

Final Location Hydraulic Report Update

US 301/SR 41 (Gall Blvd.) from SR 39 to South of CR 54

Work Program Item Segment No.: 256422-2

Project Development & Environment Study Update



Florida Department of Transportation
11201 North McKinley Drive
Tampa, Florida 33612

November 2012 (Cover Update)

Final Location Hydraulic Report Update

US 301/SR 41 (Gall Blvd.) Project Development & Environment (PD&E) Study Update

**From SR 39 to South of CR 54
Pasco County, Florida**

WPI Segment Number: 256422-2

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Final Location Hydraulic Report Update

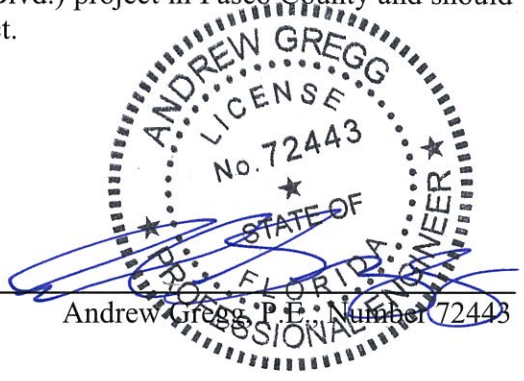
for the

US 301/SR 41 (Gall Blvd.)

From SR 39 to South of CR 54

Project Development & Environment Study Update

This document has been prepared by Pitman Hartenstein & Associates, Incorporated, Engineers, (Florida Certificate of Authorization No. 4464) under the direction of a State of Florida Registered Professional Engineer. The work and opinions rendered in this report were developed using highly variable factors determined by a study of the project area in accordance with commonly accepted procedures and practices. This document was prepared to provide information relative to the type, location and conceptual drainage design of improvements along the US 301 corridor and to identify potential floodplain encroachments as a result of the conceptual improvements for the US 301/SR 41 (Gall Blvd.) project in Pasco County and should not be construed to apply to any other purpose or project.



Andrew Gregg, P.E. Number 72443

11-21-12

Date

Executive Summary

The Florida Department of Transportation (FDOT), District Seven is evaluating alternative roadway improvements to be considered in a Project Development and Environment (PD&E) Study Update for US 301 (Gall Boulevard) in southeastern Pasco County. Study limits are from SR 39 to south of CR 54 a length of approximately 2.6 miles. Two build alternatives are being investigated, the 6th Street and US 301/Gall Blvd One Way Pair Alternative and the 6th and 7th Street One Way Pair Alternative.

This Location Hydraulic Report (LHR) Update is to provide additional and updated information from that included in the LHR that was prepared in February 2000 as part of the US 301 PD&E Study. This LHR Update is to provide drainage related information to assist the FDOT in reaching a decision on type, location and conceptual design of improvements along the US 301 corridor. It also documents if any floodplains will be significantly affected due to the proposed improvements

In 2009, the Southwest Florida Water Management District (SWFWMD), following the direction of the Florida Department of Environmental Protection (FDEP), commenced implementation of the rule requiring that stormwater discharges contributing to violations of water quality standards, including discharges to waters designated as impaired, must comply with the net improvement requirements of environmental resource permitting rules. Both build alternatives are within water bodies not classified as impaired by the FDEP as of December, 2011 therefore only normal SWFWMD treatment criteria will apply to the project.

The latest Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) for the unincorporated areas of Pasco County were used to identify potential flood plain and floodway encroachments associated with the proposed roadway improvements. No regulatory floodway is within the project limits. Both alternatives will involve encroachment within the floodplain that is not significant. Each encroachment within the FEMA Floodplain is to be offset with floodplain compensation of an equal volume directly connected to the FEMA Floodplain. Therefore the following can be concluded about this project:

“Replacement drainage structures for this project are limited to hydraulically equivalent structures. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility or practicability. An alternative encroachment location is not considered in this category since it defeats the projects purpose or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to totally eradicate flood impacts or even reduce them in any significant amount, existing flooding will continue, but not be increased. The proposed structure will be hydraulically equivalent to or greater than the existing structure, and backwater surface elevations are not expected to increase. As a result, the project will not affect existing flood heights or floodplain limits. This project will not result in any new or increased adverse environmental impacts. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

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DRAFT LOCATION HYDRAULIC REPORT UPDATE

This Draft Location Hydraulic Report (LHR) Update is preliminary and used as an engineering tool to provide drainage related information to assist the FDOT in reaching a decision on type, location and conceptual design of improvements along the US 301 corridor and to identify potential floodplain encroachments as a result of the conceptual improvements. Any calculations presented in this report are preliminary and are subject to change throughout the project development and design phases.

1.0 INTRODUCTION

1.1 Project Description

The Florida Department of Transportation (FDOT), District Seven, Pasco County and the City of Zephyrhills are working together to determine alternative roadway improvements to be considered in a Project Development and Environment (PD&E) Study Update for US 301 (Gall Boulevard) in southeastern Pasco County. The project location is illustrated on **Figure 1**. The study limits are from SR 39 to south of County Road (CR) 54 (Eiland Boulevard), a distance of 2.6 miles.

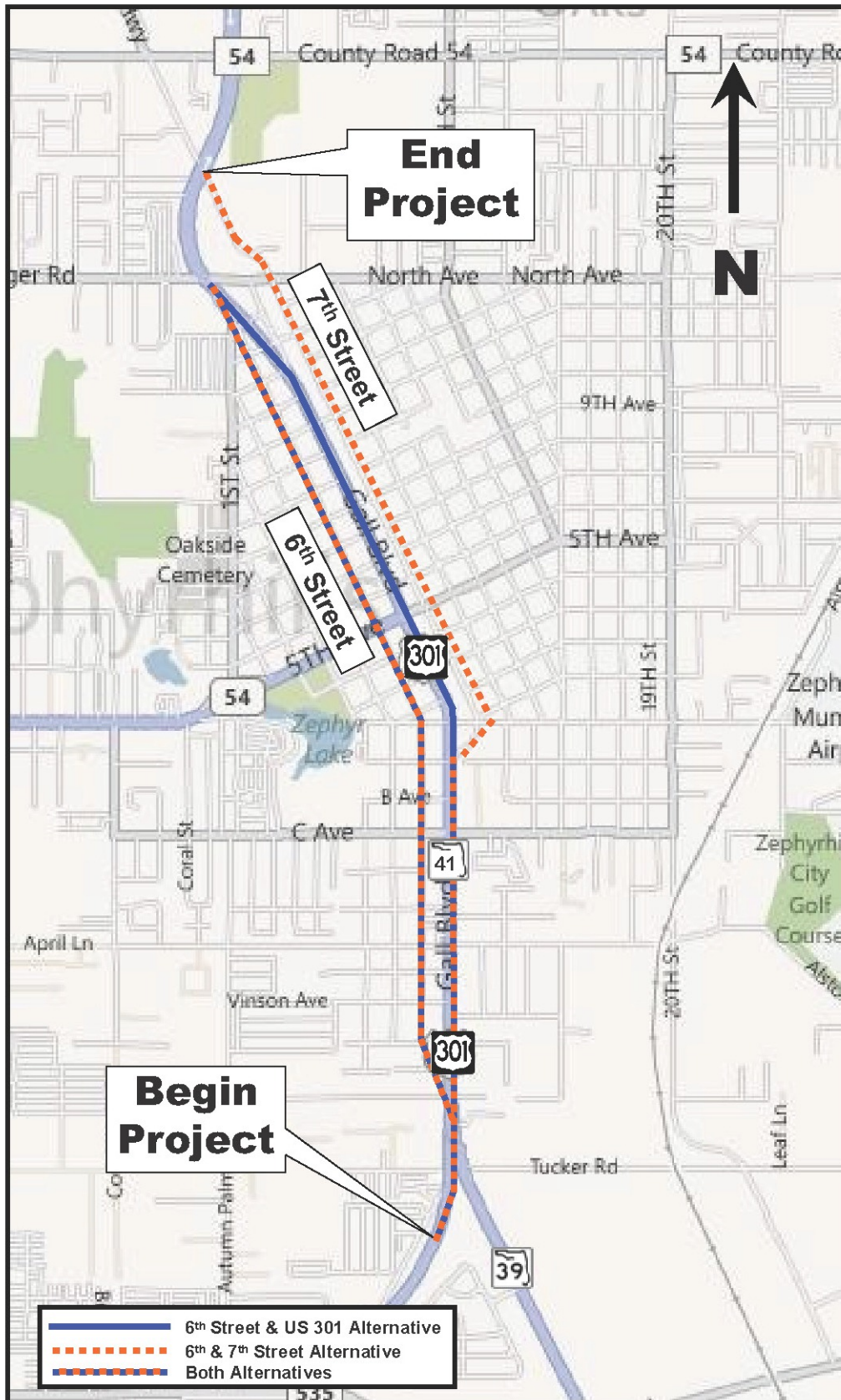
The objective of this PD&E Study is to provide documented environmental and engineering analysis which will assist the FDOT and the Federal Highway Administration (FHWA) reach a decision on the type, conceptual design and location of the necessary improvements within the US 301 study corridor to safely and efficiently accommodate future travel demand. The PD&E Study Update also satisfies the requirements of the National Environmental Policy Act (NEPA) and other applicable federal requirements, in order for this project to qualify for federal-aid funding of its subsequent phases. The PD&E Study Update will compare alternatives based on a variety of parameters using a matrix format. This analytical process identifies the alternative that would have the least impact while providing the necessary improvements.

1.2 Existing Facility

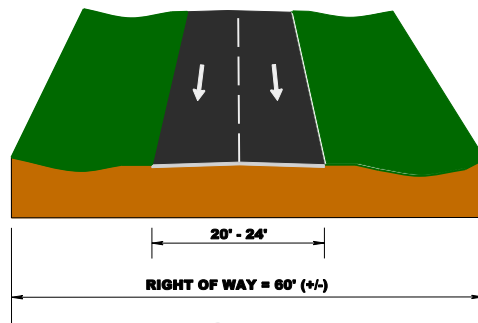
The existing US 301 roadway is a two-lane, undivided rural road with four-foot paved shoulders from SR 39 to Geiger Road (North Avenue). North of Geiger Road, US 301 is a four-lane, divided rural road with four-foot paved shoulders. A one-way pair of roadways was created in 1996 by the City of Zephyrhills using 6th and 7th Streets as an alternate route to US 301. The couplet begins at A Avenue for northbound traffic on 7th Street and ends at Geiger Road, while southbound traffic on 6th Street begins at 15th Avenue and ends at A Avenue. **Figure 2** illustrates the existing typical sections.

1.3 Project Need

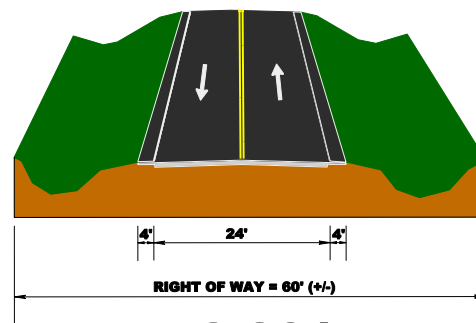
US 301 is a north-south arterial that spans the limits of eastern Pasco County and serves as a primary route connecting the cities of Zephyrhills and Dade City. A highway capacity analysis along the U.S. 301 study corridor shows that only one of five southbound roadway segments on US 301 currently does not operate at the adopted Level of Service (LOS) standard D in either the AM or PM peak hours. All five northbound



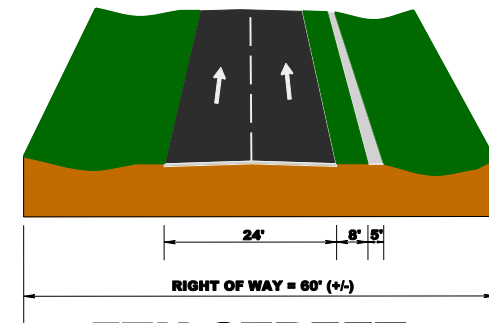
EXISTING TYPICAL SECTIONS



6TH STREET



US 301



7TH STREET



roadway segments operate at an acceptable LOS in both the AM and PM peak hours. All seven of the intersections studied along US 301 within the study corridor currently operate at an overall LOS D or better during both the AM and PM peak hours. Design year (2035) traffic projections show that if no improvements are made to U.S. 301 unacceptable LOS (LOS E or worse) is projected on additional U.S. 301 roadway segments (three of five northbound and four of five southbound) during the AM and/or the PM peak hours. Additionally, six of the seven study intersections will also operate at an unacceptable LOS during the AM and/or the PM peak hours.

The 2035 Cost Affordable Roadway Plan of the *Pasco County MPO Long Range Transportation Plan (LRTP)* identifies the conversion of US 301 from an existing two-lane undivided roadway to a one-way pair system. To provide an acceptable LOS in the design year three through lanes in one direction on each of the two roadways forming the one-way pair system are needed.

1.4 Proposed Improvements

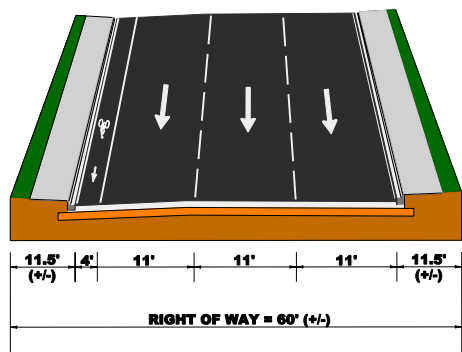
The two proposed build alternatives consist of the 6th Street and US 301/Gall Blvd One Way Pair Alternative and the 6th and 7th Street One Way Pair Alternative. The proposed 6th Street and US 301/Gall Blvd One Way Pair Alternative would convert US 301 from two-lane, two-way undivided roadway to a one-way, three-lane northbound roadway from A Avenue to Geiger Road (North Avenue). 6th Street will be widened from a two-lane to a three-lane, one-way southbound roadway from A Avenue to 16th Avenue. 7th Street will remain as it currently exists. The proposed US 301 and 6th Street typical sections will consist of three 11' lanes, a 4' bike lane and curb and gutter and 6' sidewalks on both sides. No on street parking will be provided. The proposed right of way width is the nominal existing width of 60'. The design speed is 40 MPH. **Figure 3** illustrates the proposed typical sections for this alternative.

For the proposed 6th and 7th Street One-Way Pair Alternative, US 301 will remain in its existing condition from A Avenue to North Avenue. 6th Street will be widened from a two-lane to a three-lane, one-way southbound roadway from A Avenue to 16th Avenue. 7th Street will be widened from a two-lane to a three-lane one-way northbound roadway beginning at A Avenue and ending at the Fort King Road intersection with US 301. The proposed 6th and 7th Street typical sections will both consist of three 11' lanes, a 4' bike lane and curb and gutter and 6' sidewalks on both sides. No on street parking will be provided. The proposed right of way width is the existing nominal width of 60'. The design speed is 40 MPH. **Figure 4** illustrates the proposed typical sections for this alternative.

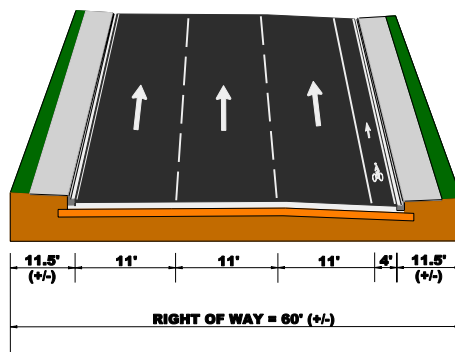
1.5 Report Purpose

This LHR Update is to bring up to date the LHR that was prepared in February 2000 as part of the US 301 PD&E Study (**Appendix A**). This LHR Update is to provide drainage related information to assist the FDOT in reaching a decision on type, location and conceptual design of improvements along the US 301 corridor. It also documents if any

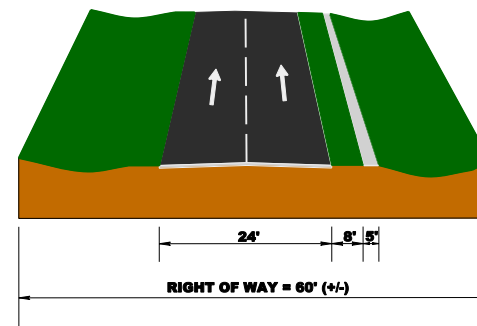
6TH STREET AND US 301 (GALL BLVD.) ONE-WAY PAIR ALTERNATIVE



6TH STREET



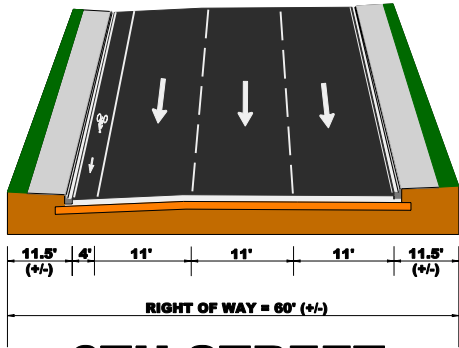
US 301



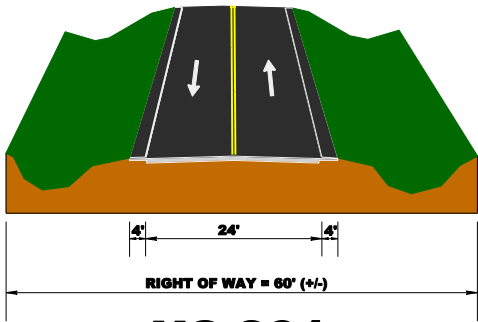
7TH STREET



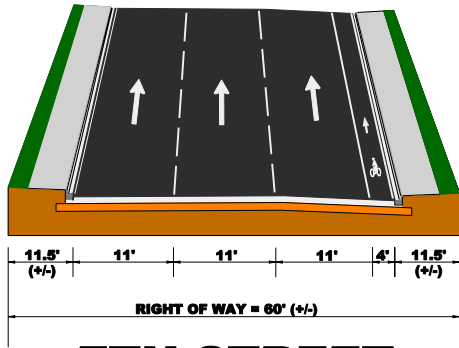
6TH AND 7TH STREET ONE-WAY PAIR ALTERNATIVE



6TH STREET



US 301



7TH STREET



floodplains will be significantly affected due to the proposed improvements. This report was prepared in general accordance with the FDOT PD&E Manual Part 2, Chapter 24, revised, January 17, 2008.

A Draft Pond Siting Report (PSR) Update has also been prepared as part of this study. That report identifies and evaluates potential stormwater management facilities and floodplain compensation areas (collectively referred to as ponds). It provides guidance and analysis with respect to various environmental concerns, and discusses possible impacts to the proposed project corridor associated with two alternatives being evaluated and calculates the sizes and recommends locations for stormwater management facilities and floodplain compensation sites.

2.0 DRAINAGE UPDATES

2.1 Soils Information

The Natural Resources Conservation Service’s (NRCS) Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>) was used to generate a custom summary report for the soils within the study area (see **Appendix B**). Table 3-1 below summarizes the soils within the project limits. Most of the soil, approximately 65%, is Tavares-Urban Land Complex, which is characterized by heavy urbanization. In general, the soils are uplands, nearly level to sloping, moderately to well-drained soils that are sandy throughout. All of the soil types within the project are type A soil, which have high infiltration rates (low runoff potential). The water table is expected to be relatively deep (seasonal high at a depth of 3.5 feet or greater).

Table 3-1
Summary of Soils within Study Area - NRCS Soil Survey

Map Unit Name and Number	Percent in Study Area	Hydrologic Group	Seasonal High Water Table		
			Depth (ft)	Kind	Month
Tavares Sand (6)	4	A	3.5-6.0	Apparent	Jun-Dec
Tavares - Urban Land Complex (15)	65	A	3.5-6.0	Apparent	Jun-Dec
Lake Fine Sand (32)	6	A	>6.0	---	---
Urban Land (38)	18	N/A	---	---	---
Arredondo Fine Sand (43)	<1	A	>6.0	---	---
Millhopper Fine Sand (69)	7	A	3.5-6.0	Perched	Aug-Feb

2.2 Existing Stormwater Management Facilities:

Presently, four storm water management facilities (ponds) are located within the project limits. The first pond is located adjacent to 7th Street, east of U.S. 301 between A Avenue

and South Avenue, on both sides of 7th Street with an interconnect pipe joining the two pond parts. The pond was constructed in 1995 in conjunction with the City of Zephyrhills one-way pair extension of 7th Street. The pond accepts runoff from the improved 7th Street and adjacent property only. The dry pond has no outfall and a high infiltration rate. Double ring infiltration (DRI) test results indicate an average infiltration rate of 17 feet per day. Should the 6th and 7th Street alternative be selected, the existing stormwater management pond located adjacent to 7th Street and east of US 301 would need to be modified to accommodate for lost volume from the new roadway alignment.

The second pond is located near the middle of the project, north of 6th Avenue, east of U.S. 301 (across from The Clock Family Restaurant). The pond accepts runoff from approximately 40 acres of surrounding area. The pond is owned and operated by the City of Zephyrhills whose City Hall is located due east of the pond. The pond is equipped with a pump station and force main which discharges west to Lake Zephyr. The pond, originally not permitted through SWFWMD, has been permitted to provide for modifications. This pond was permitted to provide for an increase in the volume of the pond through steepening the side slopes to 1:2 (vertical/horizontal) and stabilizing them with concrete in an effort to relieve flooding in the area. Discussions with City staff indicates that the City tried to increase the pumping capacity to Lake Zephyr, but said that SWFWMD would not approve increased pumping to state controlled waters where flooding is present. The pond does not provide treatment and is estimated to flood at the 5-year event.

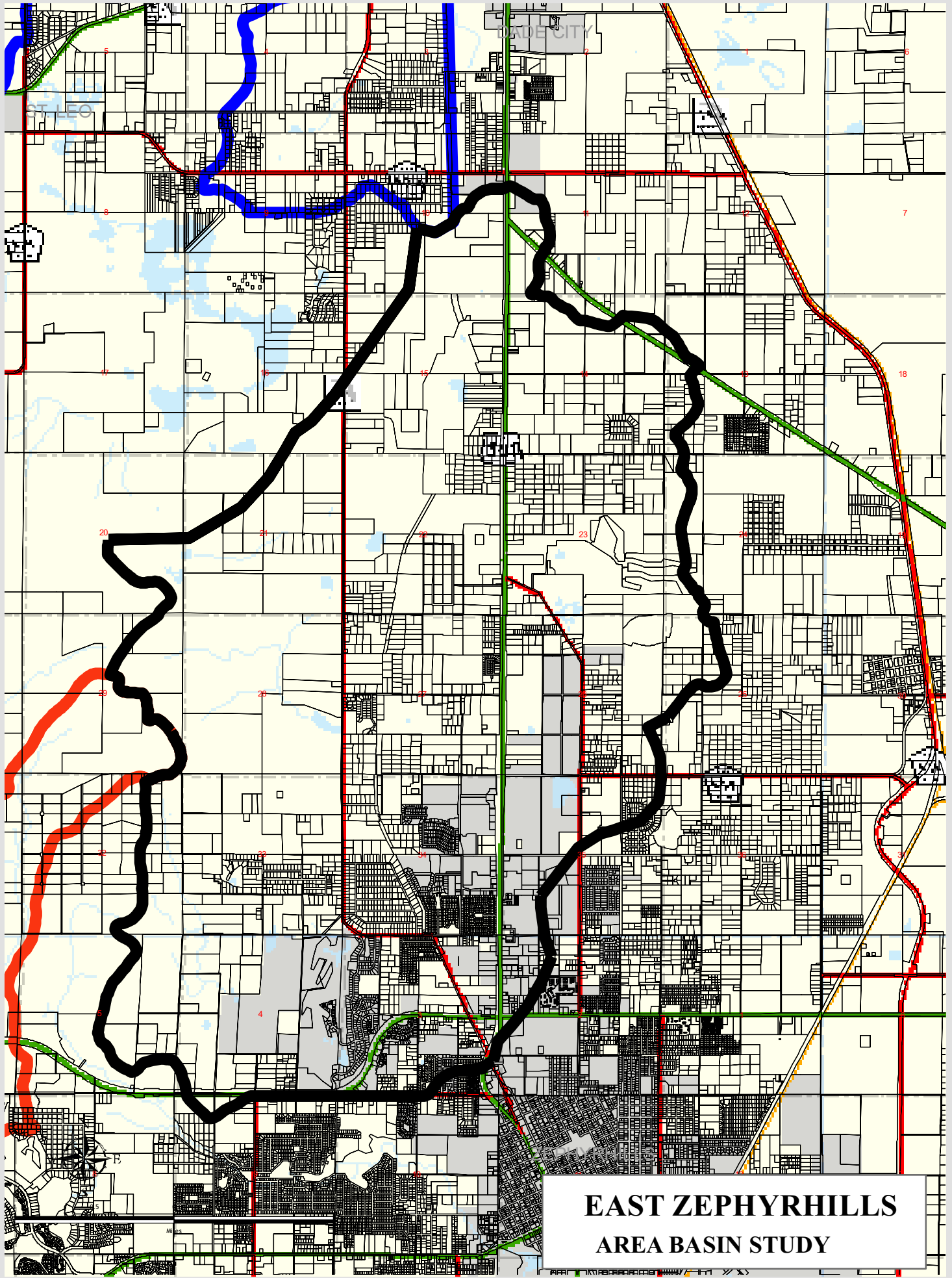
The third pond city owned pond is located at Zephyrhills Elementary School west of U.S. 301 at 14th Avenue. The pond receives runoff from east of U.S. 301 and pumps to Lake Zephyr. This pond was originally a Pasco County pond but has since been modified and is now permitted through SWFWMD with the City of Zephyrhills as owner and operator.

