Florida Department of
Transportation

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 oufalls 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.

Table of Contents

Page

List of Figures

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.

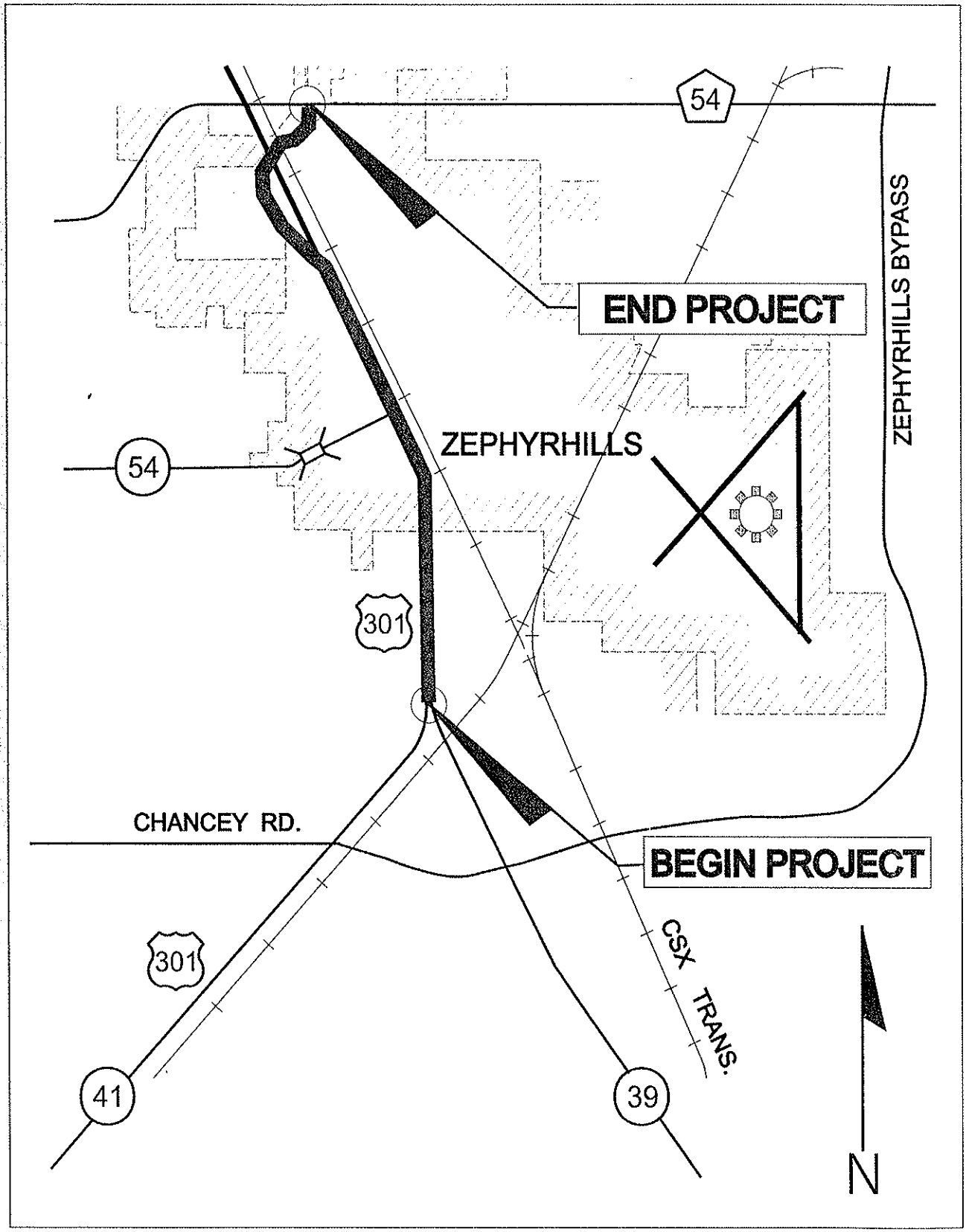
The existing roadway is a two-lane rural section with four foot paved shoulders. Roadside ditches and occasional storm sewer systems convey runoff away from the road to low-lying areas adjacent to the roadway or to stormwater management

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.

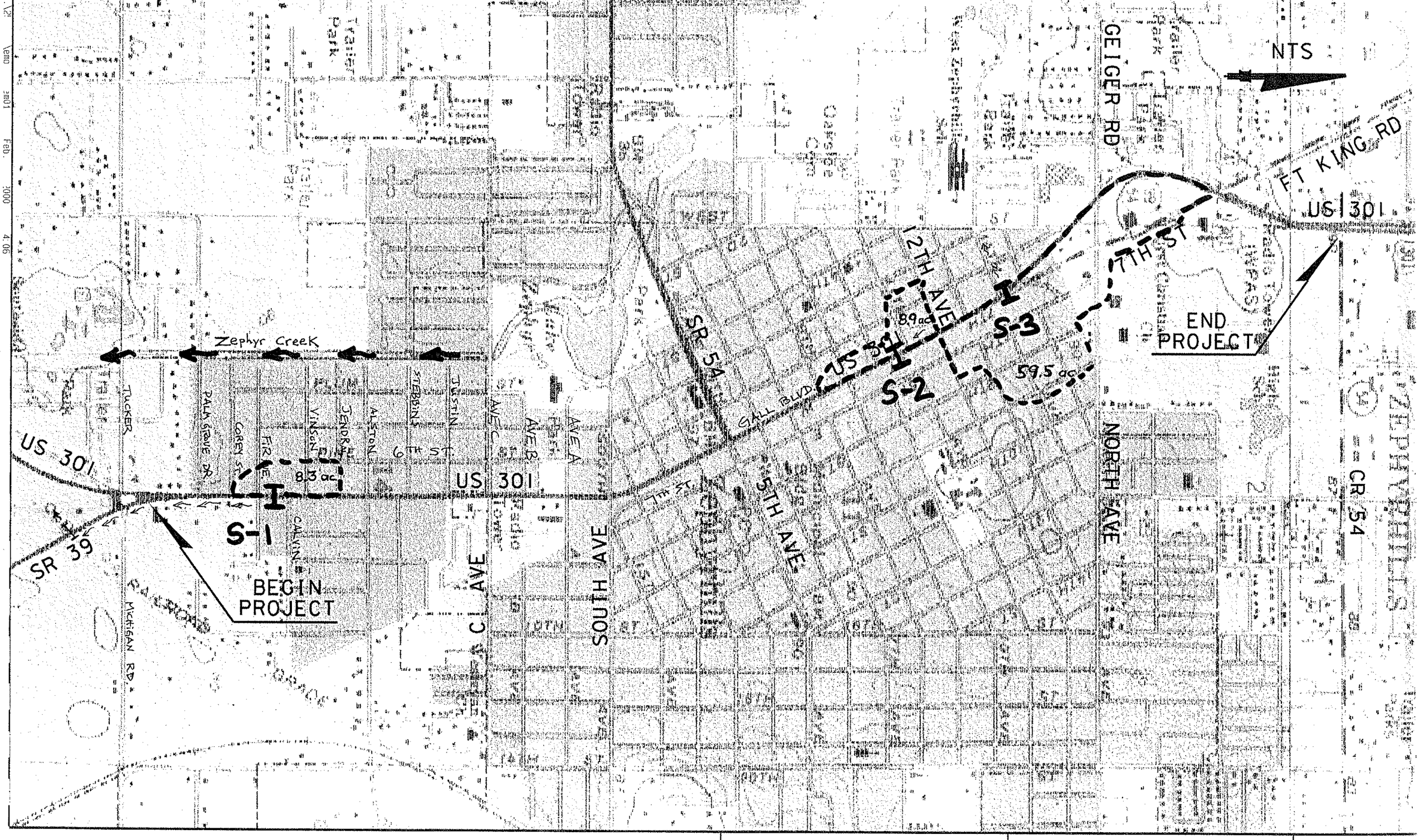
All of the proposed typical section alternatives involve adding impervious area. The improvements include a closed storm sewer system with curb and gutter and sidewalks. Permitting through the Southwest Florida Water Management District (SWFWMD) will be required. Specific stormwater permitting requirements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



U.S. 301 PD&E STUDY
(S.R.39 TO C.R.54)
PASCO COUNTY

PROJECT LOCATION MAP
W.P.I. SEG. No. 256422 1
F.A.P. No. 1455-001-U

Figure 1



STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
DISTRICT 7

USGS QUADRANGLE MAP
(REF: ZEPHYRHILLS 1998)

FIGURE 2.

