development

IMPERVIOUS AREA

DESCRIPTION	NO.	Length (ft)	Width (ft)	AREA (sf)	AREA (ac)
SUB-TOTAL IMPERVIOUS					15.00
TOTAL IMPERVIOUS AREA					**15.00**
TOTAL BASIN AREA					18.42
IMPERVIOUS (%)					**81%**

College Station Center
Post-Development
SOIL COMPOSITION

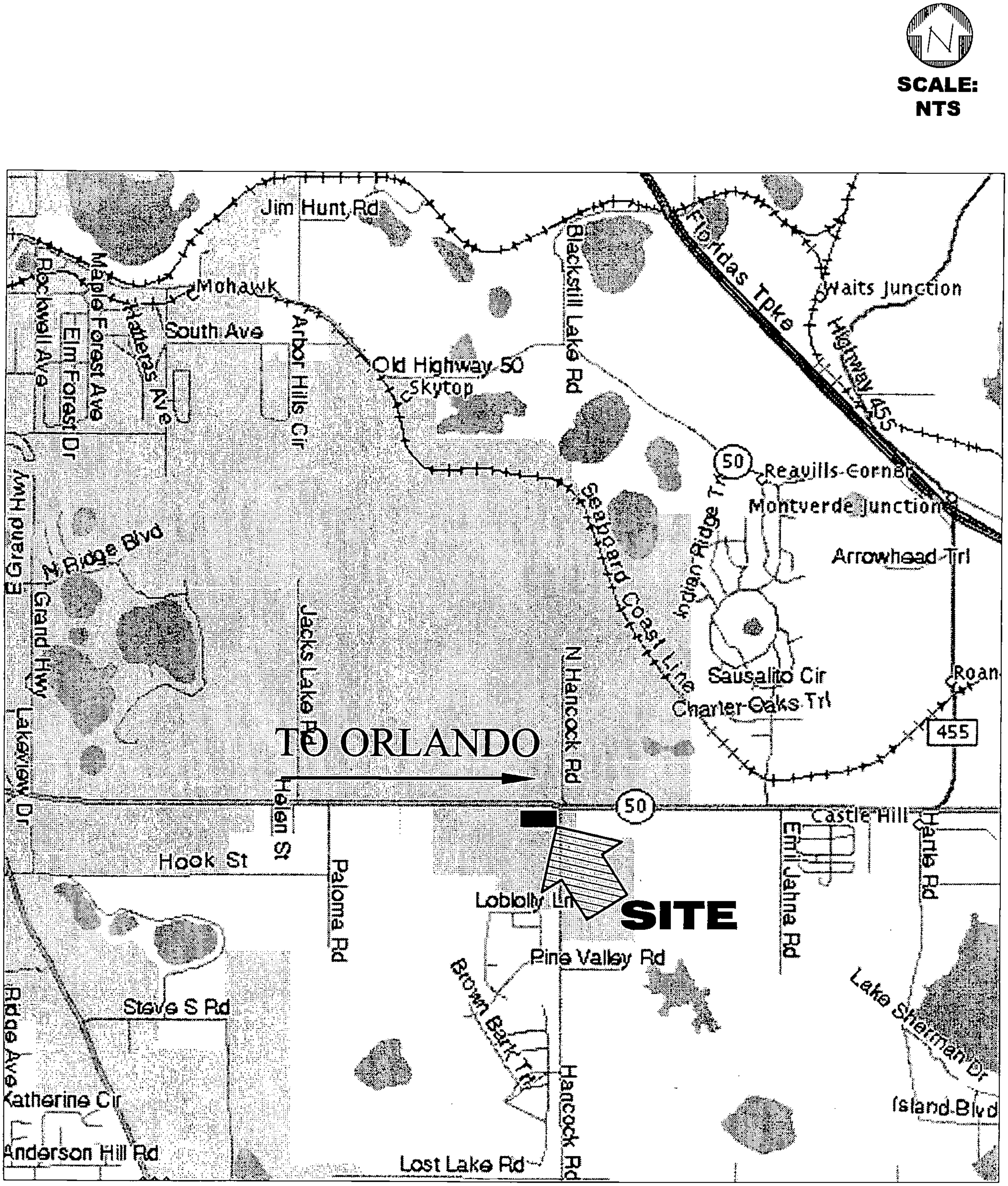
SCS Soil Type	A	B	C		D					
SCS Soil #	14, 16, 17	-	-	-	-	-	-	-	-	TOTAL
Area (sf)										0
	802,343								0	802,343
										0
										0
										0
										0
										0
Soil # Area (sf)	802,343	0	0	0	0	0	0	0	0	802,343
Soil Type Area (sf)	802,343	0		0					0	802,343
Soil Type Area (ac)	18.42	0.00		0.00					0.00	18.42