A portion of Fort King Road has been vacated by the City of Zephyrhills to build another stormwater management pond on the east side of U.S. 301 at the intersection with 14th Avenue. This fourth pond was built for the purpose of alleviating the existing flooding issues in the area.

2.3 Stormwater Management Criteria

Local Regulations: Effective July 18, 2005, Pasco County designated the East Zephyrhills basin (excluding Lake Pasadena, but including Lake Dorothea, Lost Lake, and Silver Oaks) as a closed Drainage Basins of Special Concern. The limits of the basin are delineated on **Figure 5**. Any development within the basin must comply with the requirement that there shall be no net loss of storage volume from the most restrictive of:

- A. FEMA established floodplain storage volume.
- B. Storage volume below the elevation of a recorded, County observed flooding.



**EAST ZEPHYRHILLS
AREA BASIN STUDY**

MAP 10/15/08 10:00 AM 10/15/08 10:00 AM 10/15/08 10:00 AM 10/15/08 10:00 AM 10/15/08 10:00 AM

- C. Calculated ponding based upon a 100-year return frequency, ten (10) day storm event.
- D. A more critical event standard, including a 100-year return frequency, ten (10) day storm event, defined in a County or SWFWM approved study for the applicable drainage basin.

As illustrated on Figure 5, the 6th Street and US 301 Alternative is outside the limits of this basin. The 6th Street and 7th Street alternative falls within the basin only near the Fort King Road at US 301 intersection.

Water Management District Regulations: In 2009, the Southwest Florida Water Management District (SWFWMD), following the direction of the Florida Department of Environmental Protection (FDEP), commenced implementation of the rule requiring that stormwater discharges contributing to violations of water quality standards, including discharges to waters designated as impaired in Rule 62-303, Florida Administrative Code, must comply with the net improvement requirements of environmental resource permitting rules. Applicants must provide reasonable assurance that the construction, alteration, operation, maintenance, removal or abandonment of a surface water management system will not adversely affect the quality of receiving waters such that the water quality standards will be violated. This requires stormwater management systems that discharge directly or indirectly into impaired waters to provide net improvement for the pollutants that contribute to the water body's impairment. To do this, a higher level of treatment is necessary to assure that the permit creates a net improvement in the pollutants that have caused or are contributing to the water body impairment. Pollutants to be considered include Dissolved Oxygen, Nutrients and Coliforms.

The FDEP revises the impaired water body listing periodically based on sampling within the receiving water body. The most recent update to impaired water bodies within the project area (Group 2) was May 7, 2009. See **Appendix C** for documentation related to the WBID's and impaired water body listing. Both build alternatives are within the area designated by the FDEP as Water Body Identifier (WBID) 1446 and a small portion of 7th Street is located within WBID 1448. The water bodies are not classified as impaired by the FDEP as of December, 2011 therefore only normal SWFWMD treatment criteria will apply to the project. Should the classification for the water body be revised prior to submittal of permit applications during the design phase of the project the treatment requirements would be increased significantly to meet the no net increase of pollutants criteria for water quality.

2.4 Existing Cross Drains

Field reviews were performed to examine each cross drain. Existing cross drain information was taken from field survey data obtained in May 2003 and is summarized in Table 3-2 below. Any proposed modifications to existing cross drains will result in no changes to floodplain flood levels. All drainage features will be developed in accordance with FDOT drainage standards and procedures.

**Table 3-2
Existing Cross Drain Information**

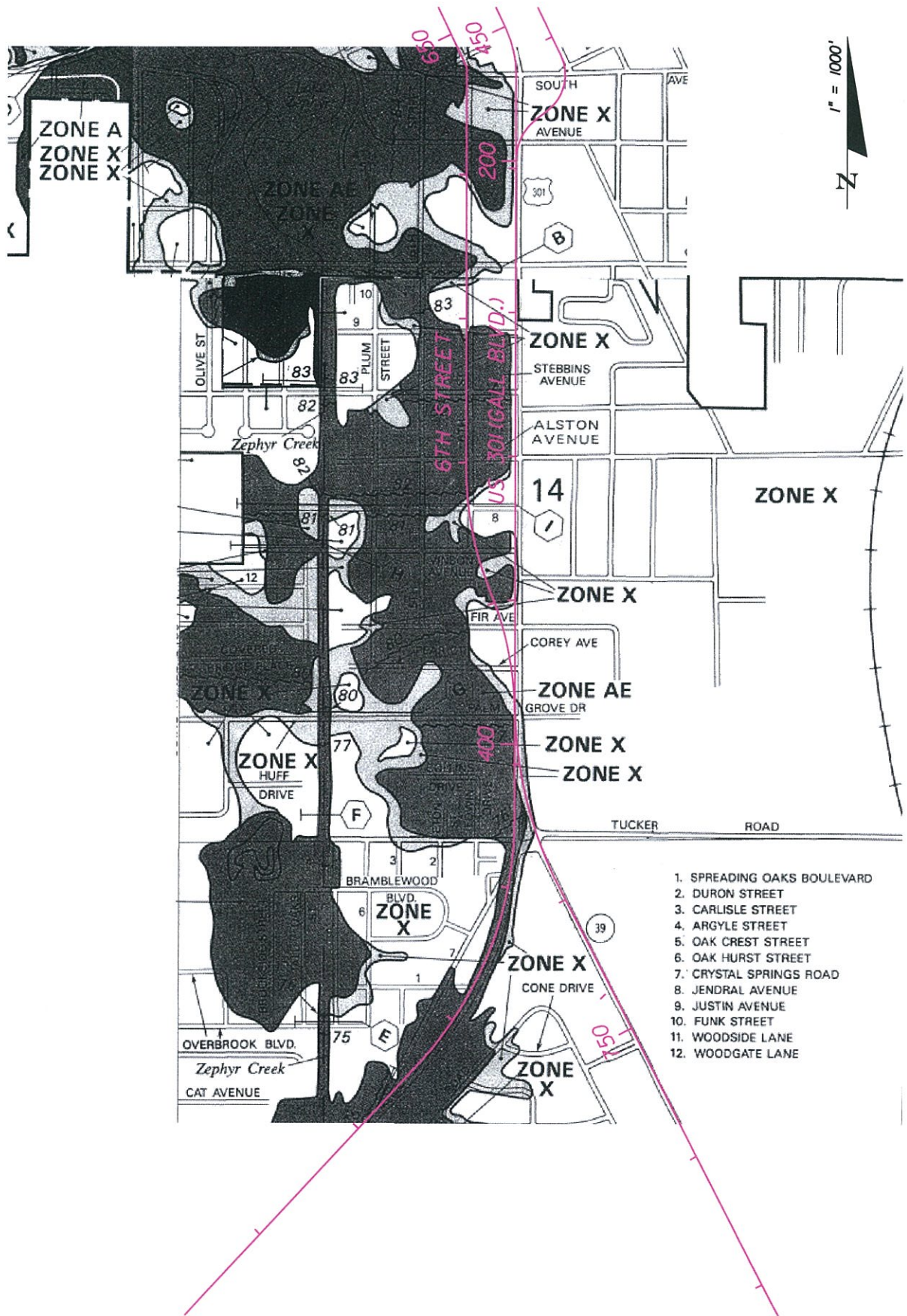
Struct. No.	Approx. Location	Size/ Description	Length (ft)	Invert Elevations		Flow Direction	Area of Basin (ac)
				West (ft)	East (ft)		
S-1	U.S. 301/Fir Ave	1-24" RCP	57.0	78.69	76.88	W-E	8.0
S-2	U.S. 301/11 th Ave	1-18" RCP	39.0	81.50	81.53	W-E	9.0
S-3	U.S. 301/14 th Ave	1-12" RCP	50.0	79.34	81.55	E-W	60.0

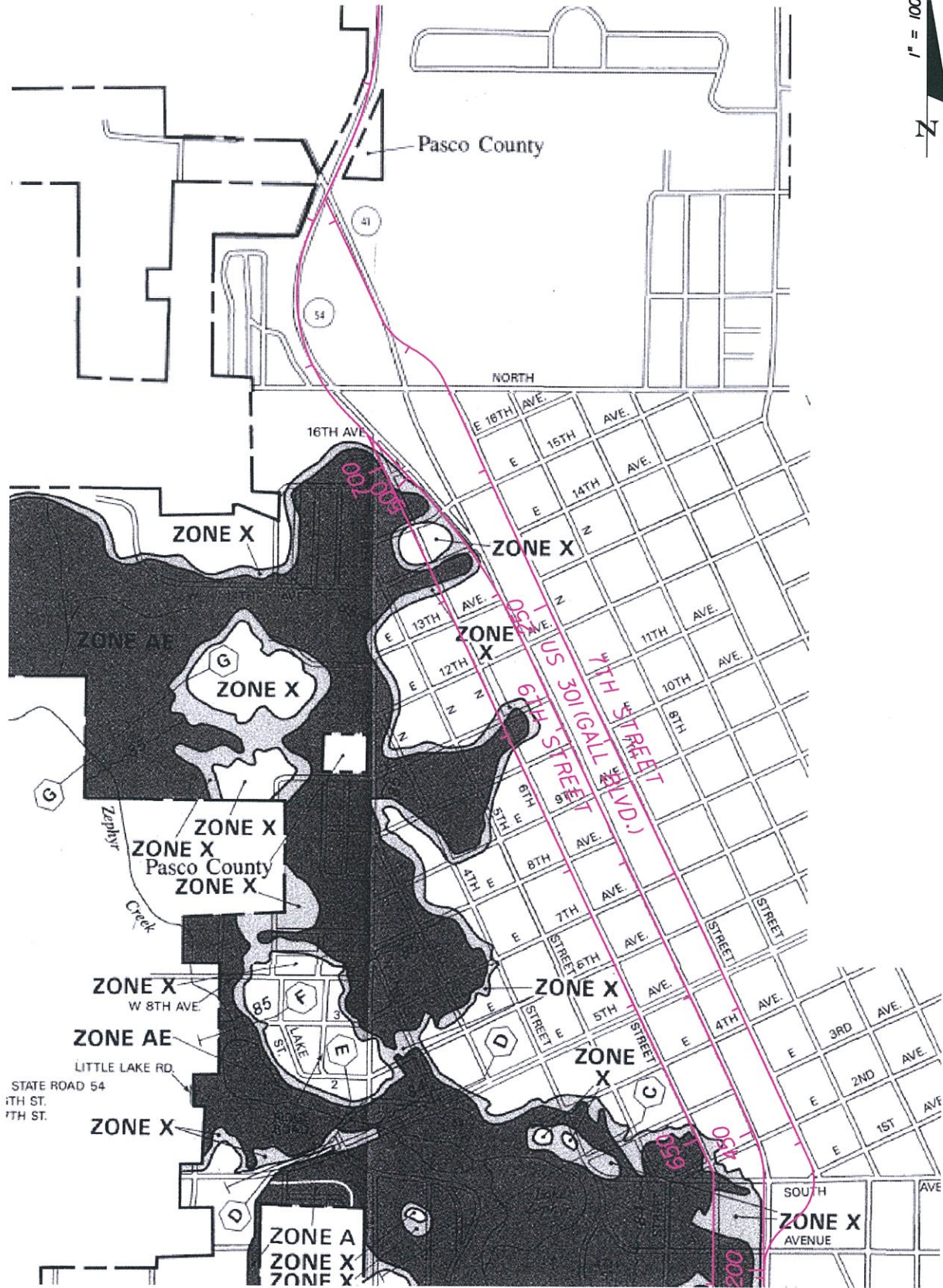
The 24" cross drain north of Fir Avenue (S-1) is the location of flooding of adjacent properties in the area. After field and office review of the system, it appears as though the historic outfall for this system is to the south along the east side of US 301 and SR 39 to another 24" cross drain under SR 39. From there it continues to flow south along the ditch on the east side of U.S. 301. The flow lines of one of the more recently installed 18" side drains along S.R. 39 are approximately 1.5 feet too high compared to other flow lines up and downstream in the system and causes backwater upstream in the ditch.

2.5 Floodplain

The latest Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) for the unincorporated areas of Pasco County were used to identify potential flood plain and floodway encroachments associated with the proposed roadway improvements. According to the latest FIRM (Map Panel Numbers 120230 0460 D dated September 30, 1992 & 120235 0005 C dated December 17, 1991), US 301 currently encroaches into the delineated 100-year flood plain at the beginning of the project. Copies of these FIRM Panels are provided in **Figures 6 and 7**.

The initial encroachment located near Tucker Road has been designated by FEMA as 'Zone AE' and 'Zone X' flood zones. A FEMA 'Zone X' designation indicates that there is a 0.2% - 1% annual chance of flooding within a specific area. This is above the base flood and no flood elevations are established. A reasonable flood elevation has been assigned to the areas designated as flood 'Zone X' based on the adjacent 'Zone AE' and existing topography. A FEMA 'Zone AE' designation indicates that there is a 1% annual chance of flooding within a specific area and a 100-year flood elevation has been assigned to that specific area. The 100-year flood elevation is lower than the edge of pavement on both sides of the roadway along U.S. 301 and 7th Street, but it currently overtops 6th Street in several locations at the north end of the project.





US 301 (GALL BLVD.) PD&E STUDY UPDATE
 SR 39 TO SOUTH OF CR 54, PASCO COUNTY
 WPI: 256422-2

FEMA FLOOD INSURANCE RATE MAP

FIGURE NO.
 6

Although, the FEMA FIRM Maps give a graphical representation of the flood zone limits, the survey allows for a more accurate reproduction of the true 100-year flood zone line using the elevations associated with 'Zone AE'. The 100-year flood zone line has been established by interpolating the elevations of the FEMA Zone AE throughout the length of the project onto contours and/or roadway cross sections.

Each encroachment within the FEMA Floodplain is to be offset with floodplain compensation of an equal volume directly connected to the FEMA Floodplain. In addition, any fill within the 100-year floodplain located within the project area is to be compensated for to produce no net encroachment into the floodplain. The floodplain compensation may be provided within the existing ditches or separate sites acquired for that purpose.

In March 2010 a study was conducted for the SWFWMD and Pasco County to establish more current floodplain information. The study titled East Pasco Watershed, Final Floodplain and Justification Report, analyzes floodplain limits and models flooding in six sub-watersheds, including Lake Zephyr. The stormwater model will be utilized in the design phase of the project to analyze the pond modeling.

3.0 FLOODPLAIN ENCROACHMENT

This Draft Location Hydraulic Report also addresses if any floodplains will be significantly affected due to the conceptual improvements. The following ten items have been addressed to document that the floodplain encroachments will be minimal.

1. History of Flooding: FDOT drainage maps, SWFWMD 1-foot contour aerial maps, and FEMA FIRM's and Flood Insurance Study (FIS) were used to identify flood-prone areas within the U.S. 301 study area.

2. Longitudinal or Transverse Encroachments: There will be a combination of longitudinal and transverse floodplain encroachments. Several segments of 6th Street will have transverse floodplain encroachments, due to the roadway PGL being lower than the 100-year floodplain. US 301 primarily will have longitudinal impacts from ditches being filled in to accommodate the roadway widening. Floodplain Compensations sites will be provided for volume compensation for all floodplain impacts as a result of floodplain encroachments.

3. Avoidance Alternatives: The proposed alignment will utilize the existing alignment throughout the majority of the project; therefore, these floodplain encroachments will be nearly unavoidable. During the design phase, adjustments to the typical section and revised side slopes could minimize impacts, however, the right-of-way is only sixty feet wide in many locations and impacts may not be able to be reduced. The proposed stormwater management alternatives may also have associated floodplain impacts, since the majority of the area to east of the north end of the project is located within the 100-year floodplain limits. Several locations were examined to avoid the floodplain entirely, but they were deemed hydraulically inadequate or not feasible.

4. Emergency Services and Evacuations: U.S. 301 is a designated emergency evacuation route. There is no history of stormwater overtopping U.S. 301 due to the existing floodplain; therefore, no emergency services or evacuation opportunities will be adversely affected. Currently, 6th Street is located within the 100 year floodplain limits. During the design phase the roadway profile will be adjusted to ensure that at least ½ of a travel lane will be available during the 100-year flood event.

5. Base Flood Impacts: There are several locations along the project corridor where encroachments to the 100-year base flood occur. The project's drainage design will be consistent with FEMA, FDOT, and SWFWMD design guidelines which state that no net encroachment, up to that encompassed by the 100-year event, will be allowed, and that compensating storage shall be equivalently provided; therefore, no significant changes in base flood elevations or limits will occur.

Floodplain encroachment varies slightly depending on which build alternative is selected. Many of the properties to the west of US 301 are located in the 100-year floodplain and pond sites could contribute to additional floodplain impacts.

6. Regulatory Floodway: There are no regulated floodways throughout the project limits.

7. Natural and Beneficial Floodplain Values: The proposed roadway pairs will follow the same general alignment as existing roadways and compensating storage will be provided equivalent to any proposed encroachments; therefore, no natural and beneficial floodplain values will be significantly affected.

8. Floodplain Consistency and Development: The conceptual improvements are in accordance with the City of Zephyrhills comprehensive plans. Future development will be in accordance with designated land uses according to the adopted comprehensive plans and their land development regulations.

9. Floodplain/FIRM: Updated FIRM maps have been provided in Figures 6 and 7. The majority of the project is located within zone AE and has an assigned base flood elevation. These elevations were coordinated with topographic survey and SWFWMD 1-ft contour topographic maps to establish preliminary encroachment areas. The refined encroachment areas will be determined during the subsequent design phase.

10. Risk Assessment: The roadway improvements are determined to be low risk based on the criteria of impact to emergency vehicles, flood risk and impacts to natural and beneficial floodplain values as discussed in the Federal-Aid Policy Guide CFR 650A.

4.0 PUBLIC NOTIFICATION

A Public Hearing for the project will be held to present the build alternatives. The District must include in its public hearing advertisements in local newspapers, a statement that the project involves encroachments into the base floodplains.

5.0 CONCLUSION

This report is intended to provide additional and updated information from that contained in the Location Hydraulic Report prepared in February 2000. Where new or additional data was available it has been presented herein. Based on this information and information from the 2000 LHR, minimal encroachment to the floodplain is anticipated for this project. The conceptual improvements to the one way roadway pairs will result in little impact to the floodplain and is low risk to emergency vehicles and evacuation routes. Therefore the project can be considered a project on existing alignment involving replacement of drainage structures in heavily urbanized floodplains and the following can be said:

“Replacement drainage structures for this project are limited to hydraulically equivalent structures. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility or practicability. An alternative encroachment location is not considered in this category since it defeats the projects purpose or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to totally eradicate flood impacts or even reduce them in any significant amount, existing flooding will continue, but not be increased. The proposed structure will be hydraulically equivalent to or greater than the existing structure, and backwater surface elevations are not expected to increase. As a result, the project will not affect existing flood heights or floodplain limits. This project will not result in any new or increased adverse environmental impacts. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

6.0 REFERENCES

In addition to the references listed in the original LHR (Appendix A), the following additional resources were utilized.

FDOT- Project Development and Environment Guidelines Chapter 24, (January 2008)
SWFWMD – Environmental Resource Permit Information Manual (December 2010)
FEMA - Flood Insurance Study (September 1992)
FEMA – Flood Insurance Rate Maps (September 1992) & (December 1991)
FDEP - Evaluation of Current Stormwater Design Criteria Within the State of Florida (2007)
FDEP – Stormwater Quality Applicant’s Handbook (March 2010 Draft)
Pasco County – Chapter 900. Development Standards

Appendix A

Location Hydraulic Report - February 2000

Location Hydraulic Report

U.S. 301 (S.R.41)
from S.R. 39 to C.R. 54

Financial Project No. 256422-1-21-01
State Project No. 14050-1551
Work Program Item No. 7116060

Prepared by: Florida Department of Transportation
District VII
11201 N. McKinley Drive
Tampa, Florida 33612

February 2000

Executive Summary

The Florida Department of Transportation is studying the U.S. 301 corridor through the City of Zephyrhills from S.R. 39 to C.R. 54 (Fountain Road). The project length is approximately 2.6 miles. The study investigates improvement alternatives which include widening and one-way pair extensions of 6th Street and 7th Street.

The major drainage feature is Lake Zephyr which outfalls through Zephyr Creek to the Hillsborough River. **No regulated floodway exists within the project limits.** However, a 100 year floodplain has been established by FEMA and is located west of and adjacent to existing U.S. 301. The proposed improvements would impact the floodplain longitudinally from approximately S.R. 39 to Avenue C. Outside of the Lake Zephyr Watershed are numerous closed basins which each have an associated base floodplain. Impacts to these floodplains vary depending on which alternative is used. Compensating storage ponds will likely be required to offset any impact to the floodplain due to fill. **Encroachment to the floodplain is not significant.**

Existing drainage structures within the project limits include three cross drains. Any modifications to the structures will result in insignificant impacts to the floodplain or to downstream conditions.

Various flooding problems exist along the existing U.S. 301 corridor that should be addressed in the design phase of the project. The drainage problems are largely

attributed to the lack of positive drainage. The project area is highly urbanized and is characterized by numerous isolated basins with no positive outfall.

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I. Introduction

A. Purpose

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) study which evaluates improvement alternatives along S.R. 41 (U.S. 301) from S.R. 39 to C.R. 54 (Fountain Road) in Pasco County (see Figure 1 Location Map). The purpose of this report is to provide drainage related information to assist the FDOT in reaching a decision on type, location and conceptual design of the necessary improvements along the U.S. 301 corridor. It is the goal of the PD&E study to accommodate the present and future traffic demand in a safe, efficient, and cost effective manner.

B. Existing Conditions

The U.S. 301 corridor is a north/south primary arterial facility that conveys traffic through downtown Zephyrhills. The project is approximately 2.6 miles in length. The southern portion of the project (from S.R. 39 to Avenue C) is located within unincorporated Pasco County. The northern portion to C.R. 54 is located within the City of Zephyrhills. See Figure 2 for project location on USGS quadrangle map.