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

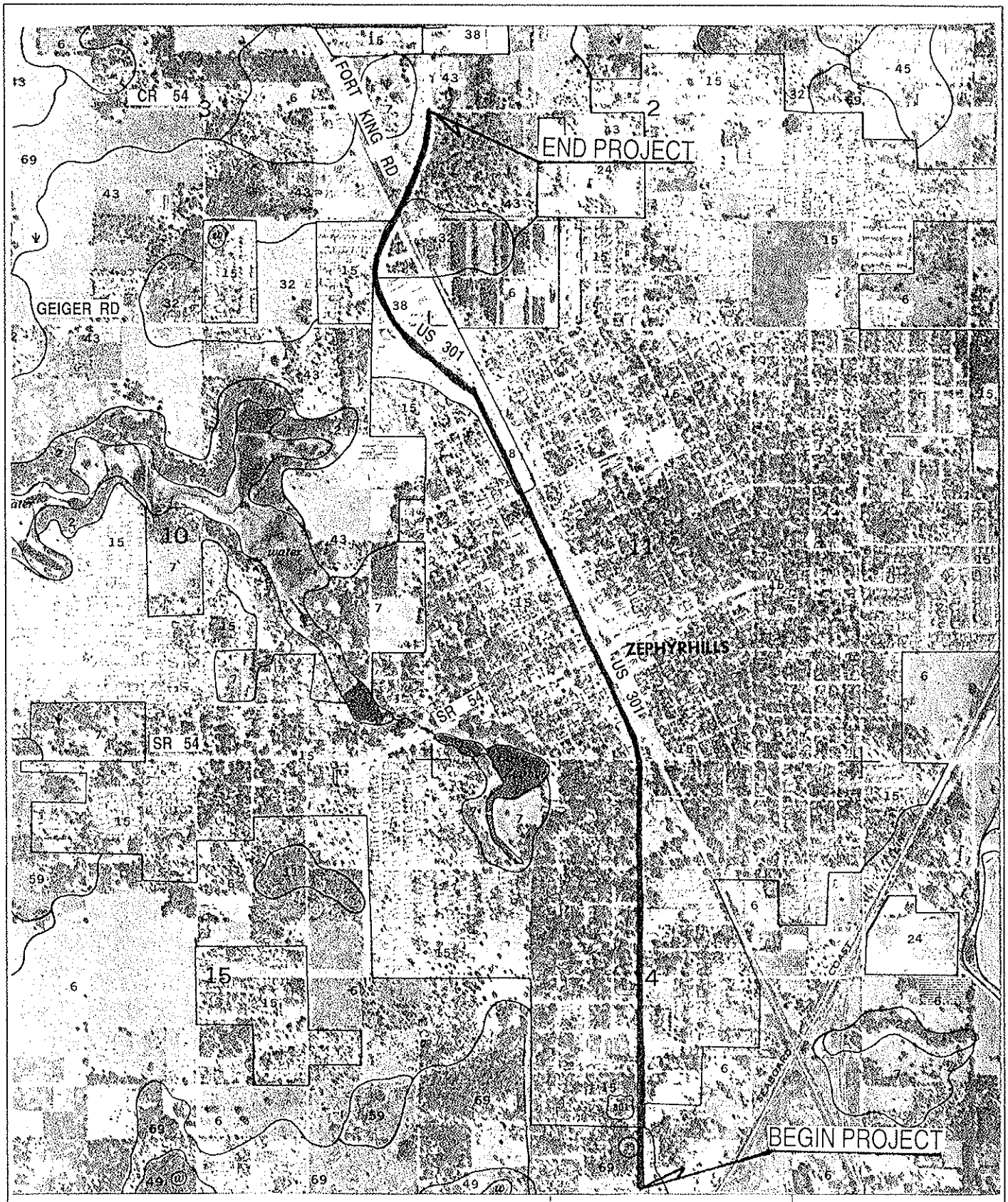
The SCS Soil Survey of Pasco County (see Figure 3) was used to identify the soils within the project corridor. The table below summarizes the soils within the project limits. Most of the soil type is Tavares-Urban Land Complex which is characterized by heavy urbanization. In general, the soils are uplands, 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/ 11th Ave.	1 – 18" RCP	39.0	81.92	81.56	W-E	9.0
S-3	U.S. 301/ 14th 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 Zephryhills 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.

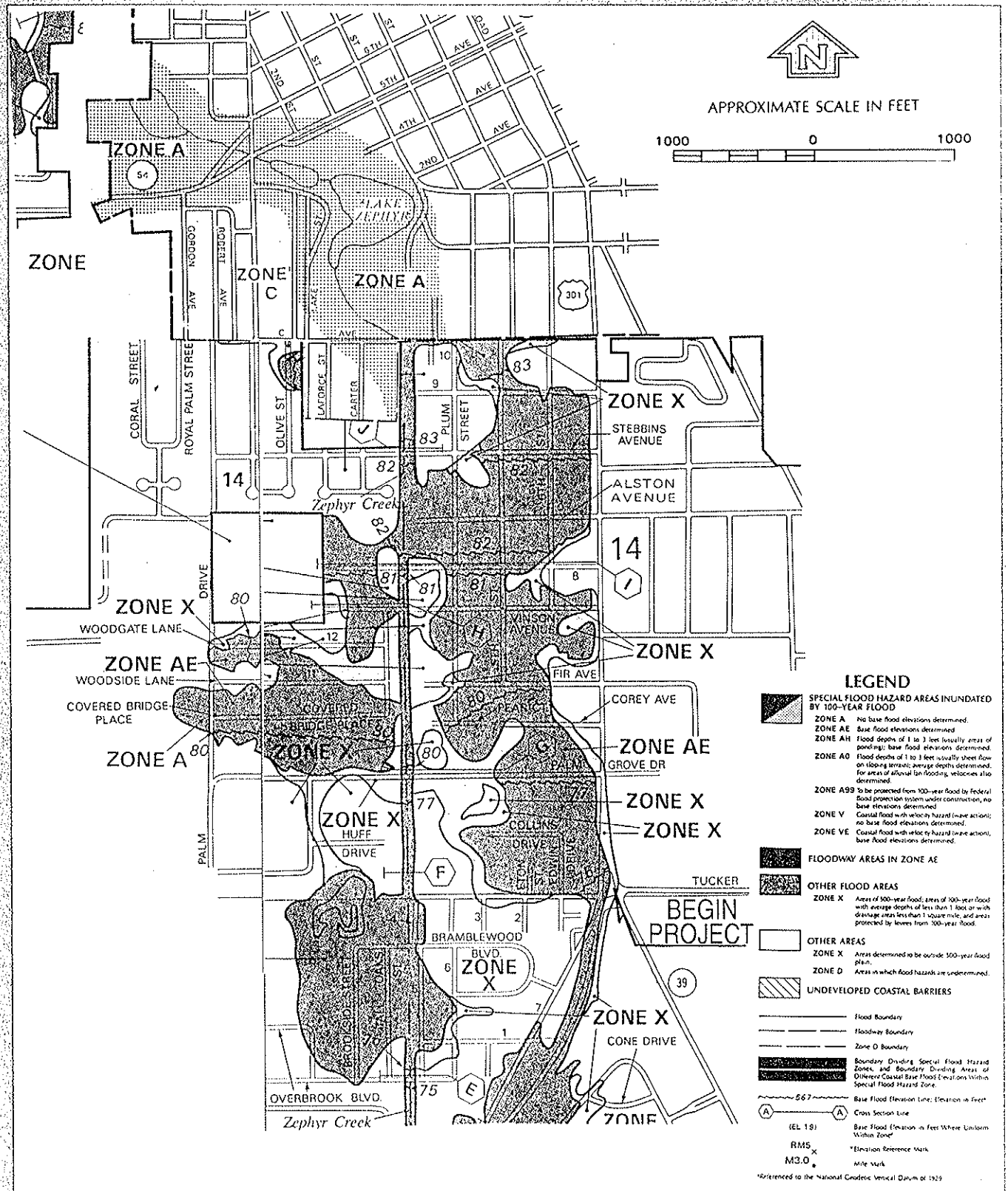
The amount of impact to the floodplain varies depending on which typical section alternative is used. Appendix C contains the proposed typical section alternatives. Filling of the floodplain would occur longitudinally to the floodplain on the west side of U.S. 301 and traversely on the east side of U.S.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

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/calcs. Rick is agreeable to DOT usage of pond if pump capacity could be increased thru SWFWMD and DOT maintained.

XC: _____

Carlos Lopez

BY: Scott Garth

TITLE: Drainage

CONVERSATION FORM

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

TELEPHONE CONVERSATION ✓
OFFICE CONVERSATION _____
TIME: 12:40 AM/(PM)
DATE: 10/4/99

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 N. Kolov) did design. Rick to get us copy of calc's. We are welcome to use these ponds. They are overdesigned and working great.

XC: Carlos Lopez

BY: Scott Garth
TITLE: Drainage

CONVERSATION FORM

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

TELEPHONE CONVERSATION _____
OFFICE CONVERSATION X
TIME: 2:30 AM/(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:

- 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.
- Ponding problem from S.R. 39 to cross drain along east side US 301 (where closed piping exists)
- Ponding behind Zephyr Egg Company
- Jerry referred to work done to Phase II about 10 years ago. Pumping involved? Drainage "killed" the project.