MACRO CHECK:

Total Basin Area (sf) = **802,343**

Total Basin Area (ac) = **18.42**

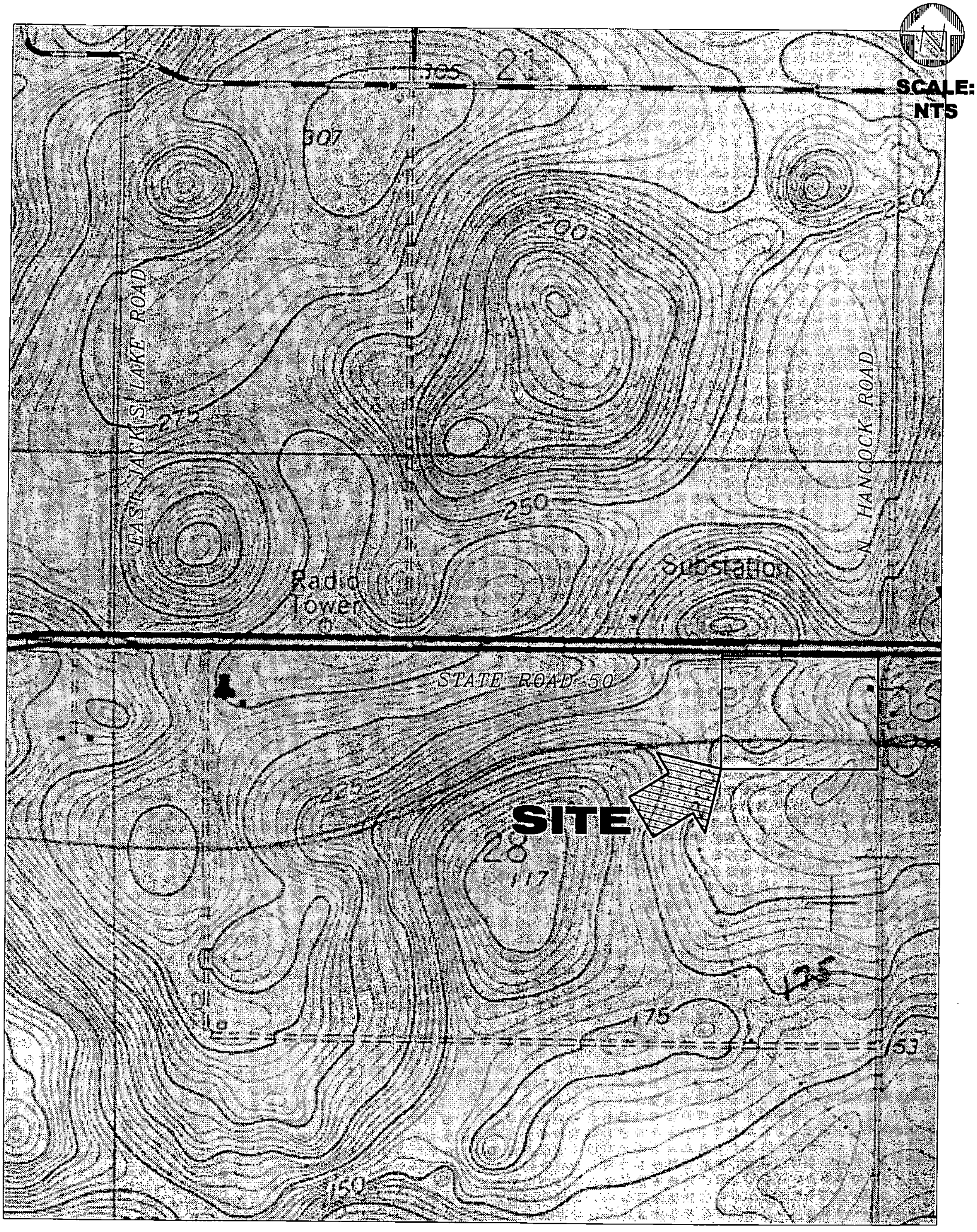
Exhibits



KELLY, COLLINS & GENTRY, INC.