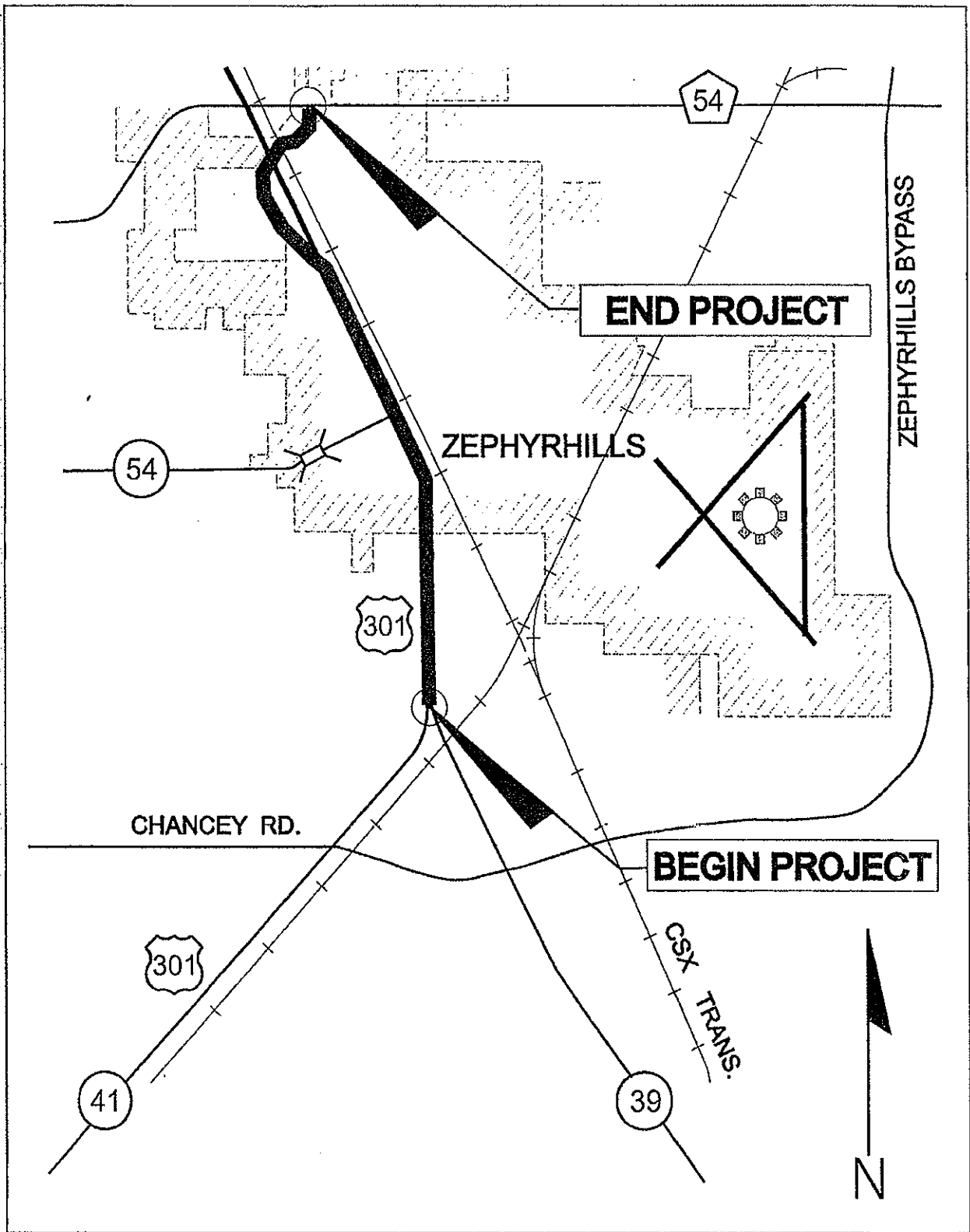
The existing roadway is a two-lane rural section with four foot paved shoulders. Roadside ditches and occasional storm sewer systems convey runoff away from the road to low-lying areas adjacent to the roadway or to stormwater management

facilities. There are also three cross drains located within the project limits. The ponds and cross drains are both discussed in detail later in this report.

B. Proposed Improvements

A one-way pair was created in 1996 by the City of Zephyrhills using 6th and 7th Streets as an alternate route to U.S. 301. Presently, the one-way pair functions for only a portion of the project length. One alternative in the PD&E study considers extending the one-way pairs to S.R. 39 to the south. Other alternatives involve the widening of U.S. 301. Typical sections for the proposed alternatives are shown in Appendix B.

All of the proposed typical section alternatives involve adding impervious area. The improvements include a closed storm sewer system with curb and gutter and sidewalks. Permitting through the Southwest Florida Water Management District (SWFWMD) will be required. Specific stormwater permitting requirements for proposed improvements are discussed in Criteria section of report.



<p>U.S. 301 PD&E STUDY (S.R.39 TO C.R.54) PASCO COUNTY</p>	<p>PROJECT LOCATION MAP W.P.I. SEG. No. 256422 1 F.A.P. No. 1455-001-U</p>
------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------

Figure 1

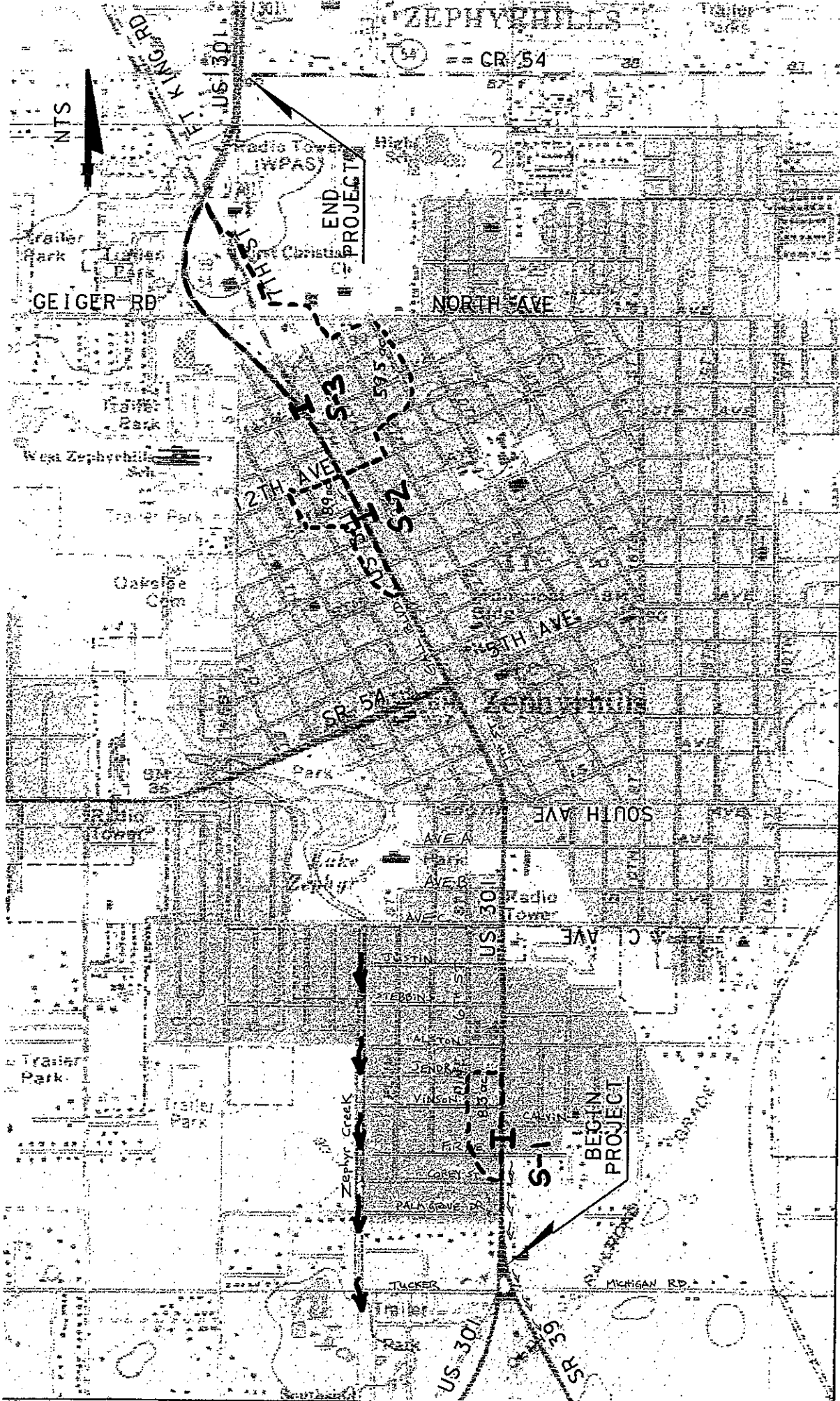


FIGURE 2

USGS QUADRANGLE MAP
(REF: ZEPHYRHILLS 1998)

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
DISTRICT 7



II. Sources of Information

Listed below are several sources which provided detailed information as to the existing hydrologic characteristics of the project area. One of the more useful reports was the *Lake Zephyr Master Plan* by Greiner, Inc. (1989). This study was instrumental in revising the floodplain map (revised 1992).

1. SWFWMD one-foot contour maps (1980).
2. USDA/ SCS Pasco County Soil Survey (Issue June 1982).
3. USGS Quadrangle Map, Zephyrhills (1998).
4. FEMA Flood Insurance Rate Map Panel No. 460 (September 1992).
5. Lake Zephyr Watershed Stormwater and Flood Management Master Plan, Greiner, Inc. (April 1989).
6. Location Hydraulic Report U.S. 301 from Chancey Road to C.R. 54E, Greiner Inc., (August 1988).
7. Original Construction Plans U.S.301, Project No. B-940 (Fiscal Year 1935).
8. Old Drainage Maps, Project No. 14050-1511-01 (no date found).

9. Technical Proposal for U.S. 301 from Chancey Road to C.R. 54E, State Project No. 14050-1537, WPA No. 7115944; HNTB (Feb. 16, 1988).
10. Drainage Structure Investigation and Evaluation Report, SPN 14050-3546, WPA 7116045, S.R. 39 (U.S. 301); Coastal Engineering (August 1993).
11. Design Documentation U.S. 301 Zephyrhills; Coastal Engineering (March 1994).
12. Recent field reviews by Carlos Lopez and Scott Garth of FDOT District 7 (1999-2000).
13. Interviews with FDOT Maintenance personnel and outside agency officials (see Appendix for project correspondence).
14. FDOT Drainage Manual Volume 2A ,Chapter 3
15. PD&E Manual; Part 2, Chapter 24-Floodplains
16. SWFWMD Environment Resource Permitting Information Manual (February 1999)

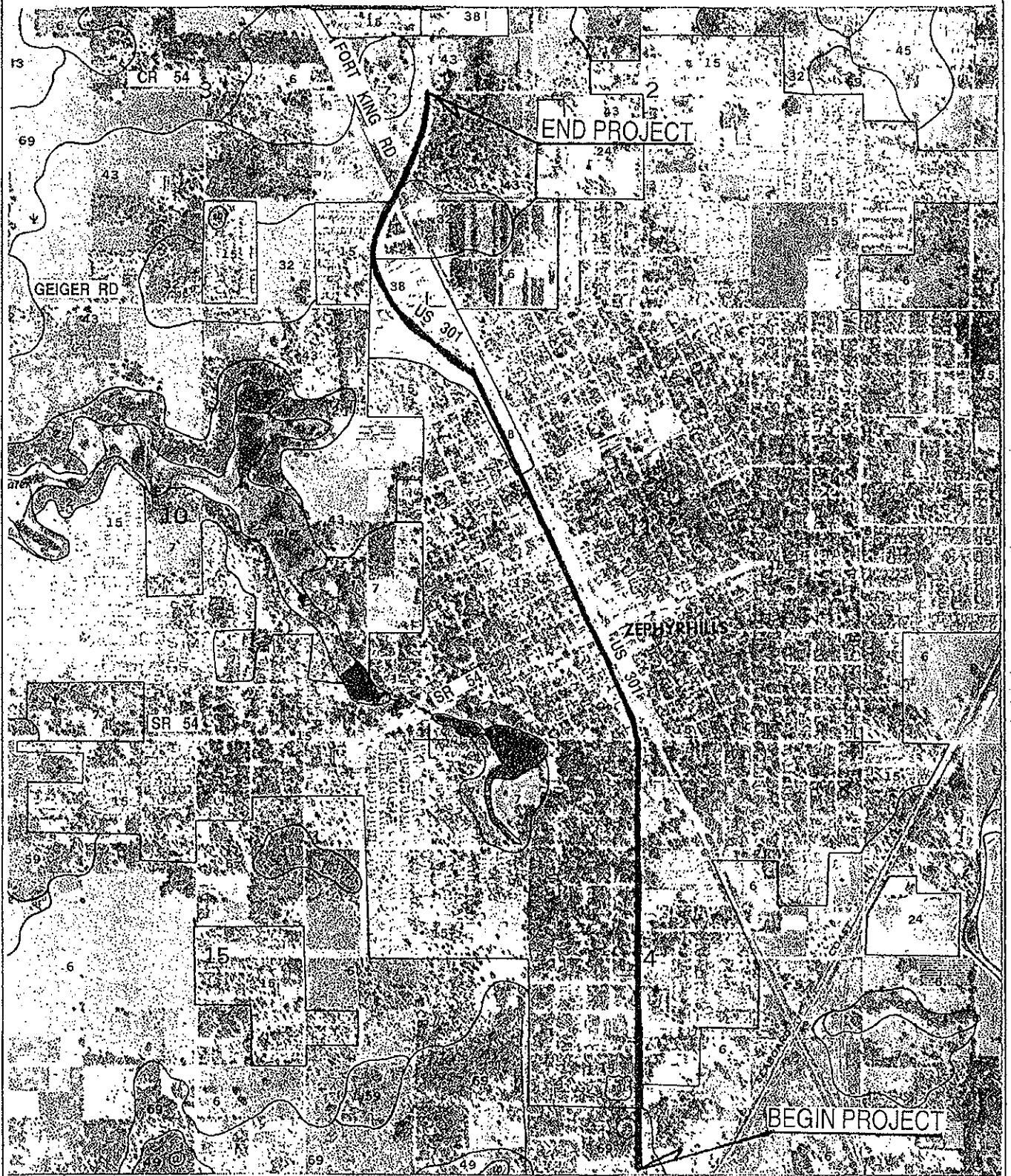
III. Soils

The SCS Soil Survey of Pasco County (see Figure 3) was used to identify the soils within the project corridor. The table below summarizes the soils within the project limits. Most of the soil type is Tavares-Urban Land Complex which is characterized by heavy urbanization. In general, the soils are uplands, nearly level to sloping,

moderately to well drained soils that are sandy throughout. All of the soil types within the project are type A soil which have high infiltration rates (low runoff potential). The water table is expected to be relatively deep (seasonal high at a depth of 3.5 feet or greater).

Table 1
Summary of Pasco County USDA / SCS Soil Survey

USDA Map Symbol and Soil Name	Hydrologic Group	Seasonal High Water Table		
		Depth (ft)	Kind	Month
Tavares Sand (6)	A	3.5-6.0	Apparent	Jun-Dec
Tavares - Urban Land Complex (15)	A	3.5-6.0	Apparent	Jun-Dec
Lake Fine Sand (32)	A	>6.0	---	---
Urban Land (38)	N/A	---	---	---
Arredondo Fine Sand (43)	A	>6.0	---	---
Millhopper Fine Sand (69)	A	3.5-6.0	Perched	Aug-Feb



STATE OF FLORIDA
 DEPARTMENT OF TRANSPORTATION
 DISTRICT 7

USDA SOILS
 MAP

FIGURE 3

IV. Existing Stormwater Management Facilities

Presently, three stormwater management facilities are located within the project limits. All three ponds are owned and operated by the City of Zephyrhills. The first pond is located adjacent to 7th Street, east of U.S. 301 between Avenue A and South Avenue. The pond was constructed around 1995 in conjunction with the City of Zephyrhills one-way pair extension of 7th Street. The pond accepts runoff from the improved 7th Street and adjacent property only. The dry pond has no outfall and a high infiltration rate. Double ring infiltrometer (DRI) test results indicate an average infiltration rate of 17 feet per day (see DRI test results in appendix).

The second pond is located near the middle of the project, north of 6th Avenue, east of U.S. 301 (across from The Clock Family Restaurant). The pond accepts runoff from approximately 40 acres of surrounding area. The pond is owned and operated by the City of Zephyrhills whose offices are located due east from the pond. The pond is equipped with a pump station and force main which discharges west to Lake Zephyr. The City of Zephyrhills has expressed a desire to increase the pumping capacity of the pond to help alleviate some flooding problems associated with the pond. No SWFWMD permit exists for this pond as it was constructed prior to in the 1960's. A telephone memorandum (dated 11-15-99) with Rick Moore of City of Zephyrhills is included in Appendix A.

A third pond is located at Zephyrhills Elementary School west of U.S. 301 at 14th Avenue. The pond receives runoff from east of U.S. 301 and pumps to Lake Zephyr (see telephone memo with Rick Moore dated 2-21-00). This pond was originally a Pasco County pond but has since been modified and is now permitted through SWFWMD with the City of Zephyrhills as owner and operator.

IV. Stormwater Management Criteria

The stormwater management criteria for the proposed pond sites will be governed by both the Southwest Florida Water Management District (SWFWMD) and the Florida Department of Transportation (FDOT). A Pond Siting Report is currently being prepared for this project by the FDOT and will go into further detail as to the specific criteria concerning treatment and attenuation.

Because the project is located within both open and closed basins, both sets of criteria will need to be addressed depending on which basin. Below is a summary of the criteria.

SWFWMD Criteria:

A. Closed Basins

1. Water quantity- required retention volume = post development runoff volume less the pre-development runoff volume for the

100yr/24hr storm; type II Florida modified rainfall distribution;
Antecedent Moisture Condition (AMC) II.

2. Water quality- dependent upon the type of treatment system:

a. Wet detention- one inch of runoff from directly connected
impervious area (DCIA).

b. Dry detention- one half inch of runoff from DCIA.

B. Open Basins

1. Water quantity- the discharge is limited to the historic discharge (or
previously permitted rate) of the site for the 25yr/24hr storm event
using the type II Florida modified rainfall distribution, AMC II.

2. Water quality- same as for closed basin (above)

C. Floodplain Encroachment

No net encroachment into the floodplain. Any required compensating
storage shall be equivalently provided between the seasonal high
water level and the 100 year flood level.

FDOT Criteria:

The FDOT criteria for stormwater related activities shall include Rule Chapter 14-86
critical duration analysis up to and including the 100 year/24 hour storm event.

V. Existing Cross Drains

Field reviews were performed to examine each cross drain. Existing cross drain information was taken from original construction plans or old drainage maps and is summarized in Table 2 below. Cross drains locations are shown on Figure 2.

Any proposed modifications to existing cross drains will result in minimal impacts to floodplains. All drainage features will be developed in accordance with FDOT drainage standards and procedures.

Table 2.
Existing Cross Drain Information

Structure No.	Approx. Location	Size/ Description	Length (ft)	Invert Elevations		Flow Direction	Area of Basin (ac)
				West (ft)	East (ft)		
S-1	U.S. 301/ Fir Ave.	1 – 24" RCP	57.0	75.0	75.0	W-E	8.0
S-2	U.S. 301/ 11 th Ave.	1 – 18" RCP	39.0	81.92	81.56	W-E	9.0
S-3	U.S. 301/ 14 th Ave. / Ft. King Rd	1 – 12" RCP	50.0	81.53	81.64	E-W	60.0

Structure S-1:

Cross drain S-1 is located under U.S. 301 approximately 200-feet north of Fir Avenue. The cross drain conveys approximately 8.3 acres of residential/commercial runoff. The flow direction is from west to east. The runoff is conveyed into a series of ditch bottom inlets that flow south along the east side of U.S. 301. The storm sewer system flows south of Michigan Avenue where it daylights into a roadside swale along the east side of S.R. 39. The stormwater then flows west through a 24-inch RCP under S.R. 39 (south of the project limits) ultimately discharging into the Hillsborough River. Therefore, this system is an open basin.

Mr. Jerry Sanford of FDOT Maintenance (Brooksville office) has identified the storm sewer system downstream of the cross drain as having a drainage problem. Apparently, ponding occurs along the east side of U.S. 301. See memorandum in Correspondence section of appendix.

No historic or design high waters are identified on the old drainage maps for the cross drain. No evidence of overtopping or hydraulic inadequacy was found in the research associated with this pipe. The pipe is likely to be extended or modified during the design phase and should be sized to pass the design event (50 year) and checked for overtopping. Coastal Engineering evaluated this cross drain in 1993 for structural adequacy and found there to be no problem associated with the pipe. See pipe inspection report in correspondence section of appendix.

Structure S-2:

Structure S-2 is an 18-inch RCP under U.S. 301 located approximately 200 feet south of 11th Avenue. The pipe is no longer a true cross drain as the upstream end (west side) has been modified to include a series of ditch bottom inlets that extend north to 12th Avenue. The downstream end of the pipe is a mitered end section that outfalls into a small dry retention area (approximately 20-feet in diameter and 3-feet deep). The retention area is located in front of the Car Wash just south of Burger King on the east side of U.S. 301. The system conveys approximately 9 acres of residential/ commercial runoff to the low area.

The pipe is located within a closed basin. Old drainage maps indicate that this pipe discharged to a low area east of the old railroad grade east of U.S. 301. The original U.S. 301 construction plans from 1935 showed a much larger drainage area (105.4 acres from the west side alone) coming to this pipe. The pipe functioned as an "equalizer pipe". A more recent drainage map indicates a much smaller drainage area (approximately 9 acres) coming to the pipe from the west. The SWFWMD one foot contour map shows the potential for a larger area to come to this pipe in a larger storm event. A thorough field review will be required in the design phase to adequately determine the extent of the basin area.

According to the old drainage map the historic high water is elevation 82.7 feet. A February 2000 field review showed no evidence of a present water.

Although there is no evidence of a flooding problem here, the area is suspect because it is located within a closed basin characterized by high development and

little, if any, retention. In design phase, the area adjacent to the pipe on either side of U.S. 301 is likely to be taken into a proposed stormwater pond.

Structure S-3:

This 12" concrete pipe is located under U.S. 301 at 14th Avenue. The upstream end of the pipe is located in the gore/ditch area between U.S. 301 and Fort King Road. The pipe conveys approximately 59.5 acres of residential/commercial runoff in a westerly direction. This pipe is sub-standard in size (FDOT requires 18-inch minimum for cross drains) and the area is frequently flooded (see correspondence in appendix). Under flood conditions, Fort King Road is closed due to high flood waters. The roadway elevation of Fort King Road is 2-3 feet lower than U.S. 301. Documentation from Coastal Engineering (see August 1993 memo with Lt. Tracy of Zephyrhills Police Department) indicates flooding of Fort King Road only. This was verified by a 2-21-00 telephone conversation with Rick Moore of City of Zephyrhills Public Works Department. Rick went on to say that the runoff flows west down 14th Avenue into the detention pond at Zephyrhills Elementary School where it is then pumped via a 16-inch force main to Lake Zephyr. This was permitted by SWFWMD.

The more recent drainage map showed no present water (January 1968) and a high water of 82.7 feet downstream of the pipe at the Zephyrhills Elementary School site. A February 2000 field review saw no present water. However, evidence of water was visible in the ditch downstream of the pipe parallel to U.S. 301 (west side U.S. 301; south of 14th Avenue). A water mark was clearly seen at the crown of the pipe on the west (downstream end). The stain was a chalky white residue that seemed to

come from some of the surrounding dirt roads. The mark could be seen in the ditch and on the headwall of the 12- inch concrete pipe.

The original Location Hydraulics Report (LHR) performed by Greiner, Inc. (1989) recommended that the pipe not be upsized. At that time, it was decided that if the pipe were upsized the flooding problems would be transposed to a location downstream of U.S. 301. However, this needs to be reevaluated as a result of the pump station installation.

It is recommended that area be re-investigated in the design phase to determine whether the present downstream conditions are able to accept an increase in flow. It may be possible to increase the pipe size to pass the 50-year flow. It may be necessary to upgrade the side drains and ditch along the south side of 14th Avenue. Also, the ditch bottom inlet and 8-inch PVC pipe at West Street and 14th Avenue would require upgrading. A permit modification through SWFWMD should be discussed early in the design phase. Close coordination with the City of Zephyrhills will be required with regards to the pump station.