XC: Carlos Lopez
Jerry Sanford

BY: Scott Garth
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 the 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,

Jack

CC: FRANK MATTMULLER

FROM COASTAL ENGINEERING REPORT (8-93)

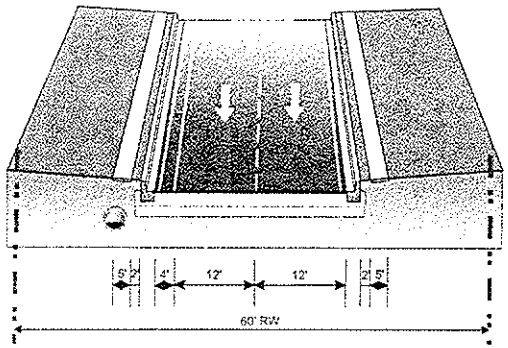
Appendix B

Typical Sections

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

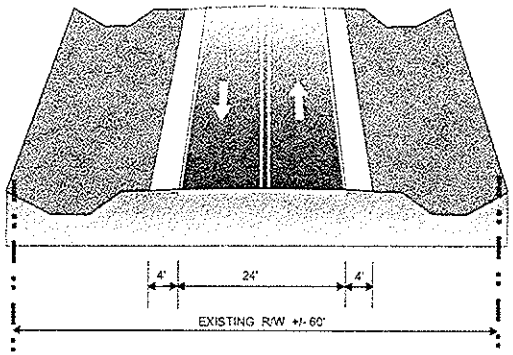
ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U

PROPOSED TWO LANE
ONE WAY
TYPICAL SECTION



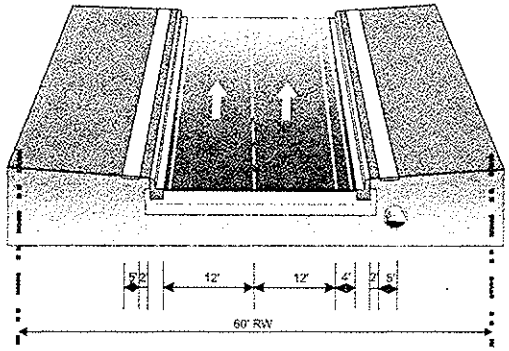
6TH STREET

EXISTING
TYPICAL SECTION



U.S. 301

PROPOSED TWO LANE
ONE WAY
TYPICAL SECTION



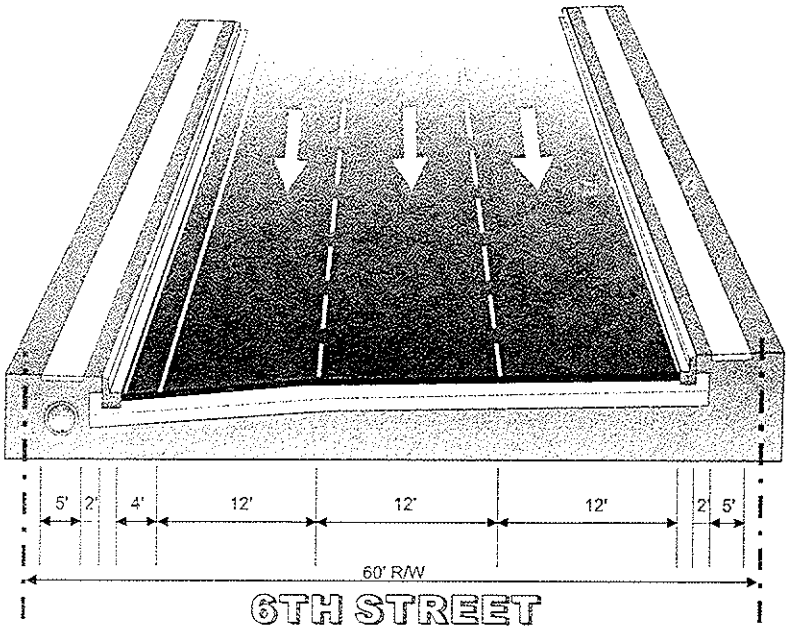
7TH STREET

ALTERNATIVE 1

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

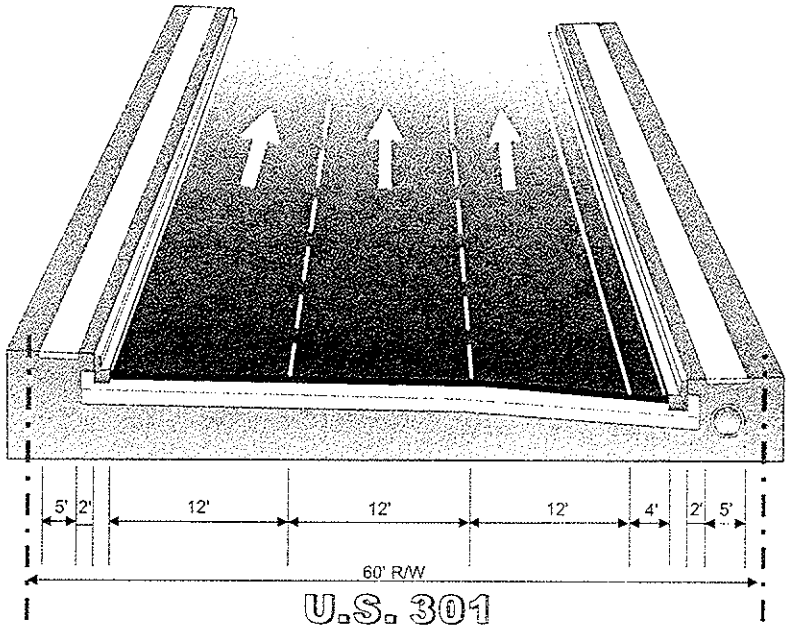
ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U

PROPOSED THREE LANE ONE WAY
TYPICAL SECTION



6TH STREET

PROPOSED THREE LANE ONE WAY
TYPICAL SECTION



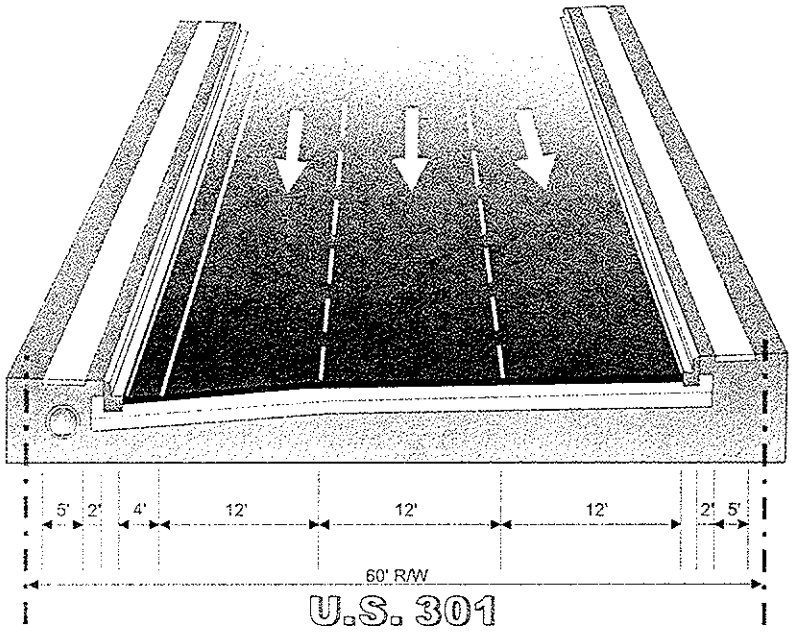
U.S. 301

ALTERNATIVE 2

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

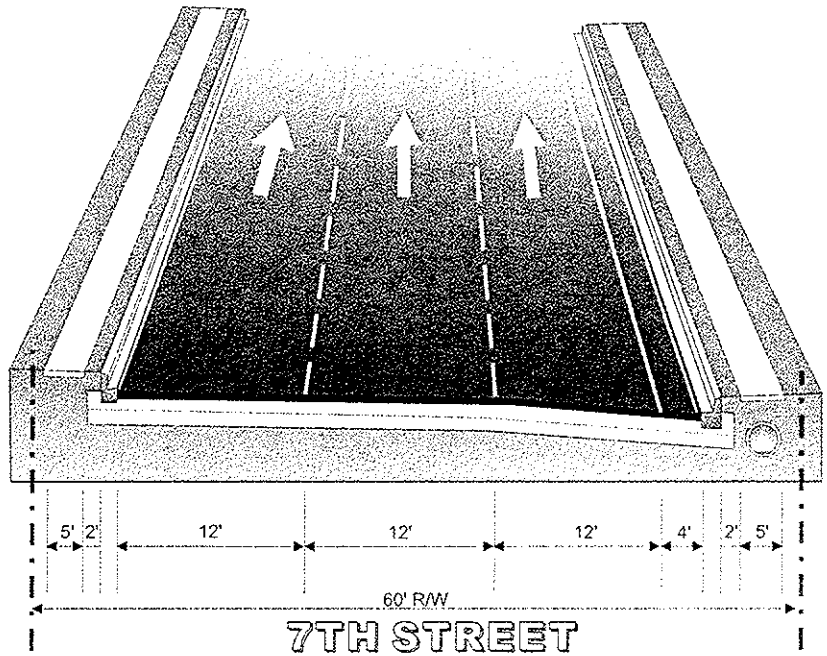
ITEM SEG. 256422 1 FEDERAL AID NO. 1455-001-U