ENGINEERING / PLANNING

COLLEGE STATION CENTER
CLERMONT, FLORIDA

LOCATION MAP

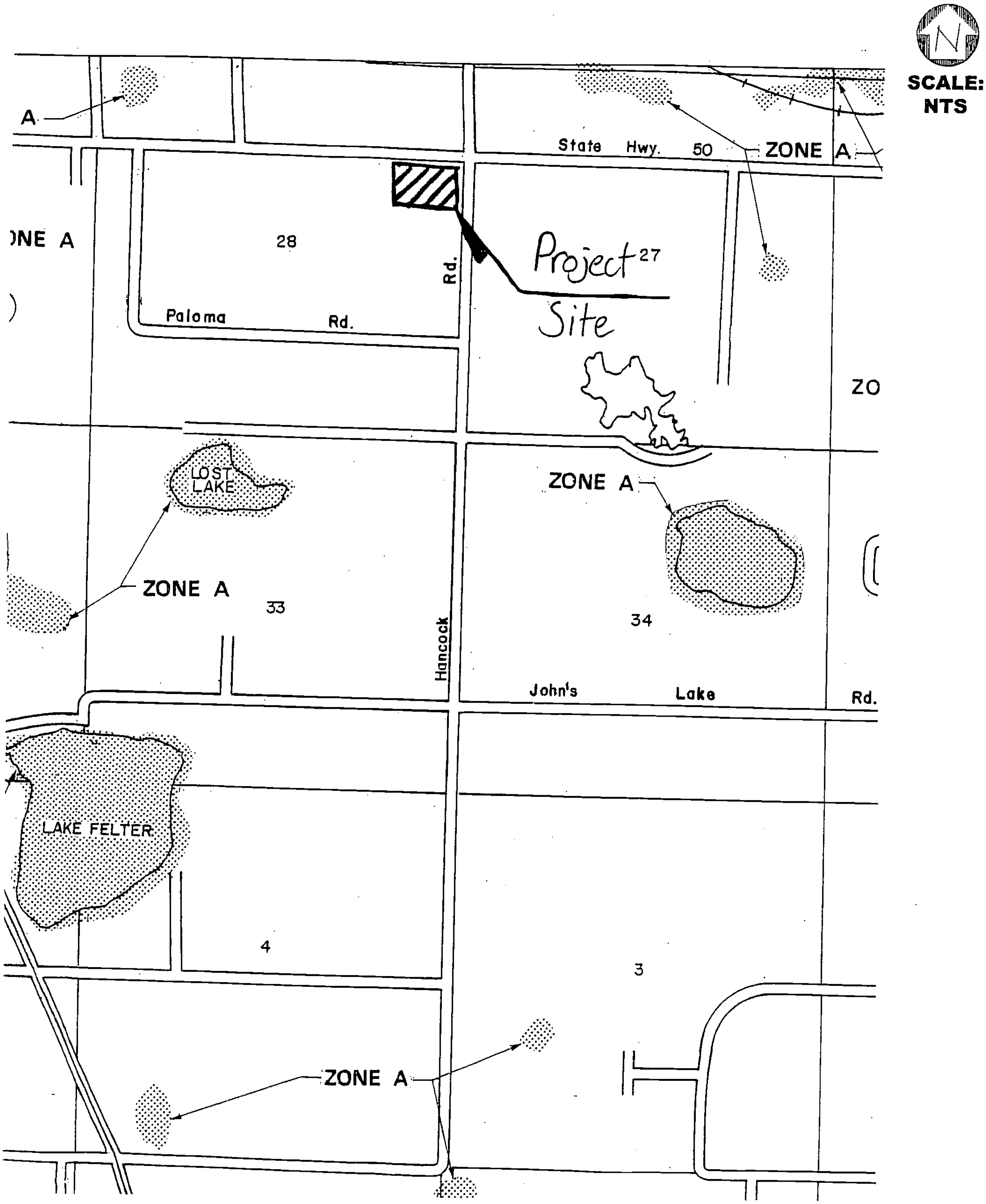


KELLY,
COLLINS &
GENTRY, INC.