VII. Base Floodplain Involvement

There are no regulated floodways within the project limits. The 100 year (base) floodplain has been established for the Lake Zephyr Watershed and is shown in Figure 4. The Lake Zephyr floodplain is located adjacent to Zephyr Creek and extends eastward to U.S. 301. Flood profiles along Zephyr Creek have been

developed and can be seen in the Pasco County Flood Insurance Study (revised 1992).

Although not identified by the Federal Insurance Administration as a floodplain, the area east of U.S. 301 can also be considered floodplain. The area is characterized by isolated closed basins with no positive outfall. Therefore, impact to these basins, (especially with the alternative that involves 7th Street) could be considered floodplain impact as well. The extent of floodplain impact on basins associated with 7th Street would greatly depend on where the 7th Street extension traverses the basin. If the extension traverses the basin's low point thereby removing storage the impact would be great and volume would need to be recreated in a pond. If the extension traverses the outer limits of the basin and avoids the low point, then the impact to the basin's floodplain would be minimal or none.

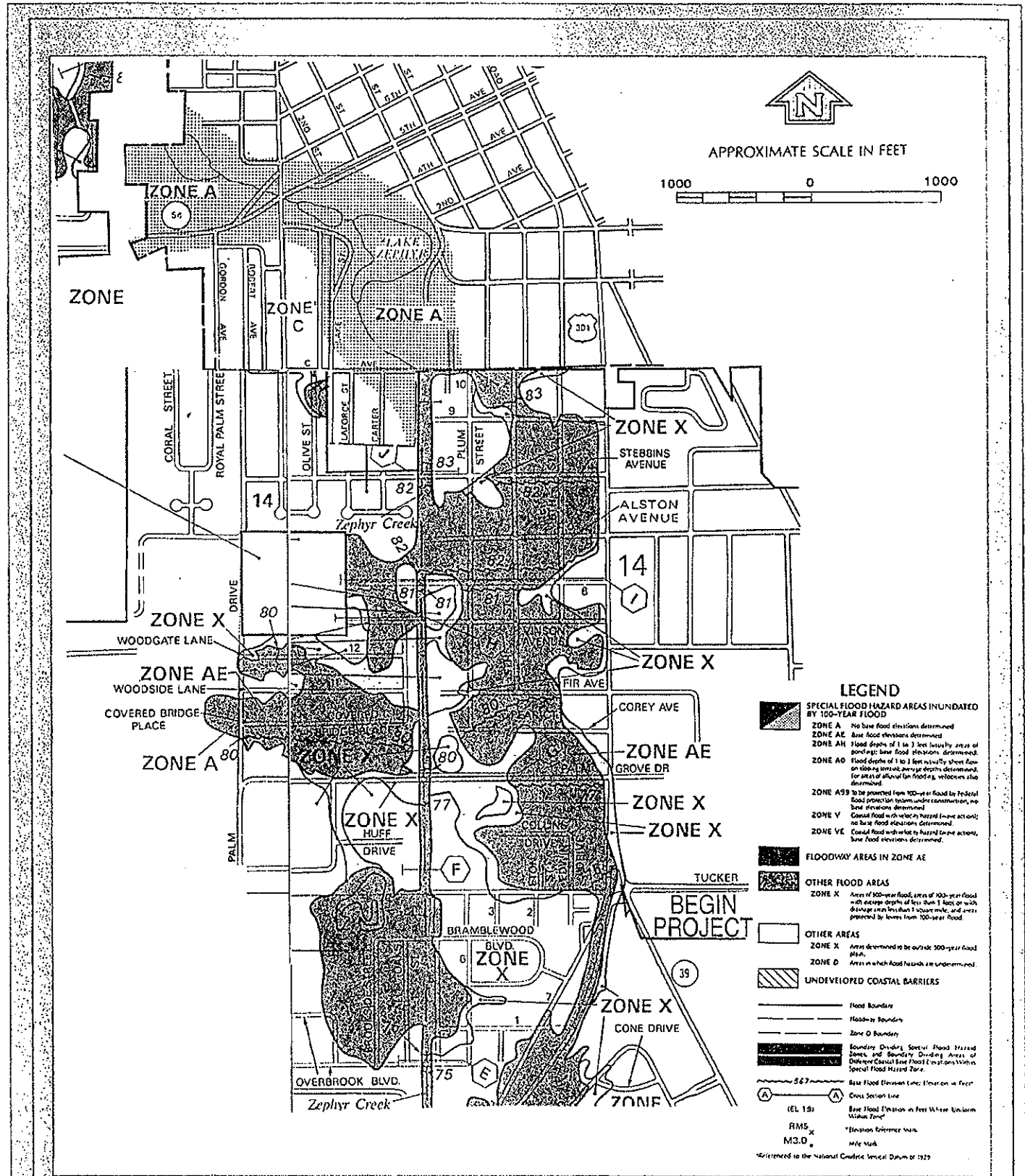
The amount of impact to the floodplain varies depending on which typical section alternative is used. Appendix C contains the proposed typical section alternatives. Filling of the floodplain would occur longitudinally to the floodplain on the west side of U.S. 301 and transversely on the east side of U.S. 301.

It is anticipated that impacts will occur and that compensating storage ponds will likely be required to offset the impact.

VIII. Conclusion

Based on the data collected for this report, **minimal encroachment** to the floodplain is anticipated for this project. Therefore, the project can be considered a **project on existing alignment involving replacement of drainage structures in heavily urbanized floodplains** and the following can be said:

*“ Replacement drainage structures for this project are limited to hydraulically equivalent structures. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered in this category since it defeats the project purpose or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to totally eradicate flood impacts or even reduce them in any significant amount, existing flooding will continue, but not be increased. The proposed structures will be hydraulically equivalent to or greater than the existing structures, and backwater surface elevations are not expected to increase. As a result, the project will not affect existing flood heights or floodplain limits. The project will not result in any new or increased adverse environmental impacts. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. **Therefore, it has been determined that this encroachment is not significant.**”*



STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
DISTRICT 7

FEMA 100 YEAR
FLOOD MAP
1992

FIGURE 4

- LEGEND**
- SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD
 - ZONE A No base flood elevations determined
 - ZONE AE Base flood elevations determined
 - ZONE AH Flood depths of 1 to 3 feet usually areas of ponding; base flood elevations determined
 - ZONE AO Flood depths of 1 to 3 feet usually sheet flow on 100-year average depth determined; for areas of unusual fan flooding, velocities also determined
 - ZONE A99 to be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined
 - ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined
 - ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined
 - FLOODWAY AREAS IN ZONE AE
 - OTHER FLOOD AREAS
 - ZONE X Areas of 100-year flood, areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 100-year flood
 - OTHER AREAS
 - ZONE X Areas determined to be outside 100-year flood plain
 - ZONE D Areas in which flood hazards are undetermined
 - UNDEVELOPED COASTAL BARRIERS
 - Flood Boundary
 - Floodway Boundary
 - Zone D Boundary
 - Boundary Dividing Special Flood Hazard Zones and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zone
 - Base Flood Elevation Line: Elevation in Feet
 - Cross Section Line
 - Elevation in Feet Within Uniform Water Zone
 - Elevation Reference Mark
 - Mile Mark
- Reference to the National Gridline Vertical Datum of 1929

Appendix A

Correspondence

RECORD OF TELEPHONE COMMUNICATION

DATE: 02-21-00

TIME: 2:00 pm

PROJECT NAME: US 301 Zephyrhills

PROJECT NO.: 25642212101

PARTY CALLING: Scott A. Garth

COMPANY: FDOT D. 7

PARTY CONTACTED: Rick Moore

COMPANY: CITY OF ZEPHYRHILLS
813-788-2313

SUBJECT: 12" rcp @ U.S. 301 and Fort King Road

TELEPHONE COMMUNICATION SUMMARY (Including Decisions and Commitments)

I spoke to Rick today concerning the 12-inch cross drain at 14th Avenue and U.S. 301. Rick said the pipe conveys runoff to the west to the Zephyrhills Elementary School detention pond. The pond has a pump station with a 16-inch force main that pumps to Lake Zephyr. This was permitted by SWFWMD.

As for the cross drain, only Fort King Road overtops. No overtopping of U.S. 301.

ACTION REQUIRED

obtain SWFWMD permit for pump station at Zephyrhills Elementary School

H:\DRAINAGE\SCOTT\US301PDE\022100.WPD

CONVERSATION FORM

DISTRICT SEVEN
DESIGN

1201 N. MCKINLEY DRIVE
TAMPA, FL 33612

TELEPHONE CONVERSATION

OFFICE CONVERSATION

TIME: 9:30 (AM) PM

DATE: 11/15/99

CONVERSATION WITH: Rick Moore 813-782-5531

RE: US 301 Zephyrhills PD&E
Existing City Pond across from city Hall

REPRESENTING: City of Zephyrhills Public Works Director

DISCUSSION: I asked Rick about the existing pond located between 7th Street and US 301, north of S.R. 54 west of City Hall, east of Clock Restaurant.

Rick said that pond was built in 1960's and is pumped via a 12" FM to Zephyr Lake. (non permitted - prior to SWFWMD). The pond has flooding problems and the city has tried to increase capacity of pump thru SWFWMD but has not been able to. Pond is equipped with a backup pump/generator.

Rick has pump data but no old plans/caler. Rick is agreeable to DOT usage of pond if pump capacity could be increased thru SWFWMD and DOT maintained.

XC: _____

BY: Scott Garth

TITLE: Drainage

Carlos Lopez

CONVERSATION FORM

DISTRICT SEVEN DESIGN 1201 N. MCKINLEY DRIVE TAMPA, FL 33612	TELEPHONE CONVERSATION <input checked="" type="checkbox"/> OFFICE CONVERSATION _____ TIME: <u>12:40</u> AM/PM <input checked="" type="radio"/> DATE: <u>10/4/99</u>
-----------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

CONVERSATION WITH: Rick Moore

RE: US 301 PD&E

REPRESENTING: City of Zephyrhills Public Works Director

DISCUSSION: I asked Rick two (2) questions:

1) Do you have a site plan for the proposed Ferman Auto site on the east side of US 301 between Ave B and Ave C?

A: Yes. A site plan has been submitted but not approved yet. City of Zephyrhills tried to buy his property but failed. Oval Terrace is the owner. Rick suggested calling him to see if he's interested in selling.

2) Dry retention ponds north of GTE on 7th Street. Do you have calc's/borings/perc rates.

A: TBE (Peter Nikolov) did design. Rick to get us copy of calc's. We are welcome to use these ponds. They are overdesigned and

XC: working great.

BY: Scott Garth

TITLE: Drainage

Carlos Lopez

CONVERSATION FORM

DISTRICT SEVEN
DESIGN
1201 N. MCKINLEY DRIVE
TAMPA, FL 33612

TELEPHONE CONVERSATION _____

OFFICE CONVERSATION X

TIME: 2:30 AM/PM (PM)

DATE: 9/15/99

CONVERSATION WITH: Jerry Sanford

RE: US 301 Zephyrhills PD&E
, SR 39 to SR 54

REPRESENTING: Brooksville - maintenance

DISCUSSION: Carlos Lopez and Scott Garth met with
Jerry Sanford to discuss drainage issues concerning US 301
in Zephyrhills. The following items were discussed:

- o No overtopping associated with existing 24" cross drain just north of Fir Avenue. Jerry feels that it probably used to flow west towards Zephyr Creek.
- o Ponding problem from SR. 39 to cross drain along east side US 301 (where closed piping exists)
- o Ponding behind Zephyr Egg Company
- o Jerry referred to work done to Phase II about 10 years ago. Pumping involved? Drainage "killed" the project.

XC: Carlos Lopez

BY: Scott Garth

Jerry Sanford

TITLE: Drainage Engineer

MEMORANDUM TO PROJECT NOTEBOOK

Date: June 2, 1993.

From: Jack M. Wright, Project Designer

RE: Concerns of FDOT Maintenance Department
Project No. 93270, CR 39 (US 301), Pasco County, Florida

On this date I talked with Mr. Jerry Sanford of FDOT, Dade City, Florida, regarding any special concerns they might have about drainage or other facets of maintenance of the captioned project. Mr. Sanford expressed concern for the following locations:

1. Intersection of 12th Avenue and US 301. Mr. Sanford stated that even though he had not witnessed any flooding at this location, he felt that the roadway was low in this area and that an analysis of the area would be in order. He stated that the basin was closed and he felt that this was a potential problem area.
2. Intersection of Fort King Road and US 301. Mr. Sanford stated that this intersection floods very frequently and that the local police had become very efficient at closing this intersection to traffic during rainstorms. He also related that the properties adjacent to this intersection were inundated at these times as well. This location is a major source of concern for FDOT forces.
3. Intersection of 6th Avenue and US 301 near the Clock Restaurant. Mr. Sanford stated that the outfall pipe from the side ditch at this location which transports water to the City's DRA is of insufficient capacity to accept the runoff at this location. Some minor flooding and excess standing water is experienced at this location.
4. Intersection of 5th Avenue (SR 54) and US 301. Some flooding has been experienced along the side streets at this location. The problem may well be outside the Scope of this project, but Mr. Sanford expressed the desire for us to investigate this location to determine if anything could be done to alleviate this problem.
5. First intersection north of begin project to east. Mr. Sanford stated that this location traps runoff and that the side ditches have no outfall. He suggested that the possibility of cutting a lateral ditch to the existing canal be investigated or transporting runoff to the existing city right-of-way and thence to the canal. (There may be difficulties encountered in that the canal is a connection for the chain of lakes in the area. Should these be classed as "outstanding" waters it may not be possible to discharge without prior treatment, if at all.)

FROM COASTAL ENGINEERING REPORT (8-93)

MEMORANDUM TO PROJECT NOTE BOOK

FROM: JACK M. WRIGHT, PROJECT DESIGNER

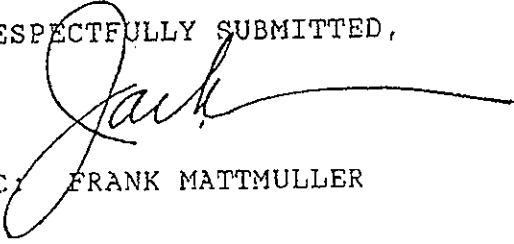
AUGUST 25, 1993

PROJECT NO. 93709, SR 39 (US 301), PASCO COUNTY, FLORIDA

RE: MEMORANDUM DATED JUNE 2, 1993 DOCUMENTING CONCERNS OF THE FDOT MAINTENANCE DEPARTMENT

ON THIS DATE LT. TRACY OF THE ZEPHYRHILLS POLICE DEPARTMENT WAS CONTACTED REGARDING THE FLOODING REPORTED TO CEA IN THE CAPTIONED MEMORANDUM. LT. TRACY STATED THAT NO FLOODING IMPACTED US 301 (SR 39). DURING HEAVY RAINSTORMS FLOODING DOES OCCUR NEAR THE INTERSECTION OF FORT KING AVENUE AND SR 39, BUT THE FLOODING ONLY AFFECTS FORT KING ROAD.

RESPECTFULLY SUBMITTED,


CC: FRANK MATTMULLER

FROM COASTAL ENGINEERING REPORT (8-93)

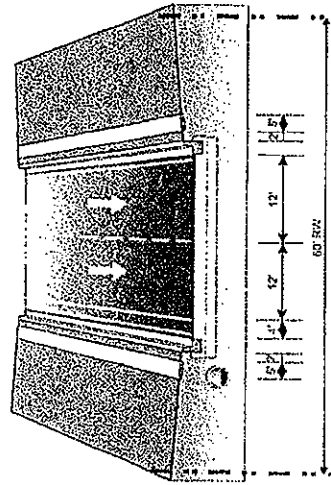
Appendix B

Typical Sections

**U.S. 301 ZEPHYRHILLS
FROM S.R. 39 TO C.R. 54**

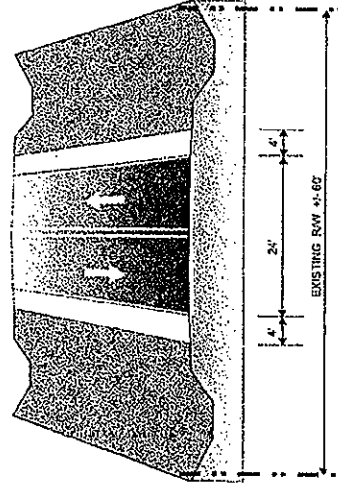
ITEM SEC. 256422 1 FEDERAL AID NO. 1455-001-U

**PROPOSED TWO LANE
ONE WAY
TYPICAL SECTION**



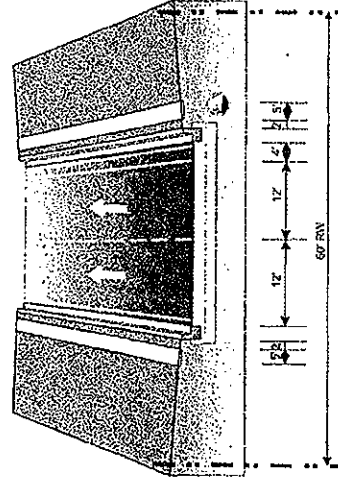
6TH STREET

**EXISTING
TYPICAL SECTION**



U.S. 301

**PROPOSED TWO LANE
ONE WAY
TYPICAL SECTION**



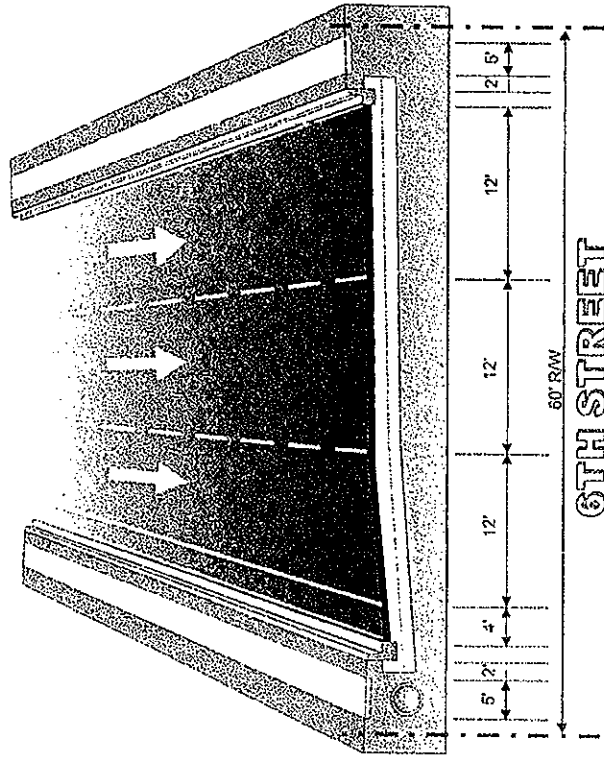
7TH STREET

ALTERNATIVE 1

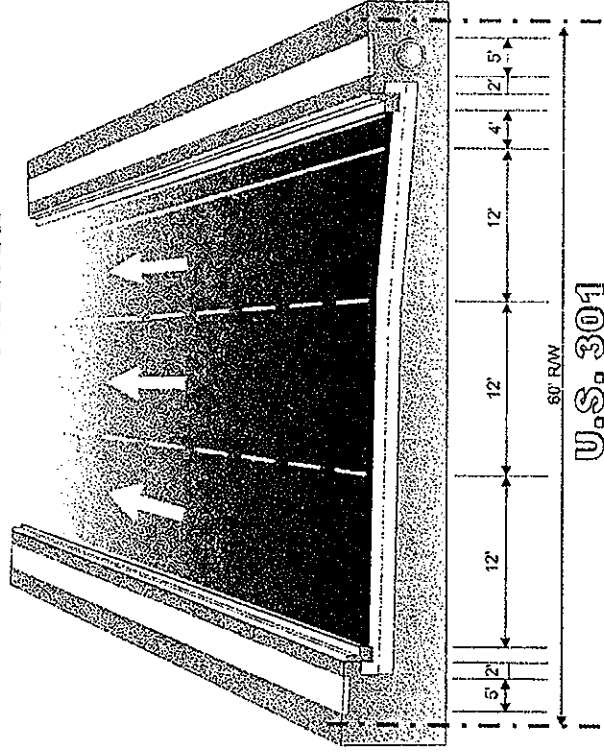
**U.S. 301 ZEPHYRHILLS
FROM S.R. 39 TO C.R. 54**

ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U

**PROPOSED THREE LANE ONE WAY
TYPICAL SECTION**



**PROPOSED THREE LANE ONE WAY
TYPICAL SECTION**

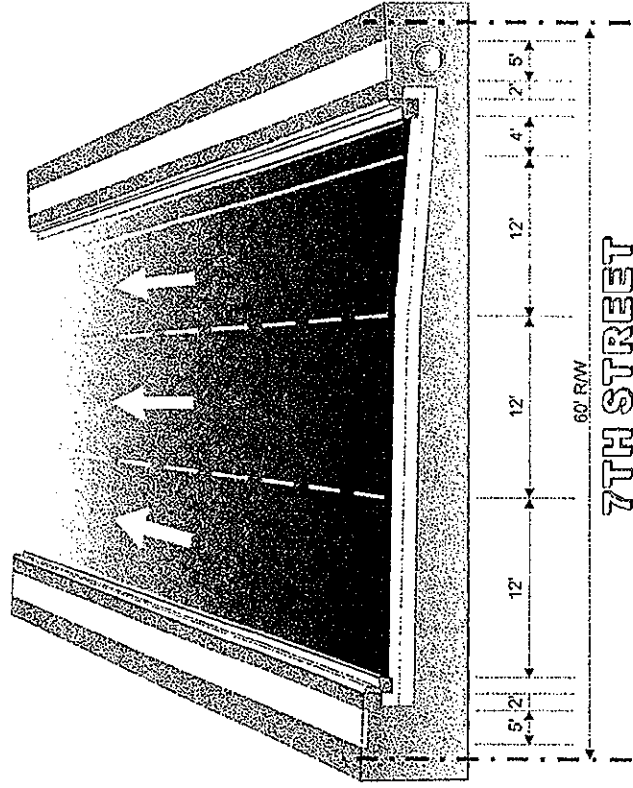


ALTERNATIVE 2

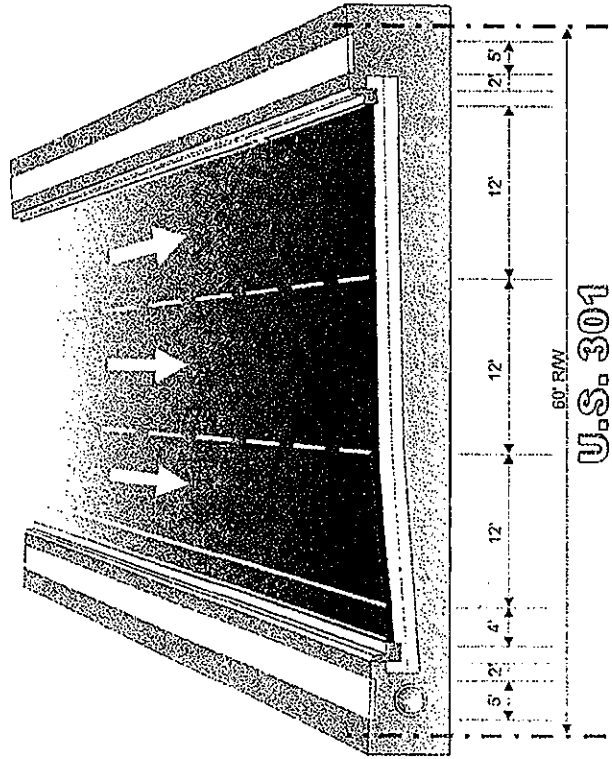
**U.S. 301 ZEPHYRHILLS
FROM S.R. 39 TO G.R. 54**

ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U

**PROPOSED THREE LANE ONE WAY
TYPICAL SECTION**



**PROPOSED THREE LANE ONE WAY
TYPICAL SECTION**



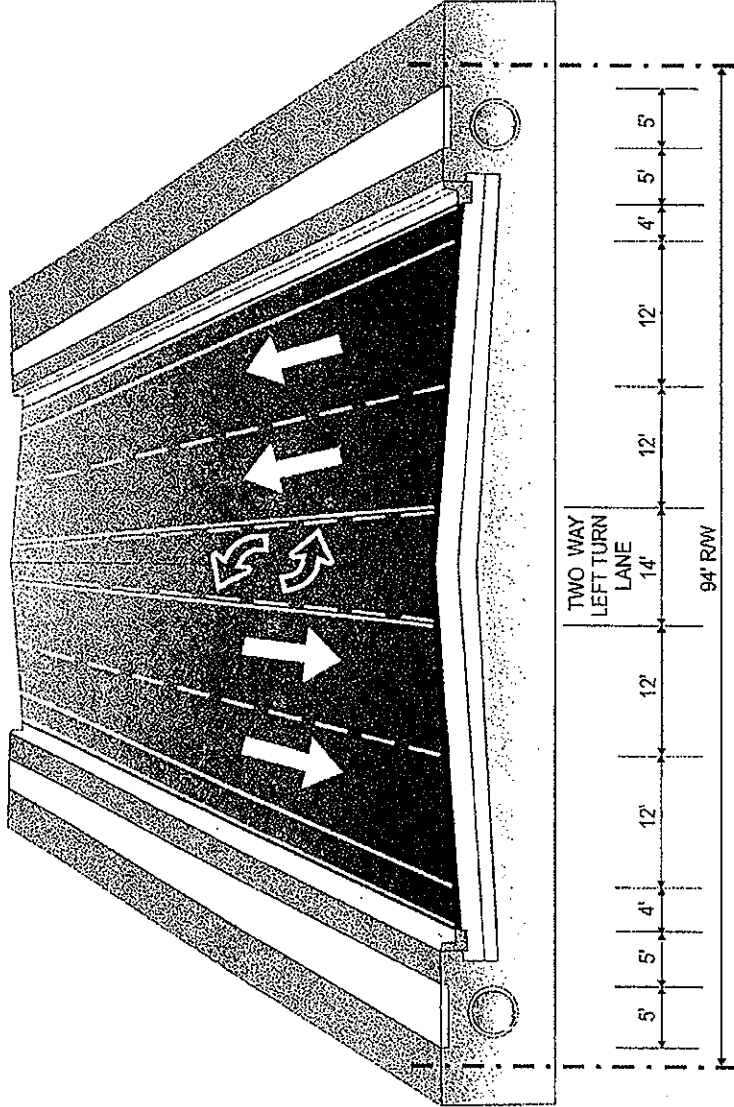
ALTERNATIVE 3

7TH STREET

U.S. 301

**U.S. 301 ZEPHYRHILLS
FROM S.R. 39 TO C.R. 54
ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U**

FIVE LANE UN-DIVIDED SECTION

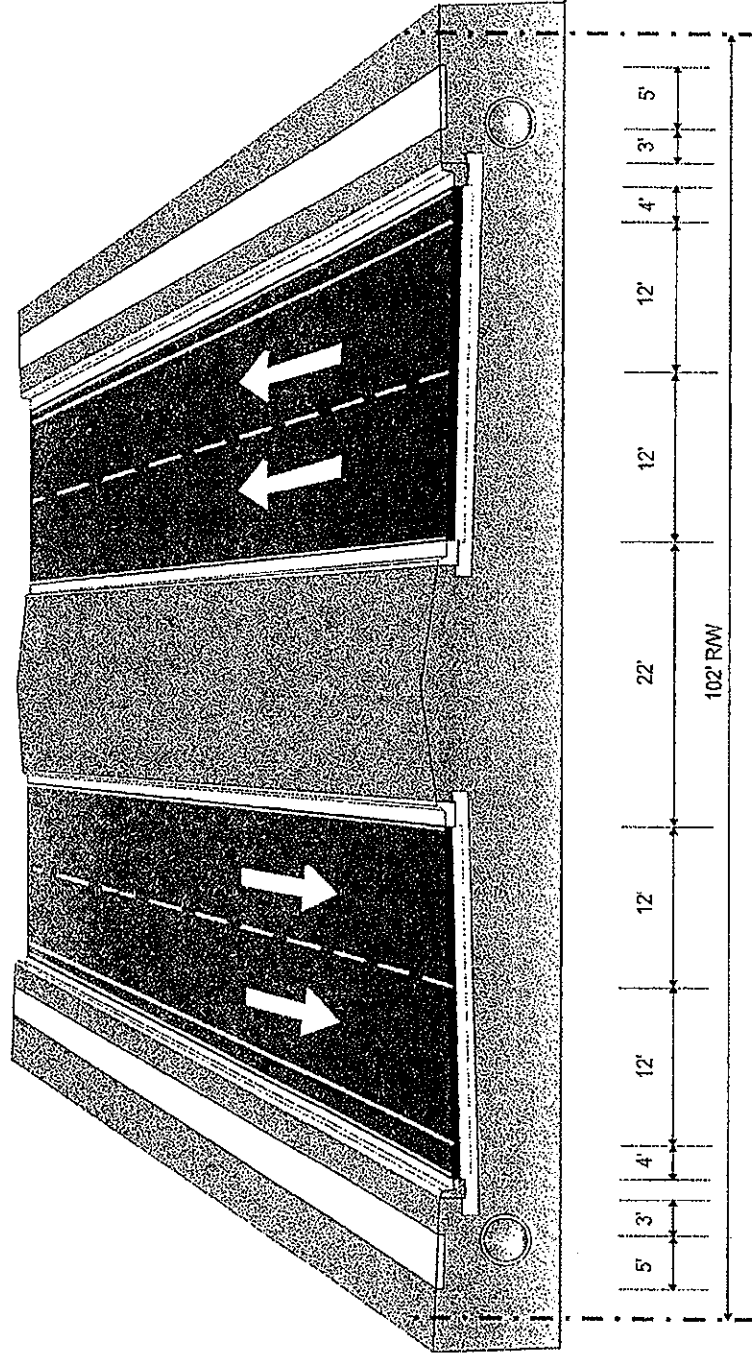


ALTERNATIVE 4

**U.S. 301 ZEPHYRHILLS.
FROM S.R. 39 TO C.R. 54**

ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U

FOUR LANE DIVIDED SECTION



ALTERNATIVE 7

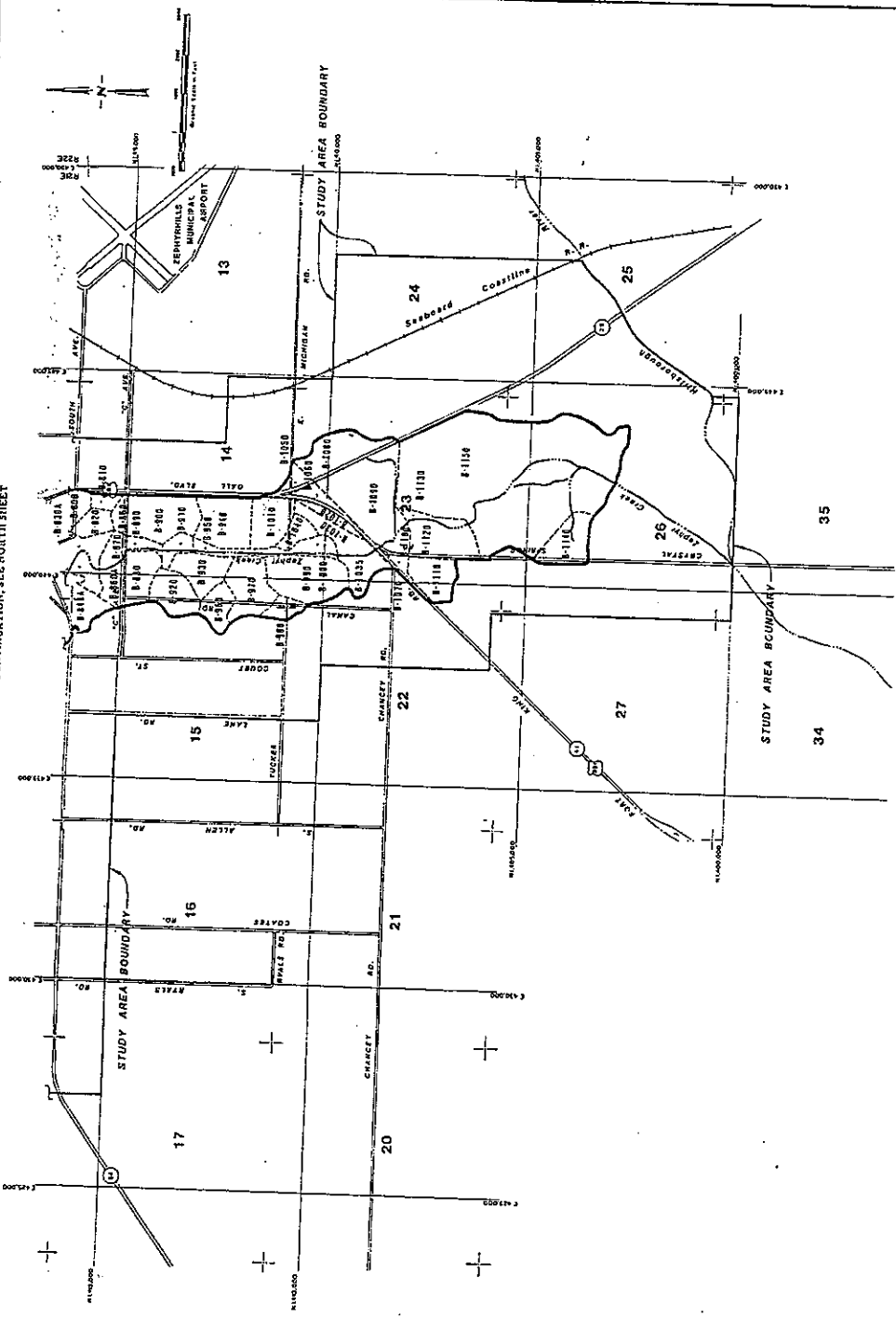
Appendix C

Lake Zephyr Watershed Delineation Map

LEGEND

- (64) STATE HIGHWAY
- (301) U.S. HIGHWAY
- ROADWAYS
- ++++ RAILROADS
- STREAMS & WATERWAYS
- 20 SECTION NUMBERS
- + SECTION CORNERS
- WATERSHED BOUNDARY
- - - SUB-BASIN BOUNDARY
- STREAM
- 8-1008 SUB-BASIN NUMBER

FOR CONTINUATION, SEE NORTH SHEET



LAKE ZEPHYR WATERSHED STUDY
 WATERSHED DELINEATION MAP
 SOUTH

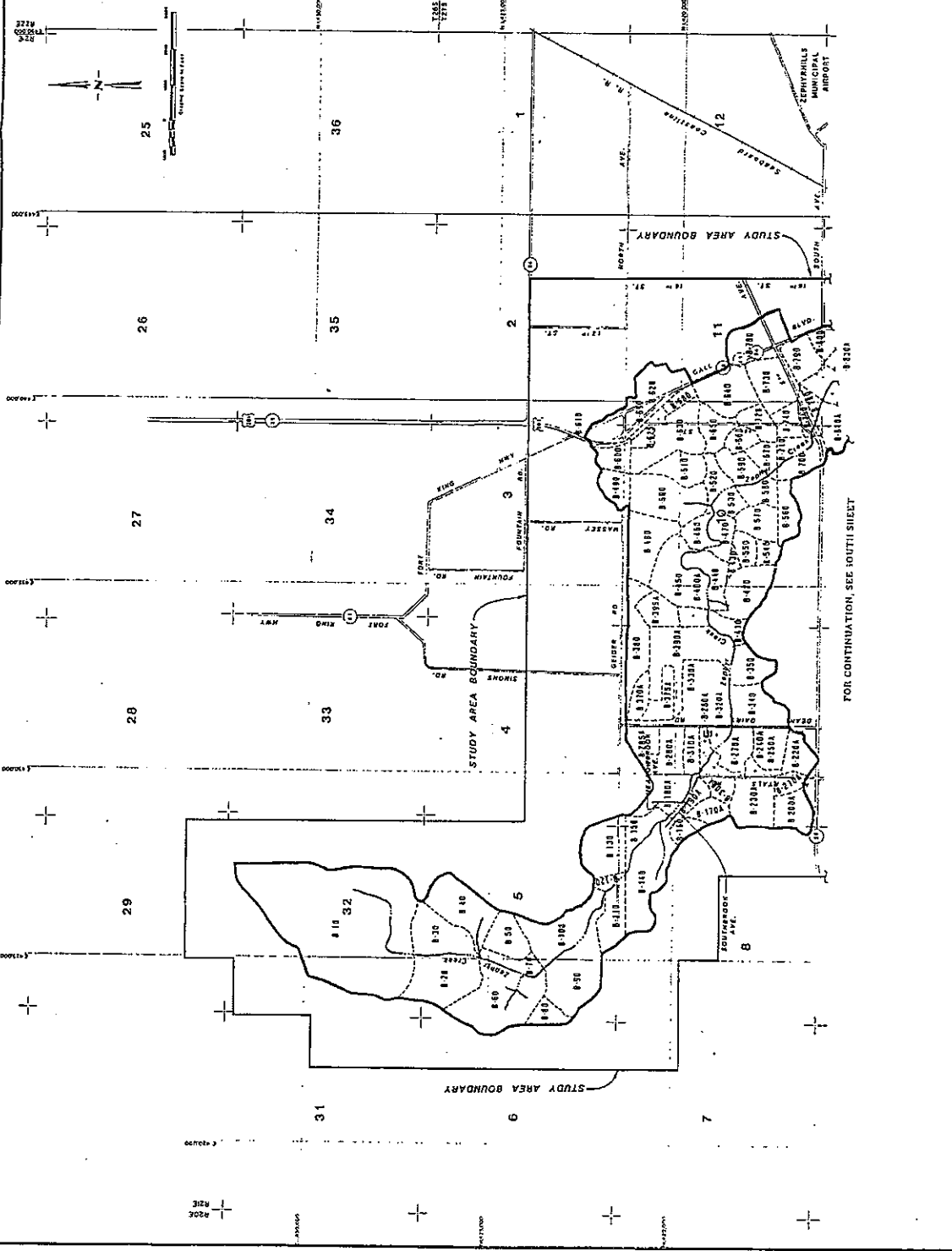


Greiner, Inc.
 CONSULTING ENGINEERS
 DES MOINES, IOWA

REVISION: OCTOBER 1, 1917
 MARCH 16, 1959

LEGEND

- STATE HIGHWAY
- U.S. HIGHWAY
- ROADWAYS
- RAILROADS
- STREAMS & WATERWAYS
- SECTION NUMBERS
- SECTION CORNERS
- WATERSHED BOUNDARY
- SUB-BASIN BOUNDARY
- STREAM
- 1000 SUB-BASIN NUMBER



LAKE ZEPHYR WATERSHED STUDY
 WATERSHED DELINEATION MAP
 NORTH
 FIGURE 1278



Greiner, Inc.
 CONSULTING ENGINEERS
 UTAH, IOWA

REVISED: OCTOBER 1, 1947
 MARCH 10, 1945

FOR CONTINUATION, SEE SOUTH SHEET

Appendix D

Existing Pond DRI test results



STATE OF FLORIDA
City of Zephyrhills

PASCO COUNTY

5335 Eighth Street

Zephyrhills, Florida 33540

(813) 788-2313

MAYOR
James A. Bailey

CITY COUNCIL
Clyde C. Bracknell
President

Alan L. Brenia
Vice President

Charlotte Crumb

Elizabeth A. Geiger

Robert M. Taylor

Nick Nichols
City Manager

Linda D. Boan
City Clerk

Thomas P. McAlvanah
City Attorney

April 12, 1994

Mr. Peter Nikolov
Tampa Bay Engineering, Inc.
18176 US 19 North, Suite 550
Clearwater, FL 34624

Re: Soils Data, 7th Street

Dear Pete:

Enclosed you will find the data that you requested.
If you have any questions, please call me at
813-782-5531.

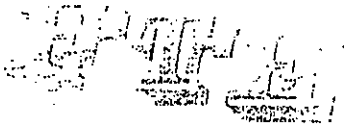
Sincerely,

Rick Moore
Public Works Director

DRI test results for
Pond on 7th street
East of U.S. 301,
South of South Avenue.

DATA 7 Design Department

OCT 8 1999



Florida Testing & Environmental, Inc.

P.O. BOX 937 • ZEPHYRHILLS, FLORIDA 33539 • TELEPHONE (813) 780-8767
• FAX (813) 780-8864

April 4, 1994
FTE Project No: 94-5056

City of Zephyrhills
5335 8th Street
Zephyrhills, Florida 33540

Attn: Mr. Rick Moore

Subject: Infiltration Analyses, S.H.W.M. Determinations,
and Shallow Subsoil Lithology
Proposed Roadway Construction Project
From U.S. 301 to South Avenue
Zephyrhills, Pasco County, Florida

Dear Mr. Moore:

Florida Testing & Environmental, Inc. (FTE) has completed the infiltration analyses for the subject site, and is pleased to submit this report. This report contains the results of our Double Ring Infiltration Tests, apparent S.H.W.M. determinations, and shallow Subsoil Auger Borings. This work was performed in general accordance with the scope of work established by Tampa Bay Engineering, Inc. - Project Civil Engineers.

This report has been prepared, for the exclusive use of our client, and his consultants, for their use in the design of this project, in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

Our scope of work related to this project has included:

1. Conducting a site reconnaissance.
2. Performing two Double Ring Infiltration Tests in accordance with ASTM Method D 3385 with applicable modifications.

Soil, Concrete, Bituminous and Water Analysis
Hydrogeology - Environmental Permitting

3. Conducting a total of nine 60.0 inches to 180.0 inches each deep auger borings in accordance with ASTM D 1452 Test Method.
4. Preparing this report presenting the results of our testing program.

FIELD ACTIVITIES

Double-Ring Infiltrometer Tests

Florida Testing & Environmental, Inc. has performed two Double Ring Infiltration Tests and two deep subsoil auger borings at locations selected by the design engineer. The Double Ring Infiltration Tests, designated as DRI-1 and DRI-2 were performed at a depth of 36.0 inches each below the existing land surface. Elevation/depth of the test is indicated on individual test data sheets. The following is the report of our testing program:

1. Two double ring infiltration tests were performed during the period of March 30, 1994 through March 31, 1994 at locations selected by the project design engineer. The tests were performed in accordance with Standard Method for Infiltration Rate of Soils in field using Double Ring Infiltrometers, ASTM D 3385 (with applicable modifications), at 36.0 inches below existing land surface. Results of these tests are attached with this report.
2. A constant water head of 6.0 inches was maintained for a period of 3.0 hours. Water use was monitored at prescribed intervals and was used in the calculation of the infiltration velocity. Testing was terminated when a maximum stabilized infiltration rate had been established.
3. An analysis of the water supply used in the infiltration tests, was done in the form of temperature determination. Results of this analysis are also included with this report.

4. The infiltration rates for the Double-Ring Infiltrometer tests have been listed below:

Test No.	Test Location	Infiltration Rate
DRI-1	See Plan	9.0 inches/hour
DRI-2	See Plan	8.0 inches/hour

*12.7 gpd
12.7 gpd*

Hand Auger Borings

Nine hand auger borings - one in the vicinity of each DRI test, and seven additional along the proposed roadway alignment were performed. The borings were conducted in accordance with the Standard Method for Soil Investigation and Sampling by Auger Methods, ASTM D1452. Visual field classification of all the soil samples was accomplished with the aid of the Unified Soil Classification System. Soil samples were obtained by simultaneously pressing and corking a hand held and operated auger into the ground. At regular intervals, the tool is withdrawn and subsoils are examined. Although, the sample is mixed, it is sufficient for identification and classification. The shallow subsoil lithology has been tabulated below.

Boring No.	Location	Apparent S.H.W.M.	Existing G.W.T.
AB-1	Vicinity of DRI-1	38.0" B.L.S.	Not Encountered
AB-2	Vicinity of DRI-2	48.0" B.L.S.	Not Encountered
HA-1	CL of Proposed Roadway - See Plan	48.0" B.L.S.	Not Encountered
HA-2	CL of Proposed Roadway - See Plan	48.0" B.L.S.	Not Encountered

Boring No.	Location	Apparent S.H.W.M.	Existing G.W.T.
HA-3	CL of Proposed Roadway - See Plan	Non-distinguishable	Not Encountered
HA-4	CL of Proposed Roadway - See Plan	Non-distinguishable	Not Encountered
HA-5	CL of Proposed Roadway - See Plan	Non-distinguishable	Not Encountered
HA-6	CL of Proposed Roadway - See Plan	Non-distinguishable	Not Encountered
HA-7	CL of Proposed Roadway - See Plan	48.0" B.L.S.	Not Encountered

Shallow Subsoil Lithology:

Auger Boring No: AB #1
 Location: Vicinity of DRI-1
 Apparent S.H.W.M.: 38.0" B.L.S.
 Existing G.W.T.: Not Encountered
 Soil Lithology:
 0.0 - 12.0": Gray, Fine Sand (SP)
 12.0 - 38.0": Light Tan, Fine Sand (SP)
 38.0 - 45.0": Tan, Slightly Silty, Fine Sand w/Stains (SP)
 45.0 - 50.0": Tan & Orange, Sandy Clay (CL)
 50.0 -180.0": Gray & Orange, Sandy Clay (CL)

Boring Terminated at 180.0 inches Below Existing Land Surface .

Appendix E

**SWFWMD Permit Exemption-1994 shoulder
improvements to U.S. 301**



DESIGN DOCUMENTATION

W.P.I. 7116045

STATE PROJECT NUMBER 14050-3546
FEDERAL FUNDS
SR 39 (U.S. 301) ZEPHYRHILLS

PASCO COUNTY, FLORIDA

Prepared By:
Coastal Engineering Associates, Inc.
966 Candlelight Boulevard
Brooksville, Florida 34601
(904)796-9423

March 1994

CEA 93709

Engineering • Planning • Environmental • Architecture

EE-0000142 • AA0002249

Hernando County
966 Candlelight Boulevard • Brooksville, Florida 34601
(904) 796-9423 • Fax (904) 799-8359

Pasco County
3936 Lake Padgett Drive • Land O' Lakes, Florida 34642
(813) 996-6792 • Fax (813) 996-3601

TABLE OF CONTENTS

DESIGN DOCUMENTATION
WPI 7116045
SPN 14050-3546
SR 39 (US 301) ZEPHYRHILLS
PASCO COUNTY, FLORIDA

<u>SECTION</u>	<u>DESCRIPTION</u>
A	Scope of Services
B	Final Pavement Design Package
C	SWFWMD Permit Exemption
D	Lane Closure Calculations
E	Signalization Documentation
F	Roadway Lighting Evaluation Report
G	Response to Comments Phase III Phase II



An Equal Opportunity Employer

Southwest Florida Water Management District

2379 Broad Street • Brooksville, Florida 34609-6899 • 1-800-423-1476 (Florida Only) or (904) 796-7211 • SUNCOM 628-4150 • T.D.D. Number Only (Florida Only): 1-800-231-6103

7801 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-7481 SUNCOM 578-2070

170 Century Boulevard
Barrow, Florida 33830-7700
(813) 534-1448 SUNCOM 572-6200

111 Corporation Way
Venice, Florida 34292-3524
(813) 483-5970 SUNCOM 549-5970

2303 Highway 44 West
Inverness, Florida 34453-3869
(904) 637-1360



- Charles A. Black
Chairman, Crystal River
- Roy G. Harrell, Jr.
Vice Chairman, St. Petersburg
- Sally Thompson
Secretary, Tampa
- Joe L. Davis, Jr.
Treasurer, Wauchoula
- Ramon F. Campo
Brandon
- James L. Cox
Lakeland
- Rebecca M. Eger
Sarasota
- John I. Hamner
Bradenton
- Curtis L. Low
Land O' Lakes
- James E. Marlin
St. Petersburg
- Margaret W. Sistrunk
Odessa

February 17, 1994

M. Frank Mattmuller
Coastal Engineering Associates
966 Candlelight Boulevard
Brooksville, FL 34601

Subject: PROJECT EVALUATION - CN:12456
US Hwy 301 - 4 foot Shoulder and 5 foot Sidewalk Addition;
Sec/Twp/Rge: 11 & 14/26S/21E; Pasco County
Beginning Latitude 28°13'03"; Longitude 82°10'58"
Ending Latitude 28°14'33"; Longitude 82°11'13"

Dear Mr. Mattmuller:

- Peter G. Hubbell
Executive Director
- Mark D. Farrell
Assistant Executive Director
- Edward B. Helvenston
General Counsel

The Southwest Florida Water Management District is responsible for protecting the water resource and its related environment for the citizens of the District. The District Governing Board has adopted permitting requirements designed to conserve water resources, preserve water quality, protect wetlands and reduce flooding.