PROPOSED THREE LANE ONE WAY
TYPICAL SECTION



U.S. 301

PROPOSED THREE LANE ONE WAY
TYPICAL SECTION



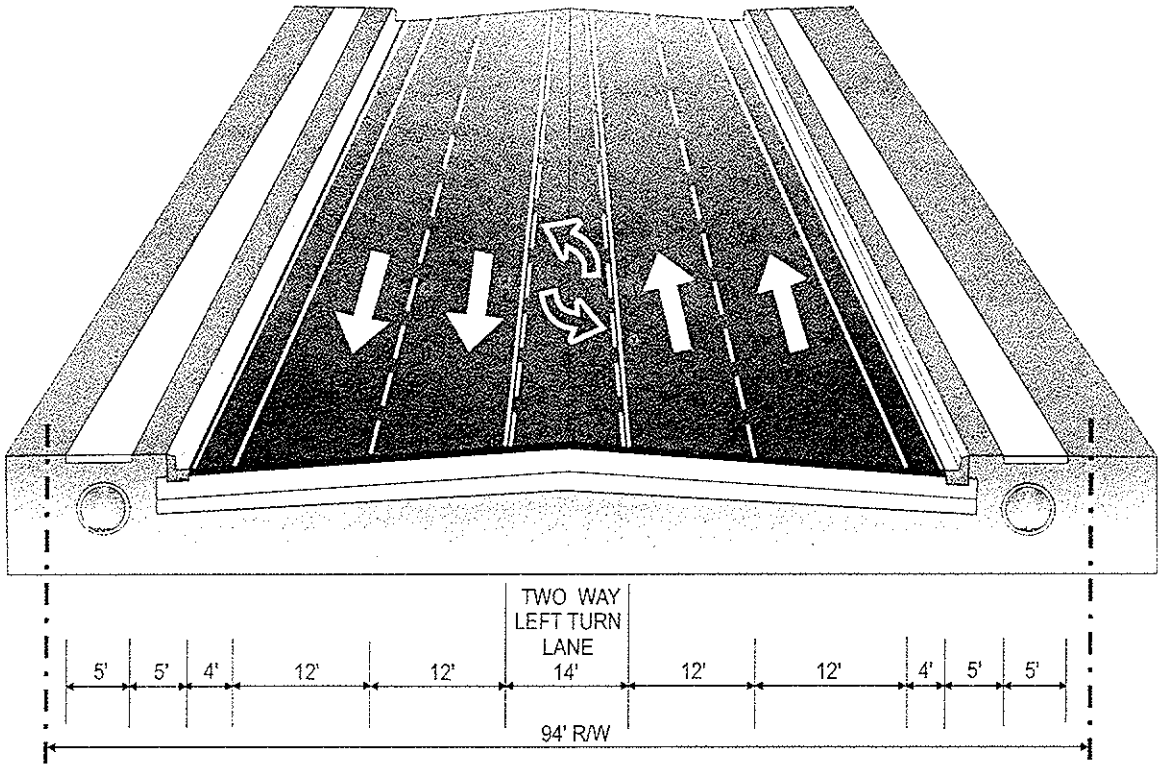
7TH STREET

ALTERNATIVE 3

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

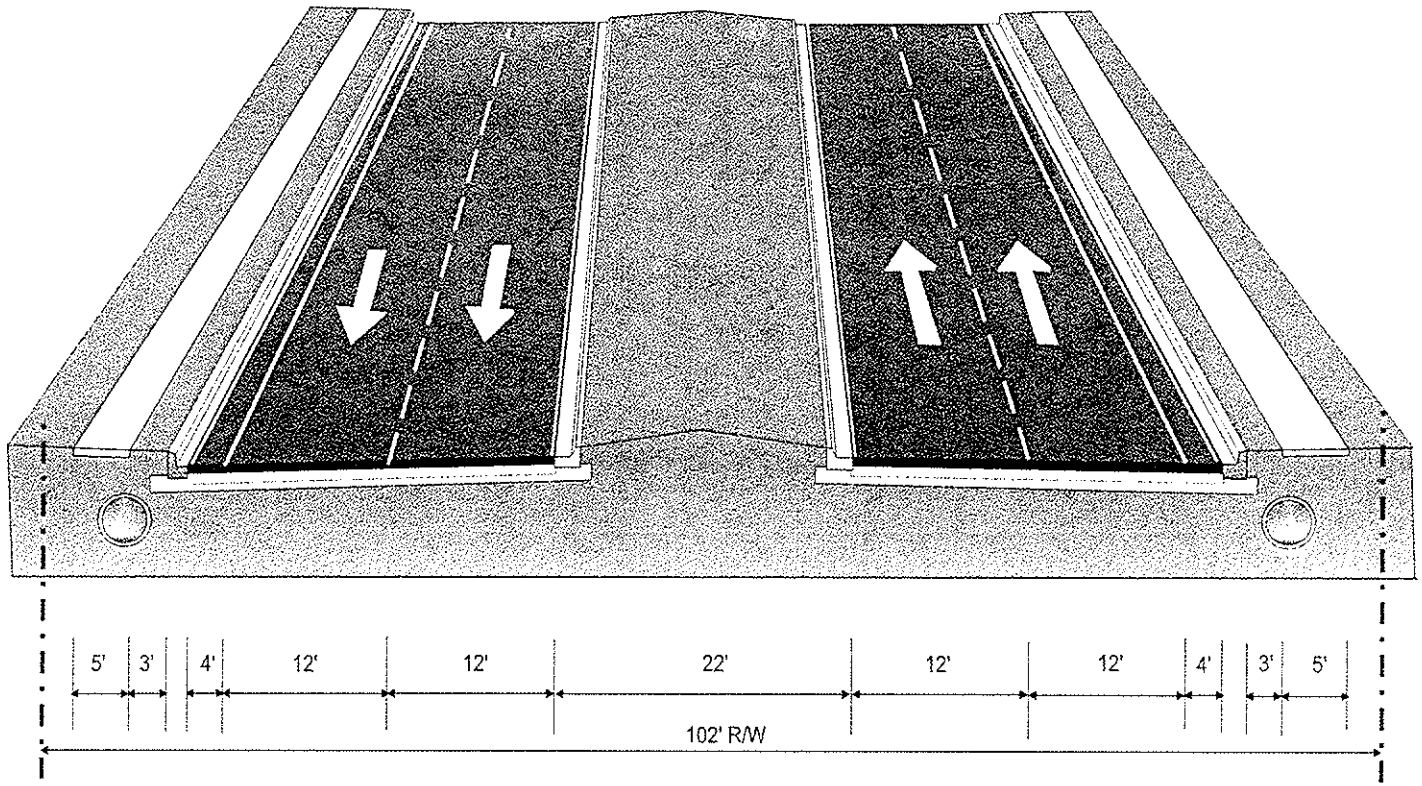


ALTERNATIVE 4

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

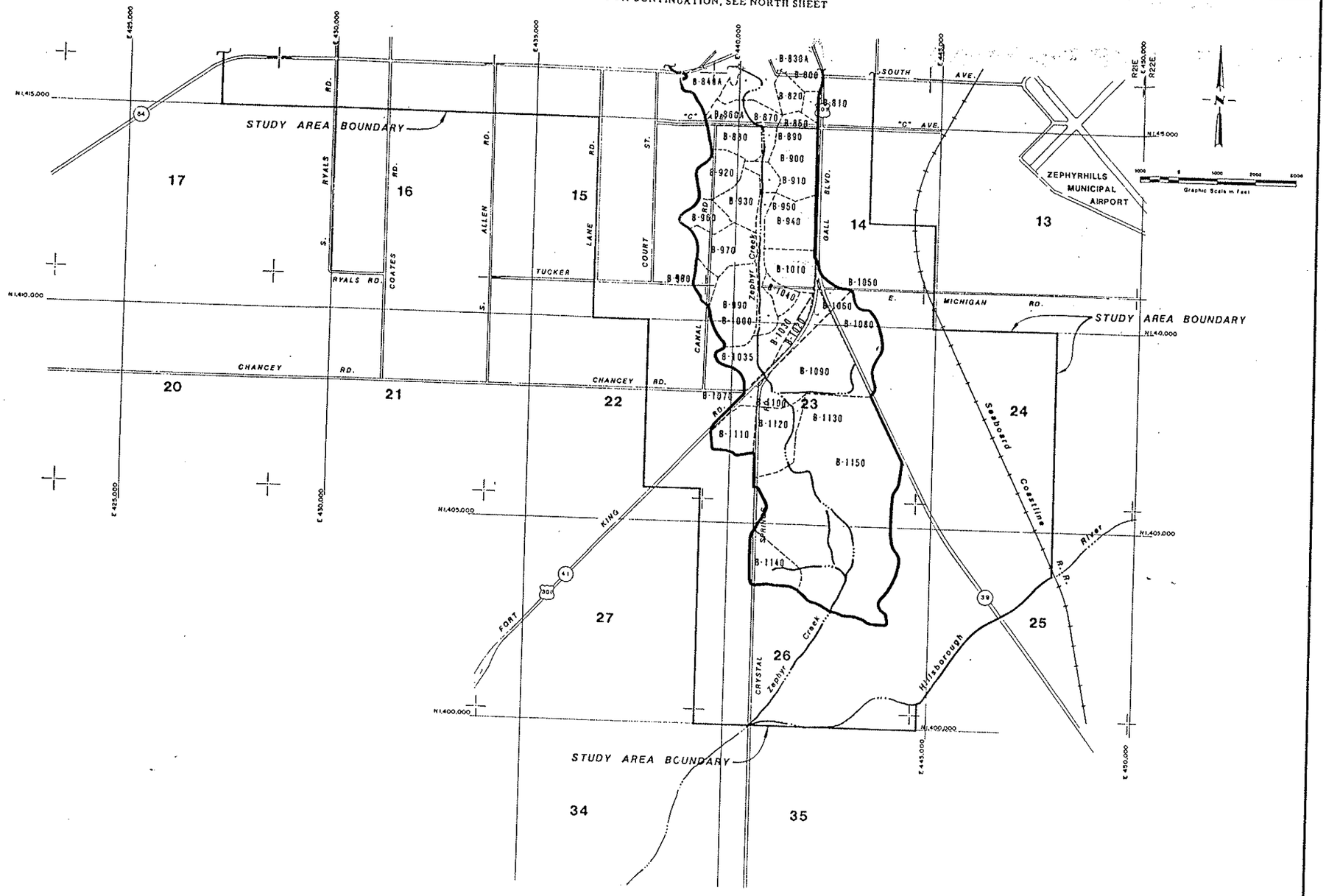


ALTERNATIVE 7

Appendix C

Lake Zephyr Watershed Delineation Map

FOR CONTINUATION, SEE NORTH SHEET



LEGEND

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

REVISION: OCTOBER 1, 1987
MARCH 10, 1989

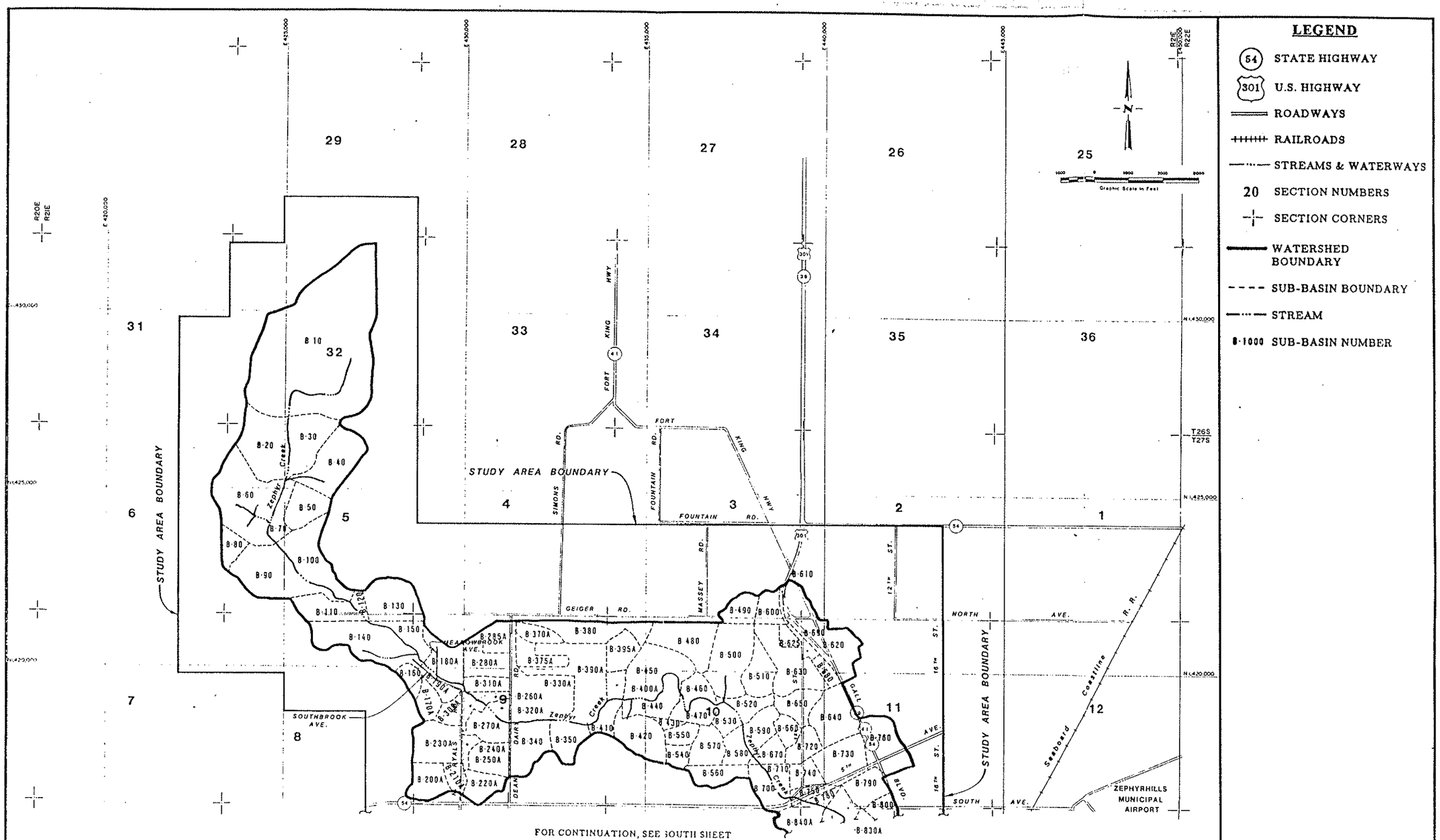
Greiner, Inc.
CONSULTING ENGINEERS
TAMPA, FLORIDA

PASCO COUNTY FLORIDA

LAKE ZEPHYR WATERSHED STUDY

WATERSHED DELINEATION MAP

SOUTH FIGURE IV-2S


LEGEND
54 STATE HIGHWAY
301 U.S. HIGHWAY
ROADWAYS
RAILROADS
STREAMS & WATERWAYS
20 SECTION NUMBERS
SECTION CORNERS
WATERSHED BOUNDARY
SUB-BASIN BOUNDARY
STREAM
B-1000 SUB-BASIN NUMBER
STUDY AREA BOUNDARY
FOR CONTINUATION, SEE SOUTH SHEET
REVISION: OCTOBER 1, 1987
MARCH 10, 1989
Greiner, Inc.
CONSULTING ENGINEERS
TAMPA, FLORIDA
PASCO COUNTY FLORIDA
LAKE ZEPHYR WATERSHED STUDY
WATERSHED DELINEATION MAP
NORTH
FIGURE IV-2N

Appendix D

Existing Pond DRI test results

STATE OF FLORIDA
City of Zephyrhills
PASCO COUNTY

5335 Eighth Street Zephyrhills, Florida 33540 (813) 788-2313

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

Rick Moore
Public Works Director

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

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.

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

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

COASTAL
ENGINEERING ASSOCIATES INC.

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

TABLE OF CONTENTS

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

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