ENGINEERING / PLANNING

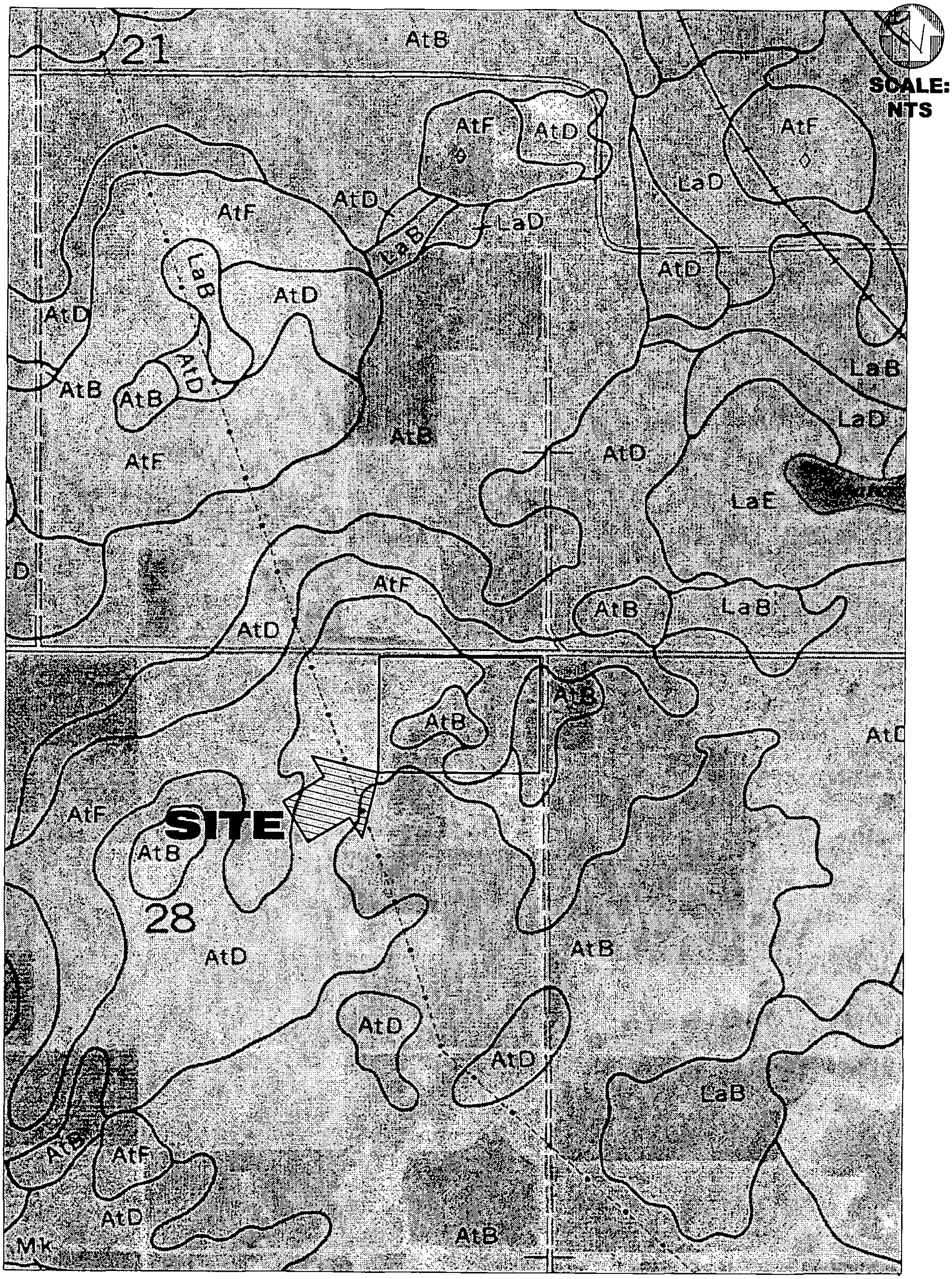
COLLEGE STATION CENTER
CLERMONT, FLORIDA