We have received and reviewed your submittal for the project referenced above. Pursuant to Chapter 40D-4, Florida Administrative Code, (F.A.C.), a permit will not be required for the proposed road improvements (for reference see Chapter 40D-4.021(7), F.A.C., and Chapter 40D-4.041(1), F.A.C. and Part B, Section 3.2.2.8.a.1. F.A.C.).

Plans and information submitted will be kept on file and referenced in support of this opinion.

Please be reminded that all practicable and necessary effort should be taken during construction to control and prevent erosion and transport of sediments downstream.

If I can be of further assistance, please contact me at extension 4329.

Sincerely,

Wojciech M. Mroz, P.E.
Surface Water Permitting Supervisor
Brooksville Permitting Department
Resource Regulation

WMM:ml

Excellence
Through
Quality
Service

cc: Project Evaluation File
Mark A. Manuel, P.E., Enforcement Engineer
Ellen F. Cuarta, Enforcement Field Technician
Source: letter

B8:6/92



COASTAL
ENGINEERING ASSOCIATES INC.

REQUIRED STORAGE VOLUME CALCULATIONS

W.P.I. NO. 7116045
STATE PROJECT NO. 14050-3546
STATE ROAD 39 (U.S. 301)
FROM FIR AVENUE TO 16TH AVENUE
PASCO COUNTY, FLORIDA

PREPARED BY:

COASTAL ENGINEERING ASSOCIATES, INC.
966 CANDLELIGHT BOULEVARD
BROOKSVILLE, FLORIDA 34601

As Submitted

M. Frank Mattmuller 1/21/94
M. FRANK MATTMULLER, P.E. NO. 45843

JANUARY 1994
CEA 93709

Engineering • Planning • Environmental • Architecture

966 Candlelight Boulevard • Brooksville, Florida 34601
904-796-9423 • Fax 904-799-8359
FR-0000142-AAC0022*9

CALCULATION NARRATIVE

State Road 39/U.S. 301 (Gall Boulevard) is an existing two lane road which will require minor roadway improvements to improve the roadway surface and to enhance the safety of the facility for both motorists and pedestrians. The project limits are from Fir Avenue to 16th Avenue in Zephyrhills, Florida. The total project length is 2.1 miles.

The minor improvements consist of milling and resurfacing SR 39 within the project limits, adding 4 foot paved shoulders along approximately 1.5 miles of the project and a 5 foot sidewalk for approximately 0.5 miles. Some widening will be required in the area of South Avenue and 12th Avenue in order to bring the left turn lanes along SR 39 into compliance with current safety standards. Also, signing and marking and signalization improvements are proposed.

Much of SR 39 falls within the approximately 3,130 acre Lake Zypher Watershed as documented by Greiner, Inc. in their Lake Zypher Watershed Stormwater and Flood Management Master Plan prepared for Pasco County in April, 1989. Basin delineation along SR 39 is based on the Greiner, Inc. study augmented by SWFWMD topographic mapping and field surveillance.

Those basins which contribute to the Lake Zypher Watershed are considered to be "open" basins with a corresponding rainfall based on a 24 hour, 25 year event. Other basins are "closed" and the rainfall resulting from a 24 hour, 100 year event is utilized in the related calculations. Rainfall Maps taken from the SWFWMD Permit Information Manual indicate rainfall depths of 8.4 inches and 11.8 inches for the respective "open" and "closed" basins.

The existing pervious surface which is being replaced by impervious is predominantly Tavares - Urban Land Complex - Type "A" Soil. The area of proposed paved shoulders dominates the new impervious area. The existing shoulders have historically been utilized for side street parking resulting in minimal ground cover and a high level of compaction. A subsequent curve number of 72 has been agreed upon by SWFWMD staff (Wojciech Mroz) for the existing condition.

A summary of the storage volumes required as compensation for the increased impervious area within each basin along the project length is presented herein. The additional storage required due to the improvements to SR 39 within the Lake Zypher Watershed is less than 0.19 Acre-Feet. Storage required for the entire project is 0.25 Acre-Feet.

S.R. 39 (U.S. 301)
 REQUIRED STORAGE VOLUME

CRA PROJECT NO. 93709-7

BASIN DESIGNATION	BASIN LIMITS	NEW IMPERVIOUS AREA (SI)	OPEN BASIN 0.26 (CF/SF)	CLOSED BASIN 0.28 (CF/SF)	REQUIRED STORAGE VOLUME (CF)
B-904	Begin project to Sta. 415 + 50 (LT) Sta. 417 + 25 (RT)	4060	.26		1055.6
B-900	Sta. 415 + 50 (LT) to Sta. 433 + 50 (LT)	5140	.26		1336.4
	Sta. 417 + 25 (RT) to Sta. 423 + 50 (RT)	2000		.28	560.0
	Sta. 423 + 50 (RT) to Sta. 433 + 50 (RT)	1700		.28	476.0
B-810	Sta. 433 + 50 (LT) to Sta. 442 + 00 (LT)	2620	.26		681.0
	Sta. 433 + 50 (RT) to Sta. 456 + 50 (RT)	3920		.28	1097.6
B-800	Sta. 442 + 00 (LT) to Sta. 450 + 25 (LT)	2480	.26		644.8
B-790	Sta. 450 + 25 (LT) to Sta. 456 + 50 (LT)	-0-	.26		-0-
B-760	Sta. 456 + 50 (LT & RT) to Sta. 473 + 50 (LT & RT)	7395	.26		1922.7
B-640	Sta. 473 + 50 (LT) to Sta. 484 + 00 (LT)	3980	.26		1034.8
	Sta. 473 + 50 (RT) to Sta. 484 + 00 (RT)	2000		.28	560.0
B-690	Sta. 484 + 00 (LT & RT) to end project	5940	.26		1544.4
TOTAL REQUIRED STORAGE VOLUME =					10,913.30 CF
SUM OF TOTAL =					0.25 AC-FT

RUNOFF CALCULATIONS FOR
POST-CONDITION VERSES PRE CONDITION

25 YEAR / 24 HOUR RAINFALL DEPTH (P) = 8.4 INCHES

POTENTIAL STORAGE ABSTRACTION(S) = $\frac{1000 - 10}{CN}$

RUNOFF DEPTH (Q) = $\frac{[P - 0.2S]^2}{P + 0.8S}$

PRE-CONDITION: CURVE NUMBER = 72 TAVARES - URBAN LAND COMPLEX
TYPE "A" SOIL, WITH EXISTING
SHOULDERS UTILIZED FOR PARKING

$$S = \frac{1000 - 10}{72}$$

$$Q = \frac{[8.4 - 0.2 (3.888)]^2}{8.4 + 0.8 (3.888)}$$

$$S = 3.888$$

$$Q = 5.05 \text{ INCHES}$$

POST-CONDITION: CURVE NUMBER = 98

$$S = \frac{1000 - 10}{98}$$

$$Q = \frac{[8.4 - 0.2 (0.204)]^2}{8.4 + 0.8 (0.204)}$$

$$S = 0.20408$$

$$Q = 8.16 \text{ INCHES}$$

RUNOFF DEPTH FOR POST - PRE = 8.16 - 5.05 = 3.11 INCHES

V_r = VOLUME REQUIRED FOR STORAGE OF POST - PRE RUNOFF

$$V_r = \frac{1.0 \text{ S.F.} \times 3.11 \text{ INCHES}}{12 \text{ INCHES/FOOT}}$$

$$V_r = 0.26 \text{ C.F./S.F.}$$

RUNOFF CALCULATIONS FOR
POST-CONDITION VERSES PRE CONDITION

100 YEAR / 24 HOUR RAINFALL DEPTH (P) = 11.8 INCHES

POTENTIAL STORAGE ABSTRACTION(S) = $\frac{1000}{CN} - 10$

RUNOFF DEPTH (Q) = $\frac{[P - 0.2S]^2}{P + 0.8S}$

PRE-CONDITION: CURVE NUMBER = 72 TAVARES - URBAN LAND COMPLEX
TYPE "A" SOIL, WITH EXISTING
SHOULDERS UTILIZED FOR PARKING

$$S = \frac{1000}{72} - 10$$

$$Q = \frac{[11.8 - 0.2(3.888)]^2}{11.8 + 0.8(3.888)}$$

$$S = 3.888$$

$$Q = 8.15 \text{ INCHES}$$

POST-CONDITION: CURVE NUMBER = 98

$$S = \frac{1000}{98} - 10$$

$$Q = \frac{[11.8 - 0.2(0.204)]^2}{11.8 + 0.8(0.204)}$$

$$S = 0.20408$$

$$Q = 11.56 \text{ INCHES}$$

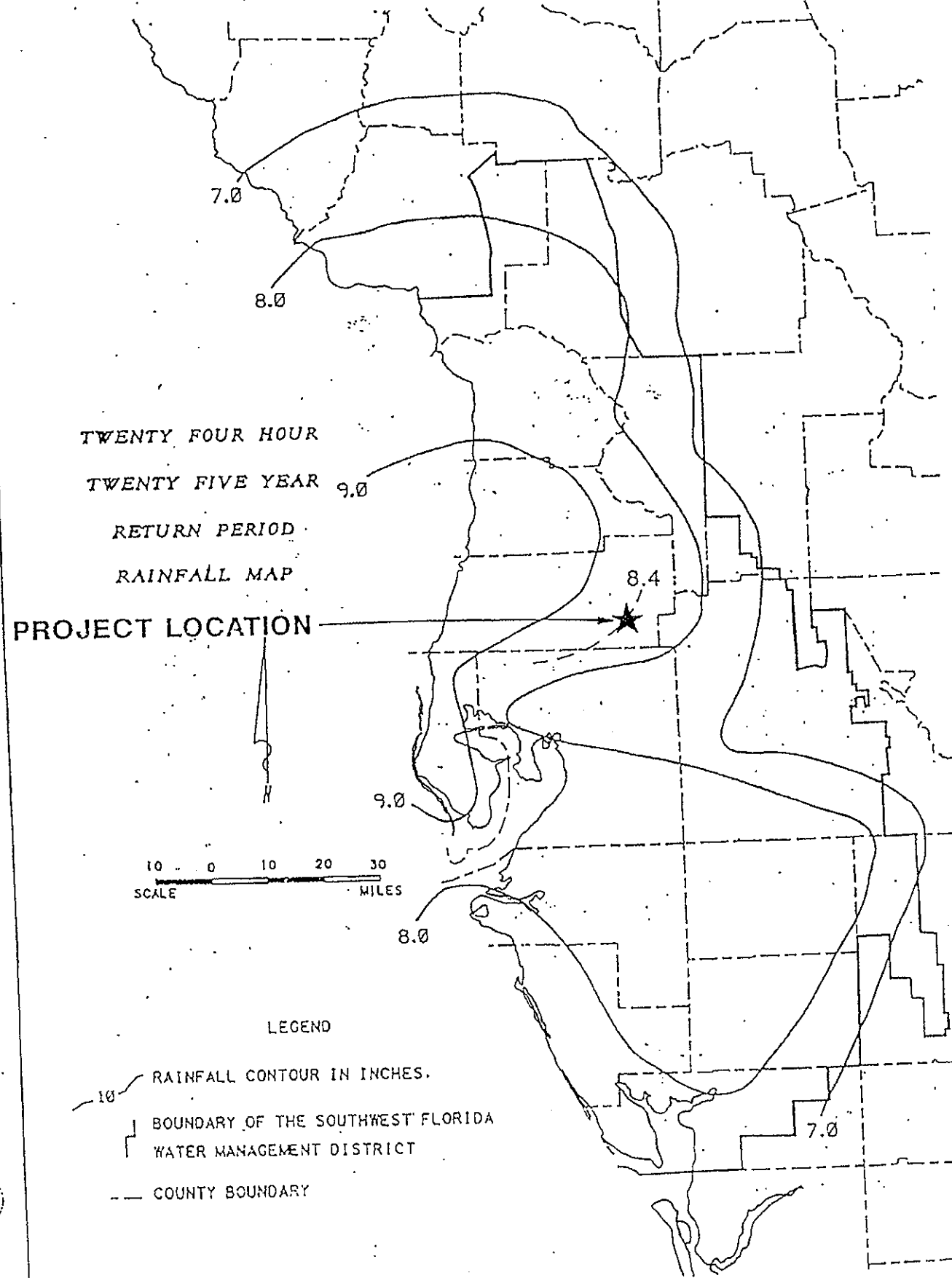
RUNOFF DEPTH FOR POST - PRE = 11.56 - 8.15 = 3.41 INCHES

V_r = VOLUME REQUIRED FOR STORAGE OF POST - PRE RUNOFF

$$V_r = \frac{1.0 \text{ S.F.} \times 3.41 \text{ INCHES}}{12 \text{ INCHES/FOOT}}$$

$$V_r = 0.28 \text{ C.F./S.F.}$$

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT



SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

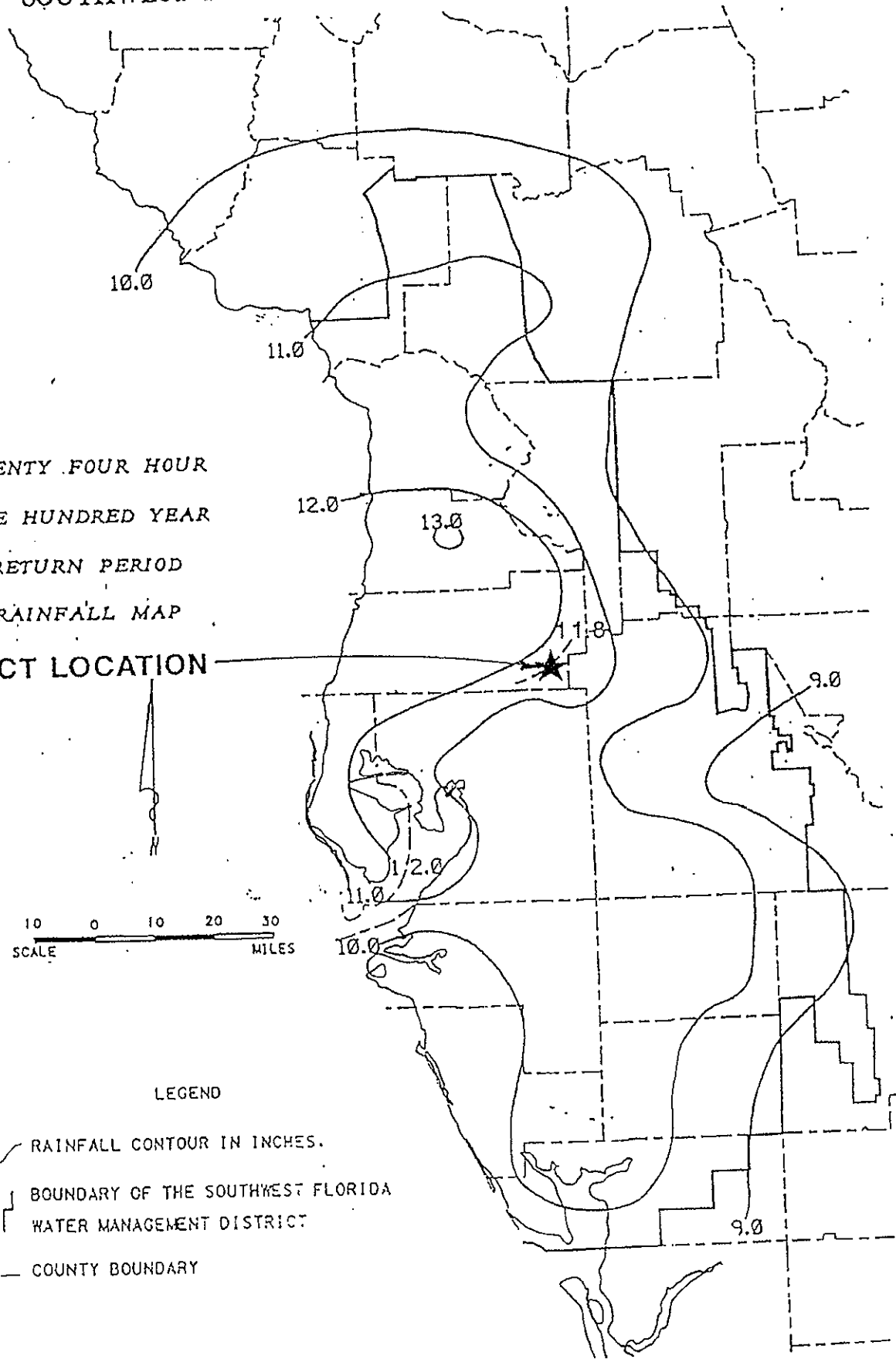
TWENTY FOUR HOUR
ONE HUNDRED YEAR
RETURN PERIOD
RAINFALL MAP

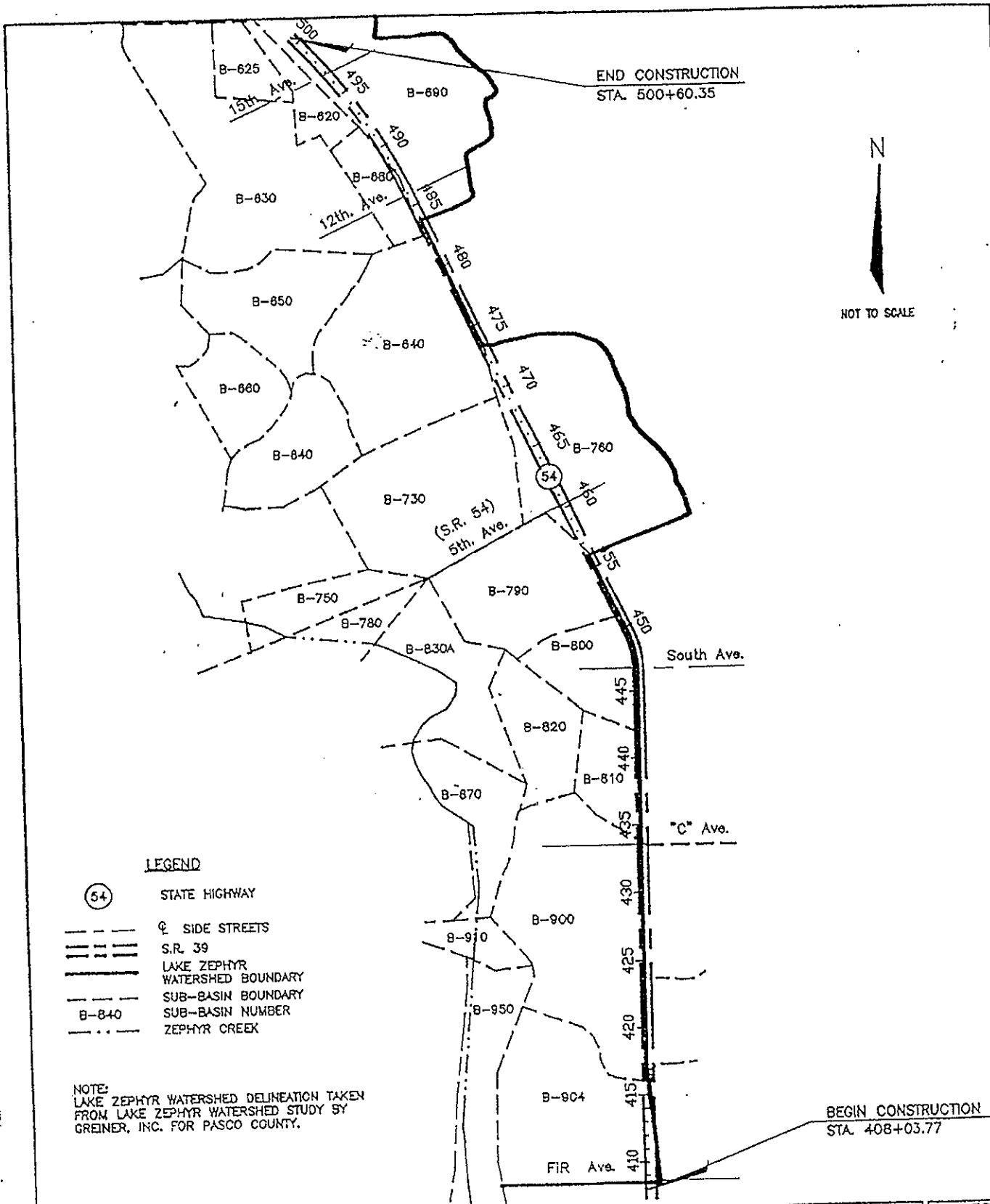
PROJECT LOCATION

10 0 10 20 30
SCALE MILES

LEGEND

- 10 RAINFALL CONTOUR IN INCHES.
- BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
- COUNTY BOUNDARY





LEGEND

- STATE HIGHWAY
- SIDE STREETS
- S.R. 39
- LAKE ZEPHYR WATERSHED BOUNDARY
- SUB-BASIN BOUNDARY
- SUB-BASIN NUMBER
- ZEPHYR CREEK

NOTE:
LAKE ZEPHYR WATERSHED DELINEATION TAKEN
FROM LAKE ZEPHYR WATERSHED STUDY BY
GREINER, INC. FOR PASCO COUNTY.

END CONSTRUCTION
STA. 500+60.35

N
NOT TO SCALE

South Ave.

"C" Ave.

Fir Ave.