7601 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-7481 SUNCOM 578-2070

170 Century Boulevard
Bartow, 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 34453-3867
(904) 637-1360

An Equal Opportunity Employer

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:

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
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 1/27/94
M. FRANK MATTMULLER, P.E. NO. 45843

JANUARY 1994
CEA 93709

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

CKA PROJECT NO. 93709-7

BASIN DESIGNATION	BASIN LIMITS	NEW IMPERVIOUS AREA (SF)	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) = $\frac{1000}{CN} - 10$

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

$S = \frac{1000}{72} - 10$ $\qquad$ $Q = \frac{[8.4 - 0.2\ (3.888)]^2}{8.4 + 0.8\ (3.888)}$

$S = 3.888$ $\qquad$ $Q = 5.05$ INCHES

POST-CONDITION: CURVE NUMBER = 98

$S = \frac{1000}{98} - 10$ $\qquad$ $Q = \frac{[8.4 - 0.2\ (0.204)]^2}{8.4 + 0.8\ (0.204)}$

$S = 0.20408$ $\qquad$ $Q = 8.16$ INCHES

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

Vr = VOLUME REQUIRED FOR STORAGE OF POST - PRE RUNOFF

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

Vr = 0.26 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 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 INCHES

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

Vr = VOLUME REQUIRED FOR STORAGE OF POST - PRE RUNOFF

$Vr = \frac{1.0\ S.F.\ X\ 3.41\ INCHES}{12\ INCHES/FOOT}$

Vr = 0.28 C.F./S.F.

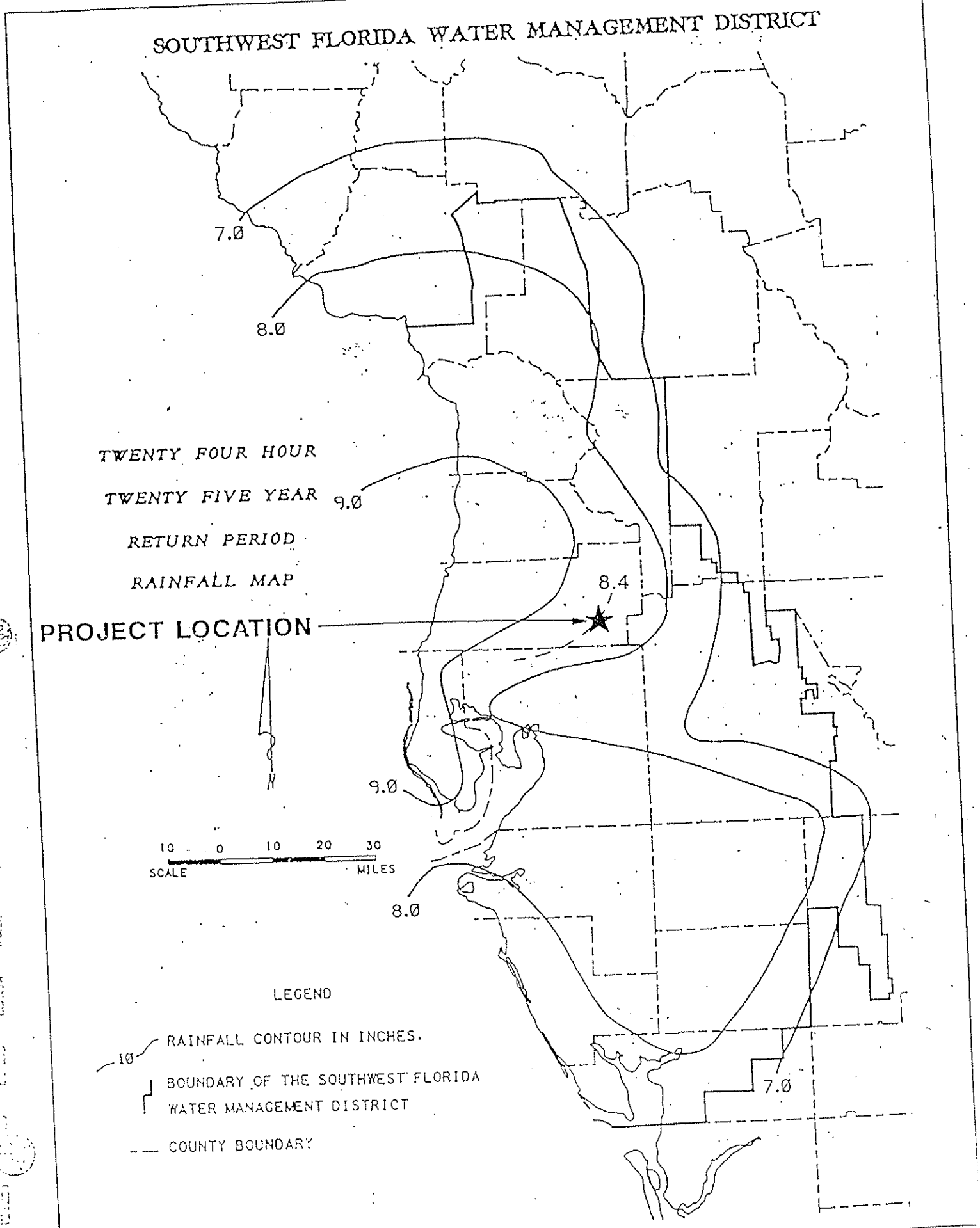

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
7.0
8.0
9.0
8.4
9.0
8.0
7.0
TWENTY FOUR HOUR
TWENTY FIVE YEAR
RETURN PERIOD
RAINFALL MAP
PROJECT LOCATION
N
10 0 10 20 30
SCALE
MILES
LEGEND
10 RAINFALL CONTOUR IN INCHES.
BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
COUNTY BOUNDARY