U.S.G.S. MAP



COMMUNITY - PANEL NUMBER 120421 0375 B
EFFECTIVE DATE: APRIL 1, 1982

KELLY, COLLINS & GENTRY, INC. ENGINEERING / PLANNING	COLLEGE STATION CENTER CLERMONT, FLORIDA	FEMA MAP



KELLY, COLLINS & GENTRY, INC. ENGINEERING / PLANNING	**COLLEGE STATION CENTER CLERMONT, FLORIDA**	**SOILS MAP**

LAKE COUNTY
MAP SYMBOLS
(CONVERSION LEGEND)

The first capital letter is the initial one of the map unit name. The second capital letter, A, B, C, D, E or F shows the class of slope. Symbols without a slope letter identify nearly level soils.

SCS Map Symbol	U.S. Forest Service or Additional SCS Symbol	Conversion Symbol	Map Unit Name
Fm	Ma	2	Arents
Fm	Ma	3	Arents-Urban land complex
Ac	--	4	Anclote fine sand, depressional
Am	--	5	Anclote, Myakka and Felda soils, depressional
Sw	--	6	Anclote, Delray and Hontoon soils
ApB	WcA	7	Apopka sand, 0 to 5 percent slopes
ApB	--	8	Apopka-Urban land complex, 0 to 5 percent slopes
ApD	WcC	9	Apopka sand, 5 to 12 percent slopes
AsB	AsB	10	Astatula sand, 0 to 5 percent slopes
Br	--	11	Brighton muck, depressional
Im	Me, Ib	12	Bluff and Manatee soils, frequently flooded
AtB	AuB, AtB	13	Candler sand, 0 to 5 percent slopes
AtB	--	14	Candler-Urban land complex, 0 to 5 percent slopes
AtD	AtD, AsD	15	Candler sand, 5 to 12 percent slopes
AtD	--	16	Candler-Urban land complex, 5 to 12 percent slopes
AtF	--	17	Candler sand, 12 to 25 percent slopes

TABLE K.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Dura-tion	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
14*:											
Candler	A	None	---	---	>6.0	---	---	---	---	Low	High.
Urban land	---	---	---	---		---	---	---	---	---	---
15 Candler	A	None	---	---	>6.0	---	---	---	---	Low	High.
16*:											
Candler	A	None	---	---	>6.0	---	---	---	---	Low	High.
Urban land	---	---	---	---	---	---	---	---	---	---	---
17 Candler	A	None	---	---	>6.0	---	---	---	---	Low	High.
18 Cassia	C	None	---	---	1.5-3.5	Apparent	Jul-Jan	---	---	Moderate	High.
19 Ellzey	B/D	None	---	---	0.5-1.5	Apparent	Jun-Sep	---	---	High	High.
20 Emeralda	D	Frequent	Long	Jun-Feb	0-0.5	Apparent	Jun-Oct	---	---	High	Low.
21 Eureka	D	None	---	---	0-1.0	Apparent	Jun-Oct	---	---	High	High.
22*:											
Everglades	B/D	Frequent	Very long.	Jun-Jan	0-0.5	Apparent	Jan-Dec	4-10	>76	Moderate	Moderate.
Everglades	B/D	Frequent	Very long.	Jun-Jan	0-0.5	Apparent	Jan-Dec	4-10	>76	Moderate	Moderate.
23 Felda	B/D	None	---	---	0-1.0	Apparent	Jul-Mar	---	---	High	Moderate.
24 Fellowship	D	None	---	---	+2-0	Perched	Jun-Mar	---	---	High	High.
25 Immokalee	B/D	None	---	---	0.5-1.5	Apparent	Jun-Sep	---	---	High	High.
26, 27 Kendrick	A	None	---	---	>6.0	---	---	---	---	Moderate	High.
28 Lake	A	None	---	---	>6.0	---	---	---	---	Low	High.
29*:											
Lake	A	None	---	---	>6.0	---	---	---	---	Low	High.
Urban land	---	---	---	---	---	---	---	---	---	---	---
30, 31 Lake	A	None	---	---	>6.0	---	---	---	---	Low	High.
32 Lochloosa	C	None	---	---	2.5-5.0	Apparent	Jul-Oct	---	---	High	High.

See footnote at end of table.

Appendix

ICPR Model

Drawdown

Soils Report