BEGIN CONSTRUCTION
STA. 408+03.77



BASIN DELINEATION

S.R. 39

SHEET

1

OF 1 SHEET

93709

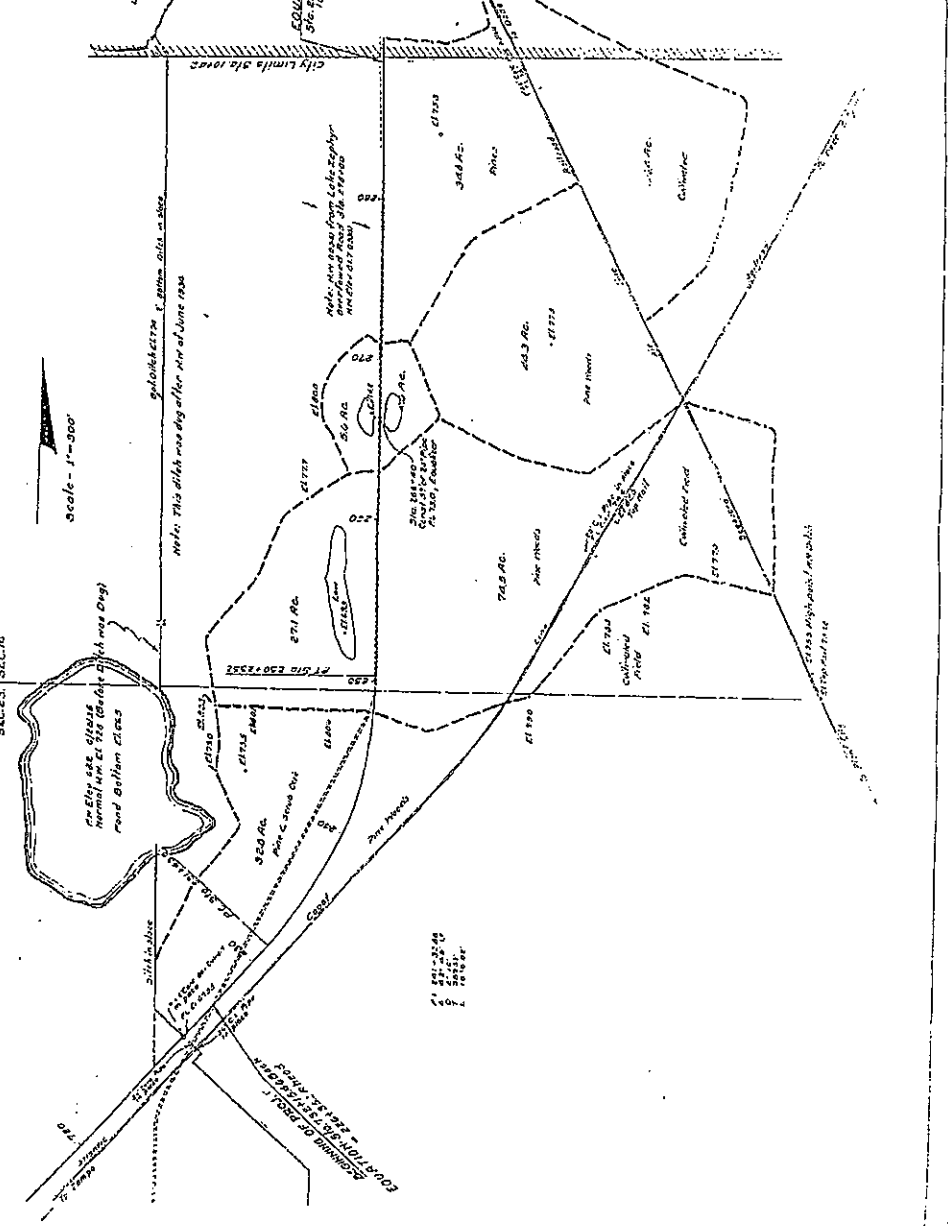
Appendix F

Old Drainage Maps

Scale	1" = 300'
North Arrow	Indicated
Projection	State Plane
Date	1950

STATE OF FLORIDA	
STATE ENGINEER	
DRAINAGE MAP	
ZEPHYR HILLS	
Sheet No.	1
Scale	1" = 300'
Date	1950
Project	Drainage
City	Zephyr Hills
County	Alachua
State	Florida

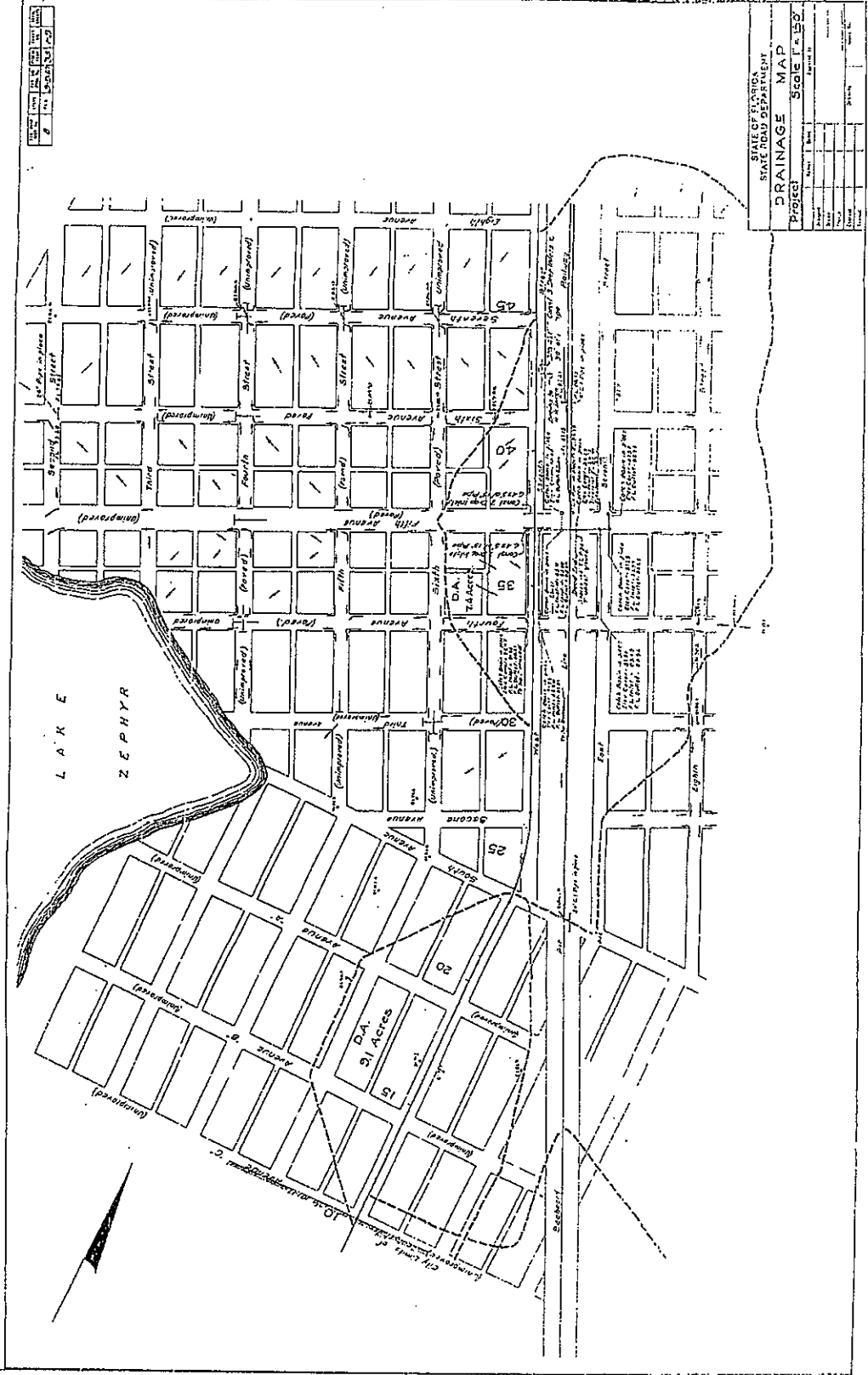
THW 265-50.21E.
SEC. 23, SEC. 14



CLASSIFIED
NOV 19 1964

DATE	NO.	BY	REVISION
1927	1	J. H.

STATE OF FLORIDA
 STATE ROAD DEPARTMENT
DRAINAGE MAP
 PROJECT Scale 1" = 150'



Sheet	1	of	1
Scale	1" = 150'		
Project	DRAINAGE MAP		
City	...		
County	...		
State	FLORIDA		
Date	1927		
Drawn by	...		
Checked by	...		
Approved by	...		

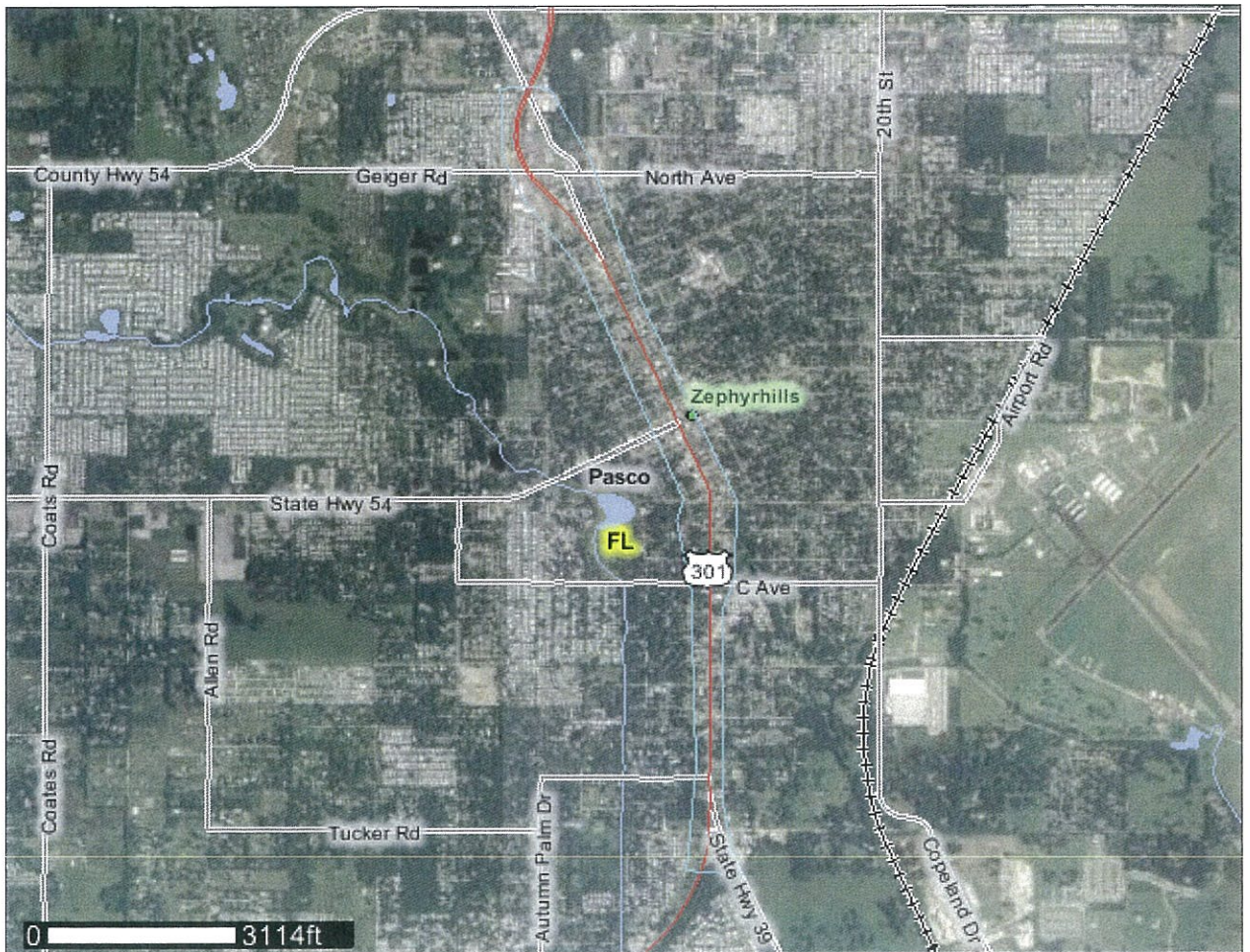
Appendix B
NRCS Soil Report



A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Pasco County, Florida

US 301 PD&E Study Area



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

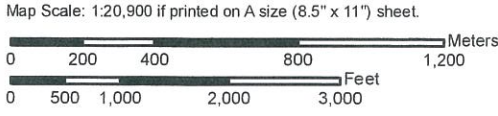
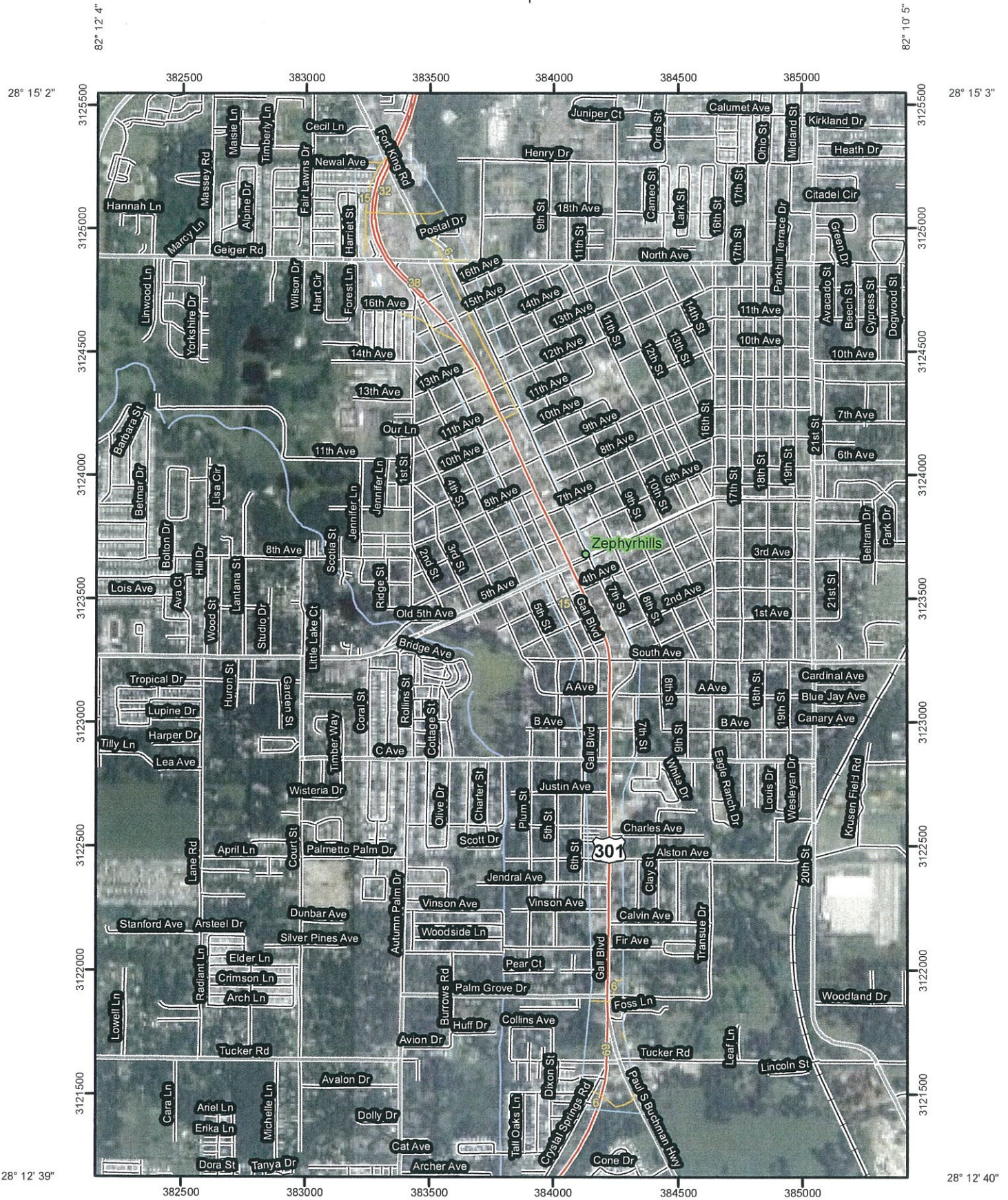
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



82° 12' 2"

82° 10' 3"

28° 12' 39"

28° 12' 40"

28° 15' 2"

28° 15' 3"

82° 12' 4"

82° 10' 5"

3125500
3125000
3124500
3124000
3123500
3123000
3122500
3122000
3121500

3125500
3125000
3124500
3124000
3123500
3123000
3122500
3122000
3121500

382500 383000 383500 384000 384500 385000

382500 383000 383500 384000 384500 385000

MAP LEGEND

	Area of Interest (AOI)		Very Stony Spot
	Soils		Wet Spot
	Soil Map Units		Other
Special Point Features		Special Line Features	
	Blowout		Gully
	Borrow Pit		Short Steep Slope
	Clay Spot		Other
	Closed Depression	Political Features	
	Gravel Pit		Cities
	Gravelly Spot	Water Features	
	Landfill		Streams and Canals
	Lava Flow	Transportation	
	Marsh or swamp		Rails
	Mine or Quarry		Interstate Highways
	Miscellaneous Water		US Routes
	Perennial Water		Major Roads
	Rock Outcrop		Local Roads
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		
	Spot Area		
	Stony Spot		

MAP INFORMATION

Map Scale: 1:20,900 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pasco County, Florida
 Survey Area Data: Version 8, Jan 27, 2010

Date(s) aerial images were photographed: 8/13/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Pasco County, Florida (FL101)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Tavares sand, 0 to 5 percent slopes	9.8	4.4%
15	Tavares-Urban land complex, 0 to 5 percent slopes	144.7	64.5%
32	Lake fine sand, 0 to 5 percent slopes	12.9	5.8%
38	Urban land	39.8	17.8%
43	Arredondo fine sand, 0 to 5 percent slopes	0.6	0.3%
69	Millhopper fine sand, 0 to 5 percent slopes	16.4	7.3%
Totals for Area of Interest		224.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

Custom Soil Resource Report

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Pasco County, Florida

6—Tavares sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 10 to 150 feet

Mean annual precipitation: 50 to 58 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 324 to 354 days

Map Unit Composition

Tavares and similar soils: 90 percent

Minor components: 10 percent

Description of Tavares

Setting

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Eolian or sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)

Depth to water table: About 42 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Typical profile

0 to 3 inches: Sand

3 to 80 inches: Sand

Minor Components

Adamsville

Percent of map unit: 2 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Astatula

Percent of map unit: 2 percent

Custom Soil Resource Report

Landform: Ridges on marine terraces, hills on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Sand Pine Scrub (R154XY001FL)

Candler

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Sparr

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear

Millhopper

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

15—Tavares-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

Elevation: 10 to 150 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days

Map Unit Composition

Tavares and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent

Description of Tavares

Setting

Landform: Ridges on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)

Depth to water table: About 42 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 3 inches: Sand

3 to 80 inches: Sand

Description of Urban Land

Setting

Landform: Marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: No parent material

Minor Components

Adamsville

Percent of map unit: 5 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Astatula

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, hills on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Sand Pine Scrub (R154XY001FL)

32—Lake fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 20 to 150 feet

Mean annual precipitation: 50 to 58 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 324 to 354 days

Map Unit Composition

Lake and similar soils: 85 percent

Minor components: 15 percent

Description of Lake

Setting

Landform: Ridges, hills, marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Eolian deposits or sandy fluvial or marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 4s

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Typical profile

0 to 8 inches: Fine sand

8 to 80 inches: Fine sand

Minor Components

Candler

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Custom Soil Resource Report

Across-slope shape: Convex
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Arredondo

Percent of map unit: 4 percent
Landform: Hills on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Orlando

Percent of map unit: 4 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Tavares

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

38—Urban land

Map Unit Setting

Elevation: 10 to 100 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Minor Components

Myakka, non-hydric

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: South Florida Flatwoods (R154XY003FL)

Adamsville

Percent of map unit: 5 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: South Florida Flatwoods (R154XY003FL)

43—Arredondo fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 40 to 150 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days

Map Unit Composition

Arredondo and similar soils: 85 percent
Minor components: 15 percent

Description of Arredondo

Setting

Landform: Hills on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0

Custom Soil Resource Report

Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Typical profile

0 to 8 inches: Fine sand

8 to 63 inches: Fine sand

63 to 87 inches: Sandy clay loam

Minor Components

Candler

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Sparr

Percent of map unit: 3 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Lake

Percent of map unit: 3 percent

Landform: Ridges, hills, marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Kendrick

Percent of map unit: 3 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Millhopper

Percent of map unit: 3 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

69—Millhopper fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 20 to 150 feet

Mean annual precipitation: 50 to 58 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 324 to 354 days

Map Unit Composition

Millhopper and similar soils: 85 percent

Minor components: 15 percent

Description of Millhopper

Setting

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: About 42 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 7 inches: Fine sand

7 to 59 inches: Fine sand

59 to 64 inches: Fine sandy loam

64 to 80 inches: Sandy clay loam

Minor Components

Candler

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Custom Soil Resource Report

Across-slope shape: Convex
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Arredondo

Percent of map unit: 3 percent
Landform: Hills on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Kendrick

Percent of map unit: 3 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Tavares

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Sparr

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear

Nobleton

Percent of map unit: 2 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

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Appendix C

Impaired Water Body Documentation



SHEET NO. 2

**IMPAIRED WATER BODIES
LOCATION MAPS**

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ROAD NO. SR 41
COUNTY PASCO
FINANCIAL PROJECT ID 256422-2-32-02



REVISIONS		DESCRIPTION
DATE	DESCRIPTION	DATE

Tampa Bay Tributaries Group 2 Basin - Cycle 2 - Southwest District - FINAL Verified List
 Hydrologic Units: Alafia River, Hillsborough River, Little Manatee River, and Manatee River

OC-Case Number	Planning Unit	WBID	Water Segment Name	Watershed Type	Watershed Class	1996 303(d) Parameters (Parameters of Concern)	Parameters Assessed Using the Impaired Surface Waters State (ISWS) (ISWS)	Disolved Oxygen (Biology/Pollutants) (Type of Concern)	DO/Nutrient/Biology/TN/TP/BOD/Median BOD Median Values (mg/L)	Concentration of Criterion or Threshold Not Met	Previous EPA Integrated Report Category (Occurrence Assessment)	Current EPA Integrated Report Category (Occurrence Assessment)	Current Integrated Report Category (Assessment)	Current Assessment Status	Priority for TMDL Development	Verified Period (# of Exceedences / # of Samples)	Comments
09-2282	Hillsborough River	1402	CYPRESS CREEK	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Nitrogen	Median TN = 1.62 (n = 121), Median TP = 0.08 (n = 104), BOD Median = 1.0 (n = 63)	≥ 5.0 mg/L	4c	5	5	Impaired	Medium	165/172	EPA proposed a TMDL in September, 2004. Dissolved oxygen impairment linked to total nitrogen as the causative pollutant. Total nitrogen median in cycle 1 assessment was 1.3 mg/L, but has increased in the cycle 2 assessment to 1.62 mg/L.
09-2283	Hillsborough River	1402	CYPRESS CREEK	STREAM	3F	Coliform	Fecal Coliform		≤ 400 Counts / 100 mL	2	5	5	Impaired	Low	11/64	Deleted from the 1998 303(d) list in Cycle 1, re-listed in Cycle 2.	
09-2284	Hillsborough River	1402	CYPRESS CREEK	STREAM	3F	Nutrients	Nutrients (Chlorophyll)	Total Nitrogen, Total Phosphorus	Median TN = 1.62 (n = 121), Median TP = 0.08 (n = 104), BOD Median = 1.0 (n = 63)	≤ 20 µg/L	2	5	5	Impaired	Medium	2004 (2.3), 2005 (2.6), 2007 (12.03)	Deleted from the 1998 303(d) list in Cycle 1, re-listed in Cycle 2. Annual chlorophyll average did not exceed 20 µg/L in 2004 (2.3), 2005 (2.6), and 2007 (12.03). Nutrients (total nitrogen and total phosphorus) are co-limiting based on a median TN:TP ratio of 22 (n=121).
09-2285	Hillsborough River	1440E	CYPRESS CREEK NORTH	STREAM	3F	Disolved Oxygen	Disolved Oxygen		Median TN = 1.25 (n = 95), Median TP = 0.05 (n = 36), No BOD data	≥ 5.0 mg/L	3b	5	5	Impaired	Medium	19/38	Annual chlorophyll average exceeded 20 µg/L in 2007 (274.9). Chlorophyll and phosphorus based on a median TN:TP ratio of 13.54 (35 values).
09-2286	Hillsborough River	1440E	CYPRESS CREEK NORTH	STREAM	3F	Nutrients (Chlorophyll)	Nutrients (Chlorophyll)		Median TN = 1.35 (n = 96), Median TP = 0.05 (n = 35), No BOD data	≤ 20 µg/L	3b	5	5	Impaired	Medium	2007 (274.9)	
09-2287	Hillsborough River	1442	NEW RIVER	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Nitrogen, Total Phosphorus	Median TN = 2.05 (n = 18), Median TP = 0.35 (n = 19), No BOD data	≥ 5.0 mg/L	4c	5	5	Impaired	High	20/24	EPA finalized a TMDL in December, 2005.
09-2288	Hillsborough River	1442	NEW RIVER	STREAM	3F	Nutrients	Nutrients (Chlorophyll)			≤ 20 µg/L	2	5	5	Impaired	High	2002 (4.7)	Deleted from the 1998 303(d) list in Cycle 1, re-listed in Cycle 2. Nutrient impairment based on dissolved oxygen pollutant and causative pollutant of total nitrogen and total phosphorus. Nitrogen is the limiting nutrient with TN:TP ratio 6.59 (n=18).