Figure C-5

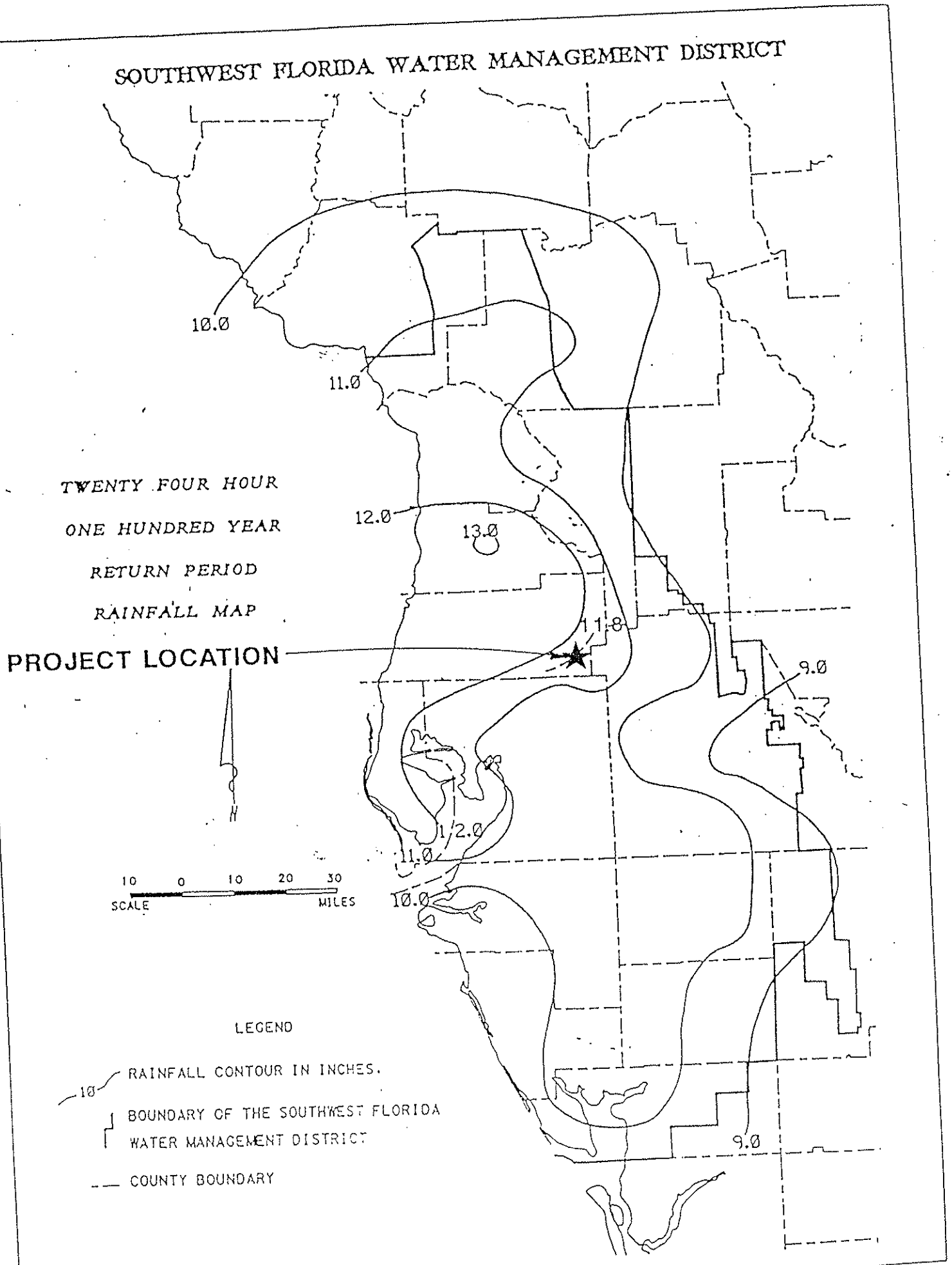
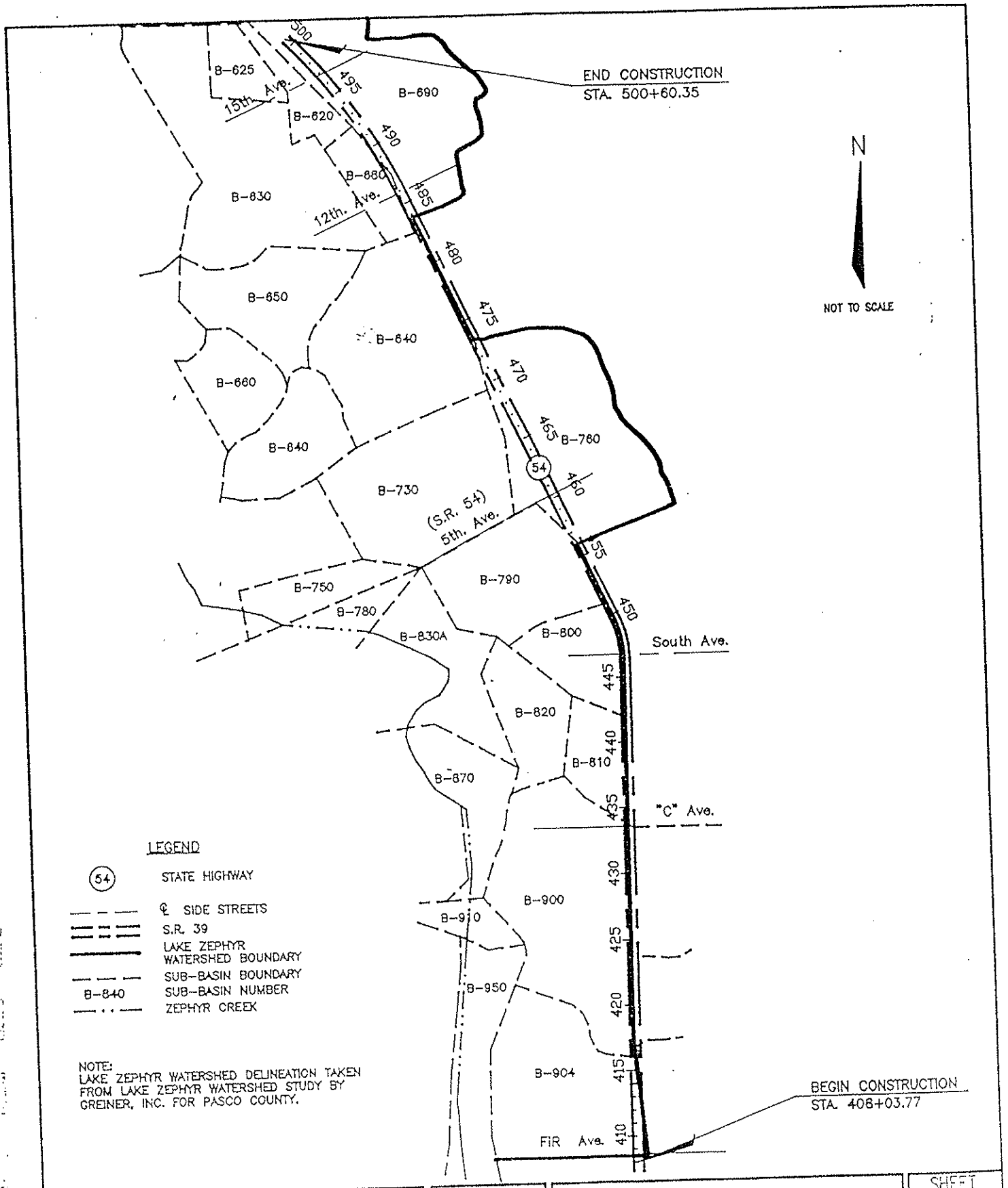

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
TWENTY FOUR HOUR
ONE HUNDRED YEAR
RETURN PERIOD
RAINFALL MAP
PROJECT LOCATION
10.0
11.0
12.0
13.0
11.8
9.0
12.0
11.0
10.0
9.0
10 0 10 20 30
SCALE MILES
LEGEND
10 RAINFALL CONTOUR IN INCHES.
BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
COUNTY BOUNDARY

Figure C-7



BASIN DELINEATION

S.R. 39

SHEET 1 OF 1 SHEETS

93709

Appendix F

Old Drainage Maps

U.S. 301 Original Construction Plans

INDEX OF SHEETS

STATE OF FLORIDA
STATE ROAD DEPARTMENT

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

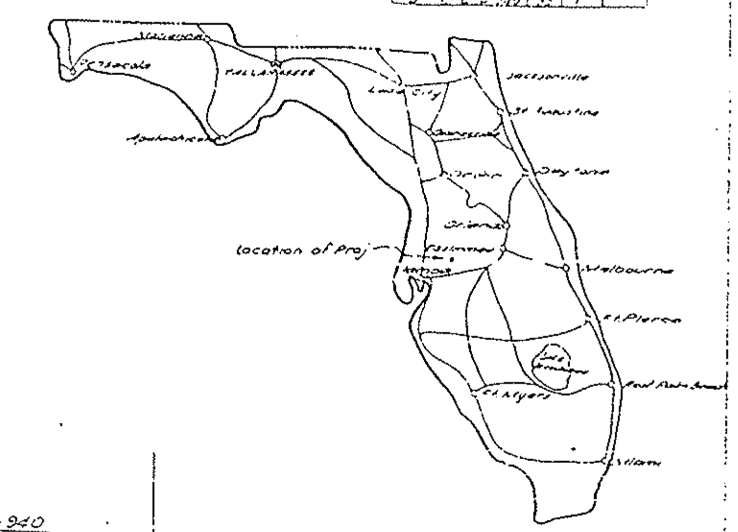
PROJECT NO. B-940

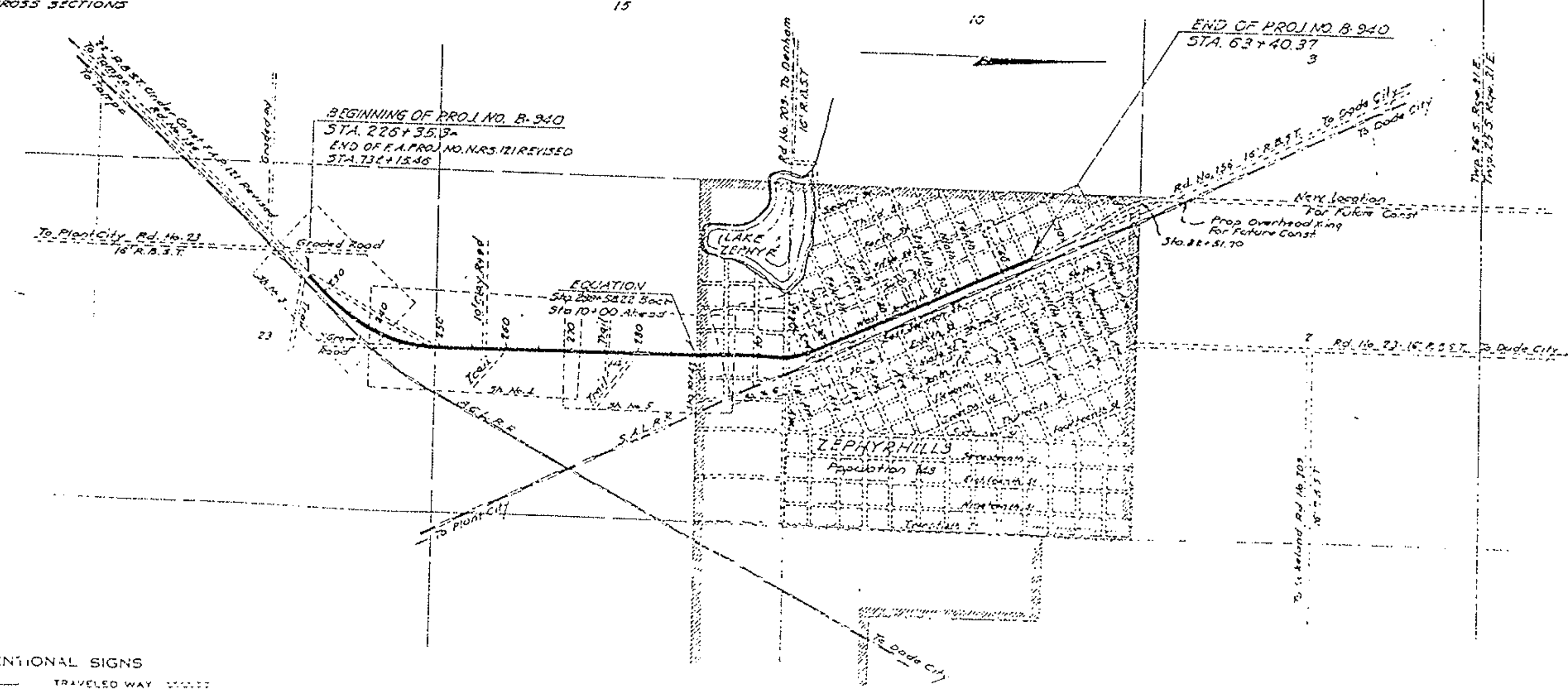
PASCO COUNTY

SCALES: PLAN, 1 IN. = 100 FT. PROFILE, HOR. 1 IN. = 100 FT. VERT. 1 IN. = 10 FT.

SCALE: 1" = 1,000'

NET LENGTH OF PROJ. = 2.190 MI.





CONVENTIONAL SIGNS

COUNTY LINE	TRAVELED WAY
TOWNSHIP LINE	CULVERTS
SECTION LINE	BRIDGES OVER 20 FT. SPAN
UNFENCED PROPERTY	POWER POLE
CITY LINE	PHONE POLE
FENCE LINE	MARSH
RIGHT OF WAY LINE	GROUND ELEV.
BASE OR SURVEY LINE	GRADE ELEV.
RAILROADS	R. R. MILE POST

LENGTH OF PROJ.

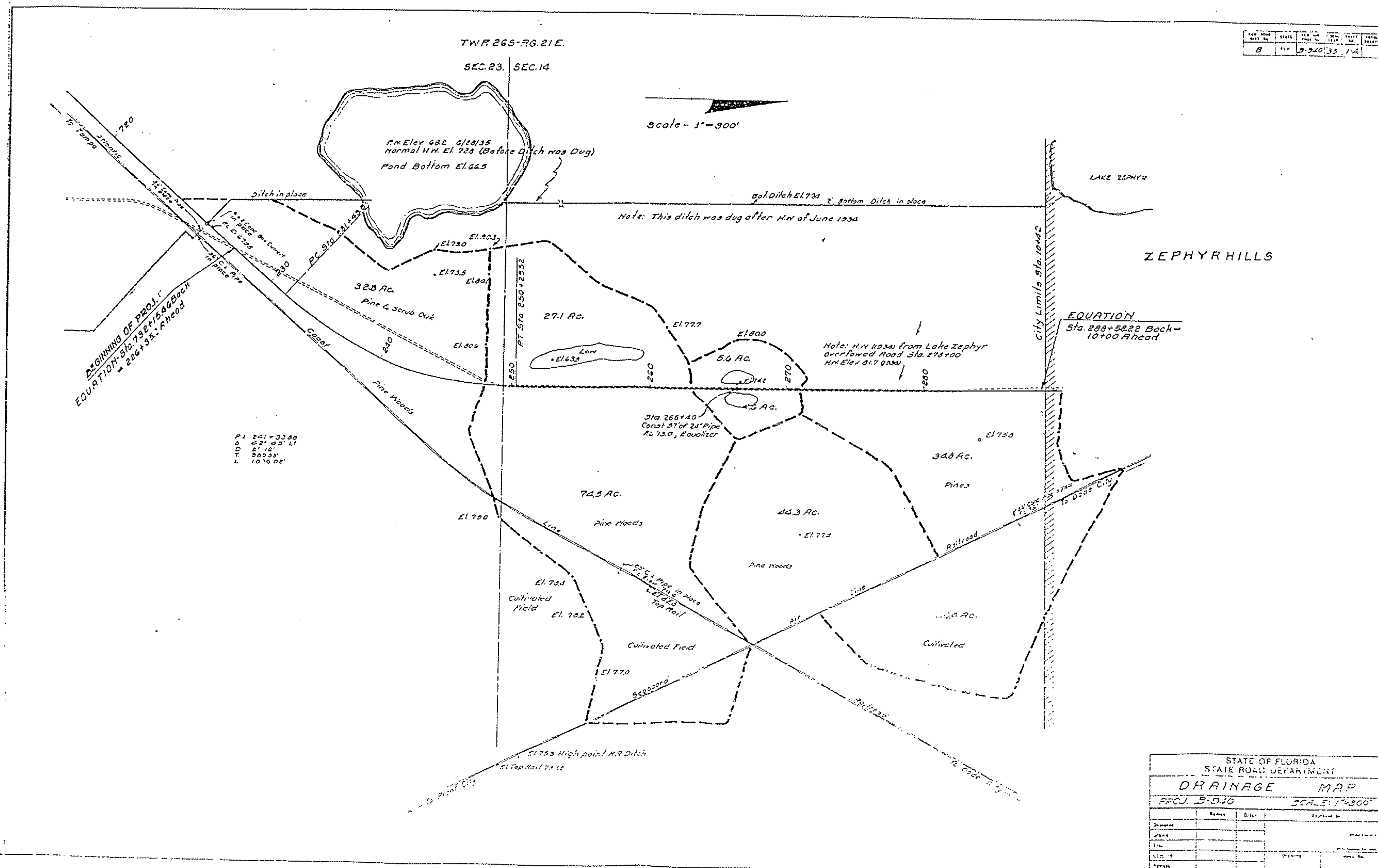
Roadway	11,563.29 Lin. Ft. =	2.190 Miles
Bridges	0.0 "	0.0
Net Length of Proj.	11,563.29 "	2.190
Exceptions	0.0 " "	0.0
Gross Length of Proj.	11,563.29 " "	2.190