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OCB Case Number	Planning Unit	WBID	Water Segment Name	Waterbody Type	Waterbody Class	1995-2000 Percentage of Concern	Parameters Assessed Using the Impaired Surface Water Rule (ISWR)	Discharged Oxygen (DO) by Station (n = # of Concern)	DO/Nutrient/Biology/TN/TP/BOD Median Values (mg/L)	Concentration of Discharge or Criterion or Threshold Met	Previous EPA Integrated Report (Waterbody Assessment)	Current EPA Integrated Report (Waterbody Assessment)	Current Assessment Category / Final Assessment	Current Assessment Status	Priority for TMDL Development	Verified Period (# of Exceedences/# of Samples)	Comments
09-2299	Hillsborough River	1443A	HILLSBOROUGH RIVER	STREAM	3F	Nutrients	Nutrients (Chlorophyll)	Median TN = 1.4 (n = 97), Median TP = 0.08 (n = 115), Median BOD = 1.1 (n = 48)	Median TN = 1.4 (n = 97), Median TP = 0.08 (n = 115), Median BOD = 1.1 (n = 48)	≤ 20 µg/L	3c	5	5	Impaired	High	2002 (3,75), 2005 (1,03)	Annual chlorophyll-a average did not exceed 20 µg/L in 2002 (3,75) and 2005 (1,03 µg/L). Biological information is insufficient to assess aquatic life use support. Listed as impaired based on dissolved oxygen and nutrient (total nitrogen) impairment. Nitrogen is the limiting nutrient based on TN/TP ratio of 5.7 (n = 82). Two stations have been included in the assessment: station 1443B that were previously assigned to WBID 1443E, station 112WFD 02301890 and station 112WFD 02302010. These stations show elevated total nitrogen values in the verified period. The stations will be re-assigned to WBID 1443A in a later RWR Run, but the data has been used to verify the dissolved oxygen and nutrient impairment.
09-2300	Hillsborough River	1443B	HILLSBOROUGH RIVER	STREAM	1	Discharged Oxygen	Discharged Oxygen	Median TN = 1.29 (n = 75), Median TP = 0.2 (n = 90), BOD Median = 1.4 (n = 45)	Median TN = 1.29 (n = 75), Median TP = 0.2 (n = 90), BOD Median = 1.4 (n = 45)	> 5.0 mg/L	4c	5	5	Impaired	High	5/0/84	EPA proposed a TMDL in September, 2004.
09-2301	Hillsborough River	1443E1	HILLSBOROUGH RESERVOIR	LAKE	1		Nutrients (TSI)	Median TN = 1.04 (n = 345), Median TP = 0.22 (n = 349), BOD Median = 1.0 (n = 177)	Median TN = 1.04 (n = 345), Median TP = 0.22 (n = 349), BOD Median = 1.0 (n = 177)	TSI ≤ 60, Color > 40	2	5	5	Impaired	Medium	2001 (48.6, 82.9), 2002 (18.0, 2002 (17), 2003 (13), 2004 (13), 2005 (42.3, 41.3), 2006 (39.5, 95), 2007 (48.4), 2008 (48.4), 2009 (48.4), 2010 (48.4), 2011 (48.4), 2012 (48.4), 2013 (48.4), 2014 (48.4), 2015 (48.4), 2016 (48.4), 2017 (48.4), 2018 (48.4), 2019 (48.4), 2020 (48.4), 2021 (48.4), 2022 (48.4), 2023 (48.4), 2024 (48.4), 2025 (48.4), 2026 (48.4), 2027 (48.4), 2028 (48.4), 2029 (48.4), 2030 (48.4)	Impaired due to dissolved oxygen impairment and nutrients (total phosphorus) as causative pollutant. Annual average TSI values did not exceed 60 TSI units in 2001 (48.6) 2002 (17), 2003 (13), 2004 (13), 2005 (42.3, 41.3), 2006 (39.5, 95), 2007 (48.4), 2008 (48.4), 2009 (48.4), 2010 (48.4), 2011 (48.4), 2012 (48.4), 2013 (48.4), 2014 (48.4), 2015 (48.4), 2016 (48.4), 2017 (48.4), 2018 (48.4), 2019 (48.4), 2020 (48.4), 2021 (48.4), 2022 (48.4), 2023 (48.4), 2024 (48.4), 2025 (48.4), 2026 (48.4), 2027 (48.4), 2028 (48.4), 2029 (48.4), 2030 (48.4)
09-2302	Hillsborough River	1451G	KING LAKE OPEN WATER	LAKE	3F		Nutrients (TSI)	Median TN = 1.47 (n = 11), Median TP = 0.02 (n = 11), No BOD data.	Median TN = 1.47 (n = 11), Median TP = 0.02 (n = 11), No BOD data.	TSI ≤ 40, Color ≤ 40	2	5	5	Impaired	Medium	007 (42.4, 24.2, PCU)	Annual average TSI values exceeded 40 TSI units with color less than 40 PCU in 2007. Phosphorus is the limiting nutrient based on a median TN/TP ratio of 6.6 (35 values).

Tampa Bay Tributaries Group 2 Basin - Cycle 2 - Southwest District - FINAL Verified List
 Hydrologic Units: Alafia River, Hillsborough River, Little Manatee River, and Manatee River

OGC Case Number	Planning Unit	WBD	Waterbody Segment Name	Waterbody Type	Weighted/Class	199-2000 Period of Concern	Parameters Assessed (Using the Impaired Surface Water Rule (ISWR))	Exceeding Criteria (Category/Percent of Concern)	DO/Nutrient/Bioassay/TN/TP/BOD Median Values (mg/L)	Concentration of Criterion or Threshold Met	Previous EPA Report Category/Assessment	Current EPA Report Category/Assessment	Current Integrated Category/Final Assessment	Current Assessment Status	Priority for TMDL Development	Verified Period (# of Exceedances/# of Samples)	Comments
09-2303	Hillsborough River	1451W	SAYON LAKE	LAKE	3F		Nutrients (TSI)		Median TN = 1.03 (n = 11), Median TP = 0.03 (n = 11), No BOD data.	TSI ≤ 40; Color ≤ 40	2	5	5	Impaired	Medium	007 (43.2, 28.3 PCI)	Annual average TSI values exceeded 40 TSI units with color less than 40 PCU in 2007. Nitrogen is the limiting nutrient based on a median TN/TP ratio of 36.83 (11 values).
09-2304	Hillsborough River	1455	TROUT CREEK	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Nitrogen	Median TN = 1.08 (n = 94), Median TP = 0.12 (n = 110), BOD Median = 1.1 (n = 60).	≥ 5.0 mg/L	3c	5	5	Impaired	High	73/109	Impaired with total nitrogen as the causative pollutant.
09-2305	Hillsborough River	1455	TROUT CREEK	STREAM	3F	Nutrients	Nutrients (Chlorophyll)	Total Nitrogen	Median TN = 1.08 (n = 94), Median TP = 0.12 (n = 110), BOD Median = 1.1 (n = 60).	≤ 20 µg/L	2	5	5	Impaired	High	2003 (9.42), 2003 (9.23), 2004 (9.24), 2007 (20.87)	Annual chlorophyll-a average exceeded 20 µg/L in 2007 (20.87 µg/L). Deleted from the 1998-2003(9) list in Cycle 1. Nitrogen is the limiting nutrient based on a median TN/TP ratio of 8.8 (99 values). Complete nutrient TMDL with dissolved oxygen TMDL. Blorecons completed in 2005 and 2006 with assessment "Suspect". Significant load increase from rural/land residential.
09-2306	Hillsborough River	1462A	CRYSTAL SPRINGS	SPRING	3F	Disolved Oxygen	Disolved Oxygen	Total Nitrogen	Median TN = 2.5 (n = 4), TP = 0.04 (n = 20), BOD Median = 0.2 (n = 1).	≥ 5.0 mg/L	3c	5	5	Impaired	High	17/18	Impairment linked to total nitrogen as the causative pollutant. This is a spring. All nutrients are elevated in this watershed.
09-2307	Hillsborough River	1469	BIG DITCH	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Nitrogen, Total Phosphorus	Median TN = 1.93 (n = 21), Median TP = 2.0 (n = 21), No BOD data.	≥ 5.0 mg/L	3b	5	5	Impaired	High	19/22	Complete Dissolved Oxygen TMDL with Nutrients (phat) TMDL.
09-2308	Hillsborough River	1469	BIG DITCH	STREAM	3F	Nutrients	Nutrients (Chlorophyll)	Total Nitrogen, Total Phosphorus	Median TN = 1.93 (n = 21), Median TP = 2.0 (n = 21), No BOD data.	≤ 20 µg/L	3c	5	5	Impaired	High	2005-06 (39.01)	Nitrogen is the limiting nutrient based on median TN/TP ratio of 0.98 (21 values). Chlorophyll-a annual mean calculated based on last two quarters of 2005 and first two quarters of 2006. Complete Nutrients (phat) TMDL with dissolved oxygen TMDL.
09-2309	Hillsborough River	1483	CHANNELIZED STREAM	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Nitrogen, Total Phosphorus	Median TN = 2.4 (n = 22), Median TP = 1.2 (n = 22), No BOD data.	≥ 5.0 mg/L	3b	5	5	Impaired	Medium	23/24	

Tampa Bay Tributaries Group 2 Basin - Cycle 2 - Southwest District - FINAL Verified List
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OGC Case Number	Planning Unit	WBD	Water Segment Name	Watershed Type	Watershed Class	1996 303(d) Parameters of Concern	Parameters of Concern Using the Impaired Status Water Rule (ISWR)	Disolved Oxygen /Biology/Pollutant of Concern	DO/Nutrient/Biology/BOD Median Value (mg/L)	Concentration of Chlorophyll a Through the Net	Previous EPA Integrated Report Category (2004 Assessment)	Current EPA Integrated Report Category (2005 Assessment)	Current EPA Integrated Report Category (2007 Assessment)	Current Assessment Status	Impairment for TMDL Development	Verified Period (Date of Exceedence / # of Samples)	Comments
09-2310	Hillsborough River	1483	CHANNELIZED STREAM	STREAM	3F	Nutrients	Nutrients (Chlorophyll)		Median TN = 2.4 (n = 22), Median TP = 1.2 (n = 22), No BOD data (n = 22)	≤ 20 µg/L	3c	5	5	Impaired	High	2005 (97.43)	Annual average Chl-a values exceeded 20 µg/L in 2005 and the exceedance value was 37.43 µg/L. Nitrogen is the limiting nutrient based on a median TN/TP ratio of 2.10 (22 values). Verified period median TN = 2.42 mg/L (n = 22), median TP = 1.20 mg/L (n = 22), and no BOD data.
09-2311	Hillsborough River	1489	TWO HOLE BRANCH	STREAM	3F	Nutrients	Nutrients (Chlorophyll)		Median TN = 1.16 (n = 21), Median TP = 0.26 (n = 22), Median BOD = 2.0 (n = 21)	≤ 20 µg/L	3c	5	5	Impaired	High	2002 (3.05), 2005 (1.7)	Annual chlorophyll-a average did not exceed 20 µg/L in 2002 (3.05 µg/L) and 2005 (1.7 µg/L). High nitrogen loading is the limiting nutrient based on median TN/TP ratio of 3.96 (21 values). This WSID was listed as impaired for dissolved oxygen in Cycle 1 and total phosphorus is the causative pollutant for dissolved oxygen in Cycle 2. There is no biological information available.
09-2312	Hillsborough River	1495A	ITCHEPACK ASASSA CREEK	STREAM	3F		Fecal Coliform		Median TN = 1.55 (n = 88), Median TP = 0.58 (n = 90), Median BOD = 2.0 (n = 11)	≤ 400 Counts / 100 mL	3b	5	5	Impaired	Low	12/16	EPA finalized a TMDL in December, 2005. Dissolved oxygen impairment linked to total phosphorus.
09-2313	Hillsborough River	1495B	ITCHEPACK ASASSA CREEK	STREAM	3F	Dissolved Oxygen	Dissolved Oxygen	Total Phosphorus			4c	5	5	Impaired	High	3/0/04	Decided from the 1999 303(d) list in Cycle 1, re-listed in Cycle 2. Annual chlorophyll-a average did not exceed 20 µg/L in 2005 (13.05 µg/L), 2006 (2.7 µg/L) and 2007 (3.2 µg/L). Nitrogen is the limiting nutrient based on a median TN/TP ratio of 2.56 (88 values). EPA finalized a TMDL in December, 2005. Listing based on dissolved oxygen and nutrient (total phosphorus) impairment.
09-2314	Hillsborough River	1495B	ITCHEPACK ASASSA CREEK	STREAM	3F	Nutrients	Nutrients (Chlorophyll)		Median TN = 1.85 (n = 88), Median TP = 0.58 (n = 90), Median BOD = 2.0 (n = 11)	≤ 20 µg/L	2	5	5	Impaired	High	2005 (13.05), 2006 (2.7), 2007 (3.2)	Verified Impaired. Total phosphorus identified as the causative pollutant. EPA proposed a TMDL drafted by State DEP in September, 2004.
09-2315	Hillsborough River	151b	EAST CANAL	STREAM	3F		Dissolved Oxygen	Total Phosphorus	Median TN = 1.03 (n = 84), Median TP = 0.54 (n = 84), No BOD data (n = 84)	≥ 5.0 mg/L	3b	5	5	Impaired	Medium	4700	

Tampa Bay Tributaries Group 2 Basin - Cycle 2 - Southwest District - FINAL Verified List
Hydrologic Units: Alafia River, Hillsborough River, Little Manatee River, and Manatee River

OGC Case Number	Planning Unit	WBD	Water Segment Name	Waterbody Type	Watershed Class	(See Subj) Parameter of Concern	Parameter Assessed (Using the Impaired Source Water Rule (ISWR))	Discovered Oxygen Deficiency Pollutant or Contaminant	DO/Nutrient/Biochemistry/BOD Median Value (mg/L)	Concentration of Contaminant (Threshold Not Met)	Previous EPA Impaired Report Category (Subj. Assessment)	Current EPA Impaired Report Category (Subj. Assessment)	Current Integrated Report Category (Final Assessment)	Current Assessment Status	Priority for TMDL Development	Verified Period (Range of Samples)	Comments
09-2316	Hillsborough River	1516	EAST CANAL	STREAM	3F		Nutrients (Chlorophyll)		Median TN = 1.03 (n = 84), Median TP = 0.54 (n = 64), No BOD data	≤ 20 µg/L	3b	5	5	Impaired	Medium	2003 (6.7), 2004 (6.3), 2005 (6.9), 2007 (12.03)	Annual chlorophyll-a average values exceeded 20 µg/L in 2003, 2004, 2005 (6.3), 2005 (6.9), 2007 (12.03). Nitrogen is limiting nutrient based on a TN/TP ratio of 1.9 (n=84). Listing based on dissolved oxygen impairment and nutrient (total phosphorus) impairment.
09-2317	Hillsborough River	1522A	FLINT CREEK	STREAM	3F		Dissolved Oxygen	Total Nitrogen, Total Phosphorus, BOD	Median TN = 2.01 (n = 73), Median TP = 0.36 (n = 76), BOD Median = 3.6 (n = 75)	≥ 5.0 mg/L	3c	5	5	Impaired	High	6/7/7	Dissolved oxygen impairment linked to total nitrogen, total phosphorus, and BOD as the causative pollutants.
09-2318	Hillsborough River	1522B	LAKE THONOTOS ASSA	LAKE	3F		Dissolved Oxygen	Total Nitrogen, Total Phosphorus, BOD	Median TN = 2.55 (n = 156), Median TP = 0.32 (n = 167), BOD Median = 6.3 (n = 142)	≥ 5.0 mg/L	2	5	5	Impaired	Medium	3/6/172	Delisted from the 1998 303(d) List in Cycle 1, re-listed in Cycle 2. DEP completed TMDL in 1998 and EPA approved it. A revised TMDL will be needed because the existing TMDL was approved by EPA prior to the passage of the Clean Water Act Watershed Protection Act.
09-2319	Hillsborough River	1522B	LAKE THONOTOS ASSA	LAKE	3F		Nutrients (Historic TS)		Median TN = 2.55 (n = 156), Median TP = 0.32 (n = 167), Median BOD = 6.3 (n = 142)	> 78.3 µg/L	2	5	5	Impaired	Medium	2001 (83.9, 52.9), 2002 (80.1, 50.7), 2003 (82.9, 83.1), 2004 (83.5, 59.6), 2005 (71.3, 69.7), 2007 (84.3, 45.7)	For the historical listing (1975-1979), annual average TSI value in the verified period exceeded the minimum historical annual average value of 52.20 TSI units by more than 50% in 2001 - 2007, and exceedances were 83.9, 80.1, 82.9, 83.5, 71.3, and 69.3 TSI units. Listing is based on a TMDL incident based on a TMDL ratio median of 8.43 (n = 156). The verified period median TN = 2.55 mg/L (n = 156), median TP = 0.32 mg/L (n = 167), and the 2005 (71.3, 69.7), BOD median = 6.3 mg/L (n = 142).
09-2320	Hillsborough River	1537	LAKE WIFE	LAKE	3F		Lead			Pb ≤ 0.1273 (n=4,705)	3a	5	5	Impaired	Medium	8/8	WBD name changed from Lake Parker to Lake Wife. This calculation has been updated to reflect the WBD name change. Quality of Lake data due to quality assurance issues.

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Hydrologic Units: Alafia River, Hillsborough River, Little Manatee River, and Manatee River

O&C Case Number	Planning Unit	WBID	Water Segment Name	Watershed Type	Watershed Class	1992 309(d) Parameters of Concern	Regulatory Agency Link (for Watershed Status, WRF, etc.)	Discovered Oxygen Biology/Pollutant (if of concern)	CO ₂ /Nutrient/Stroke/TN/TP/BOD Median Values (mg/L)	Concentration of Pollutant (if of concern)	Previous EPA Integrated Report Category (SARL Assessment)	Current EPA Integrated Report Category (SARL Assessment)	Current Integrated Category / Final Assessment	Current Assessment Status	Priority for TMDL Development	Verified Period (if of Exceedence / of Samples)	Comments
09-2321	Hillsborough River	1537	LAKE WIRE	LAKE	3F	Nutrients (TSB)	Nutrients (TSB)		Median TN = 0.89 (n = 6), Median TP = 0.08 (n = 8), No BOD data Median TN = 0.89 (n = 71), Median TP = 0.3 (n = 74), BOD Median = 1.0 (n = 72)	TSI ≤ 40, Color ≤ 40	3a	5	5	Impaired	Medium	2007 (50.1, 167 PCU)	Annual average TSI values exceeded 40 TSI units with color less than 40 PCU in 2007. The exceedance value is 50.1. Nitrogen is the limiting nutrient based on a median TN/TP ratio of 9.8 (9 values). WBID name changed from Lake Parker to Lake Wire. This calculation has been done excluding the City of Lakeland data due to quality assurance issues.
09-2322	Hillsborough River	1542A	MILL CREEK	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Phosphorus		≥ 5.0 mg/L	4c	5	5	Impaired	High	4372	Located within the Bone Valley region there is a strong correlation with total phosphorus and dissolved oxygen during the verified period.
09-2323	Hillsborough River	1542A	MILL CREEK	STREAM	3F	Nutrients	Nutrients (Chlorophyll)		Median TN = 0.93 (n = 71), Median TP = 0.3 (n = 74), Median BOD = 1.0 (n = 72) Median TN = 1.10 (n = 14), Median TP = 0.61 (n = 14), No BOD data	≤ 20 µg/L	2	5	5	Impaired	High	2003 (3.9), 2004 (3.6)	Annual average Chl-a values did not exceed 20 µg/L in 2003 (3.9) and 2004 (3.6). Nitrogen is the limiting nutrient based on a TN/TP ratio median of 2.81 (n = 71). Devised from the 1998 309(d) list in Cycle 1, revised in Cycle 2, based on the placement of the oxygen impairment and causative pollutant of total phosphorus.
09-2324	Hillsborough River	1543A	LAKE HUNTER OUTLET	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Phosphorus	Median TN = 1.22 (n = 15), Median TP = 0.35 (n = 15), BOD Median = 1.1 (n = 15)	≥ 5.0 mg/L	3b	5	5	Impaired	Medium	817	
09-2325	Hillsborough River	1547	SEFFNER CANAL	STREAM	3F	Disolved Oxygen	Disolved Oxygen	Total Phosphorus	Median TN = 1.44 (n = 21), Median TP = 0.44 (n = 21), Median BOD = 2.0 (n = 24)	≥ 5.0 mg/L	3b	5	5	Impaired	Medium	1515	Annual chlorophyll a did not exceed 20 µg/L in 2003. EPA listed a TMDL devised by State DEP in September, 2004. Nitrogen is the limiting nutrient based on a TN/TP ratio median of 3.26 mg/L (n=21). Nutrient (Chl-a) impairment based on dissolved oxygen impairment and causative pollutant of total phosphorus.
09-2326	Hillsborough River	1561	SPARTAN BRANCH	STREAM	3F	Nutrients	Nutrients (Chlorophyll)			≤ 20 µg/L	2	5	5	Impaired	High	2002 (7.5)	

¹ Florida's waterbody classifications are defined as:

Tampa Bay Tributaries Group 2 Basin - Cycle 2 - Southwest District - FINAL Verified List Hydrologic Units: Alafia River, Hillsborough River, Little Manatee River, and Manatee River

OSCC Case Number	Planning Unit	WBD	Water Segment Name	Waterbody Type	Waterbody Class	1999 303(d) Parameter of Concern	Parameter Measured Using the Approved Strategy Waterbody Type (WBT)	Discharged Oxygen / Biology/Pollutant (Metric)	DO / Nutrient / Biology / TN / TP / BOD Maximum Value (mg/L)	Concentration of Threshold Metric (Metric)	Previous EPA Integrated Report Category (Based on Assessment)	Current EPA Integrated Report Category (Based on Assessment)	Current Integrated Category / Final Assessment	Current Assessment Status	Priority for TMDL Development	Verified Period (End of Exceedance / of Samples)	Comments

- 1 - Potable water supplies
 - 2 - Shellfish propagation or harvesting
 - 3F - Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in fresh water
 - 3M - Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in marine water
 - 4 - Agricultural water supplies
 - 5 - Navigation, utility, and industrial use
- n is equal to the number of samples. When samples are collected at the same location less than 4 days apart, the median of those results represents a single sample for the purpose of determining n.

¹ EPA's Integrated Report Category:
 5 - Water quality standards are not attained and a TMDL is required.

² The Cycle 1 assessment was done in 2003 and included data from that Verified Period (January 1, 1995 through June 30, 2003).

³ The Cycle 2 assessment is the current assessment and includes data from the Verified Period (January 1, 2001 through June 30, 2008).

⁴ Where a parameter was 1999 303(d) listed, if the priority shown on the 1999 303(d) list was low, for the second cycle assessment, the priority has been changed to high, to expedite meeting the consent decree schedule. Where a parameter was only identified as impacted under the IWR, a priority of "medium" was assigned. Exceptions are waters where the impairment poses a threat to potable water or human health, which have been assigned a "high" priority, and local coliform impairments, which have been assigned a "low" priority. All other listings as of this cycle are prioritized based on the following: it is the Department's intent that listings with a "High" priority be addressed within the next 5 years, listings with a "Medium" priority be addressed within 5-10 years as resources allow, and listings with a "Low" priority be addressed within the next 10 years.

⁵ VP - Verified Period (January 1, 2001 through June 30, 2008)
 A statewide TMDL for mercury, that will address this waterbody, is scheduled to be completed in 2012.

⁶ Beach advisories are based on FL Dept of Health Enterococcus (>103 CFU/100mL) or fecal coliform (>399 CFU/100mL) criteria.
 Beach advisory data is based on "2008 Beach Advisories" file created 05/07/2008 by FDEP.
 Fish advisory data is based on "2008 Fish Advisories" file created 07/10/2008 by FDEP.

N/A = Not Applicable
 The Tampa Bay Tributaries Cycle 2 Verified List is based on IWR Run_35_2.