SUBMITTED BY [illegible]
STATE HIGHWAY ENGINEER

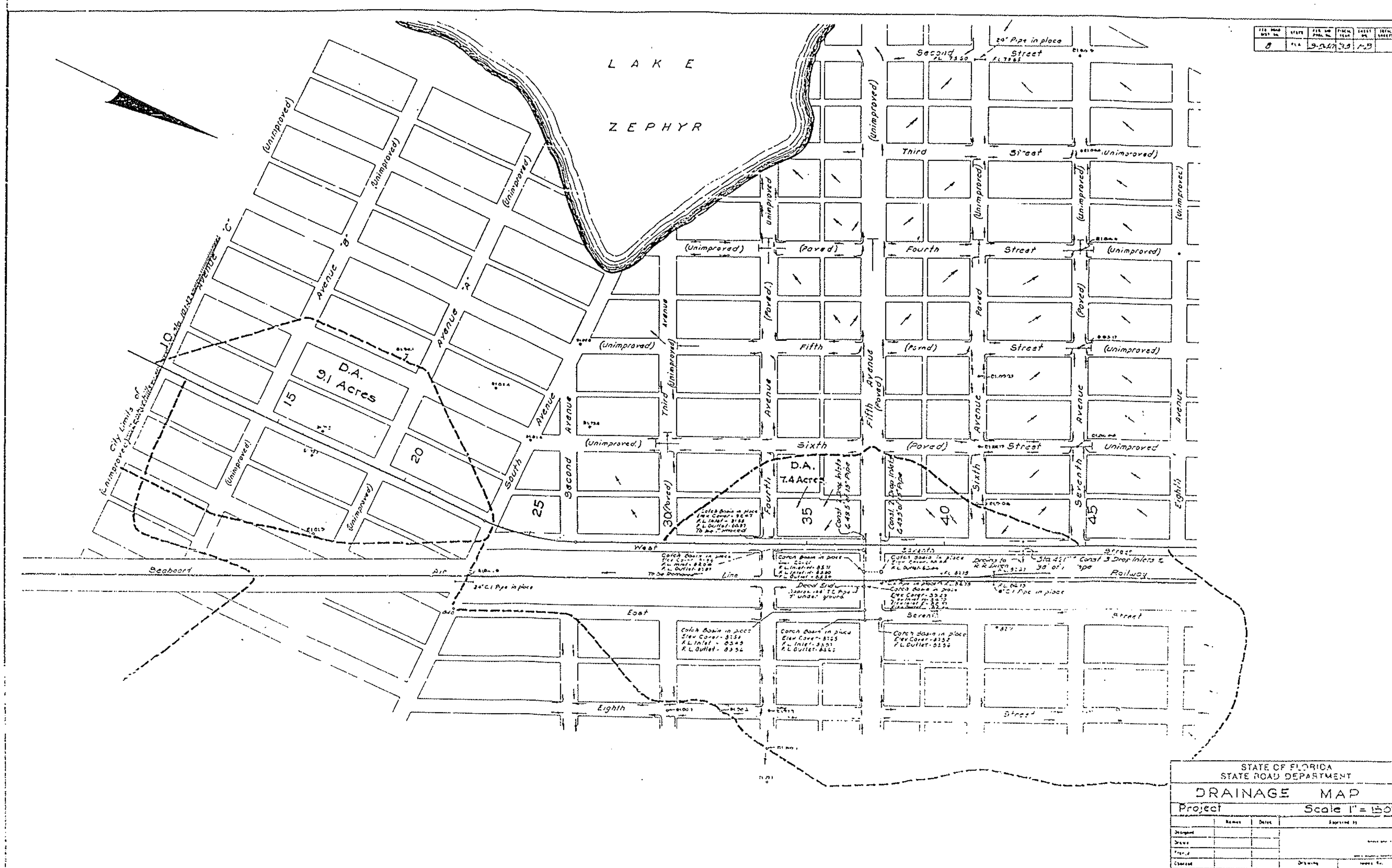
RECOMMENDED FOR APPROVAL DATE
[illegible]
DISTRICT ENGINEER

RECOMMENDED FOR APPROVAL
[illegible]
CHIEF ENGINEER Bureau of Public Roads

APPROVED
[illegible]
CHIEF OF BUREAU OF PUBLIC ROADS



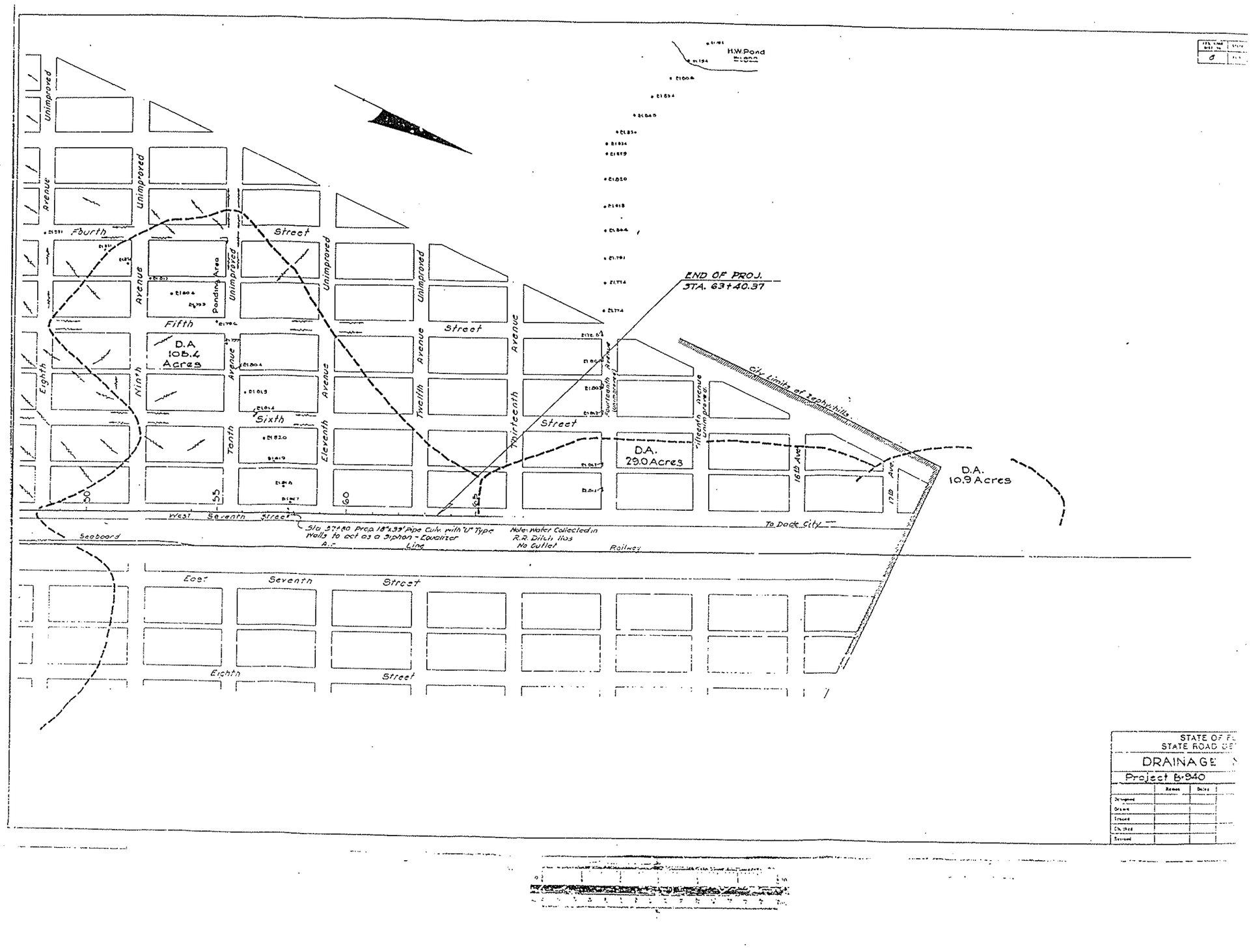
TWP. 26S-RG. 21 E.
SEC. 23.
SEC. 14
Scale - 1" = 900'
Pond Bottom El. 66.5
Ditch in place
Note: This ditch was dug after H.W. of June 1934
LAKE ZEPHYR
ZEPHYRHILLS
City Limits Sta. 10+42
EQUATION
Sta. 288+58.22 Back = 10+00 Ahead
BEGINNING OF PROJ.
32.8 Ac.
Pine & Scrub Oak
27.1 Ac.
5.6 Ac.
Sta. 266+40
74.5 Ac.
Pine Woods
44.3 Ac.
34.8 Ac.
Pines
Cultivated Field
Cultivated
Railroad
To Tampa
To Dade City
El. 753 High point R.R. Ditch
STATE OF FLORIDA
STATE ROAD DEPARTMENT
DRAINAGE MAP



STATE OF FLORIDA
STATE ROAD DEPARTMENT

DRAINAGE MAP

Project Scale 1" = 150'



STATE OF FL
STATE ROAD DE

DRAINAGE

Project B-840

	Areas	Date
Designed		
Drawn		
Traced		
Checked		
Revised		